

Incorporating Critical Thinking in Regular EFL Classes

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Critical thinking is a term often used to describe a skill that students should learn. However, the term is abstract and needs to be further analyzed in order to identify the various aspects of thinking. This will give teachers greater clarity in what to teach and help students identify what skill of thinking they are learning. This article will give an overview of the basic laws of thinking and introduce some interpretations by various thinkers of what critical thinking is. Afterwards, an example of how critical thinking has been incorporated into a regular EFL class will be given, which will then be followed by a brief discussion on the assessment of critical thinking skills.

INTRODUCTION

There is a contemporary trend to emphasize the term *critical thinking* in English as a Foreign Language (EFL) and English for Speakers of Other Languages (ESOL) course materials which is exemplified in series such as *Q: Skills for Success* (Oxford University Press), *Pathways* (Cengage Learning), and *Unlock* (Cambridge University Press). Each of these course series have dual strands focusing either on the combination of listening and speaking skills or reading and writing skills, each at various levels according to the Common European Framework of Reference for Languages (CEFR), ranging from A1 (or pre-A1 with the Basic Skills level in the *Unlock* series in which the skills are not divided) to C1. The obvious question that arises is “What is *critical* thinking, as opposed to *standard*, or *substandard* thinking?” Where are the cognitive lines that demarcate the boundaries of thought between each of these levels of thinking? Without such demarcation how can anyone determine if another person is thinking critically or not? In other words, what would demonstrate the activity of thinking critically and how can it be assessed? The Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT) has incorporated critical thinking skills into its remit of educational institutions for teaching students (MEXT, 2008, 2013, & 2018). Teachers, therefore, need to have a clear understanding of what critical thinking is, as well as its various types, in order to incorporate the concept in lessons to meet the requirements

outlined by MEXT and, importantly, have a means of assessing the degree to which students are critically thinking. This essay is an attempt to address these questions.

MEXT’S POLICIES ON TEACHING CRITICAL THINKING

MEXT has periodically published on its website provisional English translations of its policies on Education: Basic Act on Education (2006), Basic Plan for the Promotion of Education (2008), The Second Basic Plan for the Promotion of Education (2013) and The Third Basic Plan for the Promotion of Education (2018). Within these documents there are policy statements that require students to develop critical thinking skills.

In the Basic Plan for the Promotion of Education (2008) the phrase “think logically as well as critically” is mentioned six times in relation to the skills that students should foster. The opening sentence of the introduction for The Second Basic Plan for the Promotion of Education (2013) is, “What is truly needed in Japan is independent-minded learning by individuals in order to realize independence, collaboration, and creativity” (para. 1). When making a search for the word *think* in this document twenty results were found with such phrases as “the ability to utilize knowledge and skills and think, judge, and express ideas by oneself” [elementary and lower secondary school education], “general skills (communication skills, quantitative skills, information literacy, logical thinking, and problem-solving power)” [university education], and “To discover unsolved issues, then obtain specialized knowledge and general abilities and think in order to arrive at the best solution” [university education]. In The Third Basic Plan for the Promotion of Education (2018) twelve references related to *think* were found, for example, “fostering abilities to think, make judgement and express oneself,” “foster human resources who can create new values in society, such as creating new things and services by independently and autonomously thinking,” “the ability to think logically,” and “foster human resources who can think independently and act based on a high level of professional knowledge and sense of ethics.”

From these policy statements it can be seen that educational institutions need to foster students’ abilities to think logically and critically and for them to be able to do this independently and autonomously. Utilizing their knowledge and skills, students need to think, judge, make decisions, find solutions to problems, discover unsolved issues, create new ideas and be able to express their ideas to others. Furthermore, each of these elements needs to be conducted respecting ethical standards. Unfortunately, MEXT does not provide details of what these ethical standards are within these educational policy documents. However, no doubt these would include such things as maintaining honesty and integrity in collecting, analyzing, and reporting data and conclusions; making judgements that will be fair and balanced; and ensuring that there is no plagiarism.

DIFFERENTIATING LOGICAL AND CRITICAL THINKING

Stating in educational policies that students should learn logical and critical thinking skills and become independent thinkers when considering problems is important. However, without clearly defining what *logical thinking* and *critical thinking* are, some teachers may be confused about what exactly they should be teaching. What precisely is the difference between *logical* rather than *critical* thinking? To help differentiate these two notions the three fundamental laws of logical thinking, the three different types of logical thinking, and the concepts of *necessary* and *sufficient* conditions need to be introduced.

The three fundamental laws of logical thinking underpinning the various types of thinking are: the law of identity, the law of non-contradiction, and the law of the excluded middle (Hospers, 1967, p. 209) which are discussed in Aristotle's *Metaphysics, Book IV* (1984). The law of identity states that every thing is (identical to) itself. The law of non-contradiction states that no thing having a given quality also has the negative of that quality, for example, no odd number can also be an even number. The law of the excluded middle states that every thing either has a given quality or has the negative of that quality, for example, every number is either odd or even, i.e., there is no middle third option. These laws of logic can also be applied to propositions (Hospers, 1967, p. 210) such that every proposition is itself (If p , then p), no proposition is both true and false (Not both p and not- p), and every proposition is either true or false (Either p or not- p). By following these basic laws of thinking students can think logically, carefully and avoid false conclusions. These three general logical laws of thinking collectively apply to each of the following three types of logical thinking: deduction, induction, and abduction.

Deduction is a form of logic that by following formal rules the conclusion is derived from the premises. An example of this would be the following where P represents the various premises and C the conclusion:

- P1: Fat cats run big businesses
- P2: Moggy is a fat cat
- C: Moggy runs a big business

The basic logic of deduction is $A=B$, $B=C$, therefore $A=C$. However, in the given example the flow would be A (fat cats) = B (big business), C (Moggy – a cat's name) = A (fat cat), therefore C (moggy) = B (runs a big business). From premises P1 and P2 the conclusion C necessarily follows. The argument is deductively valid. Whether it is actually true or not is another matter. The truth of this particular deduction can be questioned, for example, upon the definition of *fat cats* – does it refer to obese feline pets or overpaid executives? By mixing or confusing definitions of given words and phrases the formal rules of deductive logic are broken and the argument becomes invalid.

Induction is another form of logical thinking. Unlike deduction in which the conclusion is derived from formal rules of reasoning, induction derives the conclusion from a regular pattern. The following gives an example of this and also highlights a shortcoming of relying on such a type of thinking. In the setting of 17th century Europe the truth of the following inductive argument was accepted as unquestionable.

P1: The first swan is white
P2: The second swan is white
P3: The nth swan is white
C: All swans are white

Inductive logic relies upon a series of confirmations and with each successive confirmation the conclusion becomes stronger. However, induction is fragile. With one valid exception the conclusion evaporates. With the example given above this happened when Europeans discovered black swans in Australia.

Induction has been utilized to enforce the idea that something is more likely to be true and to continue to be the truth through every successive nth observation of a given phenomenon. Humans have always experienced a sunrise and a sunset and tomorrow these will again be expected to be experienced. There is a continuity from past experience and with extremely little evidence to suggest otherwise people compound their trust in the continual future from the evidence of past experience. Russell (1912, pp. 35-36) challenged this with an example of a chicken. Being fed by the farmer one more day and being alive is not a greater guarantee of being fed and alive tomorrow as when the chicken is of a good size it will be killed for eating. Inductive thinking can lead to greater certainty in the continuation of past events, but as Russell's example shows this is far from always being true. Indeed, the more something happens is an indication of the diminishing possibility that it will happen again. Maybe that is a thought that can also be equally applied to reflecting upon everyone's lives and the life of the Sun and the universe. Thus, whereas deduction is based upon formal logical rules of reasoning, induction is based upon identified patterns.

Abduction is the third main form of logical reasoning and might be best described as "inference to the best explanation" (Douven, 2017). To illustrate abductive reasoning let us take one of his examples:

One morning you enter the kitchen to find a plate and cup on the table, with breadcrumbs and a pat of butter on it, and surrounded by a jar of jam, a pack of sugar, and an empty carton of milk. You conclude that one of your house-mates got up at night to make him- or herself a midnight snack and was too tired to clear the table. This, you think, best explains the scene you are facing. To be sure, it might be that someone burgled the

house and took the time to have a bite while on the job, or a house-mate might have arranged the things on the table without having a midnight snack but just to make you believe that someone had a midnight snack. But these hypotheses strike you as providing much more contrived explanations of the data than the one you infer to. (Douven, 2017, para. 2)

What is important to note about abductive reasoning is that although the conclusion chosen as the *inference to the best explanation* fits the premises it does not do so in a logically necessary way because other conclusions are also possible, but which are considered to be less likely. Abductive thinking will be guided by personal, social, cultural, political, religious, historic, economic, scientific, and other norms. In the past an earthquake or volcanic eruption might have been attributed to the anger or activity of a god, for example, in Hawaii the goddess Pele. Nowadays, most people trust a scientific explanation.

Two concepts that are important for critical thinking in evaluating and presenting arguments are *necessary* and *sufficient* conditions. Scriven (1976) notes, “A *necessary* condition...is a condition which must obtain (is necessary) in order that another condition obtain” (p. 62). Hospers (1967, p. 291) frames this in terms of the empirical, scientific relationship of cause (C) and effect (E) with reference to oxygen and fire. Oxygen (C) is necessary for fire (E), without which fire cannot occur. Thus it can be said that, in terms of cause and effect, *if not C, then not E* (if there is no oxygen, then necessarily there is no fire). This can be rephrased as *if E then C* (if there is fire, then necessarily there must be oxygen). This is an empirical rather than a logical example because as far as humans know, from living on Earth, fire only occurs in the presence of oxygen. This, however, might be different on other planets. Whether a *burning* caused without oxygen can be called a *fire* would have to be negotiated in terms of language usage (Wittgenstein, 2009). Necessary conditions are not therefore confined to empirical findings, but also to the language games in which thinking takes place. From a logical, or definitional, point of view, it is a necessary condition that a triangle has three sides, but it is not a sufficient condition because some other things such as the letter Z can also have three sides without being a triangle.

A sufficient condition is where “the truth of p suffices to guarantee the truth of q” (Scriven, 1976, p. 61). Hospers (1967, pp. 291-292) frames this in terms of cause (C) and effect (E). If rain is falling on the street (C) then the street is wet (E). Rain is a sufficient cause for the street being wet, but it is not a necessary cause because the street could be wet without any rain, for example, if a water pipe had burst. Substituting p and q for (C) and (E) a sufficient condition can be expressed as either *if p, then q* (if it rains then the street is wet) or *if not q, then not p* (if the street is not wet, then there is no rain). From this overview of necessary and sufficient conditions it can be seen that they are

complementary: “whenever p is a sufficient condition for q , q is a necessary condition for p ” (Scriven, 1976, p. 63). Thus, rain is a sufficient (not necessary) condition for the street being wet and the street being wet is a necessary condition for rain having occurred.

The notions of deductive, inductive, and abductive thinking and the concepts of necessary and sufficient conditions may be confusing, but these three forms of thinking and pair of conditions need to be included in any policy statement and implemented in the classroom together with the three laws of logical thinking.

Logical thinking and critical thinking are entwined, but distinct. Logical thinking is narrower and refers solely to the deductive, inductive, and abductive modes of logical thinking that connect premises with conclusions. Critical thinking incorporates these three types of thinking, but adds the *reflective* dimensions such as critique and evaluation, which are in turn critiqued and evaluated with the consequence of future critiques and evaluations being refined. The thinker needs to reflect upon the modes of logical thinking in which they conduct thought and research and critique and evaluate the consequences of taking any such approach. Critical thinking is an analysis of thinking and not just logical thinking, but also a critique of what it is to critically think. In the next section various definitions of critical thinking will be given.

DEFINING CRITICAL THINKING

The adjective *critical* suggests a level of thinking more nuanced than standard thinking. Every day, people think and make decisions: comparing prices, choosing friends, and prioritizing the tasks to do at work. What makes their thinking *critical* rather than *ordinary*? *Critical thinking* may therefore be thought of as being a vague, rather than ambiguous, concept. It may be thought as being vague because the demarcation of what is *critical* and what is *ordinary* or even *substandard* thinking are uncertain, resting upon a cline in which there are no precise boundaries. This in essence is the Sorites Paradox (Williamson, 1994) which presented the problem in terms of how to demarcate when a number of grains become a heap and when, by subtraction, a heap no longer exists. The addition or subtraction of a minute unit makes little difference to that which it is being added to or subtracted from at each stage. Yet, over successive minute changes, substantial changes are found to have occurred. The man who had a full head of hair is now bald and the ordinary thinker has now become a critical thinker. However, the important contrast is between critical and non-critical thinking, rather than ordinary thinking, which given the above examples, obviously utilizes elements of critical thinking. Examples of non-critical thinking would be believing anything read or heard without question, impulse buying, and experiencing the flow of thoughts in the mind when daydreaming. However, critical thinking begins with questioning and reflecting upon what is

thought. Whether this critical or reflective thinking is done poorly or well needs to be demarcated upon a cline for assessment purposes, which introduces the problem of vagueness.

A few definitions and expositions of critical thinking by various thinkers will next be given to gain a better understanding of what critical thinking is, or at least, how it has been understood. Dewey (1978) used the term *reflective thinking* rather than *critical thinking* and defined it as follows:

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, constitutes reflective thought. (pp. 185-186)

This is a beautifully concise definition which encompasses so much about what it means to critically think. Glaser (1972) offers a fuller, longer, definition which is worth quoting in its entirety as it gives greater detail in the aspects of critical thinking that students should be taught within schools, colleges and universities:

The ability to think critically, as conceived in this volume, involves three things: (1) an attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experiences, (2) knowledge of the methods of logical inquiry and reasoning, and (3) some skill in applying those methods. Critical thinking calls for a persistent effort to examine any belief or supposed form of knowledge in the light of the evidence that supports it and the further conclusions to which it tends. It also generally requires ability to recognize problems, to find workable means for meeting those problems, to gather and marshal pertinent information, to recognize unstated assumptions and values, to comprehend and use language with accuracy, clarity, and discrimination, to interpret data, to appraise evidence and evaluate arguments, to recognize the existence (or non-existence) of logical relationships between propositions, to draw warranted conclusions and generalizations, to put to test the conclusions and generalizations at which one arrives, to reconstruct one's patterns of beliefs on the basis of wider experience, and to render accurate judgments about specific things and qualities in everyday life. (pp. 5-6)

From these two definitions it can be seen that the points in Dewey's definition have been subsumed into that given by Glaser.

Paul and Elder (2012, p. 62) consider that there are eight elements of thought: purpose, question at issue, information, interpretation and inference, concepts, assumptions, implications and consequences, and finally a point of

view. To make sense of this (but not necessarily in the order given by Paul and Elder) it can be said that all thinking takes place within the context of a *Point of View* (frames of reference, perspective, orientation, and world view). Thinking within this point of view has a *Purpose* (goal, objective, function) which raises *Questions* (problems and issues). These questions are answered by using *Information* (facts, reasons, observations, and experiences) which is understood according to *Assumptions* (presuppositions, axioms, and anything else taken for granted) and *Concepts* (theories, definitions, laws, principles, and models) and through a process of *Interpretation and Inference* conclusions and solutions are found. These conclusions and solutions have *Implications and Consequences* for future changes in assumptions and concepts which in turn change our point of view from which future questions emerge.

In addition to this, Paul and Elder (2012, p. 103) list nine intellectual standards that need to be considered when expressing and evaluating thinking: clarity (understandable), accuracy (free from errors and distortions – true), precision (exact to the necessary level of detail), relevance (relating to the matter at hand), depth (containing complexities and multiple relationships), breadth (encompassing multiple viewpoints), logic (the parts make sense together – no contradictions), significance (focus on the important and not the trivial), and fairness (justifiable – not self-serving or one-sided).

To surmise, trying to define critical thinking too precisely should be avoided because for each definition proposed, aspects not included in the definition, but important, will later be revealed. Also, the definition may be found to be lacking in that some parts of the definition given may require further elucidation, for example, the different interpretations of *analysis* (see below). However, the more precise the definition is and the more that thinking is analyzed into its component structures the better teachers can prepare a curriculum that incorporates critical thinking skills in regular lessons.

Thus, insights by Dewey (1978), Glaser (1972), and Paul and Elder (2012) into thought and critical thinking provide useful references for understanding these notions. The notions of critical thinking can also be understood in the wider context of educational objectives and especially in what has become known as Bloom's taxonomy (Bloom, 1956).

BLENDING BLOOM'S TAXONOMY OF LEARNING OBJECTIVES WITH CRITICAL THINKING

The *Taxonomy of Educational Objectives: Book 1 – Cognitive Domain* edited by Bloom (1956) has been and remains influential in the area of locating critical thinking within the current educational environment. In Part 2, Bloom, along with colleagues, outlined their *Taxonomy of Educational Objectives* and divided it into six parts: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation (pp. 61-200). This taxonomy was revised and updated by Anderson, et al. (2001) and was given two dimensions – *The Cognitive*

Process Dimension, which has six elements: Remember, Understand, Apply, Analyze, Evaluate, and Create; and *The Knowledge Dimension*, which has four elements: Factual knowledge, Conceptual knowledge, Procedural knowledge, and Meta-cognitive knowledge.

In both versions of the taxonomy the six domains or elements of the cognitive process are presented as a linear, cumulative hierarchy ranging from the basic cognitive skill of remembering to the highest, complex cognitive skill of creativity in the revised version. The lowest ranked cognitive skill in the revised version, *Remember*, although of fundamental importance, is not critical thinking as it is purely recall without any thinking about what is remembered. The next level, *Understand*, is the first of the remaining levels that require critical thinking skills. In order to understand it is important to connect different pieces of knowledge and place them within a coherent framework of knowing and believing. Within the dimension of *Understand*, Anderson, et al. (2001) include interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining (pp. 70-76). In the following step of the *Cognitive Process Dimension*, *Apply*, Anderson, et al. (pp. 77-79) include executing and implementing, the former being when “a student routinely carries out a procedure when confronted with a familiar task” (p. 77) and the latter when “a student selects and uses a procedure to perform an unfamiliar task” (p. 78). Differentiating, organizing, and attributing are related to *Analyze* (pp. 79-83), checking and critiquing are related to *Evaluate* (pp. 83-84), and generating, planning, and producing are related to *Create* (pp. 84-88). This taxonomy will help teachers connect the various critical thinking skills to the educational objectives that need to be incorporated in course curricula.

In the updated version of the construct the top two cognitive domains are reversed with the original, Evaluation being repositioned in fifth place as Evaluate and Synthesis being renamed as Create and placed in sixth position (Anderson et al., 2001, p. 310). Placing *Create* as the final element in the hierarchy gives recognition to an important aspect of the cognitive dimension. However, Anderson et al. state, “*Create* involves putting elements together to form a coherent or functional whole” (2001, p. 84). Yet this only recognizes one aspect of creativity because removing and taking away can also be creative, for example when making etchings and sculptures. The cognitive skills of separating (*Analysis/Analyze*) and joining (*Synthesis/Create*) given in the taxonomy ought to be recognized as being of equal difficulty and one should not be placed above the other in a hierarchy. It might be better to view these cognitive dimensions not in terms of a hierarchy but as being interdependent (Ennis, 2003, p. 294). After all, analysis is a creative process so it should not be placed on a lower scale to the cognitive dimension of *Create* but recognized as integral to it. In addition, that which is being created requires evaluation, if not continually, but certainly at a pause in the creative process to judge that which has been created. Evaluation is integral to creation as any artist and designer

knows and therefore should not be placed on a lower scale either.

Despite these criticisms, teachers will find the revised version of Bloom's *Taxonomy of Educational Objectives* to be a useful framework in which to guide the incorporation of critical thinking in regular lessons.

HOW THESE INSIGHTS ARE APPLIED TO TEACHING

The previous sections give some theoretical focus to what critical thinking is and from these considerations a list of critical thinking skills can be made which should be included in various curricula in order to meet the remit of MEXT to foster logical and critical thinking skills in students. The following is a comprehensive list of necessary critical thinking skills:

- Adherence to the three laws of thinking: identity, non-contradiction, and the excluded middle
- Activating prior knowledge
- Predicting
- Brainstorming (with a mind map, etc.),
- Analyzing/Interpreting/Evaluating visuals: infographics (a picture or illustration that includes information), timelines, flowcharts for processes, bar graphs, line graphs, Venn diagrams, pie charts, diagrams, maps;
- Analyzing/Interpreting/Evaluating data, statistics, information, arguments, opinions, options, quotations
- Making inferences (inductions, deductions, and abductions)
- Ordering/Ranking/Prioritizing
- Categorizing information
- Synthesizing information
- Comparing and contrasting
- Identifying causes and effects
- Identifying problems and solutions
- Identifying pros and cons (advantages and disadvantages)
- Personalizing the information
- Recognizing unstated assumptions, values, and bias
- Considering other points of views
- Deciding on criteria of evaluation
- Drawing conclusions from evidence and evaluate claims
- Making judgments and giving supporting reasons and justifications
- Being creative: looking for similarities in dissimilar things and differences in similar things
- Applying information to a new context
- Organizing ideas (flowcharts, mind maps, T-charts to compare two topics, timelines, Venn diagrams to compare and contrast two or more topics, grids to organize information about several different things, notes showing main points and details)

- Arguing for an opinion/persuasion
- Describing
- Exemplifying
- Planning
- Summarizing
- Recognizing common erroneous and deceitful ways of thinking
- Reflection on what has been discussed and learnt

Critical thinking is a *skill* and not a *fact* and therefore needs to be *practised* regularly and applied to a wide variety of situations focusing on different thinking skill areas, rather than just being *remembered*, in order for students to become more proficient in their critical thinking skills. Critical thinking is more importantly a *state of mind*, a reflective approach of thinking and questioning that determines both the validity and quality of the information and the way it is analyzed to form various conclusions. These points have concordance with the thoughts of Dewey, Glaser, and Paul and Elder mentioned above.

Importantly for teaching is that critical thinking should never be considered a singular skill, but a multitude of skills in which thinking needs to be variously practised. Devising activities related to the various listed critical thinking skills given above is of importance. Critical thinking begins with questioning. In education questions *prime* the students for the requisite critical thinking skills they are to be engaged in and through a process similar to that given by Paul and Elder (2012, p. 62) above are led to an answer – a conclusion or decision to do something.

The following is one example of an activity that was used to practise critical thinking skills for students taking a four-skills Intensive English course three times a week at Kwansai Gakuin University in Japan in the autumn semester, 2020. The students at the start of the course had a range of TOEIC scores from 710 to 955 and were given weekly assignments to read an article from the most recent edition of *The Economist*, a weekly business and international current affairs magazine published in the UK, and discuss a contemporary world issue. The following discussion questions were related to the article, “Exams are grim, but most alternatives are worse” (2020). The article discusses how Covid-19 has affected education and caused cancellations and changes to high-stake exams and argues that important exams need to be conducted in some form.

1. The article has as part of the heading “Papers, please”. What is the dual meaning of this phrase within the context of this article?
2. Why are exams grim? Do they have to be? Why?
3. Why are alternatives to exams worse?
4. Are big exams the best way of measuring what students have learnt?

5. What are the six problems mentioned about exams internationally?
6. What are your solutions to each of the problems mentioned above?
7. “If teachers are responsible for appraising their pupils’ work, they may reinforce their own biases.” What examples are given and how can we avoid such bias?
8. The article mentions “pushy middle-class parents”. In Japan there is the phrase “monster parents.” Can you explain what kind of parent this is and why they act in such a way?
9. To what extent can anxiety and stress hinder or improve a person’s exam performance? Give examples. How do these affect you?
10. Some students “would rather be tested at the end of their course than have their work constantly assessed.” Would you agree? How would you like to be assessed? Why?
11. “Despite Covid-19, schoolchildren should still sit exams.” After reading the article what do you think?
12. What will happen with university exams early next year in Japan?
13. University entrance exams have been, and continue to be, paper-based requiring students to travel to each of the various universities’ test centres. In the 21st century with improved IT do we still need to hold paper-based tests? TOEFL has a paper-based and also an Internet-based test. What are the pros and cons of paper-based and Internet-based tests? Can you think of five pros and five cons for each type of test?
14. In the UK students take nationwide tests that are administered by various approved examination boards at the ages of 16 and 18. Schools do not set their own independent tests, but teach students what they need to pass the national tests. How does this compare to Japan? Discuss the pros and cons of each system for teaching and testing.
15. Should exams focus on what has been learnt or how what has been learnt can be applied to solving problems? Why?
16. Binary or Multiple-choice answers are easy to mark – they are either right or wrong. How can we evaluate subjective answers?
17. Can education ever be neutral? How does education reflect the norms of society?
18. How do you imagine education will change in the future? Will this be for the better or the worse? Why?

These eighteen questions give practice in a number of the skills important for critical thinking. For example, the skills of understanding a problem and giving a solution is practised in questions 5 and 6 which are tied (the first requiring an understanding of the problems and the latter requiring solutions) while question 7 combines both of these two skills. Question 13 requires students to give the pros and cons of two types of tests and justify their opinions with reasons and question 14 asks students to reflect upon a

comparison with an international situation and Japan. These are fundamentally open questions that require students to demonstrate the way they think. Closed questions show students' answers but fail to show the thinking from which they chose the answer. Therefore, any good assessment of a student's critical thinking skills requires open questions.

As previously mentioned, MEXT requires that students should become autonomous, independent thinkers, but education generally takes place in a social, collaborative space, namely the classroom with engagement between students and between students and the teacher. This invokes a Vygotskian (2012) approach to teaching critical thinking skills and the application of the notion of the Zone of Proximal Development (ZPD). University students are obviously not bereft of thinking skills, but these skills may not be optimized. One's thinking, even in one's own language, may be less than critical, but to think and express ideas in a second or foreign language is a different order of difficulty. The teacher must start by allowing the students to think for themselves and work in pairs or groups to discuss and exchange ideas regarding the given topic, provide opinions, reasons and justifications, make challenges to these given ideas and give help in expressing these in the target language without the aid or interference of the teacher. Peer support is an important aspect in which the weaker students can be helped by the stronger students and also everyone can benefit from such collaboration by utilizing their combined knowledge and thinking skills. This meets a number of MEXT's policy statements mentioned above, for example, fostering independent thinking, working in collaboration with others and utilizing knowledge to solve problems. Later, the teacher's engagement needs to be tailored to the needs of the students. Whenever teaching is provided it needs to support what is nascent in the learners, guide it towards maturity, and let go when no longer needed. Guiding students through questions that require critical thinking skills is a maze in the making. The teacher has to work with the student or group of students and address their various directions on thinking, checking and confirming coherent reasons for taking such a cognitive path or providing appropriate questions or challenges to the chosen path taken by the students to help them see or follow a more logically coherent route. However, sometimes, the students have seen a different coherent path that the teacher had not imagined, so the teacher also needs to be open to critically thinking about their own position in this collaborative teaching environment.

To lead students towards becoming better critical thinkers is one thing, but to assess how well a student is critically thinking is another thing.

ASSESSING CRITICAL THINKING

Much of the literature on critical thinking appears to be about what it is and how to teach it rather than how to assess it. Assessment requires a criterion or a set of criteria of that which is to be assessed. However, the notion of critical

thinking is broad with numerous definitions. To state the criteria by which to assess how well a student has critically thought Halpern (2003) notes:

assessment is a multivariate concept – it is, in part, a question of definition (What is critical thinking?), a question of evidence (What sorts of responses on what sorts of tasks show critical thinking?), and a question of purpose (Assessment for whom and for what purpose?). (p. 356)

No doubt any definition of critical thinking will make reference to *analysis*. However, the type and degree of analysis will be different according to the context. Ennis (2003) gives these examples, “analysis of the political situation in the Middle East, analysis of a chemical substance, analysis of a word, analysis of an argument, and an analysis of an opponent’s weaknesses in a basketball game” (p. 294). Each of these requires a different set of criteria to judge the type of *analysis* being considered in thinking critically. This shows that critical thinking cannot be assessed as if it were a singular skill. Instead, each of the various components that together constitute critical thinking require their own individual set of assessment criteria.

Another problem with assessing critical thinking is that people think in different ways. One person will analyze the political situation in the Middle East in one way and another person in a different way and come to different conclusions. Both could be critically thinking at a high level, but in order to determine this some kind of criteria would have to be set in place. Yet, what exactly would that criteria be and set by whom and for what purpose? Such real-life situations can have no right or wrong answer and different solutions can lead to the same end result. The examiner needs to avoid bias in their own thinking and be able to judge another’s line of thinking according to its merits and also be open to novel ideas and solutions.

To demonstrate critical thinking, one needs some knowledge of what one is critically thinking about. Indeed, thinking is always thinking about something – the activity requires content. The ideas of *nothingness*, *emptiness*, and *vacuum*, despite their negations of *something*, have content with which the mind can engage in thinking critically. Thinking about thinking is an example of a self-reflective activity in which the subject becomes the object, and this is integral to what critical thinking is. McPeck (1990) notes that, “Possessing basic knowledge and information is a prerequisite for critical thinking” (p. 44). This becomes especially apparent when critically thinking about a specialized subject area such as biology or literature. Without sufficient knowledge of the subject area one can make educated guesses or by using critical thinking be able to make simple comparisons or arguments. However, to be able to fully engage one’s critical thinking skills one needs knowledge – and this leads back to Bloom’s Taxonomy. One cannot critically think about astrophysics without

some knowledge and understanding of the subject. Therefore, it is important to note that when assessing critical thinking teachers need to distinguish between testing the students' knowledge of the subject from their critical thinking skills applied to that subject. To focus on assessing critical thinking skills teachers need to provide tests that contain information the students already possess. If not, then the test for critical thinking is compromised. How can any student be assessed for critical thinking when they do not understand the subject they are to critically think about? Furthermore, in order to assess critical thinking, it is necessary to use similar but different material to that used as teaching activities in the class so that students are not just remembering the solutions. Fresh materials and activities upon which students have to apply their thinking skills are required.

Norris (2003) notes that when assessing critical thinking one needs to recognize the distinction between the *disposition* from the *ability* to think critically. Some students naturally show a disposition to critically think and apply their skills readily to problems while others have the ability, but are less inclined to do so. Thus, it was found that in critical thinking tests those with lower dispositions underperformed. However, given general guidelines and hints for certain questions this group of students' performances could be improved. As Norris notes, "neither the guidelines nor the hints tell the examinees how to answer. They provide suggestions...but for an examinee who does not know how to do what is suggested, they will be useless" (p. 322). Such guidelines and hints help to assess students' ability in critical thinking rather than their disposition to critically think. However, one of the goals of MEXT for teaching critical thinking is for students to become independent and autonomous thinkers. Giving such guidelines and hints in tests fails to take this important characteristic into consideration.

These issues, however, do not preclude the possibility of some kind of assessment of critical thinking. Indeed, some kind of assessment is essential if teachers are to determine if and to what degree critical thinking skills have been learnt by students. Teachers can devise activities that focus on a particular aspect of critical thinking, such as ranking and comparison, and determine the criteria by which each aspect is judged. Answers can, for example, be given through the completion of tables, charts, Venn diagrams, and multiple-choice questions, which can be especially useful in assessing the critical thinking skills of students with lower-level language skills. However, in addition to these, or possibly solely in the case of demonstrating argumentative skills, an open, free-writing (or spoken) component that requires students to justify their answers will reveal much more about the way a student is thinking critically for assessment purposes.

CONCLUSION

Critical thinking is an important set of skills which students need to become more proficient in using and with which to become more confident as independent, autonomous thinkers in society. In order to meet the remit of MEXT, teachers need to be better acquainted with the logic of thinking and its various types and place critical thinking skills within the framework of the educational objectives for the courses being taught. In order to do this a comprehensive list of critical thinking skills was introduced together with an example of how a variety of these skills can be incorporated into a lesson with a focus on dialogue with other students and the teacher. A number of issues related to the assessment of critical thinking were given and it was concluded that a careful consideration of assessment needs to be made in order to better establish the extent of the success of critical thinking instruction.

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