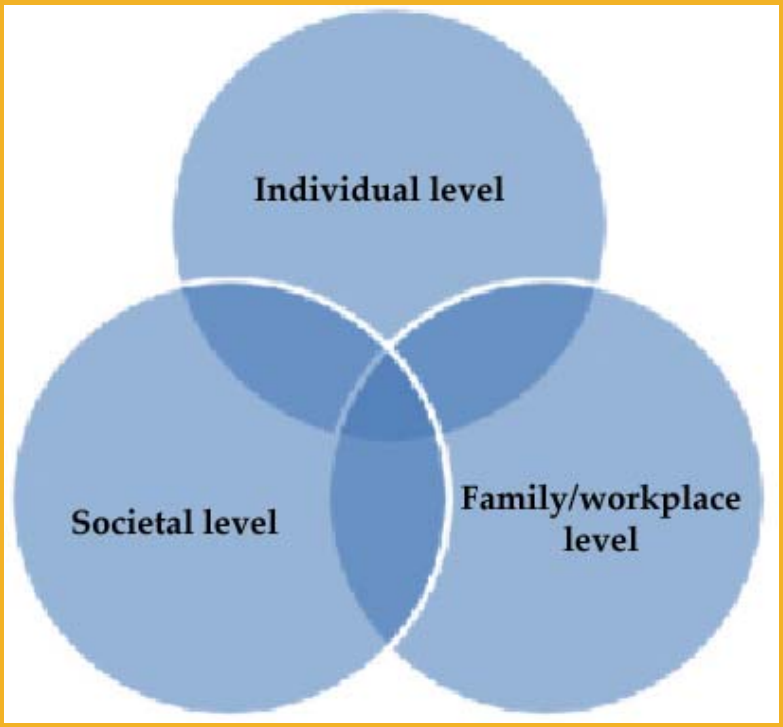
Malawi Primary, Secondary and Teacher Education



Critical thinking sourcebook for Malawi

Malawi Institute of Education

Critical thinking Sourcebook for Malawi

Developed and published by

Malawi Institute of Education
PO Box 50
Domasi
Malawi
Email: miedirector@sdnp.org.mw

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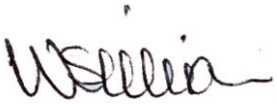
Preface

Malawi Institute of Education (MIE) in collaboration with the Ministry of Education, Science and Technology (MoEST) embarked on activities to mainstream critical thinking in education institutions in Malawi in 2010. The rationale for the initiative is to improve the quality of education in Malawi. MIE and MoEST consider critical thinking as an opportunity for Malawi to prepare learners to develop critical thinking skills which are relevant for decision making.

Through critical thinking, MoEST expects that students will be exposed to survival strategies and skills which will be applied to their daily life thereby improving their livelihood as well as develop Malawi. Therefore, the development of the sourcebook is a move towards achieving that expectation. This is why Malawi Institute of Education and Ministry of Education, Science and Technology will continue to support the activities of critical thinking as a key component of pedagogy at different levels, from pre-school through tertiary levels.



William Susuwele-Banda, PhD

Executive Director, Malawi Institute of Education

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Production team

Editing	:	Max J Iphani
Typesetting	:	Violet Likoswe
Layout and design	:	Doreen Kachala-Bato
Illustrations	:	Heath Kathewera

Abbreviations and acronyms

K-W-L	Know-Want to know– Learn
I.N.S.E.R.T	Instructional Note-taking System for Enhanced Reading and Thinking
DRTA	Directed Reading-Thinking Activity
IQ	Intelligence Quotient
ABC	Anticipation, Building knowledge, Consolidation
HIV	Human Immuno-deficiency Virus
AIDS	Acquired Immune Deficiency Syndrome
ARV	Anti-Retro-Viral
CT	Critical Thinking

Contents

CHAPTER 1
Understanding the critical thinking concept

Introduction

Thinking is a natural process for all human beings. However, the process of critical thinking happens at different levels among individuals. The concept of critical thinking is not adequately understood by many people. Yet, only a few teachers consider the development of critical thinking as an essential component of the teaching and learning process. It is, therefore, important that teachers comprehend what critical thinking involves, how it should be taught and how it should be assessed. The quality of our life and that of what we produce, make, or build depends on our capacity for critical thinking. This chapter attempts to introduce the concept of critical thinking by highlighting its key features, principles and benefits so as to broaden our understanding of the role of critical thinking towards the improvement of the quality of life.

The meaning of the term *critical thinking*

Do the task in the box below.

> Task 1.1
> Write down what you consider to be the meaning of the term "critical thinking".

The word "critical" comes from two Greek roots: "kriticos" meaning thoughtful judgment and "criterion" meaning standard. Therefore the word "critical" implies the development of "thoughtful judgment based on standards".

According to Webster's New world dictionary, critical thinking is a concept "characterized by careful analysis and judgment". "Critical", in its strictest sense, implies an attempt at objective judgment so as to determine both merits and demerits. Critical thinking, then, is the thinking that aims at reaching a well-founded judgment and hence, utilizes appropriate evaluative standards in an attempt to determine the true worth or merit of information.

The following are some definitions of critical thinking by different scholars.

- Dewey (1933) defines critical thinking as "active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends".
- Nordquist (2012) defines critical thinking as "the process of independently analyzing, synthesizing, and evaluating information as a guide to behavior and beliefs".
- The American Philosophical Association (1990) defines critical thinking as "the process of purposeful, self-regulatory judgment which gives reasoned consideration to evidence, contexts, conceptualizations, methods, and criteria".
- Klooster (2001) points out that "critical thinking involves active questioning, engaged interaction between teacher and students, among students, and within each individual learner".
- Chance (1986) defines critical thinking as "the ability to analyze facts, generate and organize ideas, defend opinions, make comparisons, draw inferences, evaluate arguments and solve problems".

Task 1.2
Compare the definition of critical thinking you wrote at the beginning with the definitions offered by the various authors.

Features of critical thinking

Critical thinking can be characterized by a number of features. These are shown in figure 1.1 below:

Figure 1.1: Features of critical thinking

Gathering data

Data means information which may include facts, theories, principles, concepts and ideas. Information is the starting point for critical thinking. In the classroom, the learner uses information to develop complex thoughts and apply them in different situations. Each learner comes to class with some knowledge from his or her own experiences. The teacher only needs to tap from this rich experience, value the information that each learner has and provide opportunities for them to collect additional information, to build on what they know or to challenge old as well as new information.

Active and careful consideration

Describing critical thinking as an active process denotes that it is the kind of thinking in which an individual examines ideas, information or situations, raises vital questions, identifies gaps and anomalies and finds relevant information

independently rather than receiving ideas and information passively. This implies that an individual engages persistently in reflecting on an issue, idea or information rather than thoughtlessly jumping to a conclusion or a decision.

Independent opinion

Critical thinking involves independent thinking where each individual thinks for himself or herself, forming his or her own ideas, values and beliefs. No person can think critically for another. This is why teachers who wish to promote critical thinking need to ensure that each learner has opportunities to think deeply about available information, develop his/her own perspectives, offer his/her own opinion, and then "develop their own individual relationship to the new knowledge they are acquiring in school" (Klooster, 2001).

Problem identification

Critical thinking begins with the identification of a problem in available information or in a given situation. Problem identification makes it possible for an individual to recognize gaps, inconsistencies, controversies or obvious biases in a piece of information or in a situation. This forms the basis for further action. Human nature is such that it considers problems as challenges to be solved through critical thinking. John Dewey agrees that critical thinking in a classroom begins with students' engagement with a problem. The problem stimulates the students' natural curiosity and therefore encourages critical thinking.

Creative questioning

It is human nature to want to know. Human beings who are critical thinkers seek answers all the time through asking questions. The effective teacher asks students higher order questions which encourage them to use critical thinking to obtain answers. Bloom's taxonomy of the cognitive domain shows six levels of reasoning. These are: recall of knowledge, comprehension, application, analysis, synthesis and evaluation. The first three levels are considered low thinking level categories while the last three are considered higher level categories. It is questions from the higher order categories which encourage critical thinking.

The effective teacher, not only asks higher order questions, but also allows students to ask questions, then encourages them to find answers for themselves. Such teachers believe that students are not empty vessels or tabula rasa (blank slates) which they, as the experts, are employed to fill with knowledge. Asking students to discover facts or find solutions for themselves is what puts them on the right path to critical thinking.

Reasoned arguments

Critical thinkers not only find their own solutions to problems, but also support those solutions with good arguments and convincing reasons (Klooster, 2001). According to Klooster, critical thinkers recognize that a problem may have more than one solution. Hence they strive to show why certain solutions are the best. To do this, they formulate a claim (which becomes the main idea or thesis). The claim is supported by a number of reasons. Each reason is, in turn, supported by evidence. The evidence can be statistical data, textual details, personal experiences or other forms of evidence recognized as legitimate by the audience.

Evidence testing

Evidence testing means verifying the generalizations or conclusions made. This involves checking information or facts rather than accepting them at face value. This is necessary because much of what people peddle as evidence may have no grain of truth in it.

Thoughtful judgment

Critical thinking involves attentive listening to all sides of a dispute, considering all the facts, and then deciding what is relevant and what is not. Thereafter, complex ideas are clearly summarized with fairness to all

sides. Finally, a thoughtful judgment is rendered. Effective teachers strive to provide opportunities for students, not only to collect data, but also to clean the data, analyze it and draw conclusions and recommendations based on the findings.

Sharing ideas/results

Critical thinking is also considered as social thinking. Ideas are tested and improved as they are shared with others. As people discuss, debate, disagree, cross-comment, and come up with an agreed list of ideas, they engage in a process of deepening their critical thinking and refining their own positions. Teachers who seek to promote critical thinking, therefore, encourage dialogue, and sharing of ideas. They use such methods as group discussion, brainstorming, think-pair-share, talk-around, reporting, collaboration or cooperative learning where people work together to solve a problem as they consider and discuss their options.

Figure 1.2 Discussing and recording ideas for reporting during a plenary session

Task 1.3

Use the features of critical thinking that have been outlined above to improve the definition you developed in Task 1.1

Core critical thinking skills

Critical thinking requires the use of particular skills. These are shown in figure 1.3

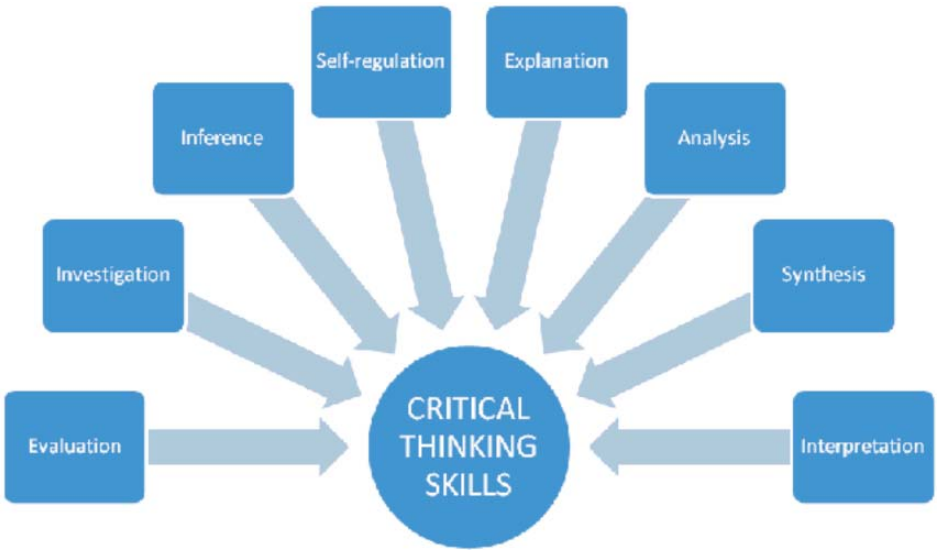


Figure 1.3 Examples of critical thinking skills

Analytic skills

According to Facione (2011), analysis involves identification of the intended and actual inferential relationships among statements, concepts, or descriptions intended to express belief, judgment, experiences, reasons, information or opinions. The sub-skills include examining ideas, detecting arguments, identifying similarities and differences and identifying unstated assumptions.

Interpretation

Interpretation means to comprehend and express the meaning or significance of experiences, situations, data, events, judgments, conventions, beliefs, rules, procedures or criteria. The sub-skills of interpretation include categorization, decoding significance and clarifying meaning from charts, and paraphrasing.

Inference skills

This involves identifying elements needed to draw conclusions, form predictions and hypothesis, deduce consequences flowing from data, statements, beliefs, opinions and descriptions.

Synthesis skills

The skills of synthesis involve assembling ideas, information and packaging new understandings in order to build knowledge. This essentially means reconstructing one's beliefs on the basis of wider experiences or new evidence.

Evaluation skills

These skills involve assessing the credibility of statements from an objective position. They include assessment of statements against evidence and drawing rational conclusions.

Investigative skills

Investigative skills involve formulating hypotheses, setting up experiments, collecting and recording observations and results, and then drawing conclusions based on the evidence collected from the experiments.

Communication/explanation skills

These skills involve the ability to explain or present coherently the results of one's reasoning or investigation. The sub-skills under communication or explanation are describing investigation methods and results, justifying procedures, proposing and defending with good reasons one's point of view.

Self-regulation skills

These skills are also referred to as thinking about thinking skills. Self-regulation means monitoring one's own thinking, evaluating one's own inferential judgments with a view towards questioning, confirming, validating or correcting either one's reasoning or results. This is also called meta-cognition.

The benefits of critical thinking

Critical thinking is part of life. It is required in all professions, disciplines and various situations including the workplace and society as illustrated in figure 1.2 below.

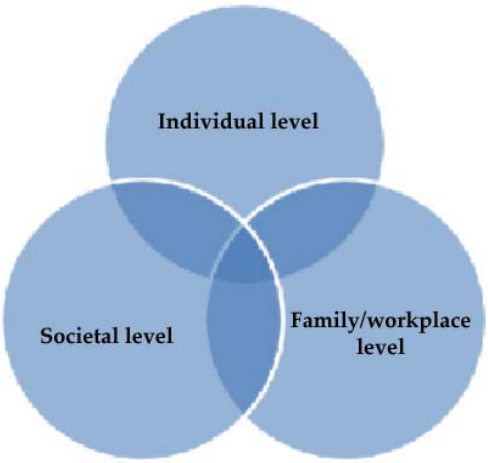


Figure 1.4: Levels where critical thinking is beneficial

Task 1.4

1 From what you have covered so far, list the benefits of critical thinking at each of the levels shown in figure 1.2.
2 Compare your list of benefits to the one below.
3 Categorize the benefits in the list into those for the individual, family/workplace, and the society at large.

The following are some of the benefits of critical thinking:

- to evaluate people, policies, and institutions, thereby avoiding social problems (Hatcher and Spencer, 2005)
- to avoid manipulation since one can formulate well reasoned arguments which can be used to challenge the authority of texts, traditions, and majorities
- to make complex decisions regarding what to do or believe
- to settle disputes by using such attributes as being well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases and prudent in making judgments
- to make accurate assessments regarding emerging issues
- to anticipate the consequences of one's decisions, which may affect not only the decision maker, but also many other people as well
- to generate multiple viable options from which the best can be chosen, tested and implemented
- to examine one's motivations to see if they make sense or to scrutinize our reasons critically to see if they are rationally justified
- enables individuals to analyze, evaluate, explain and restructure their thinking, thereby decreasing the risk of adopting, acting on, or thinking with a false belief
- critical thinking produces professionals that are self-governing

Conclusion

Critical thinking is a systematic approach to reasoning that helps one to arrive at well informed decisions. It involves the application of a wide range of skills such as analysis, synthesis and evaluation. Critical thinking helps one to get rid of falsehoods, biases, prejudices and stereotypes.

References

Albrecht, WS, and Sack, RL (2000). *Accounting education: charting the course through a perilous future*. Accounting Education Series No. 16. Sarasota, FL: American Accounting Association.

Duron, R, Limbach, B, Waugh, W (2006). *Critical thinking framework for any discipline*. In International Journal of Teaching and Learning in Higher Education, Volume 17, Number 2, 160-166 http://www.isetl. org/ijtlhe/

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

Chance, P (1986). *Thinking in the classroom: a survey of programmes*. New York: Teachers' College, Columbia University.

Ennis, R (1992). *Critical thinking: what is it*? Proceedings of the Forty-Eighth Annual Meeting of the Philosophy of Education Society Denver, Colorado, March 27-30. Retrieved from http://www.ed. uiuc.edu/PES/92_docs/Ennis.HTM

Foundation for Critical Thinking (2011). *Concept and definition of critical thinking*. Tomales, CA

Hatcher, DL, & Spencer, LA (2005). *Reasoning and writing: from critical thinking to composition*. 3rd ed. Boston: American Press. http://www.businessdictionary.com /definition/critical-thinking.html#ixzz27sX0xMCJ

Klooster, D (2001). "*What is critical thinking*?" *In the thinking classroom*. Peremena Spring 2001 (4): 36-40

Klooster, D (2001). *What is critical thinking*? *and how can we teach it*? Newark: The International Reading Association and the Open Society Institute.

Nordquist, R (2012). *Critical thinking: definition and examples of critical thinking*. http://grammar.about. com/od/c/g/Critical-Thinking.htm

Paul, RW, Elder, L, and Batell, T (1997). *California teacher preparation for instruction in critical thinking: research findings and policy recommendations*. Sacramento, CA: California Commission on Teacher Credentialing http://en. wikipedia.org/wiki/Critical_thinking

CHAPTER 2
Becoming a critical thinker

Introduction

Becoming a critical thinker is a conscious process and involves practice. The final destination of this process is to become an accomplished critical thinker, a stage at which critical thinking becomes a routine. In this chapter, we explore characteristics of a well cultivated critical thinker and stages one passes through to attain the cultivated critical thinker status.

Characteristics of a well cultivated critical thinker

A well cultivated critical thinker is a person who has reached the apex in critical thinking development. A well cultivated critical thinker displays the following characteristics:

- raises vital questions and problems by formulating them clearly and precisely
- gathers and assesses relevant information using abstract ideas to interpret it effectively
- arrives at well-reasoned conclusions and solutions
- thinks open-mindedly within alternative systems of thought, recognizing and assessing their assumptions, implications and practical consequences
- communicates effectively with others solutions to complex problems

Stages in the development of a critical thinker

Critical thinkers possess certain distinct qualities that differentiate them from ordinary thinkers. These qualities are acquired over time through practice. There are six stages of development that a person passes through to become a cultivated critical thinker. These are briefly outlined in figure 2.1 below:

Figure 2.1 Stages in the development of a critical thinker

These stages of development are elaborated below:

Stage 1: The unreflective thinker

Unreflective thinkers are not aware of the important role that thinking plays in their lives and of the consequences of problems in thinking. They lack the ability to review their thinking and do not endeavor to improve it.

Characteristics of an unreflective thinker

Generally, an unreflective thinker displays the following characteristics:

- unawareness that quality thinking demands regular practice
- unawareness that thinking involves concepts such as assumptions, inferences, implications and different points of view
- lack of knowledge of the appropriate standards for the assessment of thinking such as clarity, accuracy, precision and relevance
- lack of self-monitoring of own thinking
- thoughts are influenced by prejudices and misconceptions

Stage 2: The challenged thinker

Challenged thinkers are initially aware of the important role that thinking plays in their lives and realize that problems in their thinking have negative consequences.

Characteristics of a challenged thinker

Generally, a challenged thinker displays the following characteristics:

- awareness of the important role of thinking in life
- awareness that high quality thinking requires deliberate reflective practice
- a recognition that their thinking is often flawed but they are unable to remedy the situation
- an initial awareness of thinking as involving concepts such as assumptions, inferences, implications and different points of view and limited skills in thinking

Stage 3: The beginning thinker

A beginning thinker recognizes that he/she has basic problems in thinking and makes attempts to improve it. However, he/she lacks a systematic plan for improving the quality of thinking.

Characteristics of a beginning thinker

Generally, a beginning thinker displays the following characteristics:

- awareness of the role of thinking in life
- awareness of concepts such as assumptions, inferences, implications and points of view
- knowledge of standards for the assessment of thinking such as clarity, accuracy, precision and relevance
- monitoring of his/her own thoughts though sporadically
- a recognition of egocentric thinking in themselves and others
- some degree of intellectual humility
- some degree of intellectual confidence

Stage 4: The practising thinker

A practising thinker recognizes that he/she is responsible for his/her own thinking and constantly works to improve on it. But they still have limited skills in thinking.

Characteristics of a practising thinker

Generally, a practising thinker displays the following characteristics:

- knowledgeable of the importance of monitoring thinking systematically using concepts such as assumptions, inferences, implications and different points of view
- recognition of the need for a systematic approach to critical thinking
- recognition of the natural tendency of the human mind to engage in egocentric thinking and self-deception
- critiques own thinking through systematic practice
- recognition of own egocentric thinking as well as that of others
- development of intellectual perseverance

Stage 5: The advanced thinker

An advanced thinker uses critical thinking as a matter of habit. He/she is open and fair-minded, though they may sometimes slide into egocentrism.

Characteristics of an advanced thinker

An advanced thinker is able to:

- display insight of problems in thought
- systematically monitor her/his thinking in terms of assumptions, inferences; implications and different points of view among others
- display insight into the role of egocentrism and socio-centrism in thinking, as well as the relationship between thoughts, feelings and desires
- regularly critique her/his plan for systematic practice with the view of improving it
- display high degree of intellectual humility, intellectual integrity, intellectual empathy and put themselves in the place of others in order to genuinely understand them
- demonstrate intellectual courage to face and fairly address ideas, beliefs, or viewpoints

- exhibit the fair-mindedness necessary to approach all viewpoints without prejudice, or reference to one's own feelings or vested interests

Stage 6: The cultivated critical thinker

An accomplished thinker is in charge of his/her thinking and continually strives to improve it. He/she has internalized the basic skills of thinking. Critical thinking becomes both a conscious and highly intuitive activity.

Characteristics of a cultivated thinker

Generally, a cultivated thinker is able to:

- engage in systematic monitoring of his/her thinking
- display a high degree of knowledge of thinking as well as a high degree of practical insight as well
- assess her/his thinking in terms of clarity, accuracy, precision, relevance and logic among others
- make critical thinking part of their habits
- critique own use of thinking in his/her life and improve it accordingly
- articulate strengths and weaknesses inherent in his/her thinking
- display a high degree of intellectual humility, intellectual integrity, intellectual perseverance, intellectual courage, intellectual empathy, intellectual autonomy, and intellectual responsibility

Moving students towards critical thinking

In order to help students move from the stage of the unreflective thinker to the cultivated stage of the critical thinker, five major steps need to be considered and taken. Figure 2.2 shows the five step model to move students towards critical thinking.

Step 1 Determining learning objectives

The teacher defines learning outcomes that learners should exhibit. The target is higher order thinking which is associated with analysis, synthesis and evaluation in Bloom's taxonomy (Duron, Limbach, Waugh, 2006).

Step 2 Teaching through questioning

The teacher sets questions in order to stimulate thinking in the learners. For effective results, the questions should be divergent or open ended rather than convergent. Such questions render themselves to Bloom's higher cognitive levels of analysis, synthesis and evaluation. To complement the teacher's efforts, learners should also be encouraged to ask higher order questions. Teaching through questioning also requires use of appropriate questioning techniques. These techniques include rephrasing questions where necessary, distributing questions round the class, redirecting questions, providing feedback and reinforcing student responses without repeating their answers.

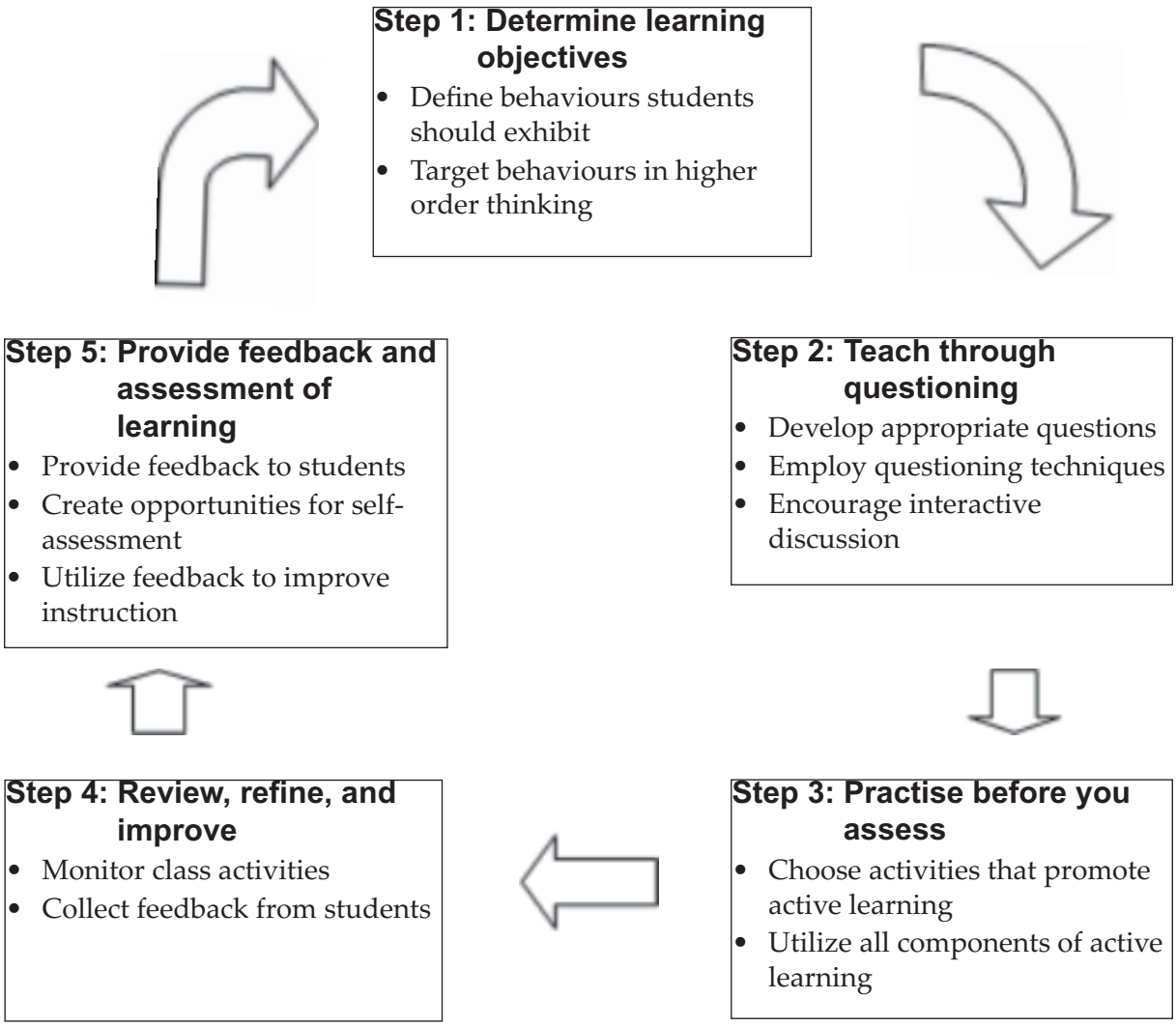


Figure 2.2 A 5-step model for moving students towards critical thinking

(Adapted from Duron, Limbach and Waugh (2006))

Step 3 Practising before assessment

In this step, the teacher engages learners in activities that enhance active learning. Such activities should be chosen from the three components of active learning namely; information and ideas, experience and reflective dialogue (Fink, 2003). Information and ideas include primary and secondary sources of information such as pupil responses and textbooks. Experience includes doing, observing and modelling. Reflective dialogue includes papers, portfolios and journals that learners compile in the process of learning.

Step 4 Review, refine and improve

This step involves continuous refining of courses in order to enhance the development of critical thinking skills in the learners. To achieve that, teachers should monitor classroom activities and track student participation in a teaching diary (Duron, et al. 2006). The teacher should also consider giving reflective comments and student feedback for possible improvement of a given course.

Step 5 Feedback and assessment of learning

Assessment of learning aims at enhancing the quality of student learning and performance rather than grading the performance. Feedback enables the teacher and the learner to discuss the success and failures in learners' performance based on set standards.

Conclusion

The ultimate goal of critical thinking is to improve the human condition. It is therefore important that learners should endeavour to improve their thinking so that they may reduce or eliminate problems that arise as a result of faulty reasoning.

References

Linda Elder and Richard Paul. *Critical thinking development: a stage theory*.

Duron, R, Limbach, B, Waugh, W (2006). *International journal of teaching and learning in higher education*. Volume 17, No. 2, pp. 160-166.

Fink, L (2003). 'A self-directed guide to designing courses for significant learning'. In Duron, R., Limbach, B, Waugh, W (2006). *International journal of teaching and learning in higher education*. Volume 17, No. 2, pp. 160-166.

The Educational Technology Centre, University of Sydney (2003). 'Teaching strategies' in Duron, R, Limbach, B, and Waugh, W (2006). *International journal of teaching and learning in higher education*. Volume 17, No. 2 pp. 160-166

Wlodkowski, R and Ginsberg, M (1995). *Diversity and motivation*. San Francisco: Josey-Bass.

CHAPTER 3
Methods and strategies for promoting critical thinking

Introduction

The success of critical thinking oriented lessons depends on a number of factors. These include type of methods and strategies incorporated in the lessons. The most common methods and strategies are classified under expositions, cooperative learning, self expression/discussion, research, argumentative/persuasive methods, reflective methods and other methods. In critical thinking oriented lessons, the methods and strategies should take into consideration certain conditions to ensure their successful utilization.

This chapter outlines the factors for success in the utilization of methods and strategies in critical thinking oriented lessons. The chapter also examines each of the methods and strategies especially their significance in critical thinking.

Factors to consider when using teaching and learning methods

Several factors should be considered when planning methods for critical thinking lessons. In general, the methods should:

- address the objectives of the subject and the current lesson. In any lesson, the main objective is to produce well cultivated critical thinkers who will be able to raise vital questions, gather and assess relevant information, use abstract ideas, come to well reasoned conclusions, think openly within alternative systems of thought and communicate effectively with others in finding solutions to complex problems (Duron, R, Limbach, B, Waugh, W 2006).
- match with the characteristics of learners. Learners in various classrooms tend to vary in terms of background knowledge, age level or developmental stages, and preferences of learning styles. Some learners might be fast learners than others and therefore the methods used must always challenge their minds, otherwise they will find the lessons boring. Moreover some students prefer working independently while others prefer working in group. A balance of the two methods will enable all categories of students to benefit from the lesson.
- match with particular school and community settings. Different schools have their own traditions so do the surrounding communities. If the teacher uses methods that are contrary to the expectations of the school and the surrounding communities, the methods may be resisted. This can lead to ineffective teaching and learning.
- match with the resources available. These resources include time, financial, human and material resources. The teacher should make an attempt to ensure that these are available, otherwise the lesson are likely going to fail.
- match with the space and size of the class. Group work will require more space than structured overview. Large classes pose a challenge in the supervision of individual work by the teacher.
- show that knowledge is neither static nor inert. The methods should be flexible enough to provide learners with an opportunity to come up with new ideas and solve problems from various points of view. Critical thinking demands that when solving a problem one should come up with several alternative solutions and choose the best.

Task 1

1 Reflect on your teaching methods. To what extent are factors for choice of teaching methods for critical thinking lessons applicable in your lessons?

2 What would be the benefits and drawbacks of considering factors for choice of teaching methods for critical thinking lessons?

Methods and strategies for promoting critical thinking

Exposition methods

Exposition methods and strategies aim at introducing new information and developing new learning. The lessons begin from what learners know to what they do not know. The examples should be presented in a logical order so that pupils can see the development of the lesson and what the teacher hopes to achieve. Such methods include:

- structured overview
- brainstorming
- the Know-Want to know-Learn
- Instructional Note-Taking System for Enhanced Reading and Thinking (INSERT)

Structured overview

Structured overview is a verbal, visual or written summary or outline of a topic that links concepts in a topic to form a conceptual framework. A structured overview is done in the form of a brief lecture at the beginning of a lesson (Ausbel, D 1968). A structured overview serves to arouse learners' curiosity and introduce key concepts and information which learners use to build new knowledge.

Brainstorming

Brainstorming is a method in which learners contribute ideas about a topic. Brainstorming can be organized at classroom level, in groups or in pairs during the building knowledge phase of the lesson. In the process, many ideas are generated about the topic. It is important that learners feel free to open up since there is no pressure for one to be brilliant in order to contribute ideas and that there is no correct or wrong answers at this stage. Brainstorming is consistent with social thinking, an important component of critical thinking. Ideas are tested and improved as they are shared with others during discussion (Klooster, D, 2001).

Know-Want to know– Learn (K-W-L)

The Know-Want to know– Learn is a method that guides learners in reading and understanding a text (Ogle, 1986). The first stage is the Know (K) stage in which the teacher introduces a topic and asks learners to brainstorm anything that they know about the topic (Figure 1). During the second stage the teacher asks learners what they want to know more of the topic based on what they listed in the first stage. This stage is therefore identified as Want to know or W. The first two stages are used during the anticipation phase.

The last stage is known as Learn (L). It involves the teacher asking learners to acknowledge what they have learned in the lesson thereby answering questions that students raised during stage two. The last stage is used in the consolidation phase. The K-W-L method is useful in developing critical thinking since it keeps learners active as they think about what they know and encourages them to ask vital questions in stage two. In addition, the method encourages learners to reflect on the lesson during consolidation phases and also raises their curiosity to verify whether their questions on what they want to learn are being addressed during the lesson. Most importantly, learners are given the opportunity to argue or contribute during knowledge building.

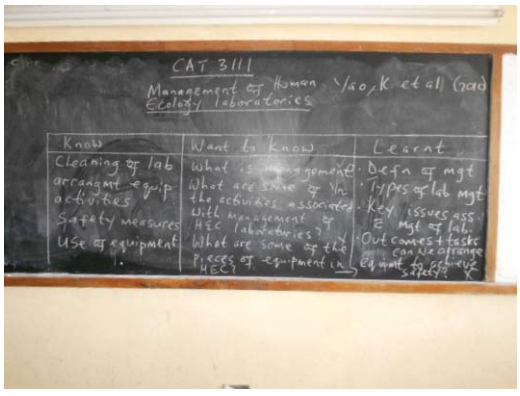


Figure 1: A sample activity of know-want to know-learn

Instructional Note-Taking System for Enhanced Reading and Thinking (INSERT)

The Instructional Note-Taking System for Enhanced Reading and Thinking (INSERT) is a procedure that begins with searching for prior knowledge and asking questions for marking texts, and then marking the different kinds of information that are found in the texts. It is mainly used in the building knowledge phase. INSERT uses four different marks. These are:

✔ checkmark - signalling that what you are reading confirms what you knew or thought you knew

\- minus -signalling that what you are reading contradicts or is different from what you already knew or thought you knew

\+ a plus - signalling that the piece of information you encounter is new to you

? a question mark - signalling that information is confusing to you or that there is something you would like to know about

The INSERT system enables learners to reflect on what they know and capitalize on it in order to learn new knowledge.

Task 2

1 Prepare lessons in your study area and show how you would use each of the expository methods to teach the lessons.

2 What would be the strengths and weaknesses of expository methods in your lessons?

Co-operative learning methods

Co-operative methods require learners to work together on a particular task. By doing so, the learners generate many ideas, share them and modify them before presenting to other members of the class. The methods promote interpersonal and inter-group understanding. In addition, the methods encourage higher order thinking, motivation and morale.

A number of prerequisites are essential for the success of co-operative learning methods positive interdependence, face to face promotive interaction, individual accountability/personal responsibility, interpersonal and small-group skills and group processing (Johnson, D, Johnson, R, Holubec, E 1994)

Positive interdependence encourages group members to realize the need for the contribution of each member. Face to face promotive interaction involves learners supporting each other and sharing resources in order for them to succeed. Individual accountability/personal responsibility involves learners take individual responsibility to contribute towards the success of group work. Interpersonal and small group skills such as trust, effective communication, and conflict resolution improve the quality and quantity of learning. Group processing involves reflection on group work in order to identify areas for improvement.

Co-operative learning methods include:

- Mix/freeze/pair
- Paired reading
- Paired brainstorming
- Jigsaw
- Community agreements
- Walk around/ talk around
- One stay three stray
- Academic controversy
- Trade a problem
- Academic and specialised roles in discussion

Mix/freeze/pair

Mix/freeze/pair is a lively means of having learners work with new partners to complete a closely defined task (Kagan, S 1994). The teacher asks students to move round and pair with the nearest person upon signalling “Freeze”. The new pair might be asked to move round and pair with another pair. The method is used where the teacher wants to build social

skills among learners in class and break the monotony of regular partnerships in the classroom.

A session of random movement in mix/freeze/pair

Paired reading/ paired summarizing

Paired reading/paired summarizing is a technique for having pairs of learners read a text closely for understanding (Vaughn, J and Estes, T 1986). One member in a pair reads and summarises a text at a time while the other member listens and asks questions. Thereafter they swap or exchange the roles. This method keeps learners active as they read, summarise and ask questions. In addition, the method enables learners to understand a difficult text or idea.

Paired brainstorming

Paired brainstorming is a method in which learners generate ideas on a topic individually and share them in pairs before presenting them to the whole class (De Bono, E 1973). The method is used where the teacher intends to develop imaginative and flexible thinking among learners. As the ideas are shared and modified during discussion, learners also develop social skills.

Jigsaw

Jigsaw is a strategy that enables learners to master one aspect of a unit and share with colleagues. The teacher divides learners into groups referred to as "home groups" and randomly identifies "experts" for various aspects of a unit. Experts for same tasks leave their home groups and meet in "experts groups" to master the material. Thereafter, experts in various aspects return to their home groups where they take turns in either leading the discussion or teaching the material to members of their home group. The method is ideal where learners are reading a text, listening to a presentation or carrying out a group investigation. In critical thinking, jigsaw encourages social skills as members interact and share ideas in both expert and home groups.

Community agreements

Community agreements is a strategy that involves members formulating rules for effective group work. The strategy is applied to check the conduct of learners in groups. The teacher asks learners to get into their groups and think of a previous group task that went on well and discuss rules of behaviour that would guide other groups for them to achieve the same results. The strategy promotes social skills as the learners formulate and abide by rules for conducting group work.

Walk around-Talk around

Walk around-talk around is a method in which learners share a lot of information within a short period of time. The teacher presents a problem and asks learners to think about solutions to it. Thereafter, learners are asked to move round randomly. Upon a hand clap, learners stop and share their ideas with the nearest person. The method motivates learners to think independently and share ideas with others.

One stray-Three stay

One stray-Three stay is a technique for having groups report the results of their discussion when there is no time to hear from each group. The teacher assigns a task to home groups comprising four members.

After discussion, one member of each home group is selected to "stray" by going to the next group to brief the three members who have remained on the findings of the student's original group. The benefit of one stray-three stay is that it enables learners to exchange ideas and build social skills such as asking probing questions and they develop confidence in themselves as they report to other groups. The other benefit is that it makes learning a fun experience as learners move round, explain their ideas and address questions raised by the other members.

Academic controversy

Academic controversy is a method in which learners argue an issue from both a positive and negative perspective before passing a judgment. The teacher assigns home groups a question that has a yes or no answer. Members in each home group form pairs and each pair is randomly assigned to either argue for or against the issue. After pair work, members in each pair are asked to share their points with learners from other groups that have been assigned the same side of the issue. Thereafter, learners move back to their home group to debate with the other pair defending their position on the issue. Pairs switch roles and defend the other side of the issue. Learners are later encouraged to drop their assigned position and argue for any side they believe in. Academic controversy promotes high order thinking as learners have to argue with supporting evidence or points for their side. In addition, it promotes flexible and democratic thinking as learners perceive issues from different perspectives.

Trade a problem

Trade a problem is a method in which learners in a home group formulate a problem for another group. The teacher's role is to introduce the topic and give instructions. The method promotes questioning and social thinking among learners.

Specialized roles in discussion

Specialized roles in discussion is similar to jigsaw since learners specialize in one aspect of a lesson and share with others. The teacher reads or presents a text and identifies roles corresponding to the number of learners in each home group. Learners in each home group are randomly assigned a role. Learners leave their home groups to form expert groups with members from other groups. After working on the issue in their expert groups, members go back to their home groups to lead their part of discussion. Some roles in a literary class include quotation finder, investigator and character interpreter. The method promotes responsibility, active participation and social skills among learners.

Task 3

1 Write the five prerequisites for cooperative teaching methods.
2 What is the benefit of each of the five prerequisites for the cooperative teaching methods?

Self expression/discussion methods

Self expression methods provide learners with an opportunity to communicate with fairness and integrity, how they think and feel without being accusatory, judgmental and abusive. The methods encourage

creative thinking, innovation and promote good health through stress management. Self expression strategies include:

- Role play
- Drama
- Save the last word for me
- Debate
- Value line
- Question board
- Predicting from terms
- Discussion web

Role play method

Role play is a method in which learners assume particular personalities depicted in a situation and act accordingly (Mtunda, F and Safuli,S. 1986). The teacher assigns roles to learners. The learners prepare an activity and present it to the class. This is followed by discussion and debriefing. The method encourages learners to be imaginative while performing their roles since preparation is limited. In addition it enables learners to reflect on the content as they role play. Furthermore, learners appreciate the position and feelings of others while acting in their roles, hence they link theory and practice. Role play also promotes interpersonal and communication skills. Role play motivates the learners to learn.

Drama

Drama is similar to role play. The only difference is that drama demands more preparation. Learners are given scripts to recite before performance. In a language class, drama helps learners to learn a new language. Drama also enables learners to communicate effectively and acquire basic information for critical thinking.

Save the last word for me

Save the last word for me is a method that is intended to give learners the opportunity to raise a comment on an issue. It is used to get quieter and more reluctant learners to participate in class discussion. The teacher asks learners to identify an interesting issue in a text and record comments at the back of a sheet of paper. The teacher invites each learner to read the issue that they have selected and then ask each presenter to invite other learners to make their comments on the issue. The learner who identified the issue makes the last comment.

Debate

Debate is a method in which learners defend their position on a question that has either a yes or no response. The teacher asks a question, learners discuss and then choose a side. Learners form teams depending on their side of the response and present points to justify their position. Debate is useful in developing critical thinking because it promotes the spirit of using ideas to defend a point without attacking people. This is an important component of critical thinking in which reasoned arguments are made to arrive at conclusion. In addition, learners share information and improve their way of thinking about the issue, hence promoting social thinking.

Value line

Value line is a method in which learners identify and justify their position on an issue to which there is a varied degree of agreement and disagreement. The teacher asks an appropriate question on which opinions vary. Thereafter learners take their place on an imaginary line between two extreme positions in accordance with the side of the issue they agree with more. Learners justify their position. Value line can help in the development of critical thinking because learners have to justify their position on an issue with reasons. In addition, it allows learners to recognize and respect other people's views and therefore develop their of social skills.

Question board

A question board is a site in a classroom where learners write or mount their questions. It can be part of a chalkboard or a wall.

Using a question board encourages learners to ask vital questions which is important for developing critical thinking. In addition, it guides the teacher on appropriate methodologies during lesson planning and delivery.

3.2.3.7 Predicting from terms

Predicting from terms is a method in which learners express their background understanding of concepts during the anticipation phase of a lesson. The teacher chooses five or six words from a text or relevant topic and asks learners to imagine and discuss the meaning of the words. Later the text or topic is presented to allow learners to compare their predictions with the actual text. The method provokes critical thinking and motivates learners to learn as they compare their prior knowledge with the new knowledge.

A session of predicting from terms

Discussion web

Discussion web is a method in which learners use supporting reasons for both sides of an issue before arriving at a judgment. The teacher asks learners to discuss in pairs a question that might be answered a yes or no. Learners identify supporting reasons for both sides of the argument and present them on a chart. They argue on the points before taking a position on the issue. The method promotes critical thinking since learners deal with high order questions and use reasons to support their position.

Task 4

1 To what extent can you use self expression methods in your study area?
2 How do self expression methods promote critical thinking?

Research methods

Research methods engage learners into a process of inquiry in order to discover facts, review a theory or develop a plan of action based on the facts discovered. In critical thinking, research methods provide a basis for making arguments. In addition, learners identify problems and find the means for solving the problems. Research methods of teaching include

- Experiments
- I-Search
- Shared inquiry
- Service learning

Experiments

An experiment is a scientific procedure for testing ideas or hypotheses. It involves eliminating the condition under study in the "control group" while holding all other conditions constant in the "experiment group". Learners compare results from the experiment group with those from the control group and draw conclusions. The teacher should involve learners in the planning, setting of the experiments, making observations and making conclusions. Experiments enable learners to

test ideas before arriving at conclusions hence they are an important method for developing critical thinking.

A scientist carrying out an experiment

I-search

I-search procedure is a method in which learners use a systematic research plan in order to solve a problem. Learners formulate a research question, prepare a research plan, collect, analyze, interpret data, and present results in a research paper. The teacher assesses the paper based on criteria that are communicated to learners in advance. I-search procedure enable learners to develop the skill of formulating and solving complex problems.

Shared inquiry

Shared inquiry approach is a method that involves learners supporting their ideas with references to a read text or restating their ideas correctly. Learners individually read a text and answer real questions that have one or more defensible answers. During discussion, the teacher assesses the willingness of each learner to participate, and how they support their answer based on the information in the text, rather than whether the answer is right or wrong. Shared inquiry enables learners to gather information and justify their position in an argument, an important component of critical thinking.

Service learning

Service learning is a comprehensive activity that sends learners out into the community to perform some useful service that is related to a course of study (Campus Compact, 2003). Service learning promotes critical thinking since learners have an opportunity to establish the relevance of their studies in the real world. In addition, it helps learners to identify gaps existing in school learning. Through service learning, learners acquire experiences that might not be available in the school system due to various constraints.

Task 5

1 In what ways do you use research methods to teach your lessons?
2 Compare and contrast research methods for critical thinking lessons and pure academic research.

Persuasive methods

Argumentative or persuasive methods aim at convincing others to support an idea or change a situation through provision of facts or justifying reasons. This entails

critical thinking, justification and proper presentation of the change or idea that somebody intends to pursue. The methods include:

- Persuasive writing
- Writing to learn – RAFT
- Fish bowl and enhanced lecture
- M-chart
- Focused lesson on argument
- Critiquing narrative texts

Persuasive writing

Persuasive writing is a method that involves presenting written work in such a way that it influences the reader to agree with the position of the writer. When used as a teaching method, the teacher familiarizes learners with arguments and supporting points from texts before engaging them in writing. Sometimes, counter arguments are used to show that both sides of the argument have been analysed. Persuasive writing influences learners to make reasoned arguments, and is therefore an important method for promoting critical thinking.

Writing to learn-RAFT

RAFT is an abbreviation for Role, Audience, Format and Topic (Crawford, A. et al 2005). It is a variation of persuasive writing. Learners identify a topic and assume a specific role. They conceptualize the nature of the audience and proper format for presenting the points to convince the audience.

Fish bowl and enhanced lecture

Fishbowl and enhanced lecture is a method in which a teacher presents a brief talk about a topic and asks six learners referred to as Fish bowl to come round, identify and raise issues such as weaknesses, lack of evidence, questions and other areas of concern in the topic. The method promotes listening skills which are instrumental for collecting information. In turn, the information will enable learners to generate vital questions or pursue arguments for or against the issue under discussion. This is important since information is the starting point and arguments are supported by points.

M-chart

An M-chart is a table with three columns on which learners write down their ideas. M-chart on terms is a device for clarifying the meaning of words beyond the perspective of the author of a text. Learners write words that are similar, neutral and opposite in meaning to the word in the first, second and third columns of the M-chart respectively. An M-chart promotes independent thinking since learners are encouraged to think beyond the author's perspective. In addition the method also helps to protect learners from manipulative language by author of texts.

Table 1: M-chart

Word	Similar words	Neutral words	Opposite
Acid Tart Sour Bitter	Sharp Flat	Neutral	Alkali Base Salt

Focused lesson on arguments

Focused lesson on arguments is a method that introduces learners to the elements of arguments. These include the main question, answer, reasons to support the answer, evidence to support reasons, facts, missing information, loaded terms, link between reasons and conclusion. The method promotes the skill of thinking open mindedly as learners link arguments with supporting ideas and conclusions.

Critiquing narrative texts

Critiquing narrative text is a method of challenging the work of fiction in a text such as biases based on gender, age, sex, social status, political inclination, culture and race. Once learners identify the biases portrayed by the author, they formulate and answer questions that seek to correct the situation. The method promotes independent thinking and using facts not opinions to pursue arguments.

Task 6

1 At what stage of the lesson would you use each of the persuasive teaching methods in your lessons?
2 What are the necessary skills that a teacher and students require for successful persuasive lessons?

Reflective methods

Reflective methods help learners to link theory, practice and experience. In doing so, learners are able to understand the relevance of learning. In addition, learners evaluate their strengths, weaknesses, inadequacies and ways in which they can improve. The methods provoke thinking as learners establish the links between what they have learnt and its application in a real life situation. Reflective methods include:

- What-So what-Now what
- Quick write
- Ten minute essay
- Free write
- Dual entry diary
- Learning log
- Directed reading-thinking activity
- Socratic questioning
- Question search

What-So what-Now what

What-So what-Now what is a method that involves establishing the relationship between knowledge and real life. 'What' involves asking learners summarise important ideas they have covered in a discussion. 'So what' involves asking learners the importance of what they have learnt. 'Now what' involves asking learners the course of action they will take about a problem. The method is relevant in critical thinking since it reads to problem solving.

Quick write

Quick write is a brief written reflection on a topic (Crawford, A, Saul, W, Mathews, S and Makinster, J (2005). The method is used either in the anticipation or consolidation phase of a lesson and consumes one to five minutes. Quick write enables learners to reflect on their learning and document important ideas during any stage of a lesson, especially the anticipation and consolidation phases. The method keeps learners active as they jot down ideas on paper.

Ten minute essays and free write

Free write is similar to quick write. Unlike quick write, free write requires more time for learners to jot down their ideas, approximately five to ten minutes. Free write can be an anticipation or consolidation activity. Free write can promote critical thinking since it involves sharing of ideas and keeps learners active in the lesson.

A free write session

Dual entry diary

Dual entry diary is a method that enables learners to develop comprehension and reflective skills. Learners read a text and write down the crucial issues on the left hand column of a piece of paper and associated comments on the right. Learners are encouraged to share their ideas and can therefore develop social thinking.

Learning log

Learning log is a record of how a learner is progressing in the learning processes. The learners document areas of study that seem to be problematic, and how they are implementing study schedules and planned techniques. Learning log enables learners to take personal responsibility for learning and think about what they are learning and how to improve.

Directed reading-thinking activity

Directed reading–thinking activity is a method in which learners make predictions about what will happen next in a text read by the teacher. The method is used in the building knowledge phase of a lesson to promote comprehension and listening skills among learners. Learners confirm their predictions as the text is read further.

Socratic questioning

Socratic questioning is a method that involves use of questions to pursue thought through various levels of the cognitive domain. Socratic questioning also promotes listening skills that can be applied in oral presentations. In a lesson, questions, especially high order stimulate interest and create in learners the inquisitive attitude which forms the base for the wish to learn more (Mtunda, F and Safuli S 1985). Clasen and Bonk (1990) that although there are many strategies that can impact student thinking, it is the teacher's questions that have the greatest impact.

Question search and question board

Question search is used in conjunction with question Board usually done as an introductory activity. A question board is a site for posting questions that grow from class discussion, while question search is an activity that involves learners formulating questions from a given topic, scenario or problem and posting them on a question board. Question search encourages learners to raise vital questions which is one of the characteristics of a critical thinker. For effective results, the questions must be open ended questions to provoke critical thinking and active learning rather than close ended or yes or no type of questions. A question search can be done at any stage of a lesson. During the anticipation phase, question search motivate learners to think about questions that are relevant to the issue at hand.

During the building knowledge phase question search can encourage learners to look for information that will address the questions or problems at hand. During the anticipation phase, question search enables learners to apply what they have learnt in new situations and more importantly make learning a lifelong activity.

Task 7

1 Many teachers don't reflect on their teaching during and after the lesson. What are the dangers of this habit?
2 Write down ways in which you can incorporate reflective teaching methods in your study area.

Other methods

Other methods for promoting critical thinking are:

- pre-teaching vocabulary
- choral reading
- request procedure
- reading and questioning
- reciprocal teaching

Pre-teaching vocabulary

Pre-teaching vocabulary is a method in which a teacher chooses words from a text that are important for learners to understand the text. The teacher gives the meaning of each word through various means and asks learners to find synonyms for each word. Pre-teaching vocabulary is used in the anticipation phase of a lesson.

Choral reading

Choral reading is a method in which learners cordially read a text in poetry and other relevant texts. The method is used in the building knowledge phase. The teacher guides learners on how to read the text. The method helps to familiarize students with many words since the text is read several times. In addition the method promotes creativity, fluency and enjoyment since the text is read in several different ways.

Request procedure

The request procedure is a method in which learners exchange roles in reading and asking questions from a text. The method is used during the building knowledge phase to enable learners to understand a difficult text. The method can work with an unlimited number of pairs. One of the partners reads a paragraph aloud while the other listens attentively and asks questions afterwards. The method keeps both partners active as they read, listen, ask and answer questions.

Reading and questioning

This method is similar to the request procedure since learners read, ask and answer questions in pairs. It is recommended for studying materials that must be understood and recalled (Temple, 2003). However, reading and questioning is more complicated since it involves both partners identifying and writing key terms in the margin after reading each section of the text. The other partner asks questions based on the key words. Reading sections are also longer than those in the request procedure.

Reciprocal teaching

Reciprocal teaching is a method in which learners exchange the roles of teacher and learners in groups of four. The method is used to enable learners to read a text with understanding. Each person playing the role of a teacher reads and summarizes a paragraph, clarifies difficult concepts and asks questions based on the text. Reciprocal teaching enhances learning since each student acquires knowledge and skills in the process of teaching other learners. Such skills include comprehension, making connection of ideas and questioning.

Conclusion

This chapter has discussed some strategies and methods for promoting critical thinking. The methods have been classified as exposition, cooperative learning, self expression/discussion, research, argumentative/persuasive and reflective methods. Other methods such as pre-teaching vocabulary, choral reading, request procedure, reading and questioning and reciprocal teaching have also been discussed. These methods encourage learner participation through active learning which promote critical thinking. The teacher should consider combining different methods and strategies while considering factors within and outside the classroom environment in order to promote critical thinking in the learners.

References

Ausbel, D (1968). *Educational psychology: a cognitive view*. New York: Holt, Rinehart and Winston.

Campus Compact (2003). *Introduction to service-learning toolkit*. Providence, RI: Campus Compact.

Clasen, D and Bonk, C (1990). *Teachers tackle thinking. Madison*, WI: Madison Education Extension Programme.

Crawford, A Saul, W, Mathews, S and Makinster, J (2005). *Teaching and learning strategies for the thinking classroom*. New York: The international Debate Education Association.

De Bono, E, (1973). *Lateral thinking: creativity, step-by-step*. New York: Perennial.

Duron, R, Limbach, B, Waugh, W (2006). *International journal of teaching and learning in higher education*, Volume 17, No. 2, pp. 160-166.

Johnson, D, Johnson, R, Holubec, E (1994). *The new circles of learning: cooperation in the classroom and schoo*l. USA: Association for Supervision and Curriculum Development.

Kagan, S (1997). *Cooperative learning*. San Clement, CA: Kagan Cooperative Learning.

Klooster, D "*What is critical thinking*?" Thinking Classroom/Peremena Spring 2001 (4): 36-40.

Mtunda, F and Safuli, S (1985). *An introduction to the theory and practice of teaching*. Blantyre: Blantyre Print and Packaging.

Ogle, D (1986, February). K-W-L: *A teaching model that develops active reading of expository text*. The Reading Teacher, 39(6), 564-570.

Temple, C (2003). *The B/C teachers' guide*. Daresalaam: Ministry of Education and Culture, Tanzania.

Vaughn, J and Estes, T (1986). *Reading and reasoning beyond the primary grades*. Boston: Allyn and Bacon.

CHAPTER 4
Assessment for stimulating critical thinking

Introduction

Assessment is a vital component of the teaching and learning processes and should be applied creatively to enhance learners' understanding and thinking. Critical thinking can be defined as an active, questioning, engaged interaction between a teacher and learners, among learners, and within each individual learner. As such, critical thinking and assessment are inextricably linked such that the development of one influences the other. Both critical thinking and assessment are essential for meaningful learning and teaching. This chapter demonstrates how assessment can stimulate critical thinking.

Summative assessment is used to measure what learners have learnt at the end of a topic, chapter or course. Information from summative assessment can be used to promote learners from one level of learning to another. Summative assessment can also be used to find out if learners have met required standards on the way to earning certification for school completion, placement or for selecting learners for entry into another level of education.

Assessment also serves a formative function. In general, formative assessment refers to assessment activities that take place in a classroom and are frequent and interactive, aiming at checking learners' progress and understanding to identify their needs in order to appropriately adjust teaching and learning. This is where assessment for learning comes in. Among other uses, this form of assessment provides immediate feedback to both the teacher and the learner and actively involves the learner in the process. It also provides the teacher with information which he/she can use to plan instruction and feedback such as giving of enrichment and remediation. In this way, formative assessment can assist teachers to be better prepared to meet the diverse needs of their learners. Formative assessment is done through tests and class exercises that come at the end of instruction. The feedback, active involvement and alterations of lesson presentation for remedial classes help the learner to develop ownership of their own learning, think through the lessons and ask questions for clarification.

In essence, assessment for learning is a process of finding out where a learner is within a learning continuum, knowing and making explicit where the learner needs to get to, and most importantly, showing the learner how to get there. It is essential that the learner takes action in order to reach the expected stage or level. A range of assessment for learning strategies can be used to help in each stage of this process. This range of tools, if adopted by teachers and learners, can help to have an understanding of what has been achieved and steps needed to take learning forward.

Principles of good practice for assessing learners

- *The assessment of learners begins with educational values.*
  Assessment is one of the tools for educational improvement. Its effective practice begins with and enacts a vision of the kinds of learning teachers most value for learners and strive to help them achieve. It is imperative that educational values should drive not only what we choose to assess but also how we do so. Some of these values include decision-making, creative thinking, problem-solving and self-esteem.
- *Assessment is most effective when it reflects an understanding of learning as multidimensional, integrated, and revealed in performance over time.*
  Learning is a complex process. It entails not only what learners know but also what learners can do with what they

know; it involves not only knowledge and abilities but also values, attitudes, and habits of the mind that affect both academic success and performance beyond the classroom. Assessment should reflect these understandings by employing a diverse array of methods, including those that call for actual performance, using them over time so as to reveal change, growth, and increasing degrees of integration. Such an approach aims for a more complete and accurate picture of learning. This forms a strong base for improving learners' intended educational experiences and achievement.

- *Assessment requires attention to outcomes and experiences that lead to those outcomes.*
  Information about outcomes is of high importance; where learners "end up with" matters greatly. In order to improve outcomes, teachers need to know learners' experiences along the way. Assessment can help in understanding which learners learn best under what conditions; with such knowledge comes the capacity to improve their learning.

- *Assessment works best when it is ongoing not episodic.*
  Assessment is a process whose power is cumulative, though isolated, "one-shot" assessment can be better than none. Improvement in teaching and learning is best fostered when assessment entails a linked series of activities undertaken over time. This may mean tracking the progress of individual learners, or cohorts of learners. It may also mean collecting the experiences of learner performance or using the same instrument term by term. The aim is to monitor learner progress towards the intended goals in a spirit of continuous academic improvement.

- *Assessment makes a difference when it begins with issues of use and illuminates questions that people really care about.*
  Assessment recognizes the value of information in the process of improvement. But to be useful, information must be connected to issues or questions that people really care about. This implies assessment approaches that produce evidence which relevant stakeholders can find credible, suggestive and applicable to decisions that need to be made. It means thinking in advance about how the information will be used, and by whom. The aim of assessment is not to gather data and return "results"; it is a process that starts with the questions of decision-makers, that involves learners in the gathering and interpretation of data, which informs and guides continuous improvement in the teaching and learning processes. The ability of learners to interpret and make sense of assessment feedback gives them an opportunity to evaluate their own learning and possibly reposition themselves for improved learning experiences. If they are able to do this, then they have set themselves in motion towards critical thinking.

- *Assessment is most likely to lead to improvement in class performance when it is part of a larger set of conditions that promote the teaching and learning processes.*
  Assessment alone changes little. Its greatest contribution comes to schools and institutions where the quality of teaching and learning is visibly valued. The drive to improve educational performance should be a primary goal of school leadership and helps to improve the quality of learner education which is central to the institutions' planning, budgeting, and personnel decisions. In this regard, information about learning outcomes in such institutions is seen as a key part of decision making, and is avidly sought. Therefore, the need for improvement in the performance of

learners should be part of the administrative agenda of schools and institutions.

- *Through assessment, educators meet responsibilities to learners and to the public.* There is a compelling public stake in education. As teachers, we have a responsibility to the public that supports or depends on us to provide information about the ways in which our learners meet goals and expectations. This responsibility goes beyond the reporting of such information; our deeper obligation, to ourselves, our learners, and society, is to improve instruction and learner performance. Those to whom teachers are accountable have a corresponding obligation to support and improve such efforts.

Developing critical thinking through assessment for learning in the classroom

Thinking for learning

Thinking for learning can be defined as developing patterns of ideas that help learners acquire deeper understanding and enable them to explore and make sense of their world. It refers to processes of thinking that can help learners plan, develop and reflect. These processes can enable learners to think creatively and critically as they carry out tasks, analyse and evaluate their findings, reflect on their learning and make links within and outside their school. Although we are born with a capability to think, there is ample evidence that we can learn to think more effectively.

The classroom is the hub of experiences which lead to learning. Engagement of learners in various activities is one way that can lead to successful learning. This involves engaging learners using a variety of teaching methods which are learner-centred. Most important is the engagement of learners in assessment activities to determine levels of achievement in the teaching process. Assessment promotes critical thinking which leads to learners developing their minds and being able to apply the knowledge learnt even after school.

Thinking for learning enables learners to gain a deeper understanding of topics, to be more critical about evidence, to think flexibly and to make reasoned judgements and decisions rather than jumping to conclusions. These qualities in thinking are needed both in school and in the wider world. Learners need to develop a repertoire of thinking strategies/tools to be drawn when they encounter new situations.

Importance of developing thinking and assessment for learning

Studies have shown that emphasis on developing thinking and assessment for learning can yield the following outcomes:

- improved learners' performance - leading to higher quality outcomes
- improved engagement of all learners in their own learning
- improved learners' ability to transfer generic skills leading to greater flexibility
- increased enjoyment of both the teacher and learner in the teaching and learning process

The characteristic features of developing thinking and assessment for learning overlap considerably, such that each outcome actively supports and reinforces the other.

Self-assessment

Self-assessment is when learners judge the quality of their own work based on evidence and explicit criteria for the purpose of doing better work in the future. When teaching learners how to assess their own progress, and when they do so against known and challenging quality standards, there is a lot to gain. Self-assessment is a potentially powerful technique because of its impact on learner performance through enhanced self-efficacy, increased intrinsic motivation and promotion of self and life-long learning.

Self-assessment plays a key role in fostering an upward cycle of learning. When learners

evaluate their performance positively, self-assessments encourage them to:

- set higher goals
- commit more personal resources or efforts to themselves
- achieve results in self-judgement
- contemplate the question, "Were my goals met?"
- respond to the judgement with the question, "How do I feel about that?"

In this regard, it is possible to teach learners how to approach self-assessment. The following four stages by Ross et al, (1998) outline clearly what needs to be done.

Stage 1 Defining the criteria

The teacher should involve learners in defining the criteria that will be used to judge their performance. Involving learners in determining the assessment criteria initiates a negotiation. Neither imposing school goals nor agreeing with learner preferences is likely to be as successful as creating a shared set of criteria that learners perceive to be meaningful. In addition to increasing learner commitment to instructional goals, negotiating intentions enables teachers to help set learners' goals that are specific, immediate, and moderately challenging; elements that contribute to greater effort. It also provides an opportunity to influence learners' orientation towards learning, a long term guidance effort, that is particularly timely in cooperative learning contexts since learners sometimes adopt orientations to group learning (such as letting someone else do all the work) that impede learning.

Stage 2 Applying the criteria

Teach learners how to apply the criteria to their own work. If learners have been involved in a negotiation in stage 1, the criteria that result will be an integrated set of personal and school goals. Since the goals are not entirely their own, learners need to see in practice examples of what they mean. These models or examples help learners understand specifically what the criteria mean to them. Teacher modelling is very important, as it provides numerous examples of what particular categories mean, and using language that connects criteria to evidence in the appraisal.

Stage 3 Giving feedback

Give learners feedback on their self-assessments. Learners' initial comprehension of the criteria and how to apply them are likely to be imperfect. Teachers need to help learners understand their learning by arranging for them to receive feedback (from the teacher, peers, or themselves) on their attempts to implement the criteria. Having different sources (eg peers and teacher) provide data for comparison and helps learners to develop accurate self-evaluations. As a result, discussion regarding differences in data can prove most helpful.

Stage 4 Developing goals and action plans

Help learners develop productive goals and action plans. The most difficult part of teaching learners how to evaluate their work consists of designing ways to provide them support as they use self-evaluative data to set new goals and levels of effort. Without the help of the teacher, learners may be uncertain whether they have attained their goals. Teachers can also help learners connect particular levels of achievement to the learning strategies they adopted and the effort involved. Finally, teachers can help learners develop viable action plans in which feasible goals are operationalized as a set of specific action intentions.

Peer assessment

When teachers require learners to evaluate one another, they do not only distribute the workload of evaluation across the learning community but also offer learners the opportunity to think critically about the process of evaluation itself. Learners might be asked to reach a class consensus on what constitutes satisfactory and exemplary performance on a variety of tasks. They may be presented with evaluation alternatives and asked to weigh the usefulness and limitations of various

assessment instruments, for example, checklists, rating scales, written analysis, and others. By doing this, learners become aware of the ways in which feedback is defined by the instrument selected.

Effective peer assessment strategies always devote time to familiarizing learners with the key objectives of each assignment and how those objectives align with the core values of the discipline. Learners can be introduced to a review process common within the field and presented with models of exemplary feedback to help them develop as evaluators. Mechanisms should be put in place to ensure that peer assessment is not unduly influenced by peer pressure and that learners appreciate the constructive or "formative" nature of the critique.

Metacognition and assessment: thinking about thinking

Metacognition is one of the 'holy' grails of education. Defined as "knowledge and beliefs about thinking and the factors affecting thinking" which regulate "the articulation of strategy and knowledge" (Pressley, 1998). It is also the primary enabling state for learners to be able to work independently and flexibly. Thus metacognition is the ability to reflect upon, understand and control one's learning. Learners therefore, should reflect on their learning and intentionally apply the results of reflection to further their learning. This reflection needs to be across several areas such as:

- making sense of the task
- knowledge of strategies and methods, how and when to use them
- knowledge and understanding of thinking processes
- monitoring and evaluating learning from the success (or otherwise) of chosen strategies or methods
- making connections across contexts

Once learners have articulated their thoughts and reflected on the process, the strategy they have used could well be taken into another context or lesson. This transfer of strategies, or linking learning, is essential if learners are to make meaningful progress. In this case, learners need support initially to structure their thoughts so that they can reflect on the thinking processes they have used.

The high level of awareness that characterises metacognition is associated with a desire for self knowledge, whereas low self-consciousness breeds intellectual defensiveness. Metacognition is often associated with stable psychological states such as Intelligence Quotient (IQ). However, rather than being developmentally fixed, research is showing that the acquisition of metacognition may be subject to instructional intervention.

Main features of metacognition

Metacognition can be considered to have the following features:

- connecting new information to former knowledge
- selecting thinking strategies deliberately
- planning, monitoring, and evaluating thinking processes

Each of the features above define some aspects of monitoring and control. Connecting new information with former knowledge is primarily driven by the context of learning, and within a framework of skills inherent in a specific task. Thus it is an integral domain to specific skills. The second involves the actual development of metacognitive strategies applied to a task. Planning, evaluating and monitoring, however, define the internal processing used to support the acquisition of the domain to specific skills and inform the application of regulatory strategies. These can therefore be considered key to the whole process of metacognition.

How to develop metacognition in the classroom

One of the ways of promoting metacognition is through assessment. Haefner (2004) describes an approach to assessment that engages planning, monitoring and evaluation, through three

different mechanisms of assessment feedback. These engage students in setting goals, evaluating their own performance and monitoring their understanding through techniques that are internal, such as self assessment, parallel such as peer collaboration, and external, such as teacher feedback.

This is done by engaging various forms of feedback in a formative way, where the criteria for learners judging the value of their work is negotiated over a school term. For most learners, teamwork is often needed to complete developmental projects that illustrate the learners' technical/content skills learnt throughout the course of their study, as well as professional skills needed by employers and other stakeholders. However, learners often complain about team based assessment, despite the fact that some learners work harder than others, the whole team is still given the same marks. Hence there is need to develop a learning environment which can help promote fair and equitable teamwork, while at the same time integrating the planning, monitoring, and evaluation inherent in metacognitive development through internal, external and parallel feedback.

How to apply the skills of metacognition

Metacognition consists of three basic elements:

- developing a plan of action
- maintaining/monitoring the plan
- evaluating the plan

Before - When you are developing the plan of action, ask yourself:

- What in my prior knowledge will help me with this particular task?
- In what direction do I want my thinking to take me?
- What should I do first?
- Why am I reading this selection?
- How much time do I have to complete the task?

During - When you are maintaining/monitoring the plan of action, ask yourself:

- How am I doing?
- Am I on the right track?
- How should I proceed?
- What information is important to remember?
- Should I move in a different direction?
- Should I adjust the pace depending on the difficulty?
- What do I need to do if I do not understand?

After - When you are evaluating the plan of action, ask yourself:

- How well did I do?
- Did my particular course of thinking produce more or less than I had expected?
- What could I have done differently?
- How might I apply this line of thinking to other problems?
- Do I need to go back through the task to fill in any "blanks" in my understanding?

It is essential therefore that metacognition happens throughout the learning process, rather than being end-loaded. By embedding metacognition throughout learning, learners are better placed to reflect on their decisions and make amendments and adjustments for improvement in real time. In addition, end-loading the metacognition can result in much confusion and poor quality reflection as the time-frame for reflection over a number of decisions and activities which have been taken in the meantime may be far too great. It is essential then that the reflective process is purposeful. Too frequently, 'reflection' is confused with a plenary; at that point any suggestions made for improvement are unlikely to be invoked as many learners feel that the opportunity has passed and the 'activity' completed. By embedding metacognition as an integral ongoing element of learning, action on feedback is immediate and decision-making processes are fresh in the mind.

In order to maintain the flow of metacognition as learners respond to tasks,

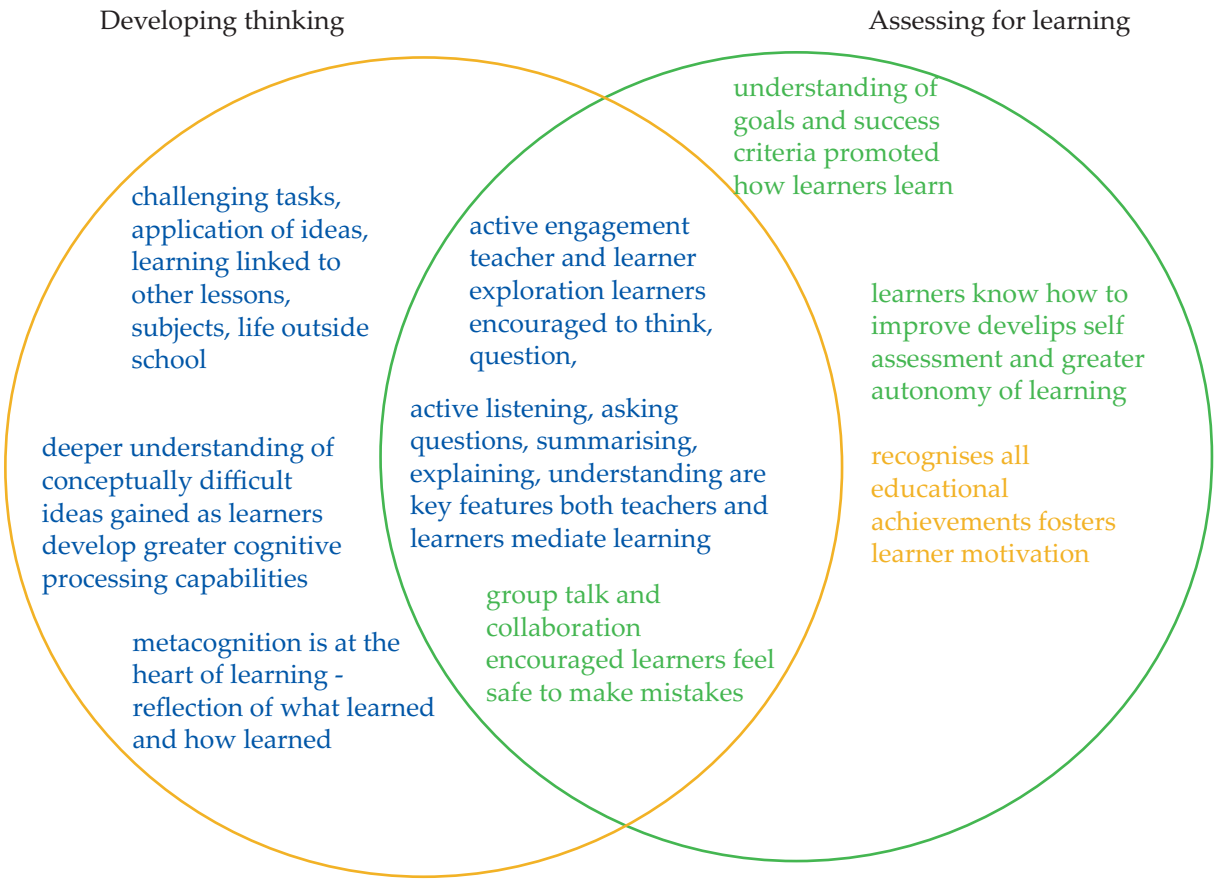
they need to be asked questions such as, 'Why do you think that…?', 'Where did you get that idea from?', 'How did you work that out?'. This ensures that they focus on thinking about their thinking, and in time, will ask these questions of themselves. Quality metacognition is a core element of both developing thinking and assessment for learning pedagogy. It is therefore critical to manage this process effectively in order to further the learning process.

Assessment in active learning

Assessment in active learning creates a context for the learners to engage with the material at a deeper level. Another benefit is that the teacher can get immediate feedback on the learners' understanding and adjust the presentation accordingly. Furthermore, assessment in active learning counteracts learners' short attention span that usually wanes.

Characteristics of lessons that develop thinking and assessment for learning

The following diagram summarizes the characteristics of lessons that develop thinking and assessment for learning in the classroom.



Adopted from Ifanc, C & Wales, Y (2010)

The diagram above shows that:

- learners are actively engaged in lessons from the very start
- developing thinking and assessing for learning are inextricably linked so that development in one influences the other
- similar strategies may be employed to promote the quality of thinking and learning
- teachers and learners explore, and take into account:
  - what learners already know
  - what learners can do
  - what strategies may be useful to tackle a problem
  - learners' misconceptions
- learners are encouraged to think, question and talk
- teachers and learners need to actively listen, ask questions, summarise and explain their understanding
- teachers and learners play a key role in mediating learning experiences, through active listening, asking appropriate questions, summarising and explaining understanding

Common characteristics in assessment for learning

- provides immediate feedback to the teacher and the learner
- actively involves the learner in the process: learner understands the feedback and can explain what needs to happen next in his or her learning
- teacher and learner collaborate to establish personal growth goals. (this allows for corrective, non-judgmental feedback)
- provides the teacher with information he/she can use to plan instruction, feedback, enrichment and remediation activities
- motivates learners: provides opportunities for success that reinforces learners' efforts. Learners begin to see the correlation between their focused effort and progress, producing hope for "closing the gap"
- low achievers generally make more gains than higher achievers. This motivates and provides them with hope for success

Conclusion

The ultimate role of classroom assessment is to stimulate learning through critical thinking. A number of ways have been discussed through which assessment can help to develop learners' thinking capabilities. This chapter has also looked at the relationship between metacognition and assessment. Due to the increasing need for learners to have a broad base of generic skills that can be applied to the diverse and constantly evolving world of work, the value of metacognition as a means for learners to regulate their understandings and develop new strategies for learning has become paramount. Classroom assessment has become a means of providing support for the development of the planning, monitoring, and evaluation inherent in metacognition. This makes learners perceive themselves to be operating at a reasonably high metacognitive level and they can also see the value of assessment in promoting self monitoring.

References

Angelo, TA and Cross, KP (1993). *Classroom assessment techniques: a handbook for college teachers* (2rd ed). San Francisco: Jossey-Bass Publishers.

Ifanc, C and Wales, Y (2010). *Why develop thinking and assessment for learning in the classroom*? Cardiff: Welsh Assembly Government.

Johnstone, H and Percival, F (1976). *Attention breaks in lecture: education in chemistry*. 13 (2), 49-50.

Kalish, A (1996, January). "A change-up sampler" *in Newsletter of the national teaching and learning forum*, 5 (2), [CD-ROM]. Oryx Press: Phoenix, AZ.

Luca, J and McMahon, M (2004). *Promoting metacognition through negotiated assessment*. In R Atkinson, C, McBeath, D Jonas-Dwyer & R Phillips (Eds). *Beyond the comfort zone: proceedings of the 21st ASCILITE conference* (pp. 562-570). Perth, 5-8 December.

Magnan, R (Ed) (1990). 147 *Practical tips for teaching professors*. Madison, Wisconsin: Atwood Publishing.

Middendorf, J and Kalish, A (1996, January) '*The change-up in lectures' in Newsletter of the national teaching and learning forum*, 5 (2), [CD-ROM]. Oryx Press: Phoenix. AZ.

CHAPTER 5
Principles of active learning and critical thinking

Introduction

There is a close connection between critical thinking and active learning. This chapter shows how active learning is related to critical thinking, explains the need for active learning, discusses the principles of active learning and explain how instruction for active learning can be organized. Suggestions will also be made for classroom arrangements that foster active learning in order to develop thinking classrooms.

Active learning as a critical thinking approach

"*Active learning describes a teaching approach in which learning is encouraged by actively engaging with the learning process, or put more simply, learning through doing*" (Gibbs, 1988).

Active *teaching and learning* involves the use of strategies which maximize opportunities for interaction. Fletcher, (2005) states that a useful way to view active learning is in contrast with the transmission model of teaching. In the transmission model, learners are only passively involved in the learning process, usually as observers of a teaching 'event'. In contrast, active learning encourages learners to make sense of information by engaging in the learning process through participation in a structured learning activity to obtain desired learning outcomes. It offers opportunities for interaction between teachers and students, amongst the students themselves, as well as between students and the materials.

Active learning and critical thinking lead to the development of usable knowledge (Temple, 2001). This is crucial in a young democracy such as Malawi's where students have to develop the values, attitudes and dispositions for democratic living rather than just being dictated to and passively following. Critical thinking is similarly an active, questioning, engaged interaction between teachers and students, among students, and within each individual learner, (Klooster, et al, 2001).

Principles of active learning

Active learning is based on the principles of constructivism and other theories of learning. Constructivism is based on the principle that an individual constructs his/her understanding of the world by reflecting on personal experiences. It applies the general principle that learners use their prior knowledge to construct the meaning of new content.

An individual constructs mental models which he/she uses to make sense of experiences. Constructivism originates from the works of Gardener, Sternberg, Vygotsky, Piaget, and others. It is a break-away movement from the traditional model of learning known positivism that had dominated higher education for many years. Positivism was based on the belief of absolute knowledge (objective reality) which existed independent of human perception. The teacher's job was to transmit this knowledge to the student. Lecturing was the main method of knowledge transfer. The student's job was to absorb whatever was lectured to them.

In constructivism, the assumption is that knowledge is constructed by the learners as they attempt to make sense of their experiences.

The following principles are necessary for effective instruction in constructivism:

- Instruction should build on experiences and content that students are familiar with. New material should be presented in the context of its intended real-world applications.
- materials should not be presented in a manner that requires students to alter their cognitive models abruptly and drastically.

- Instruction should involve students working together in groups. This idea is mostly apparent in social constructivism, which supports cooperative learning and collaborative learning
- Instruction should require students to fill in gaps and extrapolate material presented by the teacher. The idea is to remove dependence on the teacher as a source of primary knowledge and make students self- learners.

Joel Michael (2006) maintains that the following five principles of active learning ought to be incorporated in teaching programmes:

Learning involves the active construction of meaning by the learner

This principle involves the fact that students link new information with information that they already know. New and old information are assembled into mental models. If the old information is faulty, that compromises the learning of new information. "Learning can be thought about as a process of conceptual change in which faulty or incomplete models are repaired."

Learning facts and learning to do something are two different processes

This explains why students can know a set of facts and still be unable to apply those facts to solve a problem. If students are to successfully use knowledge, they must have opportunities to practise and obtain feedback. A variety of other instructional advice follows from this principle, including the fact that students who are learning to solve problems need to know more than whether the answer is right or wrong. The sequence of problems from easy to hard is also important. Students should only move to harder problems as they develop. Moving students too fast or before they are ready compromises their efforts to learn.

Some things that are learned are specific to the domain or context in which they are learned, whereas other things are more readily transferred to other domains

The issue is knowledge transfer and whether students can take what they know about one subject, topic or situation and transfer that knowledge to another subject, topic or situation. There is growing recognition that transfer involves skills that students need to develop. Learning by doing (active learning) promotes this transfer of knowledge.

Individuals are likely to learn more when they learn with others than when they learn alone

This is based on impressive research findings in different disciplines that support the power of getting students to work together to learn. "What children can do together today, they can do alone tomorrow." Vygotsky

Task 1
Why do you think this makes learning more effective?

Meaningful learning is facilitated by articulating explanations, whether to oneself, peers, or teachers.

Speaking requires that the person should first organize thought to ensure that the subject matter makes sense to him/her. Deriving meaning on a subject matter is key to effective learning. Hence articulating an answer, an idea, or a level of understanding aids in learning. The speaking or writing makes clear to the learner what they do and don't understand, and/or their understanding deepens as they frame a description that is meaningful to them.

Rationale for active learning

The case for active learning is well presented in the famous words of Confucius:
I hear and I forget.
I see and I remember.
I do and I understand.

There are a lot of benefits that accrue to the individual learner as well as the rest of the class through the use of active learning.

Task 2

1 Study the benefits of active learning listed below and state briefly what you understand by each.
2 For each item, indicate whether it has a bearing at individual or classroom levels.

Benefits of active learning

- Learners link new knowledge to existing information in ways that make sense to them.
- Active learning allows learners to commit new information/knowledge to long-term memory.
- Active learning gives learners opportunities to create meaningful uses of knowledge as they manipulate resources that support the planned activities.
- Active learning facilitates the transfer and application of knowledge to different situations because of the in-depth understanding achieved from the activity.
- Learners are more likely to find personally meaningful solutions to or interpretations of problems.
- Learners receive more frequent and more immediate feedback.
- Learners increase their self-confidence and self-reliance.
- For most learners, it is more motivating to be active than passive in the learning process.
- A task that learners have done themselves, or as part of a group is more highly to be valued.
- Learners' conceptions of knowledge change, which in turn has implications for cognitive development.
- Learners who work together on active learning tasks learn to work with other people of different backgrounds and attitudes.
- Active learning is stimulating and enjoyable, which makes learning easier.
- Learners learn from each other's contributions, which add value to the whole lesson and places everyone in a position to benefit from their participation.
- Active learning makes each learner responsible for his/her own learning since the quality of learning depends on the individual's interpretation of the knowledge and how they apply it to their own circumstances.
- It turns participants into generators of knowledge or information, and this encourages ownership.
- It encourages inductive reasoning since answers are not given, but explored. It is during this exploration of ideas that much of the learning takes place.
- It allows for immediate correction of failure since students are able to get immediate feedback during activities from others going through the same experience.
- Students are more attentive in class when they participate, focusing on issues at hand so that they produce a more reasonable response to share with the rest.
- It empowers the individual learner when he/she becomes the source of information.
- It promotes a better understanding of concepts, especially through the sharing of ideas and cross commenting.
- It evokes learners' creativity as they manipulate the resources that support the planned activities.

Organizing instruction for active learning

This section provides examples of ways to structure lesson activities to maximize learning. Three phases, as shown in the diagram below, of a lesson will be examined. This is the ABC structure of a lesson.

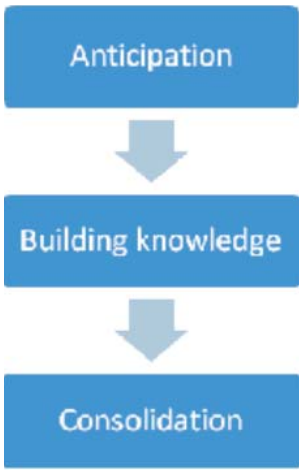


Figure 1: The ABC lesson structure

The anticipation phase

This is the first part of a lesson, also known as the introduction stage in Malawi schools. Some authors call it the orientation phase, but the activities are the same. Basically learners are directed to think and ask questions on the topic they are about to study.

Specifically, the anticipation phase involves the following:

- gaining learners' attention through the use of voice, gestures, eye contact, and other strategies
- creating a safe learning atmosphere
- activating the knowledge that learners already have
- evaluating the degree of learners' prior knowledge on the topic/lesson
- structuring the lesson
- arousing motivation, enthusiasm or curiosity on the lesson
- sharing the rationale (justification, importance or need) for the topic/lesson
- linking the lesson with previous work
- making a connection of the topic to daily experiences
- showing direction and ways of proceeding with the task/topic/lesson

The anticipation phase serves to:

- establish pre-requisite knowledge on the topic among learners
- assess what learners already know
- set purposes for learning
- focus learners' attention on the topic
- provide a context for understanding new ideas

The building knowledge phase

This phase of a lesson is commonly referred to as development phase in Malawi's classrooms. In this phase, the teaching leads learners to inquire, find out, make sense of the material, answer their prior questions, frame new questions and answer them. The learning activities in this phase help learners to develop their own understanding, their own knowledge. Hence, many authors call this phase the construction phase.

Specifically, during this phase, learners are primarily involved in:

- acquiring knowledge
- practising skills
- inquiring
- analysing content
- structuring (categorizing, comparing)
- sharing ideas and providing feedback
- modifying their existing knowledge and beliefs
- creating knowledge
- drawing conclusions

The building knowledge phase serves to:

- compare learner expectations with what is being learned
- revise expectations or raise new ones
- identify the main points
- monitor personal thinking
- make inferences about the material
- make personal connections to the lesson
- question the lesson

Consolidation phase

This phase is also known as the conclusion. Some scholars refer to the phase as the evaluation phase. The terminology really depends on what you wish to emphasize as the lesson ends.

What is important is that once learners come to understand the ideas of the lesson, there is still more to be done towards the end of the lesson. Teachers want learners to reflect on what they learned, ask what it means to them, reflect on how it changes what they thought, and ponder how they can use it in their daily lives.

The consolidation phase involves:

- reviewing major learning points
- reviewing sequences and procedures through questions
- summarizing key points
- evaluating the product (what learners learned)
- evaluating the process (ie how it has been learned)

The consolidation phase serves to:

- summarize the main ideas
- interpret the ideas
- share opinions
- make personal responses
- test out the ideas
- assess learning
- ask additional questions

Organizing the classroom environment for active learning

Classroom arrangement is an important factor in facilitating active learning. It is essential that learning space, whether it is within a classroom or under a tree, be arranged to facilitate activity-based teaching and learning. The traditional fixed seating arrangement, (see figure 2 below), where learners sit in neat rows facing the teacher (marked X) cannot effectively support the various forms of learner interactions that are vital for active learning.

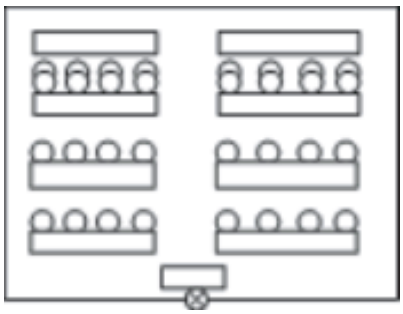
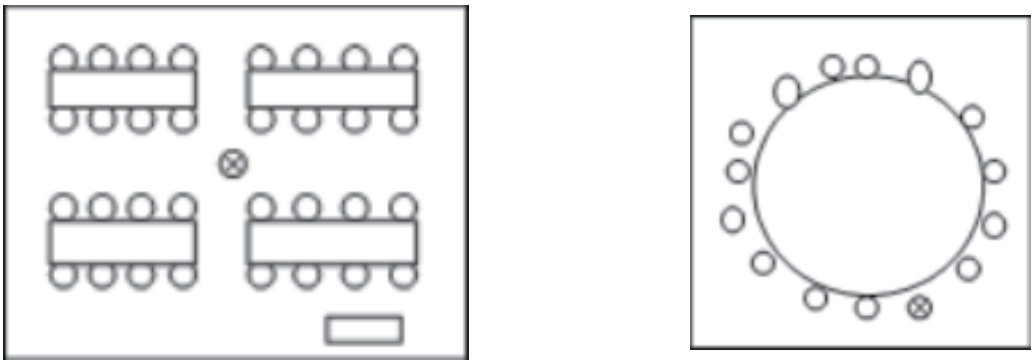


Figure 2: The traditional classroom seating plan

This design of learning space is only suitable for listening to the teacher. Unfortunately, listening to the teacher is not the best approach for active learning. The seating arrangement may actually hinder active learning.

Task 3

1 How might the traditional seating plan hinder active learning?
2 Suggest alternative seating plans that you think can facilitate active learning.
3 Study the seating plans shown in figures 3(a) and (b) and explain how each might promote active learning
4 What do you think are the essential factors to consider when organizing the classroom environment for active learning?



a b

Figure 3: Seating plans that promote active learning

In 3 (a), the seating plan may only be suitable for small group discussion. The teacher is not stationary at his/her table. She circulates around the room to observe the groups, answer questions and offer guidance.

In 3 (b), the arrangement is suitable for whole class discussion. The teacher is also sitting around as one of the discussants.

Key considerations when organizing a classroom environment for active learning include:

- involving learners in planning how to organize the room
- involving learners in creating and maintaining the classroom environment. This helps them to develop planning skills, responsibility, and feelings of self-worth.
- providing a classroom arrangement that reflects the wide variety of active learning approaches that may be used.
- considering both safety and ease of access when placing furniture and storing materials and equipment
- considering the best spot to place movable furniture so it can be moved when extra space is required
- planning space for individual, small and large group activities
- evaluating the learning environment continuously and adjusting the arrangement if students' needs require it
- involving learners in the development of class rules of conduct
- placing things to provide an attractive, stimulating and motivating learning atmosphere

Conclusion

Active learning applies constructivism learning theory. This chapter highlighted the principles and benefits of active learning. The chapter also examined how lessons can be structured using the ABC approach and how classrooms can be organized to maximize the use of active learning.

References

Crawford, A, Saul, EW, Mathews, S and Makinster, J (2005). *Teaching and learning strategies for the thinking classroom*. New York: Open Society Institute

Fletcher, S (2005). 'Engaging students in active learning: case studies in geography, environment and related disciplines' in *Journal of geography in higher education*, Vol. 29, No. 2, 313-315.

Gibbs, G (1988). *Learning by doing: a guide to teaching and learning methods*. Further Education Unit, GB.

Klooster, D (2001). *What is critical thinking*? *and how can we teach it*? Hope College.

Michael, J (2006). 'Where's the evidence that active learning works?' *Advances in physiology education*. 30, 159-167

Prince, M (2004). *Does active learning work? a review of the research. Journal of engineering education*, 93 (3), 223-231.

Schwartz, S and Pollishuke, M (1991). *Creating the child-centered classroom*. Katonah, NY: Owen, RC.

Temple, C (2001). *Critical thinking across the curriculum*. New York: Open Society Institute.

CHAPTER 6
Indigenous knowledge systems and critical thinking in Malawi

Introduction

Indigenous knowledge is broadly defined as information or data that a local grouping or community amasses over generations of life. Such knowledge is discovered or produced by the community and covers the whole spectrum of life including food processing and consumption, conflict resolution, dealing with disasters, survival techniques and gender issues.

This chapter focuses on aspects of indigenous knowledge that promote and improve critical thinking. It also explores aspects of indigenous knowledge that inhibit critical thinking and ways in which aspects of indigenous knowledge that promote critical thinking can be integrated into the school curriculum.

Aspects of indigenous culture that promote critical thinking

The indigenous knowledge system in Malawi contains a number of aspects that demonstrate critical thinking. These aspects include proverbs, riddles, similes and metaphors which are expressed in daily dimensions of indigenous life such as initiation and wedding ceremonies, traditional justice systems, poetry, story-telling and other cultural forums and practices.

Klooster (2001) defines critical thinking as independent thinking, and thinking that begins with questions or problems to be solved. In Malawian tradition, men and women raise questions and tackle problems using indigenous knowledge. Some of the questions raised and ways used to resolve the problems use critical thinking skills. The following cases serve as examples of practices and traditional customs that underpin critical thinking.

Riddles

Riddles are one aspect of indigenous culture that is typically used to demonstrate critical thinking. A riddle is a statement with a cryptic or hidden meaning. Its purpose is to test and develop critical thinking. Older men and women use riddles to test and develop critical thinking in their children. In villages, children gather around a fire before bed time to listen to the elderly people as they pose riddles that stimulate critical thinking. The following are some examples of riddles.

Activity 1

Riddle	:	I eat all kinds of food, but when I drink water I die. What am I?
Answer	:	Fire
Riddle	:	My father's hut has one pillar in the centre. What is it?
Answer	:	A mushroom.
Riddle	:	I carry my house wherever I go.
Answer	:	A tortoise or snail

Fire

Mushroom

Tortoise

Snail

Activity 2

In your groups:

1 Identify other riddles that you have heard from parents, relatives and friends.
2 Share the riddles with the rest of the class.
3 Develop your own riddle (ie which has never been heard before).
4 Share the new riddles with the rest of the class.

Proverbs

Proverbs are wise sayings which are based on personal experiences, age, and culture and serve to promote moral values, knowledge and skills. They can also be used to inspire young ones to develop good habits such as a good work ethic. The following are some Malawian proverbs.

Chichewa proverb : *Chikomekome cha nkhuyu, mkati muli nyerere.*
English equivalent : All that glitters is not gold.

Chichewa proverb : *Wadya zake alibe mbiri.*
Meaning : It is safer to use your own things than somebody else's, in case they get damaged.

Chichewa proverb : *Walira mvula walira matope.*
Meaning : Stay the course after you have made the decision because good things may come with challenges.

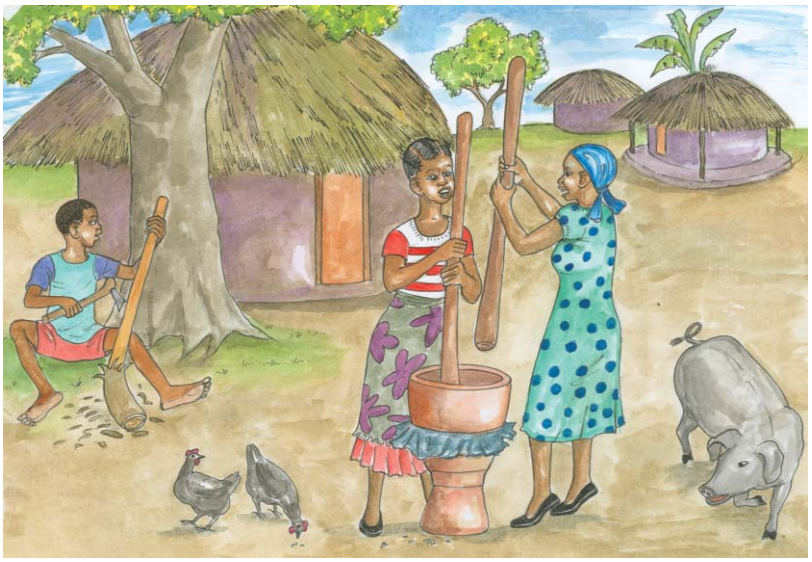
Chichewa proverb : *Chitsime chimadziwika kuya kwake chikaphwela.*
Literal meaning : The depth of the well is noted when the water in it has dried up.
Metaphorical meaning : There is a tendency to overlook the good services that a person renders at home or in society which are only appreciated when that person goes away.

It takes critical thinking to interpret and apply proverbs like these in life. Proverbs are a very quick reference point when making decisions or making a counter-argument in resolving a dispute.

Pounding songs

Pounding songs are those that women created and used before the use of maize mills. Pounding songs served two purposes. The first purpose was to motivate the women as they do the hard work of processing maize or other dry legumes to flour using a mortar and a pestle. The women could do this work alone or in pairs. Sometimes three women could skilfully pound into one mortar while singing songs.

The second purpose of pounding songs was satirical. The women used the songs to describe situations such as difficulties in marriage including gender-based violence, poverty, discrimination and other problems in a non-violent manner. This is the reason why some of these songs were original in nature and depicted serious and sensitive personal situations. The lyrics, the rhythm and the setting of the songs were carefully chosen to ensure that the messages were noted by the intended audience, ie, the husband. This was a wise way of communicating issues, fears and aspirations without confrontation.



Examples of such pounding songs included the following:

Pounding song on sterility

Ife tangugona, ee x2
Anzathu akuti akwatiwa, ee x2
Ine mun'gulire wailesi, ee x2
N'ziyesa mwana m'kachoka, ee

Pounding song on discrimination

Kwathu sungan'telo iwe
Kuno nkwanu monaunditeroee [Repeat]

Pounding song against greed

Ndakwatiwa ndi kamnyamata, kodya kasiya x2
Ndakwatiwa ndi kamnyamata, kodya kasiya x2

Chorus

Chilimwanga chimgubidi x2
Changuti tolu gali x2
Ngati aphika achimana x2
Ndakwatiwa ndi kamnyamata, kodya kasiya x2
[Repeat]

Activity 3

1 In your groups, discuss other traditional songs that intend to correct a negative situation in a family or society using non-violent ways.
2 In pairs, compose a song whose purpose is to correct a negative situation in a family or society using non-confrontational ways.

The lack of such communication strategies in the modern world of the maize mill and urbanization might explain why there is rampant gender-based violence targeting women. An innocuous way of communicating feelings, fears and aspirations to husbands has probably been lost with modernization.

Folktales

A folktale is a story usually with a moral lesson passed on from one generation to another. One of the folktales that depict critical thinking in Malawian indigenous culture concerns a man who set out on a long journey on foot. His baggage included a sack of maize, a goat and a leopard. After walking a long distance, he came across a river which was quite deep and without a bridge. He stopped on the banks of the river to think critically about how to cross it with his baggage. He had one big challenge: which piece of baggage to take across the river first so that none of the baggage pieces gets damaged or destroyed. For instance, if he takes the bag of maize first across the river leaving behind the goat and the leopard, the risk is that the leopard will pounce on the goat and kill it while he is in the middle of the river. If he takes the leopard first and leaves the goat and the bag of maize, the risk is that the goat may eat the maize.

So he decides to do it this way: He takes the goat first across the river leaving behind the leopard and the bag of maize, because leopards do not eat maize. When he returns he takes the leopard across the river. As he returns he takes with him the goat back to the other side of the river. Then he takes the bag of maize across the river and leaves it with the leopard. Finally, he goes back and takes the goat across the river, and continues with his journey.

Activity 4

1 In groups, discuss other stories that reflect critical thinking in decision making.
2 Share the stories briefly with others in your class.
3 Create your own story which depicts elements of critical thinking.

Critical thinking for problem solving in non-violent ways

Klooster (2001) also perceives critical thinking as a situation where learners try to find solutions to their own problems and try to support those solutions with good arguments and convincing reasons. The pertinent question to ask here is: To what extent does the indigenous cultural system in Malawi advocate for such an approach to problems? Learners need to see how the traditional customs and practices that promote critical thinking through reasoned arguments interface with the knowledge, skills and values learned in school. This home to school connection can easily enhance acquisition of school-based knowledge, skills and values. The following are some of the case studies depicting attempts to resolve problems using non-violent ways.

Mr Chipewa finally makes his point

When Mr Chipewa married, he lived at his wife's home in Mapapaya Village. During meal times, he and his father-in-law ate on the same mat, but from different dishes. For a long time he noticed that his share of *nsima* was always smaller than his father-in-law's, although they laboured equally in the maize field during the crop-growing season. He knew that confronting his father-in-law, or his wife or mother-in-law about this issue was going to be uncivil. He therefore, thought of a way of expressing his feelings to everybody without being confrontational.

One night when the two dishes of *nsima* were placed on a mat in the father-in-law's hut, he went in and threw the food on the floor and went out of the hut. The next person who entered the hut to continue setting the dinner was his mother-in-law. She was shocked to see the dishes tipped over. When she asked Mr Chipewa what had happened, he explained that he was chasing a big rat that had jumped over his 'small dish' and then later jumped over his father-in-law's 'big dish'. Said Mr Chipewa, '*Ndimathamangitsa khoswe amene analumpha kansima kangaka, kenako nkulumpha chinsima cha apongozichi*'.

When the mother-in-law heard this statement, she was even more shocked. She clearly noted that Mr Chipewa was dissatisfied with his share of nsima, which is the reason why he had thrown the food on the floor. From then on Mr Chipewa got his fair share of nsima. In this way, Mr Chipewa had made his point clearly through critical thinking, without confronting his oppressors.

Aspects of indigenous culture that inhibit critical thinking

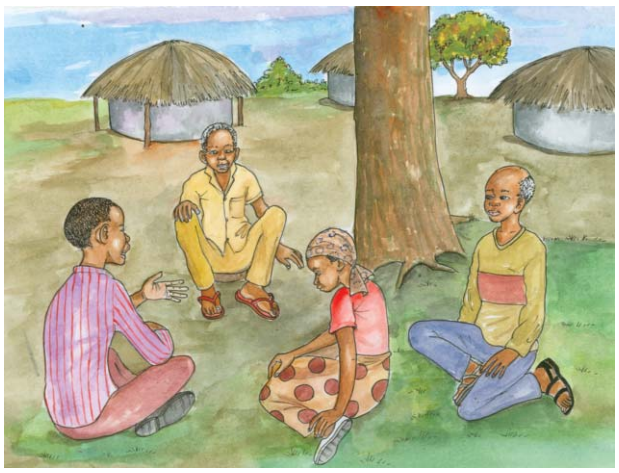
There are many aspects of indigenous culture that tend to inhibit critical thinking. These inhibitions are subtly embedded in issues such as gender, religious beliefs, politics, social status, dependence syndrome and age. Since critical thinking is also social thinking where ideas are tested and improved upon as they are shared with others, the need for freedom of expression and association among learners is critical. However, research/observation shows that some customs, beliefs and values propagated by indigenous culture do not allow such free expression and association. Gender and gender-based violence, religious beliefs, politics, social status and age are areas where such inhibition of free expression and association are clearly expressed.

Gender aspects that inhibit critical thinking

In societies where women are considered inferior to men, the women are denied opportunities to participate in decision-making and hence are denied the opportunity to be critical thinkers. Even when present in forums where critical issues are discussed, women are expected to remain silent and listen to men deliberating on the issues. This becomes even more ironical when such decisions concern the women themselves. For example, in societies where wife inheritance is practised, women do not participate in decisions that concern them. Even if the woman does not like the man being proposed to inherit her, or does not like the whole idea of wife-inheritance for that matter, she is expected to remain quiet, and not make her decision known. The story below illustrates the point.

Namaseko and Chidindo

Namaseko's husband has died after a long illness. The cause ofhis death are well known: he was HIV positive. According to the cultural practices of the Kongoro people, Namaseko is required to marry one of her husband's brothers after the funeral ceremony. Chidindo, a young man aged 21 who is in secondary school has been nominated by a group of elders to inherit Namaseko. He is clearly excited about the idea and he has even declared that he will drop out of school in order to 'take care of' his beautiful sister-in-law. Namaseko is, however, aware of the negative consequences of marrying Chidindo for two reasons. First, she knows that the marriage might put Chidindo in danger of being infected with HIV since her husband died of AIDS. Second, she feels that it is not wise for Chidindo to drop out of school just for the sake of marriage. She, therefore, makes an attempt to speak to the elders against the arranged marriage but the elders are not ready to listen to her. They point out that according to the tradition of the Kongoro people, women are not supposed to contradict what the elders have decided. So they decide to go ahead with the marriage ceremony.



Activity 5

In groups, discuss the character(s) in the case study:

1 that display(s) critical thinking skills to deal with their situations, and give reasons why you think so
2 that display(s) a lack of critical thinking skills to deal with their situations, and give reasons for your answer

Religious beliefs

Most Malawians practise certain forms of religion. The religious beliefs, values and practices that characterise these religions are numerous and varied. However, what is common to most religions is the tendency to avoid critical thinking when dealing with particular issues that concern the practitioners of a particular religion. One of the infamous cases in point is the tendency by certain religious groupings to disallow its members to seek medical attention when ill, which often leads to fatal consequences. The following case illustrates this point.

The fatal beliefs of the Eden One religious sect

Mr Kantheni and his family belong to a religious sect known as Eden One. Members of this sect are barred from seeking medical attention at the hospital or any other medical centre. Their children are also barred from attending school. One hot summer, there was a breakout of measles in the village. Most of the children in the village were infected including children of the members of Eden One. The health officials from the district health office mounted a campaign to treat and vaccinate all the vulnerable children in the village. However, they met fierce resistance from members of the religious sect who refused to have their children treated although many of them had been infected by the disease. By the time the outbreak ended all the children who had not been treated by the medical officials died. Most of them were from Eden One, including Mr Kantheni's two children.

Activity 6

In your groups:

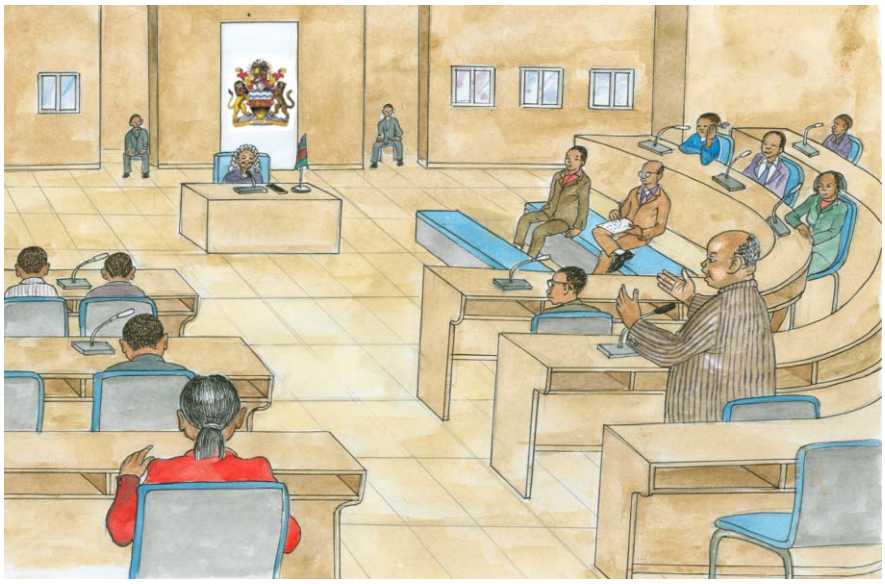
1 Discuss the beliefs of the Eden One religious sect, describing the fatal consequences of such beliefs.
2 Discuss how critical thinking could mitigate the impact of the fatal consequences of the beliefs.

Politics

Politics can suppress critical thinking. Many politicians in Malawi and probably in many African countries seek cheap popularity by focussing their attention on projects and strategies that serve their own political ends at the expense of the people who put them in office. Most of these politicians do not think critically in order to find ways that serve the wider population in their constituency or nation in sustainable ways. Consequently, they devise quick fix strategies to the challenges affecting the people under their charge, which do not address the root causes of the challenges faced. The following is a story that reflects a situation in which politics suppresses critical thinking.

Honourable MP Chigamba in Parliament

Honourable Chigamba is a member of parliament for Chawe Constituency. He notices that many of his constituents are infected by HIV and most of them are dying of AIDS. When he shares his challenge with one fellow member of parliament, she tells him that many MPs are facing the same challenge in their constituencies. She, however, advises him to seek assistance from government to procure life-prolonging drugs called Anti-Retro-Viral (ARV) drugs and make them available at the hospitals and health centres in his constituency.



When MP Chigamba visits the mortuaries at different hospitals and health centres, he discovers that most of them are full, with some corpses piled up in one freezer. "A dead person still deserves some dignity", Chigamba muses. Ignoring the fellow MP's advice, MP Chigamba decides to move a motion in parliament to request government to construct more mortuaries in the country. "Mr Speaker, Sir, since many people in this country are dying of this deadly scourge AIDS, I would like to ask government to construct more mortuaries in all the constituencies," MP Chigamba says. Surprisingly, the whole august house gave MP Chigamba a thunderous applause with, "Hear, hear, hear!"

Activity 7

In your groups:

1 Identify the character(s) in the story that you think are critical thinkers, citing reasons why you think so.
2 Discuss the characters that lack critical thinking skills in the case study, giving reasons why you think so.
3 Discuss why the last sentence of the story starts with the word 'surprisingly'.
4 Explain what you think MP Chigamba should do to show that he is a critical thinker.

Thoughtless imitation and lack of independent thinking

Thoughtless imitation, succumbing to peer pressure, jealousy and mindless competition are some of the vices that can have a negative effect on the behaviour, actions and attitudes of people at home, community and even national and international levels. All these vices are mostly underpinned by a lack of critical or independent thinking. The Malawian society has not been spared of the effects of the vices. The following folktale depicts the dangers of thoughtless imitation, competition and a lack of independent thinking.

Kaliwonera adaphikitsa ntchentche

(The copy-cat ended up preparing a dish of houseflies)

In a certain village, there was a man who had two wives. The senior wife, Nabetha, had the tendency of imitating what the young wife was doing, including preparation of food dishes for the husband that they shared. She did not want her co-wife Naduwe to outdo her in food preparation especially the relish. She wanted the husband to eat on her table the same type of relish that he had eaten at

Naduwe's house. So everyday Nabetha sent her daughter to Naduwe's house to inquire about the relish that she had prepared for the husband on that day. Naduwe eventually got so tired of her co-wife's conduct that she decided to give her incorrect information about the relish that she had prepared on that day. She told the young girl, "Well, go and tell your mother that today I have prepared a very delicious dish of houseflies for your father." "But how did you catch the flies?" the girl wondered. "Well," replied Naduwe, "I simply cut myself with a razor blade in many places on my body and sat near the rubbish pit. Many flies came to suck my blood, and that is when I caught most of them."

The young girl rushed home and narrated the story to her mother, who did the same. She caught the flies and prepared them for her husband's lunch. Unlike on previous occasions, the husband visited Nabetha's home first to have his lunch. When he opened the dishes and noticed the strange food he called Nabetha and asked, "What is this strange relish, Nabetha?" "Fried houseflies", Nabetha replied. "Since when did human beings start eating such disgusting food," the husband retorted, while storming out of the hut, leaving Nabetha astonished.

When the husband arrived at Naduwe's house he had a meal with goat-meat, which he enjoyed eating. "Mmmh, this is what I call delicious food, not the strange and disgusting meal that your co-wife has prepared," the husband said. "How can a wife," he continued, "prepare houseflies for relish?"

"Surely, that is very disrespectful, my husband," Naduwe answered. "I wonder what she was thinking," she remarked.

Activity 8

In groups:

1 Identify key lessons in the folktale [These key lessons include dangers of lack of independent thinking, over-trusting, over-dependence and lack of critical thinking].
2 Discuss how critical thinking could have helped in this situation.
3 Tell your own folktales in the same theme or any other theme that show availability or lack of critical thinking skills.

Strategies for incorporating elements of indigenous knowledge, values and skills that have elements of critical thinking into the formal curriculum

It should really go without saying that critical thinking is so crucial to learning that it needs to permeate all aspects of education. Therefore, those factors within the indigenous knowledge system that serves to promote critical thinking need to be included in the school curricula and school life in general. On the contrary, those indigenous knowledge systems that tend to inhibit critical thinking in education need to be challenged as they do not support the schooling and general education of children. The following are some of the ways that schools can incorporate elements of indigenous critical thinking into school-based or formal education:

- ensuring that learners are given an opportunity at all times to think critically

and express themselves freely in school and classroom settings on matters of learning, and are allowed to relate indigenous knowledge, values and skills to the formal curriculum
- including indigenous knowledge, skills and values in the curriculum so that learners see the home-school connection
- including activities in the formal curriculum that allow learners to apply the formal curriculum to improve indigenous technologies and skills such as black-smithing, distillation, song and dance, and art and craft
- developing in the learners the attitude that indigenous knowledge and technologies are not inferior to western forms of knowledge and technologies, but rather that they are complementary, and where resources to purchase western technologies are limited, then indigenous technologies become handy
- including in the curriculum for critical analysis and evaluation those aspects of indigenous culture that inhibit critical thinking

Conclusion

Critical thinking is an essential life skill. It can help in dealing with various challenges and situations that people encounter in life. Aspects of indigenous knowledge such as folktales, proverbs, riddles, metaphors, art and craft, song and dance serve to promote critical thinking which is crucial for problem-solving, decision-making, and peaceful conflict resolution. There are, however, some aspects of indigenous knowledge systems that inhibit critical thinking. These include wife inheritance, spouse swapping and other cultural practices that marginalize women and children; and religious and political practices that brainwash people. Therefore, those aspects of indigenous knowledge that promote critical thinking need to be accentuated while eliminating the aspects that inhibit critical thinking. The school curriculum and other non-formal curricula are powerful vehicles for promoting aspects of indigenous knowledge systems that encourage critical thinking. Learners who think critically are mindful of opportunities to use their critical thinking skills and typically engage these opportunities eagerly – whether in the classroom context or in the world of their own communities.

References

Klooster, D (2001). *What is critical thinking, and how can we teach it*?

Kumakanga, SL (1982). *Nzeru zakale*. Blantyre: Dzuka Publishing House.

Mphonda, AH (1975). *Miyambi yatsopano*. Blantyre: Dzuka Publishing House.

Emeagwali, G (2003). "African indigenous knowledge systems: implications for the curriculum," in ToyinFalola (ed) *Ghana in Africa and the world: essays in honour of AduBoahen*. New Jersey: Africa World Press.

Crawford, A (2005). *Teaching and learning strategies for the thinking classroom*. New York: The International Debate Education Association.

CHAPTER 7
Promoting critical thinking across the curriculum

Introduction

The promotion of critical thinking across the curriculum can help to ensure that learners are active participants in teaching and learning processes. They can participate in many ways such as asking and answering questions, formulating hypotheses, making their own interpretation of data, testing and sharing ideas, thinking critically for themselves and making reasoned arguments. Critical thinking employs a number of classroom strategies that encourages active learning as has been presented in Chapter 3. It is therefore important to promote critical thinking in all subjects of the curriculum to enable learners to become critical thinkers.

This chapter discusses how critical thinking can be applied in different disciplines across the curriculum. The disciplines include languages, mathematics, science, arts and social studies. It also discusses how critical thinking can be applied in integrated teaching.

Critical thinking in languages

In the Malawian school curriculum, core elements are broad themes or topics that learners go through in the school cycle. Core elements also reflect the skills that learners are supposed to acquire throughout their school cycle. Critical thinking forms part of these core elements. There are two languages in the curriculum offered at primary school level and three at secondary school level. English and Chichewa are offered at primary school while English, Chichewa and French are offered at secondary school. According to MOE, (2013), the core elements of languages and literacy (English and Chichewa) include reading, writing, speaking, listening, critical analysis, literary genres, critical thinking and reasoning, and structure and use of language.

It is important that learners have opportunities to make their own interpretations of different information as well as literary works. They should also participate in planned activities in lessons so that they can hear and engage other learners' interpretations. Reading and writing for critical thinking meet these goals.

Goals related to critical thinking in languages

The goals of language and literature study in critical thinking can be summarized as follows:

- It gives learners a common language for referring to and discussing the complex events of human life, including emotions and motives.
- It provides a good forum for learners to learn how other people, coming from different background experiences interpret complex human events.

How reading and writing for critical thinking meet these goals

- Languages give learners opportunities to make their own interpretations of varied information as well as literacy works.
- Languages help learners develop critical thinking skills as they interpret, predict and relate what they read to their own experiences.
- Learners participate in discussions where they share with other learners interpretations of what they have read or written.

How anticipation, building knowledge and consolidation phases can be applied in languages

Anticipation, building knowledge and consolidation phases can be effectively used to promote active and cooperative learning in languages. Active and cooperative learning are advocated for in all the phases so as to make learners understand and interpret literary works and information.

By studying languages, learners gain an appreciation of the forms and history of language and of the author's craft. Language as a discipline provides opportunities where learners can discuss situations that matter as seen from the outside in and the inside out and described by masters of observation and linguistic craft. They can use literary works to deepen their understanding of people near and far. As they discuss the work with their classmates and hear how others respond to them, they can better understand their classmates and themselves. In order to achieve this, active teaching methods must be used. Learners rarely gain insights from listening to the teacher's wisdom. Rather, it is better that they must work for those insights through thinking and discussion. These methods which can encourage this include shared inquiry, discussion web, assigned roles in discussions, role play, drama and dramatic interpretation. The following is an example of how critical thinking can be incorporated in language teaching:

Anticipation phase

The teacher introduces the title of the day's topic.

Teacher : Our topic today is 'Understanding stories'

Learner : Which stories?

Teacher : Any story you can read. What I mean is that when you read a text or a story, you should understand and make sense of it.

The teacher then introduces the title of the story and asks learners to open their textbooks to the page of the story.

The teacher then asks learners what they look for when they read a story or a text. Learners come up with answers such as 'main character or characters', events in the story, main idea or theme in the story and lesson or lessons.

Building knowledge phase

Teacher draws chart on the chalkboard as follows:

Main characters	Theme(s) or main ideas	Lessons

Teacher asks learners to open their textbooks to the page with story 'Elephants and farmers". Teacher tells learners to individually read the story so that they can complete the chart as shown on the chalkboard.

Teacher : 'When you have completed reading and filling the chart, find a partner and share your responses.'

Learners asks : Are there right or wrong answers in this activity.

Teacher asks other learners to respond.

Teacher asks some learners to present their work and other learners with other ideas to add on the list to the chalkboard. Learners are guided to ask questions and to defend their choices reasonably.

Consolidation

Teacher asks learners to do a quick write in the chart. If they need additional points from the chart on the chalkboard. Teacher asks learners what they have learnt about the relationship between wild animals and farmers.

Explanation of the above process

In the anticipation phase, the teacher raises learner's curiosity by asking them how they can make sense of a story. The teacher then

introduces title of the story they will read. On building knowledge, the teacher provides a framework in form of a chart which learners must complete after reading the story. They build knowledge as they are guided on what to look for in the story using the chart headings. The learners will also build knowledge as they put marks on the story. The teacher consolidates the lesson by asking the learners to complete the chart using ideas raised by themselves and others. The teacher goes further by asking learners lesson of the story.

Specific teaching and learning strategies for languages

Languages and literacy use a wide variety of active learning methods that are advocated for developing critical thinking. Such methods include:

- drama and role play-used in dramatizing or role playing a story that has been learnt and analysed
- direct reading and thinking activity – used on a fictious story or any other piece of literacy work
- reflection – used when learners reflect on a role play or drama
- quick write – used for various topics
- brainstorming – individually or paired on any chosen topic to generate ideas
- character map – can be developed after reading a story or listening to a story
- paired reading/paired summarizing – used after reading a story or any other literary piece
- paired reading/choral reading – used for a poem, dialogue or a play
- directed reading activity – used when reading a comprehension passage to identify key ideas and information in a text

Critical thinking in mathematics

Critical thinking is of paramount use in mathematics. Some learners tend to lose interest in mathematics because of the misconception that the subject is challenging. Learners' wrong perspective of mathematics makes their learning of mathematics challenging. This can also be attributed to poor reading skills in handling mathematical problems expressed in words. In today's world of technology, providing easy answers at the touch of a button is highly favoured. Skills such as reading, reasoning, critical thinking and problem solving are important in helping learners to perform well in mathematics.

Goals related to critical thinking in mathematics

The following are some of the goals related to critical thinking in mathematics in the Malawian curriculum. Learners or students should:

- learn mathematical concepts and problem solving strategies
- gain knowledge through problem solving in authentic contexts
- learn in learner directed, experiential, active, and collaborative settings
- use inquiry and discovery, (NCTM, 1994)

How critical thinking can help to meet these goals

- In scientific investigations learners construct their own meanings of concepts.
- Learners, ask questions, collect data or evidence during the investigation processes or steps, analyse data and develop logical explanations for the outcomes.
- Learners solve problems using their own strategies in all the steps of an activity.
- The teacher provides various levels of support and guidance to learners on activities and guides the learners to ask questions make assumptions and draw conclusions.

How A-B-C phases can be applied in mathematics

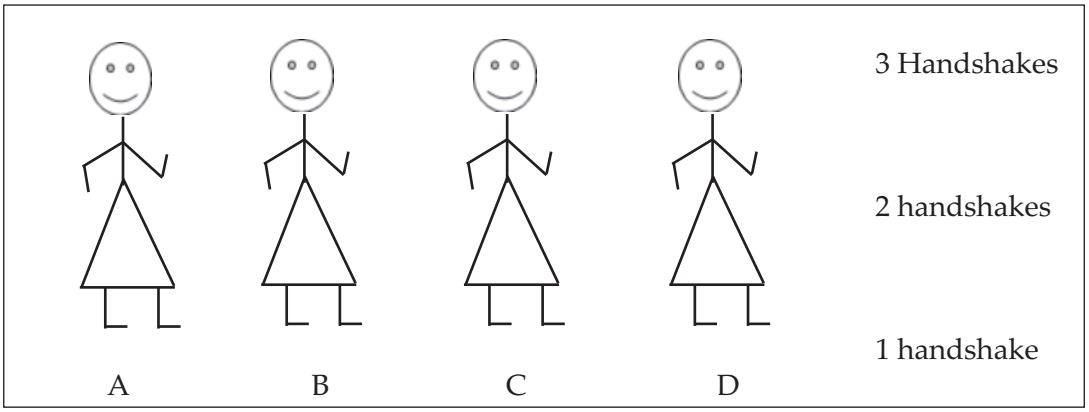
The following is an example of how critical thinking can be incorporated in the teaching of mathematics.

Anticipation

The anticipation phase of a lesson in mathematics can begin with a story or a puzzle, for example:

Suppose there are 4 people in a room. How many handshakes would there be if everyone in the room shook each other's hand once? What about in a room with 100 people?

Several methods can be used to solve this problem. One way is to ask some learners to role play the scenario in their groups while others count the number of handshakes. This can be presented as follows:



Person A shakes 3 hands (B, C and D).

Person B shakes 2 hands since this person has already shaken hands with person A (C and D).

Person C shakes 1 hand (D).

This will give us 3 + 2 + 1 = 6 handshakes.

Building knowledge

However, it will be challenging for learners to solve for 100 people using the same method. It would be tiresome for one to draw 100 people or indeed count all the handshakes one by one. Therefore, a faster approach needs to be found so that it becomes easier to solve for any number.

Consolidation

The illustration above gives a pattern that can be used to solve for 100 people. It follows that person 1 will make 99 handshakes, person 2 will make 98 handshakes … This gives us 99 + 98 + 97 + 96 + 95 +… which would be cumbersome. To make this problem easy a formula needs to be used for more people.

If there were 4 people in a room, each of those 4 would shake hands with 3 others. Thus, we have 4 x 3. However, this would count the handshakes between each pair twice, so we have to divide by 2, resulting in 6 handshakes.

For 100 people, it will be 100 x 99/2 = 4,950. This gives us the formula n (n-1)/2 to solve similar problems.

Explanation and discussion

In the anticipation phase, the teacher divided the class into small and cooperative learning groups and allowed interaction among group members. The role play helped learners to build the concept from concrete experience to the abstract.

In the building knowledge phase, a more challenging problem that can take too long is explored. The teacher does not reveal the solution but rather asks questions to lead learners to derive a formula. He/she helps learners to move from concrete to semi-concrete and finally to the abstract where they can manipulate numbers based on their concrete experience of counting the handshakes.

In the consolidation phase, the teacher discusses with the learners how to come up with a formula that can be used for easy computation when large numbers are involved. This way learners understand how the formula has come about and they can use it with ease. They can also apply it to other situations without too much difficulty.

Specific teaching and learning strategies for teaching mathematics

Anticipation

Strategy	*Example*
Quick-write	Write a description of a circle.
Think-pair-share	"Think of three other ways of solving 9 x ? = 72; pair with another learner; share and compare your responses"
T-graph	Compare and contrast a triangle and a rectangle.

Building knowledge

Strategy	*Example*
K-W-L	What do we know about quadratic equations? What do we want to know about quadratic equations? What did we learn about it?
Venn diagram	Use a Venn diagram to categorise numbers as ordinal, natural, imaginary, etc.
Semantic feature analysis	Construct a semantic feature analysis chart of geometric shapes (features might include the following: angles, sides, opposite angles, right angles and other).
T-graph	Compare and contrast a triangle and a rectangle.

Consolidation

Strategy	*Example*
New problem	Show another way to multiply 16 x 21
RAFT	Assume the role of a geometric figure; write to another figure and explain why you are more attractive

Critical thinking in science

In teaching and learning science, scientific inquiry is mandatory. Scientific inquiry is a way of communicating scientific knowledge that actively engages learners in investigations around larger ideas and central themes. This perspective requires teachers to serve as guides in supporting learner investigations. Learners are provided various levels of ownership over the questions at hand, the methodology, and how they choose to make sense of the data. This enables learners to 'do science' and construct their understanding of scientific phenomena through hands-on investigations.

Goals related to critical thinking in science

The following are some of the goals related to critical thinking in science in the Malawian curriculum:

- engage learners in meaningful scientific investigations
- gain new knowledge through investigations and authentic contexts
- learn in learner directed, experiential, active and collaborative settings
- use inquiry-based teaching strategies
- help learners see science as a way to view and understand the world

How A-B-C phases can be applied in science

Example

The teacher would like to provide an opportunity to his learners to learn about forces and their effects. He wants to concentrate on the meaning of force and its effect of causing movement in objects.

Anticipation

A teacher asks learners to spend three minutes writing about anything they can think of related to the term force. The learners write as much as they can. Then the teacher asks them to share their findings in pairs. She listens to the responses of a few pairs, validating what they say at times but not going into any details about any idea. Then the teacher tells learners that

they will investigate the effects of force on their own.

Building knowledge

The teacher divides the learners into small working groups. The teacher asks the learners to identify materials in the classroom that can be pushed or pulled. The learners identify the materials and try to push or pull them in their small groups. The materials include desks, learners themselves and balls.

The teacher then asks the learners to identify objects that cannot be pushed or pulled. The learners mention the materials such as walls and windows, and try to push and pull them.

The teacher then asks the learners to discuss why other materials can be pushed or pulled while others cannot. She keeps on asking questions to groups of learners as she moves around the room and learners also ask questions on what they did.

Consolidation

The teacher asks the learners to describe what they observed in the last phase/activity. They explain that they were observing some objects being able to move when pushed or pulled while others could not be moved.

The teacher discusses with the learners to establish that a force is a push or pull and that it can cause movements of objects when exerted on them. Later, the teacher asks learners to identify objects outside the classroom that move when force is exerted on them.

Explanation and discussion

In the example above, the teacher asks in the anticipation phase the learners to write on their own as many ideas as they can on force. This gives the learners a good opportunity to reflect on and write about what they know about force. This also enables the teacher to assess the prior knowledge the learners have on force. She then divides them into small groups to share their ideas and also asks them to carry out activities to demonstrate the idea of force.

In the building knowledge phase, learners carry out activities that demonstrate the effects of force. They identify the materials on their own and use them to demonstrate the effects of force.

In the consolidation phase, the teacher discusses with learners to establish the meaning of force and its effects.

Critical thinking in the arts

Art subjects in the Malawi curriculum include performing arts, creative arts, physical education and clothing and textiles. These subjects are usually taught using conventional participatory methods. The distinctiveness of subjects in this discipline comes about because they promote development of creativity and personal expression. To achieve these, the learner is involved primarily in independent thinking processes and he/she is engaged in high order activities such as thinking about the design, composing and how her/his final product will be presented. In all these processes the learner engages in continuous self-assessment in order to perfect the product before presentation. It is important that critical thinking processes are incorporated in all these steps so as to produce valuable products.

Goals related to critical thinking in the arts

The teaching of subjects in the arts discipline aims at promoting individual or personal expression in a visual, audio or physical manner in ways that a learner benefits from the exposure to what others do but also from the feedback that others give after analyzing and appreciating the product.

Specifically, in the arts learners are:

- supported in taking risks as they develop personal creativity
- taught to value craft at the same time promoting their creativity
- encouraged to discuss artistic products and production processes
- helped to recognize all the knowledge they gained in engaging in artistic activities

- provided opportunities for growth within arts oriented community
- exposed to experiences that help them develop appreciation of artistic products
- encouraged to develop self confidence in their artistic creativity (adapted from Crawford A et al 2005)

In artistic subjects, these goals are achieved in different ways such as these:

- giving learners opportunities to choose what they want to engage in or do
- learners choices are presented, questioned, discussed and learners are expected to articulate and reasonably defend their choices. This is a worthwhile activity as it helps learners to perfect their creative aspirations in order to improve on self-expression, development of confidence and on making rational independent thinking and arguments
- learners are encouraged to asses the various processes they engage in and how they are developing. In so doing their minds are active and questioning and rearranging the process and its outcome. This helps in constructing valuable knowledge and experiences
- learners also learn to discuss the work of others in constructive and meaningful ways that benefits them as well as the originators
- the teacher is engaged in supporting the learner by modelling expected qualities
- learners are encouraged and supported to be original and to avoid copying other learners' ideas
- there is usually no correct or wrong answers in the arts as expression of creativity is of prime importance and naturally diverse

How ABC phases can be applied in arts

Like in all other disciplines, the teacher usually introduces the topic or theme and the learners are directed to think or even ask questions about what they know or want to know. In arts subjects, the teacher also introduces the topic or theme and discusses with the learners the purpose for learning the topic and gets to know what learners already know and what they anticipate to know on the topic.

Learners are not passive recipients of what is to be taught because the teacher's role in arts is to get the learners' cultural background as well as levels of knowledge, experiences, talents, creativity, likes, dislikes and fears. The following is an example which can occur in the languages.

Topic : Story-telling pictures
Lesson title: Drawing a picture story

Anticipation

The teacher introduces the topic.

Teacher : We are starting a topic on Telling stories using pictures. Has anybody seen a story which has pictures in it?
Learner 1: I have seen a story with one picture.
Learner 2: I have read a story which had several pictures.
Teacher : Who else has read a story with several pictures? (learners raise hands)
Teacher : Who can tell us what the pictures showed?
Learners: 'The main characters'
'The picture showed the environment where the story was taking place'
Teacher : 'Can you give examples of what was in the environment?'
Learners: Trees, a river, bridge, bushes, a king's compound, a lion chasing a hare

Building knowledge

The teacher opens a Chichewa or English book on pages which have stories with pictures and shows the learners. Teacher asks learners to open their English or Chichewa textbooks to find stories which have pictures.

Teacher : 'Now that you have found some stories in your English and Chichewa textbooks, find two friends to form a group. You

will need the textbooks where you have identified the stories with pictures'

Learners form groups and are guided to discuss the role of pictures in the story.

Teacher : In your groups, start composing a story you will write down and brain storm the type of pictures that you will develop.

The teacher now asks al the groups to present the outcomes of their group discussions to the class. Other learners were urged to ask questions and to ensure that all groups produce original stories.

Consolidation

Teacher : 'Now that we have discussed the story pictures we developed, what is it that you have learnt.'

Learners explained what they have learnt from the questions and comments that others made to their presentations.

Teacher : 'In the next lesson, you will start developing your stories and sketching the pictures. Other ideas to consider are that the stories should be interesting and not copied from others. How are you going to ensure that your stories are original?'

Learners: 'We will have to brainstorm the ideas and the lesson for the story.'

Teacher : Why is this lesson important to you?

Learners:
1. 'We will learn how to compose and write stories'
2. We will learn how to draw.

Discussion and explanation

The teacher aroused learners' curiosity in the anticipation phase by introducing the title of the topic for the lesson and proceeded by asking them questions on what they already know on the topic.

In the building knowledge phase, the teacher then asked the learners to search for information in their textbooks and formed discussion pairs to further analyse the information. The pairs then shared with the larger group. As the lesson progressed, the teacher asked the learners to work in groups of four to compose and write a story and also to brainstorm on the pictures to go with the story.

Consolidating the lesson the teacher asked the learners to reflect on the lesson and to explain what they had learnt from the lesson to be applied in the next processes. Learners also explained why the lesson was important for them.

An example of an arts lesson

A lesson on 'Songs sung at local events'. In this phase learners can be asked to work in pairs or small groups to think about and compose a song, discuss it and present it by writing and singing it in their pair/group first, and then to the whole class. They can even teach other learners to sing the song. During the presentation, learners should also explain the meanings of the songs and the other learners should be encouraged to ask relevant questions on the same. The same activities can be used for other arts subjects such as where drawings.

Specific critical thinking strategies for the arts discipline

Arts involve both craftiness and creativity. The mind is always in active processes in creating experiences and not just ordering or following sequenced steps in order to make a product. There is no final answer at the end of an instructional process like is the case in science subjects.

Assessment

Assessing arts products is different from other disciplines. The learner is encouraged to assess her/his product first in order to identify problems and rectify them before peers take their turns to assess, but also to ensure that the idea is original. Peers assess when the product is presented whereas the teacher can assess all processes continuously as the product is being

produced. Assessment by peers is meant to help the producer to perfect the product and to further develop artistic skills.

Teachers' role

In arts, the teachers' role is to encourage and support learners' creativity. In the processes or steps to produce a product, the teacher should urge the learners to ask questions, identify problems and solve them. The teacher should be there only to guide on:

- selection of resources
- designing
- finalizing the product
- presentation

Consolidation

In this phase, the teacher and learners put together their products and discuss issues of originality, relevance and when the product is used. This is a forum where learners can make suggestions for improving their various products. The teacher asks learners to mention whatever they have learnt for themselves and from others.

Learners may also be guided to:

- compose-usually this involves writing first and is better done collaboratively either in pairs or small groups
- design patterns
- evaluate or judge and even rate the products using a checklist, rating scale or rubrics
- learners are also expected to present their work in pairs or groups. Self assessment should be promoted so that learners can make improvements before final presentation

Critical thinking in social subjects

Social subjects are a group of subjects that deal with socio-cultural, personal and religious issues. In the Malawi curriculum this group is composed of life skills, social and development studies, social and environmental sciences, religious education and bible knowledge. Social subjects deal with knowledge, attitudes, skills as well as values and beliefs. Cognitive learning theories are based on the fact that learners learn using the knowledge they already have. Social subjects demand that learners make sense of the content, concepts and processes and form attitudes and values.

Swiss Psychologist Piaget demonstrated that 'we learn by making sense of the world in terms of the concepts we already have'. Piaget asserts that 'in the learning processes we change our old concepts and make more sense of the future.' Social subjects require learners' involvement in active and collaborative learning so as to be able to interpret and question facts, concepts, ideologies and form their own opinions and develop appropriate attitudes. They naturally engage in critical thinking processes. However, Bible knowledge and religious education deal with religious teachings. They therefore deal with beliefs and ideologies that a person subscribes to according to cultural and religious influences.

Goals related to critical thinking in social subjects

The goal of social subjects is to impart basic knowledge on concepts that influence beliefs, values and attitudes. The learning of social subjects helps learners to appreciate the cultural and religious values of their own culture and those of others. In critical thinking, the goal helps in:

- giving learners knowledge of various aspects of human life
- affording learners opportunities to know and analyse practices, beliefs, values inherent in diverse cultural, political and religious groups
- learning to analyse cases, to solve problems and to make rational decisions
- practising to question some beliefs and ideologies

Specific strategies for teaching social subjects

Social studies and life skills education apply methods that promote active and collaborative learning and critical thinking. Learners in social subjects engage in analyzing their experiences and those of

others in so doing learning cooperatively. For example, in a life skills lesson on 'self awareness' which is a step in the process of developing confidence, a teacher can ask learners to individually list her/his strengths and weaknesses. This may follow up in pairing to discuss each others' strengths and weaknesses and presenting to a larger group.

In the building knowledge phase learners may be asked to work individually first to think and suggest what they can do in order to improve on their weaknesses. This may be followed by sharing with the whole group. Mind or character maps can also be developed. Other common strategies include:

- quick writes
- role play
- directed reading-thinking activity
- value line
- dual- entry diary
- fish bowl
- debate

Assessment

Assessment for learning is recommended in the teaching of social studies, life skills and in religious education as well as in Bible knowledge. In assessing social subjects, one is assessing attitudes beliefs as well as skills and values. Self-assessment is also a strong feature when assessing social subjects.

How ABC phases can be used in social subjects

Social and religious subjects combine the giving of facts as well as making learners form their own opinions and attitudes.

Anticipation

Naturally the teacher will introduce the topic in order to prepare learners on what they will learn as well as to raise their curiosity. The teacher may start by asking learners questions on what they know about the topic. Learners can answer orally or in writing. For example in a life skills lesson on '**stress and anxiety management**', the teacher might ask learners to say what they know about stress and anxiety. They can do this individually first, then in pairs. The teacher can do further explanations and give an example. He/she can then ask learners why they think it is important for them to learn the topic.

An example of a Bible knowledge lesson on *What the Bible says about diseases*. The teacher can ask those who know about the Bible to explain examples of stories that refer to diseases. The teacher can further ask them to explain the Bible's stand on diseases. This can be done in pairs then reported by a few to the whole class. The teacher can probe further on why they think it is important for them to learn the topic.

The two subjects mentioned in the examples above both contain reading texts. For Bible knowledge it's the Bible verses whereas for life skills it can be a story or a poem or a play.

Building knowledge phase

The teacher can begin this phase by asking the learners to individually read a case or Bible verses using Direct Reading and Thinking Activity- DR-TA. Obviously, the learners will make marks as they read. After the reading activity, learners can work in small groups and share what they have made out of the text they read. The learners should defend their opinions as they present and ask each other the *What*?, *Why*? *So What*?, *What then*? questions. At the next level, the teacher can call upon some learners to present their work. Here again learners might ask one another more questions.

At the next step, the teacher can briefly give the meanings of stress and anxiety. He/she can then ask learners to refer to their textbook for the meaning.

The teacher can then brief the learners on the situations that can cause stress and anxiety. A brainstorming session can follow where a list of the causes is generated. The next step would be to assign (in groups) learners a set of causes and ask the questions Why? and How? on each of the causes. The responses can be shared with the whole group.

Consolidation

This phase will serve to summarise what has been covered in the anticipation and building knowledge phases. The teacher can ask the learners to each do a quick write on what they have learnt from the lesson such as the meanings of 'stress' and 'anxiety' (for a life skills lesson) and on what the Bible says on diseases (in a Bible knowledge lesson). This method can work for learners in senior primary and in secondary schools. For lower primary, the teacher can ask several learners to explain what they have learnt and their stand on the issues learnt.

The teacher can then summarise verbally other issues not highlighted by the learners and inform them about the next lesson. The following is an example of a lesson in social subjects.

Subject : Social and environmental sciences
Topic : Human rights
Lesson title: Types of human rights

Anticipation

The teacher introduces the lesson topic to the learners.

Teacher asks learners: 'Is anybody here aware that as human beings we are born with some entitlements called rights?'

Learners who know respond positively.

Learner asks : I hear that we have rights as soon as we are born but I do not know what it means.

The teacher asks a learner who knows human rights to explain.
The teacher repeats and clarifies the explanation.
Teacher asks learners to do a 'Quick Write' on rights.

Building knowledge

Teacher asks learners to work in pairs and share their lists of rights.

Teacher asks pairs in turns to present the rights they have listed down. The list is compiled on the chalkboard. Teacher adds any rights that have been omitted. Teacher tells learners to identify other ideas listed that are not rights and the list is refined.

Teacher informs learners that the rights fall into categories.

Teacher: We have listed almost all the rights that we are entitled to. Now we will attempt to categorize them. The following are the categories.
Teacher writes the categories on the chalkboard.

Learner: Can you please explain what each category means.

Teacher explains the categories.

Teacher: Open your books and find the topic human rights.
Teacher tells learners to form groups of five to eight.
Teacher asks learners to identify from each category of human rights the rights that directly affect them as children.

Groups are guided to be ready to defend their responses when presenting.
Groups present their work and at the end one list is compiled. Teacher assists during this process.

Consolidation

Teacher consolidates on the list of human rights.

Teacher asks learners why knowledge of human rights is important for them.
Teacher gets different views from the learners and summarises the importance of them knowing their rights.

Teacher asks learners what life would be like if children did not have rights and how they can appreciate their rights in their daily lives.

Teacher tells learners to ask any questions on the topic.

Discussion and explanation

The teacher introduced the topic to raise learners' interest but went further and asked them what they knew about human rights. Human rights were explained in this process.

Learners continued building their knowledge by doing a quick write on their rights. The process progressed as learners shared their quick writes in pairs and then with the whole group. The teacher took another step to categorise the rights. Learners asked some questions on this. In the next step the learners continued in active learning collaborating with each other to analyse the categories of rights in small groups.

The teacher summarized the human rights.

Critical thinking in inter-disciplinary teaching

Often times learners look at subjects or courses they learn at school as stand-alone disciplines. The relationship may not be obvious in some cases but there are many relationships among disciplines. Apart from relationships between and among subjects, there are also relationships between and among topics within one subject. These relationships are important because they bring about useful meanings of subject matter. Therefore, combining two or more subjects or disciplines in a single unit is a good way to create meaningful contexts for learning.

Goals of inter-disciplinary teaching

The goals of inter-disciplinary teaching are to:

- learn interrelated concepts and principles through problem solving
- create authentic contexts in which learners can apply new knowledge
- help learners see and experience tangible connections among disciplinary topics and concepts
- help learners gain new knowledge through hands on investigations in authentic contexts
- help learners learn in learner directed, experiential, active and collaborative settings
- enable learners to use inquiry based teaching strategies (NRC 1996; NRC 2001)

How A-B-C phases can be applied in interdisciplinary teaching

Example

An estate owner sells tobacco worth K9,000,000.00. He uses that money for the following activities:

- pays back a loan for farm inputs worth K5,000,000
- pays labourers worth K2,000,000
- pays for transportation and other costs worth K1,000,000
- pays for hidden costs worth K200,000

How much profit does the estate owner make at the end of the farming season? Discuss each of the four costs above and how they affect farming in Malawi.

Anticipation

Teacher asks learners to read the example above and discuss it in pairs. Apart from just solving it as a mathematical problem, learners will talk about the inputs in the production of tobacco, the hardships that farmers go through and the economy of the country in the context of tobacco farming. They will also talk about the hidden costs, in terms of briberies made at selling points and the evils of such actions. Learners can also consider issues of gender, child labour and abuse of labourers.

Building knowledge

The teacher then asks learners to discuss the implications of the four costs on the farmer and his family, the workers and their families, and Malawi as a nation. At this stage the discussions highlight issues of agriculture and farming, social and environmental studies, economics, human rights, foreign exchange and gender among others. In so doing learners are not only applying mathematics in agriculture but also learning more issues affecting the economy of their country.

Consolidation

The teacher asks learners to present their findings and provide solutions to the highlighted problems. Learners will debate some issues on which they may not easily agree. This will help increase their understanding of the economy of their country.

Explanation and discussion

In the example above, several subjects were discussed in one lesson. The example presented was more of mathematics and agriculture but more things were discovered during discussions and when working out the example. Specifically, in the anticipation stage, learners made connections among concepts and topics learned previously. They integrated and applied knowledge from different disciplines in the building knowledge stage. In the consolidation stage, the connections among the various concepts were made explicit to the learners and they understood the relevance of the problem.

Conclusion

This chapter has discussed how critical thinking can be promoted across the curriculum. The chapter has discussed how disciplines such as languages, mathematics, science, arts and social studies can use the ABC approach in promoting critical thinking. In addition, goals relate to critical thinking in these disciplines have been highlighted.

References

Crawford A, et al (2005). Teaching and learning strategies for the thinking classroom. New York: Open Society Institute

Johnson DW, Johnson RT and Holubec, EJ (1994). *The new circles of learning: cooperation in the classroom and school*. Alexandria VA: Association for Supervision and Curriculum Development

Temple, C (2001). *Critical thinking across the curriculum*. New York: Open Society Institute

CHAPTER 8
Relevance of the critical thinking concept to various aspects of life

Introduction

Critical thinking (CT) is an important tool that every individual should strive to develop and internalise as it improves the quality of thinking. The concept and principles of critical thinking are universal and they can be applied to any context through the process of reflective contextualisation to a particular situation or challenge. Its core skills include observation, interpretation, analysis, inference, evaluation, creation, explanation and meta-cognition. The benefits of applying such skills are enormous such that its relevance and bearing on different aspects of life cannot be overemphasised. In other words, critical thinking is a key that if developed, internalised and fully utilised in everyday life endeavours, can greatly contribute to the overall success and wellbeing of an individual.

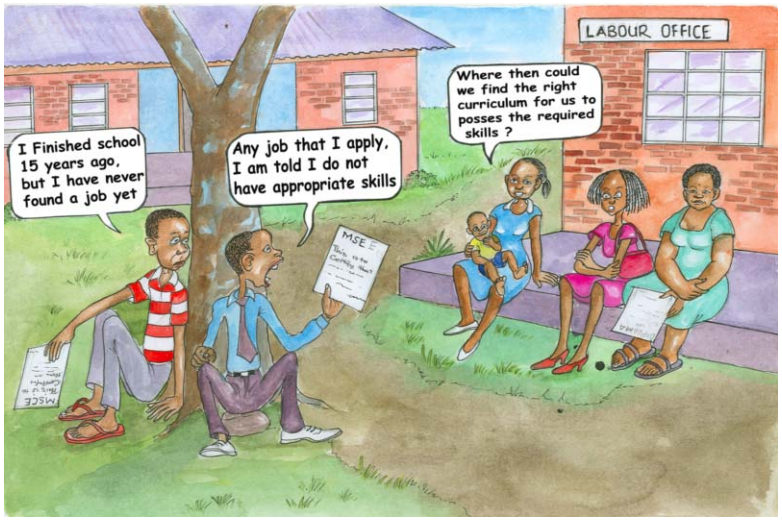
This chapter endeavours to demonstrate how relevant the concept of critical thinking is to various aspects of life such as education, politics and governance, media and religion.

Relevance of critical thinking to the education sector

This section looks at the relevance of CT within the education system. It starts by demonstrating how CT enhances students' understanding of the content; facilitates creation of solutions to problems and develops a culture of life-long learning; democratises the classroom environment; and how it helps in maintaining school property just among others.

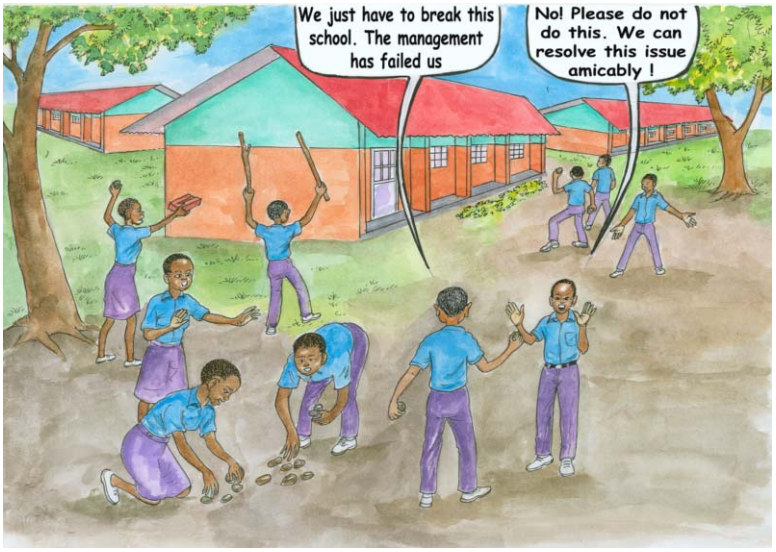
Critical thinking is considered an important aspect in teaching and learning because it enables learners to analyse, evaluate, explain and restructure their thinking to challenge the norm, thereby decreasing the risk of adopting, acting on, or thinking with a false belief. In other words, CT enables learners to move from mere memorisation to questioning, examining, creating, interpreting, and debating on course content (Temple, 2001). Through the process of questioning and reflection on the thinking itself, instructions that employ CT methods promote active learning and enhance learners' understanding and retention of content. In this way, the teaching and learning process becomes enjoyable to both the teacher and the learner, and steers up independent and inquiry learning. Therefore, in this regard, active learning improves the quality and relevance of the learning process in all aspects.

In addition, education that includes CT methods enables learners to learn how to learn. Once this has been achieved learners can continue to learn on their own and anywhere without requiring the presence of a teacher thereby developing in themselves confidence and a life-long learning culture. Learners who reach this level continue to engage with the world leading intellectuals that help their minds to sharpen further and put to maximum use the knowledge, skills and values they learn, create more knowledge, and solutions to problems including those that their teachers cannot foresee (Temple, 2001). The illustration below depicts some of the problems that learners will face if they do not develop critical thinking while in school.



CT methods democratise the classroom, and the learning conditions foster learners' confidence and self esteem. It is within a democratised contexts that everyone feels free to participate in and take charge of their own learning and learning tasks are carried out for their own sake and the goal is extended beyond exam expectations to application in real life situations. The increase in confidence and self esteem leads to enhanced creativity and skilfulness in the achievement of quality education on the part of the learner. Thus, the learners' exposure to CT methods which promote transfer and application of skills beyond the classroom does benefit not only the individual learner, but the society as a whole.

In addition, CT skills can help in reducing cases of vandalism of school property which has become the order of the day whenever there are disagreements in schools. The application of CT by both the learners and school authorities can help in resolving conflicts amicably thereby saving time, money and property.



Learners who use CT as a basis for reasoning and decision making realise that even where the authorities may be at fault there can be no justification for vandalising school property or beating up of staff. Such learners also realise that school property is their own property and they become responsible for loss and pay for the damages besides losing considerable time for learning. On the other hand, teachers and school authorities who use CT skills in their dealing with learners analyse situations carefully and avoid decisions that irritate and provoke learners into strikes and acts of violence.

On the other hand, teachers who employ CT methods create an environment which presents opportunities for further development of independent and critical thinking on the part of the learners. That is, the process of teaching does not only consist of presenting facts which are then reproduced during examinations, but includes problem tasks with ambiguous solutions. Thus, a safe and an inviting environment is created when the learners are not afraid of potential negative responses to their ideas, thoughts and opinions either on the part of the teacher or the other learners. In this regard, the teacher learns to work together with the learners and make their work easy and enjoyable. Moreover, the teacher becomes experienced in the methods aimed at developing active learning and critical thinking and gradually develops his or her own activities and strategies that work better according to the needs of the learners.

Teachers who use CT also become aware that they are not the only and ultimate source of information for the learners and that there is more than just one correct answer to most questions; and consequently, they learn to accept and even encourage learners to develop and express opinions which are different from their own. Such an approach requires the teacher to become proficient in using co-operative methods and strategies and the ability to ask the learners questions which develop thinking on a higher level, hence the need for CT teaching methods.

CT skills enable learners to any learning tasks with a deeper understanding of the subject matter. This enables them to face examinations without fear or anxiety. During examinations, such learners understand the demands of test items better and employ CT skills to help them successfully handle the examinations. If learners in schools and colleges can be taken along this direction, cases of cheating during examinations can be drastically reduced, hence help save the resources that are otherwise spent to re-administer leaked examinations. The development of CT skills not only helps learners to understand the subject matter, but also enables them to plan and manage themselves and the test items before, during and after the release of examination results. This is very important, especially for those learners that develop a feeling of 'no life' after performing badly in an examination.

Furthermore, CT skills can help examiners to make relevant test items that demand skills beyond recall of facts to application of knowledge, values and skills learnt (Haladyna, 1997). In this way, the relevance, effectiveness and reliability of an examination in relation to course aims and candidate's potential is enhanced. This factor is crucial as it enhances the credibility of the qualifications obtained and the capability of the graduates that undergo a particular course of study.

Another important aspect within the area of education and training where CT is necessary is school inspection. Inspectors need CT skills in setting out and monitoring minimum standards for schools. Where the inspectors, school proprietors and school administrators are guided by CT skills in making judgments about requirements and suitability of educational institutions, cases of unnecessary school closure can be minimised and there would only be justified reasons for those schools warranting closure. Again, there would be a better understanding and good

relationships among stakeholders of the education system. Where the actors and the overseers of the education system allow CT skills to influence their decisions, the school would become a safe and conducive environment for learning; the interests of government and other stakeholders would be safeguarded; incidents of corruption among them would decrease; and consequently, the quality of education would improve. All these can result in an effective and efficient education system that is well respected and trusted by society and the industry which it serves.

In addition, the importance of the inspectorate is the policy direction on the education system. Key to the effectiveness and success of an education system and indeed, any other system is the quality and relevance of the policies that guide its activities. In this case, the ability to think critically and arrive at sound judgements by the policy makers is crucial. Policies that are derived from a rigorous critical thinking process can be of good quality, down-to-earth, relevant and practical in nature. That is, effective policies are a product of a careful analysis of multiple factors that relate to the issues involved and are free from potentially undue influences and other biases. Such policies are visionary in nature and are not drawn to victimise or hinder the progress of any group in society, and can work well in the context for which they are designed or adapted. This can only be realised if the policy framers have had a sip of the CT concept and the principles underlining critical thinking.

In curriculum development, there is need for curriculum planners and developers to use CT skills. Developing an effective and relevant curriculum that does not become obsolete so easily in this fast-changing world is a challenging intellectual activity and requires use of CT skills. It is for this reason that curriculum developers need to be intellectuals with high levels of CT in order for them to come up with a sound curriculum that effectively serves its citizens. Use of CT skills in developing curriculum also increases the credibility of the product. Those that plan and develop the curriculum, therefore, require critical thinking to a great extent in order to help them think through other curriculum processes such as try-out, delivery, monitoring and evaluation processes. Failure to think about such processes beforehand can lead to the development of a curriculum that can hardly work leading to waste of precious and scarce resources.

Relevance of critical thinking to politics and governance

This section discusses how relevant critical thinking is to politics and governance of the state and other institutions that are political in nature or by nature of their business. It examines current political issues; formulation of bias-free policies; decision making and accountability.

Running the affairs of a nation or state with millions of people is a challenge since everybody in the country would want their different needs to be addressed. It is for this reason that the politics require people who are mature in terms of thinking processes and decision making. Therefore, if politics is joined by individuals who are critical thinkers, there can be improved levels of engagement and debate on national issues. Where politicians, their advisers and other actors in the government machineries are equipped with CT skills, institutions and countries can prosper as there would be no instances of wasted time on trivial or other issues that are of no use to the betterment of the nation and its citizens.

CT would also help individuals serving the government to come up with improvements over what existed before for a better Malawi. For example, reducing distances to schools and ensuring the comfort of learners in the classroom. The illustration below demonstrates the case in point.

CT skills can reduce cases of new governments complaining of and inheriting empty coffers from their predecessors. An analysis of Malawi's political history gives the impression that no proper handovers are done and that there is no transition period from one government/president to the other as is the case with world leading democracies such as those of the USA and UK. This in itself indicates lack of CT skills in our leaders. CT skills can help politicians to appreciate their role for the nation's betterment and do their best to advise the incoming government/president as it would appeal to their minds that they are not taking over a different country or people. Under normal circumstances, politicians are elected into positions based on the viability of their manifestos most of which zero in on bettering the lives of the citizens. So, politicians with sound reasoning ought to share best practices that enabled them to uplift the welfare of citizens and forewarn about the tactics and policies that did not work very well. Such a situation can only come about if there is development and application of CT skills.

CT would help our country to break away from the foreign aid dependency syndrome. This would enhance the use of resources from donors to establish industries and create wealth. Malawi can earn the much needed forex if we process or raw materials into high quality finished goods for exportation rather than selling raw materials which only attract very low prices. For example, it is sad to observe that Malawi's high quality timber from the Chikangawa forest is exported other countries at very low prices, but wooden products that we buy from there are so expensive such that we pay even hundred times the cost of the timber needed to make such a product.

Government for a long time has been putting in place mechanisms for poverty reduction but poverty has been on the increase because politicians and citizens alike have engaged in the same activities in the same way. Consequently, the same results have always been achieved. It is important to remember that if you always do what you have always done, you will always get what you have always got, so goes the saying. It is also important to know that government or politicians cannot end personal poverty but only that it can create enabling conditions which citizens can exploit to their advantage to eradicate their own poverty. Hence critical thinking can help in coming with new ways of doing things by removing barriers to development.

A government that consists of rational people in going about its duties would not base its decisions on stereotypes or push agendas that would otherwise work to the disadvantage of its citizens. Critical

thinking can help politicians to win peoples' confidence through rational decisions that improve their well-being and not propagandas or cheap politics such as character assassination and segregation in terms of distribution of development projects or amenities based on political, tribal or religious affiliations. They would appreciate the importance of taking into consideration and embracing the views and philosophies of diverse groups, hence make rational decisions in the allocation of resources and lead citizens as members of one family and not as segmented groups.

Critical thinkers are accountable and transparent in dealing with responsibilities entrusted on them and as such they would not prosecute those that wish to have an insight into how they go about their duties. Such leaders or politicians are open minded and create forums for free contact and dialogue, and they allow national issues to have prominence over party or personal interests and are not driven by self-seeking or party agendas.

Critical thinking individuals who are entrusted with public offices can principled politicians who strive to respect and protect the rule of law and wishes of the electorate/masses. They do not engage themselves in political prostitution and do not take pride in themselves, but become aware of their role – to represent and speak for the people and not for themselves or any other group apart. Furthermore, politicians have the responsibility to propel citizens into development by administering development projects and CT skills will help them in making decisions on rational distribution of development projects.

Much as politicians require CT, the masses also need the skills to monitor and foster good governance. A mass of people that has critical thinking capacity can easily hold their leaders accountable if they feel the leaders are abusing their positions, or are not fulfilling their promises and obligations. A country of critical thinkers can elect people into political and other positions after making informed choices based on CT principles. Cases of putting people into power as a thank you for petty handouts such as cloth, maize and cash given can be reduced or eliminated all together.

Relevance of critical thinking to the media

Critical thinking skills are also useful to the media fraternity. All over the world the media has much influence on the lives of people. As such, those working in the media industry need to use CT skills as they discharge their responsibilities. Citizens need to be well-informed about issues that influence their lives. This calls for publishing of well-researched and balanced articles that cover topical issues without bias, fear or favour.

As people who have a lot of influence on other people, journalists need to be responsible and accountable to the people they are serving and the society at large. They need to have expertise in investigative journalism which demands considerable application of CT skills. They have an obligation to report the truth without prejudice, bias or misconception. They need to produce articles and stories they would be proud to be associated with and not to backtrack when they are quizzed to give evidence on the same. Using CT skills they can evaluate the circumstances that lead to an event and thereby avoid misinforming the public on the same and improve their judgment of issues as media personnel.

The media needs to refrain from brainwashing its readers, but provide them with information that will set them in motion for action about issues that concern them most. It is in this perspective that individuals who want to engage themselves into the serious business of informing the public should take keen interest to develop and use their critical thinking skills.

The acquisition of critical thinking skills by politicians should put them on the path to realising the development agenda of their community. Where this is failing, the media can help to uncover inefficiencies and negligence by the government and key

service providers when providing services to citizens with a view to remind them of their obligations to the community. The illustration below depicts how powerful the media can be in re-inforcing transparency and accountability in a democratic state such as Malawi.

Ability to think and analyse issues critically can also help the media in the planning of civic education in which the public can be sensitised to issues of malpractices. For instance, keeping learners away from school during initiation ceremonies while schools are in session or denying children access to medical care because of some beliefs. Journalists need to be critical of issues for the benefit of citizens and the voiceless and never allow themselves to be used by government and other institutions in fighting against their opponents.

Relevance of critical thinking to religion

There are some people who believe that critical thinking and religion cannot go together. On the contrary, according to the reality on the ground, religion as any other field of life requires critical thinking. People are involved in the analysis of both their own beliefs/teachings and those of other people before criticising or joining a particular religion or belief. It is for this reason that critical thinking in religion is important. The application of CT skills in religious circles can also enhance co-existence and tolerance among people of the same or different religious beliefs/denominations. The use of CT skills in religion can reduce cases of religious rivalry/conflicts. It is therefore clear that a religion where its members develop and apply CT skills as they go about practising their belief can minimise cases of brainwashing and increase emancipation from falsehood.

Interpretation of religious beliefs and writings considered sacred offer another context in which CT greatly plays a role. Some people have been misled by the literal meanings of such writings due to lack of CT skills. For example, in the Bible some people cite Exodus 14:15 where God says to Moses 'Why do you cry to me?...; and Psalm 28:1 where David says to God, 'To you I will cry, O Lord my Rock…' Anyone who applies CT skills in such context would not overlook the background and contexts in which these words are spoken, and hence would not find any contradiction between the two texts. In the first scenario, Moses had gone back to God for another level of help before implementing what he had been told to do earlier on, while in the second case David was showing how much satisfied he was with his God. CT skills are therefore, relevant to situations in which people either deliberately or ignorantly ignore logic, fact, truth or reasonable arguments for personal interests. In this regard, CT skills can be of much use in gathering facts and evidence and all that can aid in understanding what or how we think and what we read about, hear of or listen to.

If people apply CT skills as they ponder about religious practices and alternatives, cases of unnecessary break-away and duplication of religions/denominations would be reduced as people would opt to reason from within and reconcile their differences. Furthermore, since the concept of CT is in most cases denied its rightful place in religious matters, there are cases of injustices that occur in religious circles that would otherwise be minimised if reasoning were to be given a chance to play a role in matters relating to the management and administration of religious affairs. The

ability by both the clergy and the laity in acquiring and using CT skills can help the church liberate its processes from egocentric and hypocritical tendencies and move towards just, fair, transparent, accountable and democratic ideologies that can be applicable within the religious confinements.

From the discussion above, it is therefore clear that no religion or religious sect can meaningfully progress if it does not allow its members to question some of its acts and beliefs. There are so many aspects of religious life that require application of CT skills, be it on the part of religious leaders or the laity. This is inevitable and is always there whether intentional or otherwise and can be deduced from cases and resolutions the clergy or the laity make.

Conclusion

In summary, the discussion has shown that the critical thinking concept is relevant to various aspects of life. It has been argued that critical thinking skills are important to the education sector, politics and governance; the media and religion. All these aspects of life require skills of critical thinking and that the skills are universal. One does not need to learn particular skills for different areas of life but that all are used universally and only that the context determines a particular approach. Individuals should recognise that critical thinking is driven by the desire to improve processes or issues and not meant to attack those in power. As such, there is need to unlock their critical thinking domain. People who are able to work outside the confines of their experiences and seek new solutions to challenges become more successful in the long run. It is therefore, hoped that learners in schools would be exposed to experiences that enable them to develop critical thinking skills, which they can use in school and beyond. Such learners would make a difference when they play different roles in these various aspects of life.

References

http://en.wikipedia.org/wiki/Critical_thinking

Elder, Linda (2001). *The miniature guide to critical thinking for children*. The Foundation for Critical Thinking.

Elder, Linda (2002). *Teacher's manual for the miniature guide to critical thinking for children*. The Foundation for Critical Thinking. Stand Up. www.standup.org

Crawford, A et al, (2005). *Teaching and learning strategies for the thinking classroom*. New York: The International Debate Association.

Temple, C, 2001. *Reading and writing for critical thinking in higher education: Critical thinking across the curriculum*. New York: Open Society Institute/RWCT Project www.rwct.org

Writing test items to evaluate higher order thinking Journal of Psychoeducational Assessment , Volume 18 (4): 374 SAGE – Dec 1, 2000

Haladyna, T.M (1997). *Writing test items to evaluate higher order thinking*. Needham Heights, MA: Allyn and Bacon.

Centre for Critical Thinking (1996a). *The role of questions in thinking, teaching, and learning*. [On-line]. Available HTTP:

http://www.criticalthinking.org/University/univlibrary/library.nclk

Strohm, SM and Baukus, R A (1995). "Strategies for fostering critical thinking skills" in *Journalism and Mass Communication Educator, 50* (1), 55-62.

Other reading

Bean, JC (1996). *Engaging ideas: the professor's guide to integrating writing, critical thinking, and` active learning in the classroom*. Jossey-Bass.