Critical Thinking: Narrative Review

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Abstract

Introduction: In this narrative review, the author explored concepts of critical thinking: definition, goal, instruments and dimensions. The aim of this article is to synthesize the information from multiple sources into a more detailed process for "critical thinking" (CT) based on the 5 A's model (Ask, Acquire, Appraise, Apply, Assess) that incorporates the dimensions.

Methods: Literature review was based upon convenience sample of materials used to teach the subject and Pubmed search of "critical thinking" limited to free full text, RCTs, systematic reviews and narrative reports.

Results: Deliverables include a step by step table for the "critical thinking" 5 A's process with explanations in the body of the paper. Other deliverables include consolidated tables of the information presented in the introduction.

Discussion: Potential areas of concern are introduced including a lack of overall tool for measuring critical thinking and the impracticality of assessing all dimensions of CT.

Conclusion: This provides a resource for beginning to understand the complexities of critical thinking and elucidating the associated dimensions.

Keywords: Critical Thinking; Literature Search; Appraisal; Evidence Based Medicine; EBM; EBCP; Education

Introduction

Synonyms, Goals, Aims

The process of "critical thinking" provides an essential framework for implementing Evidence Based Practice (EBP) as per the process developed by Sacket [1-3] Many advocate for the use of EBCP [4,5].

This section will explore the concepts of critical thinking (CT) including the following: synonym, definitions, goal, aims. Synonyms for "critical thinking" include the following: creative thinking, reflexive thinking, clinical reasoning, diagnostic reasoning, decision-making. [6p2] [7p1033] The goal of critical thinking is to answer a question that matters. Regarding healthcare, the goal is to synthesize a safe, resolute, well-structured practice [6p2] to make a positive difference in individuals. General protocols ought to be uniquely fit to the individual's demographics and idiosyncrasies. The importance of CT is as follows: predicting academic achievement for healthcare

students [8p6], diagnosis and management by healthcare professionals [8p1] [9p1] and helping patients to critically appraise information streams [10p2] (blogs, websites, family, friends). The aim of this article is to synthesize the information from multiple sources into a more detailed process for "critical thinking" based on the 5 A's model (Ask, Acquire, Appraise, Apply, Assess) that incorporates the dimensions; including "salting to taste" for the patient's context.

Methods

Literature review was based upon convenience sample of materials used to teach the subject and Pubmed search.

Pubmed search limits

1. Free full text

2. English

3. Metaanalysis, RCT, review, systematic review.

Term results and trials included

4238 critical thinking, too many and searched more specific terminology

54 "critical thinking" Added convenience selection of articles from past experience teaching EBP course.

Results

Deliverables from the literature search follow which include: definitions, dimensions, barriers and solutions, process.

Authors that have explored "critical thinking" include the following: Facione, Ennis, Scheffer, Rubenfeld, Paul, Elder, Bartell, and Alfaro-Lefevre [22p4] Facione' frameworks include "Holistic critical thinking (HCT)" which is defined in table 1 with other definitions. Before creating a clearer definition of critical thinking, the plain language summary of the definitions was offered in table 2.

Number	Definition	Source
1	Objective analysis and evaluation of an issue in order to form a judgment	Oxford Languages [11]
2	Disciplined thinking that is clear, rational, open-minded, and informed by evidence	Dictionary.com [12]
3	Meta-cognitive, nonlinear process of purposeful judgment that includes self-directed learning and self-assessment	D'Antoni [13p1] quoting [14][15]
4	Holistic critical thinking (HCT) = "thinking with quality, that is, a process of judgement centered on deciding what to believe in or do; to achieve it, the thinker must not be negative or cynical, but thoughtful or reflexive and equilibrated, requiring people to express some kind of reasoning or basis for what they say".	[6p4]

Table 1: *Definitions of "Critical Thinking".*

Steps	5 As: Title of Step	Terms Used in Definition	Plain Language Definition
0	Dimensions	Meta-cognitive, quality	Thinking about the way you think … Consider context; what you don't know; own biases; respect and appreciation to past ideas sources; use logic, avoid fallacies; consider feelings; humble skepticism not cynical
1	Ask: Define the problem	Issue, believe in or do	Determine the problem specifically and the outcome. Determine initial options list to fix problem.
2	Acquire: Collect evidence	Informed by evidence	Obtain evidence regarding problem and options.
		Open-minded, not negative or cynical	Consider other's views and develop a larger options list.
3	Appraise: Analysis part	Objective analysis, evaluation, rational	Not including biases, using reasoning (logic), measurable outcomes (symptoms, signs, risk), requiring others to explain viewpoint
		Self-directed	Not controlled by an authority or politically accepted narrative
		Clear, rational	Diagrammed or written pros and cons so you can understand how you arrived at the conclusion and perhaps explain it to others who might have weighed it differently.
		Non-linear	Multiple outcomes can be used to determine a solution (Eg. Benefit vs Risk; not just benefit)
		Reflexive	Quickly able to make decisions when it matters
4	Apply: Conclusion, solution	Judgment	Does information apply to the demographic of the patient? Determine if solution is feasible with modifications and try it out
5	Assess: determine if outcome was met	Self-assessment	Did your option you chose worked to get the intended outcome with minimal risk and without ethical concerns

Table 2: Plain language summary of definitions of "Critical Thinking".

Dimensions

I will define critical thinking as a process of finding a solution to a problem in the best possible way. The best possible way includes the CT dimensions in step 0 of table 2 and continues through the steps identified. Unfortunately, the best possible way includes many other general CT dimensions that will be partially delineated soon. Since it is impossible to identify and measure all dimensions as well as weigh them appropriately, critical thinking may be impossible for finite beings. Nevertheless, we must try to do an adequate job since the opposite (not critically thinking) would require critical thinking as well to be considered the best option. In addition, many of us are aware of the consequences of inaction or being at the mercy of the commercial charlatans. Critical thinking requires many abilities that are called dimensions. These dimensions are listed in table 3. Here is further information regarding some of the dimensions that would not fit as nicely in table 3.

#	Dimension	Sub-Dimension	Details
1	Cognitive skills	Knowledge, Understanding [6p2] [16p255], Bloom's Verb [17]	Each of the Bloom's Verbs can be applied to any topic (biology, math, language, technology, EBCP). Regarding EBCP (Hill's criterion of causality, scientific method). These verbs show higher levels of critical thinking [17] Eg. Using Microsoft Excel for storing text
2			vs using equations for advanced calculations and graphing.
3		Application, Bloom's Verb	Apply an abstract idea to a concrete situation to solve a problem [17]
4		Comprehension, Bloom's Verb	Understand main idea and express in own words [17], communication [18p1]
5		Analysis, Bloom's Verb	Break down concept into parts and show relationships [17] Eg. Use excel to list pros and cons of a decision
6		Evaluation, Bloom's Verb	Make informed judgments about value. [17] Application of standards [6p2] [17] Defend without counter Eg. Use excel to assign values and then sum values to make decision
7		Synthesis, Bloom's Verb	Bring together parts to build relationship for new situation. [17] Discuss [8p1], Debate [19p1] (defend with counter), invent, statistical model building Eg. Using Microsoft Excel for storing debate topics and using it in a debate
8		Interpretation	
9		Self-regulation	Not "going crazy" in response to stress
10		Inference	
11		Analytical spirit	
12		Cognitive maturity	See text
13		Argument evaluation	
14		Ability to reply arguments	
15		Explanation	Providing written, verbal, digital, video critical answers Supply answers at different levels of Bloom's verbs: information, Explain, Debate, Expressing information in a more widely distributive manner
16		Substantive dimension	
17		Decision making	How to weigh options
18		Other cognitive functions [20p11]	
19		Executive function [20p11]	as per Miyake et al quoted by Dean [20p2]: Set-shifting ability, Inhibitory control, working memory updating
20		Memory [20p11]	Reason is dependent upon memory [20p19]
21		Reflection [6p2]	Perceptual and cognitive biases
22		Logical Reasoning [6p2]	Includes deduction, induction
23		Intelligence	IQ testing questions deal with memory of number sequences, missing parts of a picture, vocabulary
24		Contextual perspective [6p2]	Appraising information in the context that it came from (history, culture, audience, language styles)
25		Academic performance	
26		Thinking style (intuitive, analytical thinking)	Intuition [6p2] being able to not ignore important cues, involves talking to yourself

27		Knowledge transfer [16p255]	applying knowledge gained in one situation to similar situations [16p255] or altering previous protocols to fit situations requiring modification
28		Creativity [6p2]	Able to "think outside the box", avoid false dichotomies; visualize the outcome and plan how to achieve it
29		Tentativeness [21p3]	Scientific findings are "inherently uncertain, temporary and revisionary" [21p3]
30	Behavior skills	Analysis [6p2]	When px believes + with instance zd; while px believes - with instance zr. Difference seems to be d and r. Although the issue might be zdw vs zrn and the real reason is w and n
31		Widening of thinking	Seeking widening, accepting, being able to think about an idea without believing it, using different thinking methods
32		Analytical spirit	Drive or want to figure out the truth
33		Systematization	Organizing processes into steps
34		Self confidence	Believe that you have been given the abilities to do great things
35		Ethics	Prioritizing needs of patients, families and communities [6p4], Safety [6p4], Quality [6p4], Credibility, Trust, Intellectual integrity [6p2]
36		Dialogic dimension	How to communicate with humor, charm, wisdom, restrain. Perhaps, should include self-talk.
37		Attention	Keeping mind working on a particular task
38		Flexibility [6p2]	
39		Perseverance [6p2]	Not giving up due to attention, fatigue, breaks
40		Search for information [6p2]	
41		Activism and civic engagement [22p903]	Determining the priority problems of community and self, using most effective and ethical methods for good, countering others' methods
42	Mind habits	Curiosity [6p2]	
43		Search for truth	
44		Supposition identification	Identify the assumptions, hypothesis

Table 3: *Dimensions of critical thinking 1-7 Cognitive (Knowledge through Synthesis).*

Notice that the first 6 sub-dimensions under the cognitive dimension are related to Bloom's Taxonomy and provide a level of rigor for critical thinking. These levels of rigor can be use with any topic and provide a way to progressively bring the student to higher levels of critical thinking throughout a curriculum.

12 Cognitive maturity [6p5]

These are the stages of epistemic assumptions. [16p256] In other words, these are stages of how people believe due to the things they assume. The stages of thinking include the following: Less mature, Quasi-reflective, Reflective. Less mature thinking is often associated with the idea that knowledge is certain, immediately present and correct answers usually are provided by authority to all questions. [16p256] Often a child will simply accept what their parents say as the truth. This type of thinking might be looked down upon; however, authoritative answers are helpful to keep us from "reinventing the wheel". The need for authoritative answers can continue into adulthood

by using friends, parents, government, or religious texts as the authority. Authorities should be given proper respect and interpretations should be in context. Also, truth exists because I can not say it does not unless I want to disqualify my statement. Because if truth does not exist then the phrase "there is no truth" is not true; which is self-defeating. Thus, truth exists although the question is "do we know it?". Who could claim to be or know the truth? Who could claim to be the supreme authority? Should we trust scientific consensus that is beholden to government grants or the latest narrative of the elite class? I must respectfully mention that there is much evidence for the existence of God presented in professional debate found easily on the internet by William Lane Craig and John Lennox. Therefore, the authoritarian viewpoint should not be totally dismissed. More importantly would be the interpretation of the revelation. Paranormal phenomena (psychokinesis, hauntings, and clairvoyance) contradict the basic limiting principles of current scientific understanding. [20p2] However, there is much evidence that cannot be explained by science and thus the limitations of science need to be acknowledged. There is nothing illogical about a supernatural being doing that which is supernatural. Quasi-reflective thinking is that problems might have many answers, answers need to be justified, choose evidence that fits an established belief. [16p255] The choosing of evidence that fits our belief is cognitive bias. Often, we have to avoid cognitive bias despite negative consequences from power holders. Reflective thinking investigates the problem from different angles which are justified probabilistically. [16p255] Who would have the middle knowledge to know the probabilities? Unfortunately, the most mature stage is still limited by the best available evidence. One must be humble and realize that the answer might be challenged and re-evaluated by new evidence and perspective in the future.

22 Logical reasoning [6p2]

Logic has many forms including the following: Formal, Informal, Modal. In addition, the caution is to avoid logical fallacies. [20] Reasoning [20p19] has many forms as well such as: Deductive (top-down, general to specific), Inductive (down-up, specific to general), Conditional, Practical. Practical reasoning includes discernment [6p2] and discretion [16p255]. Practical reasoning and discretion ought to be done in a real situation. [16p255] Professional discretion [16p255] is "bounded practical reasoning that differs from free fantasy due to a knowledge base that is recognized as relevant for the specific professional practice". [16p255] Discretion has the central feature of the "ability to rapidly and accurately identify situational cues while accessing personal theories". [16p259]

Further definition of critical thinking can be determined by instruments for determining levels of critical thinking. Instruments for measuring "critical thinking" are listed in table 4 with the dimensions they are intended to measure. This further defines critical thinking although it is difficult to quantify given different theoretical perspectives and the massive number of dimensions that are not quantified by these instruments. [7p1] Furthermore, each of these dimensions are interrelated. If we say that an intervention affected critical thinking based on an instrument, are we not saying that critical thinking is at least in part defined by the outcomes of the test. If we critically think about this; it should lead to a humble understanding of our inadequacies regarding arriving at optimal holistic critical thinking

#	Instrument	Dimension
1	California Critical Thinking Essay Test [6p2]	
2	Cornell Critical Thinking Test [6p2]	
3	California Critical Thinking Disposition Inventory [6p2][7p1035]	
4	Holistic Critical Thinking Scoring Rubric (HCTSR) by Facione [6p6]	
5	Health Sciences Reasoning Test (HSRT) [13p1]	
6	Critical Thinking Skills Test (CCTST)[7p1035][21p4]	Do not related to critical thinking skills relative to CCTDI [7p1036]
7	Deese-Roediger-McDermott task (DRM) [20p11]	Executive function and memory [20p11]
8	Wisconsin Card Sorting Test [20p11]	Executive function and memory [20p11]

9	Priming word pairs for Indirect semantic priming [20p11]	Other cognitive functions [20p11]
10	Implicit sequence learning [20p11]	Other cognitive functions [20p11]
11	Cognitive Reflection Test [20p11]	Thinking style (intuitive, analytical thinking)
12	Rational Experiential Inventory (REI) [20p11]	Thinking style (intuitive, analytical thinking)
	Lasater Clinical Judgment Rubric (LCJR)[7p1035]	Clinical Judgment
13	Real-world Outcomes [6p2]	
14	Pintrich' motivated strategies for learning questionnaire (MSLQ) [9p2]	
15	Pencrisal Critical Thinking Test [6p2]	
16	Prova de Pensamento Critico [6p2]	
17	Mental dice task [20p11]	probabilistic reasoning
18	Reasoning Tasks Questionnaire (RTQ) [20p11]	probabilistic and conditional reasoning
19	Measures of academic achievement such as grade pint average [20p11]	Intelligence, critical thinking, and academic performance
20	Raven's Matrices [20p11] Advanced Progressive Matrices Test [20p11] Raven's Progressive Matrices [20p11]	Intelligence, critical thinking, and academic performance
21	Watson-Glaser Critical Thinking Appraisal (WGCTA) [6p2] [20p11] [7p1035] [21p4]	critical thinking
22	Critical Thinking Process Test (CTPT)[23p4]	
	Critical Thinking Tests Specific to Appraisal of Articles Cochrane risk of bias tool Risk of Bias in Nonrandomized Studies- of interventions A MeaSurement Tool to Assess systematic Reviews 6 questions to trigger critical thinking	Critical appraisal of articles
23	Combine the above	Multiple dimensions

Table 4: Instruments to measure "critical thinking" and dimensions they measure.

Barriers, Solutions

Barriers that exist for critical thinking are voluminous. Determining barriers and causes include anything that would affect a dimension. Significant learner problems in students are about 5.8%-9.1% [8p2]. These students are often identified due to lack of academic performance as an initial metric from the outcomes related to knowledge, attitude or skill development. [8p2] In other words, the student is failing a class. This can also present as failing boards. Causes can be due to knowledge deficits, bad clinical judgement, or inadequate use of time [8p2]. Ahmady offers these as causes: low emotional intelligence, psychological illness, material abuse, attitude or behavioral problems, affective, cognitive, structural, interpersonal such as family tension [8p2]. Other causes may include: not staying current with every-changing information and systematizing information to promote learning [4p903], lack of time to think due to real demands, preparation [22p904], self-confidence [22p904], availability of nutrition [22p904], lack of mentorship, and non-engagement.

Solutions are many; however, the goals of teaching should be kept in mind: determine a test for critical thinking, determine realistic threshold of achievement [16p260] for that student and define EBP based methods. Regarding solutions to non-engagement, methods

include individual based problem solving [22p904], simulation clinical training [24p968], debate [19p1] related to mastery level Bloom's verbs [19p5], and TBL which is comparable with debate [19p2]. Also, one must consider the side effects of these methods. Stress which can result from "high-fidelity simulation" although "the student who had the self-evaluation capacity seemed to reflect on their responsibility to learn and the need to acquire the required skills for patient care" [24p973] [8p7] table 5 provides a more detailed list of teaching methods.

#	Method	Results
1	Audience response systems (ARS) [8p6] … Eg. Clickers	No diff, yet more enjoyable [8p6]
2	Blended learning [8p6]	Improved scores, not by chance <0.001; improved critical thinking <0.05 [9p1]
3	Case-based learning (CBL) [25p415]	Critical thinking dispositions inventory: positive, not by chance [25p415]
4	Clinical simulations of emergency situations [7p1035]	helped [7p1035]
5	Community-based education [18p1]: learning in settings outside college (such as home care, nursing homes, hospitals, offices)	
6	Concept map [23p6]; SMD = negative	
7	Critical appraisal exercises [7p1035]	
8	Daily quizzes [8p6]	
9	Engage students in protocol formation [16p260]	
10	Engage students in research [16p260]	
11	Engagement into grand rounds	
12	Formative evals [8p6]	
13	Genogram [7p1035]	
14	Individual based problem solving [22p904]: tackling an issue the student is interested in	
15	Journal clubs [16p255]	
16	Learning activities base on the concept [7p1035]	positive influence on clinical judgement as per LCJR
17	Mentorships with those who are proficient	
18	Mind mapping [13p1][7p1035]	same as regular note taking [13p1], helped [7p1035]
19	Mobile web-based learning technology [7p1035]	improved [7p1035]
20	Problem based learning (PBL) [16p255]	SMD = 0.21, p=0.043 [23p6]
21	Proficiency testing for teachers of EBP	
22	Reflective journals [16p255]	
23	Scenarios based on community health practices [7p1035]	improved crit think [7p1035]
24	Self-directed teaching approach [8p6]	
25	Short, frequent objective-led summative assessments of individuals in a group [8p6]	
26	Simulation clinical training [24p968]: simulated patient (actors) or manikins	
27	Structured Academic Controversy (SAC) learning tool [7p1035]	
28	Structured debate mediated by teacher [7p1035]	
29	TBL [8p6]	Increased results of application questions more than recall; although both increased. Only significant p=0.03 when combined in the study. Small N=30 study [26p1]
30	Teaching and practicing critical appraisal of research [7p1035]	improved [7p1035]

Table 5: *Types of Teaching Method Solutions and Results.*

Process

Based on the plain language definition represented in table 2 and the dimension in table 3, I will explain the process of "critical think-ing" in more detail. The intent is to incorporate the dimensions in the appropriate step as per table 6. Many have delineated the steps of this process to a limited extent. Aglen used these steps: identify the problem, identify the objective, solve the problem, evaluate the results. [16p255] Agostino used these steps: "obtain, evaluate, analyze and apply information to address problems". [22p903] While these steps are included in Table 6, I will further explain the incorporation of the sub-dimensions into the steps.

#	5 As	Main idea	Sub-dimension inclusion	General notations
0	All steps		Blooms levels #1-7, #8 interpre-tation, #9 self-regulation	
1	Ask	Define the problem	#44 Supposition ID	Specific demographics, break out into multiple questions, define specific outcomes, diagnosis or treatment
2	Acquire, Access	Obtain sources of information	#42 Curiosity, #31 Widening of thinking, #40 Search for infor-mation, #43 Search for truth	Related to the problem
3	Appraise	Determine quality of sources	#10 Inference, #11 Analytical spirit, #17 Decision making, #22 Logical reasoning, #44 Supposi-tion ID	Are statements backed by research? Informal or formal appraisals. Are they primary sources or trusted secondary.
4	Apply	Qualify, use approach to solve problem or innovate solution	# 35 Ethics, # 41 Activism	Does it fit with the demographic of the patient? Follow protocol or modify?
5	Assess	Determine if problem was solved as per outcomes by innova-tion with minimal harm	#27 Knowledge transfer	Problems: pain, discomfort, blurred vision, fatigue, disability Outcomes should be measurable. Harms: inconvenience, cost, value crisis, pain, disability. Issues: sustainability, duration of effect, MCID

Table 6: *The 5 A's of Critical Thinking applied to patient management. Most dimensions apply to all steps.*
Dimensions particular to an area are mentioned.

#0 All Steps include many of the dimensions. I highlighted Bloom's level to bring attention to the idea that these steps can be done at an elementary level or even a post-doctoral level. This process can be quite grueling for an individual writing a doctoral thesis and may require self-regulation.

#1 Asking a question starts with the refining of an ill-structured problem into a specific question or set of questions [16p255]. Often our initial question has some uncertainty, ambiguity and can change. [16p255] Structured problems are specific questions that have a tiered set of sub-questions. The sub-questions are supposed to lead to the answering of the higher question. Clarifying any assumptions and hypothesis in the question is important. Can the answer be obtained by a survey or does it require a randomized controlled trial

(RCT)? This would help the questioner to set the filters in the database search succinctly. Formulate searchable questions that will prepare for the next step [16p259]. Using MESH terms in the Pubmed database helps to get most articles tagged to that term. The questions should be testable, repeatable, specific. Testable means observable either by the basic reliability of sense perception, extended perception, or logical inference. The question should include sub-questions on whether the experimental results have been witnessed by multiple researchers (repeatable). The benefit vs risk balance should be questioned by the searcher. Specificity should be given on the demographic of the patient including the following: sex, age, race, diagnosis (name, grade, phase, associated diagnoses). The outcome should specify the benefit type (pain, discomfort, sign) and risk type (heart problems, cancer, death). These need to be separate searches that are filtered to higher level evidence such as meta-analysis, systematic review and RCT for treatments. The PICO tool can be used by the searcher to specify the Problem (Diagnosis), Intervention (Treatment, Diagnostic tool), Comparison (other treatment) and Outcome.

#2 Acquiring sources of information requires curiosity to browse through titles and abstracts to determine it the full article is needed. "Perform systematic searches in bibliographic data bases or other relevant sources, separating the relevant from the irrelevant". [16p259] Often this is "problematic due to lack of skills in critical reflection and clinical experience" [16p259]. Widening of thinking will occur as more information is presented to the mind and more questions are formed. This search for information should be a search for truth; not for personal gain. Evidence is derived from theories and research, the actual clinical and organizational circumstance and the patient's situation and preferences. [16p255] Evidence should not be from professional's personal preferences, habitual routines, opinion-driven decisions based on traditional practices [16p255], or dishonest gain.

#3 Appraisal is meant to "critically assess the research and summarize the results" [16p259]. Informal appraisal can be accomplished with the ABCDFix model (allocation, blinding, comparable, drop-outs, intent to treat, other x-factors). Formal appraisal tools are available for most study types. Determine the quality of the study and the effect evidence. The effect evidence includes effect size compared to minimally clinically important difference (MCID). Also consider if the p-value is below the pre-determined alpha limit (normally < 0.05) to see if it could have happened by chance alone. Being able to infer applicability to the patient scenario in important. Having an analytic spirit will drive the healthcare professional to see the best for their patient.

#4 Application to of the research information to practice [8p259] can be exciting. Ethical considerations of applicability to your patient's situation can be fearful. Learning how to modify the approach to specific patient needs is important. For the community, activism is another form of application.

#5 Assessment is where the healthcare provider would "evaluate the outcomes" [16p259] The knowledge transfer from one case to another makes the process worth it. What was the results? Were your results (good, neutral, or bad) possibly due to any modifications? How could you modify it next time? Was the patient compliant with the protocol? If the intervention did not work as suggested, then review the protocol. If the protocol continues to give less than satisfactory results, then question the narrative.

Discussion

Unfortunately, with all of this information on "critical thinking", a unified test for it is not available or used regularly. The total assessment for critical thinking including all sub-dimensions would be an unbearable for the researcher and subject. Some are concerned that EBP critical thinking will cause standardization in the hands of the cognitive immature that might lead to cookbook type practice. [16p261]. Practitioners are knowledge creators [16p261] that learn to make what only a master chief could achieve and teach others. Practitioners should be able to question the narrative and have a voice regarding their unique patients. Unfortunately, it is difficult to put power in the hands of those that have cognitive maturity without care maturity.

Conclusion

In this narrative review, I explored the concepts of critical thinking with respects to definition, dimension, testing with instruments, barriers, solutions, and process. The process of "critical thinking" provides an essential framework for implementing Evidence Based Practice (EBP). Further training and research are needed to teach higher Bloom's verb levels to create a society that can engage more critically in the exchange of ideas without canceling, marginalizing, ad hominem or name calling. Perhaps this will create a respectful atmosphere where the majority and the minority of people will be informed enough to determine what they want to pay for, and fringe elements can invest in their interests. This sounds like a utopia; perhaps we could at least move closer.

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