

Trends of Thought That Allow College Students Reasoning Critically Through Everyday Situations

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Abstract --- This research study was of a descriptive type, about the conditions that lead the university students to think critically as part of the objective general of "characterizing the skills that allow reasoning critically to the student of the bachelor's degree in basic education with emphasis in foreign languages and bachelor's degree in basic education with emphasis in physical education, recreation and sports, of the Faculty of Sciences of Education - UCEVA, through the application of the HCTAES test (evaluation of the critical thinking through situations daily situations, proposed by Halpern 2006.)

The found results allowed the researchers to set the trend that the student has, taking a series of decisions that support the use of cognitive resources, to run skills and develop them with procedures and established rules, correctly applied. In addition, it gives the opportunity to teachers of both academic Programs object of study to create some contexts that allow the deployment this type of thinking.

In conclusion, it manages to describe the use of the cognitive resources used in the stall of new knowledge and the strategic usage of it in the resolution of problems present in the daily activities.

Keywords— Skills, Thinking, hypothesis, Arguments, Probability, uncertainty, Decision-making, Problem-solving.

I. INTRODUCTION

Whenever a person wants to think in a definition of what reasoning critically means, first of all, it has to start by establishing, what it is not, that's to say, it is not memorizing, it is not common sense, it is not what is believed to know; but it actually is everything that involves cognitive abilities and disposals for them to be used (Caicedo; Mina; 2014).

For now, in the discussion about critical thinking, there is no consensus on the precise definition of it, nor favorable scenarios to conceptualize a way to reason critically. For many theoreticians, this

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approach bet to the understanding of what this trend wants to convey, but it is not dare to set any position that enable to validate them as definitive. According to the perspectives that are posed about critical thinking, it can accepted that the skills representing them, have a huge cognitive component, and is, that cognitive component which allows to know what to do. This is how thinking required to apply strategies, and hence is when skills give place to the resolution of problems, because these are a special type of thinking strategies that are arisen when you have to give an appropriate response to a problem situation. In this regard it should be said that, although these positions vary from one author to another, the direct point is seeking to focus on the skills that make up the critical thinking. Throughout this paper revision of perspectives of different authors, and highlight the look of Ennis (1987) who raises a set of skills, from his taxonomy of critical thinking, everything that allows you to clarify problems, ask questions, gather information and distinguish it from what is relevant and from irrelevant; to be able to make inferences arriving of deductive reasoning; be able to recognize unjustified claims, distinguish the force of an argument of a trial, deciding on answers or solutions.

Other authors such as Swartz and Perkins (1990), presented an overview of types of thinking. These are routed from broad categories, such as creative thinking, critical thinking, decision making, the resolution of everyday problems and solving mathematical problems. Other more specialized type of thought such as knowledge, inference, evaluation and Metacognition.

II. THEORETICAL FRAMEWORK

A group of international experts in the 1980s, started a movement of critical thinking and assessment of critical thinking. During this time, the discussion focused on going beyond traditional approaches, which only concentrated on the accumulation of unconnected knowledge and little relevant information and not in the learning process, and as the cognitive processes empower thinking. At the end of this decade, this stance had won notable recognition, but in the same way, had made relevant apparent questions that were unavoidable for the time; such as what are exactly those skills and dispositions that characterize critical thinking? What are some effective ways to teach critical thinking? and how and what can assess be with the critical thinking? When attempted to inquire about teacher seeks training in critical thinking, such questions have become difficult to resolve because they acquired social, political and economic dimensions. Because

of this, the philosophical American Association (APA) and through its Commission for pre-university philosophical studies taking a great interest in the study of critical thinking and its impact in the educational field. So as, in December 1987 the APA delegates to Facione as principal investigator of the Commission of studies of critical thinking in college students, to conduct a systematic investigation of the skills and critical thinking assessment. (Facione, 1998).

With regard to this topic there has been certain discrepancy, according to Nieto, A and Saiz, C. (2008) there are still "the provision of critical as a trend, a propensity or a susceptibility thought. to do something under certain conditions It would be, therefore, a motivation to deploy critical thinking when the circumstances to apply"(p.2). Other authors (Facione, Peter A., 2007) suggest that the provisions are intellectual attitudes or habits of mind, pointing to intrinsic motivation as something permanent that leads the person to act in a certain way. According to this vision, Facione (2007) raises a more attitudinal stance. Suggest that a critical thinker should exhibit the following intellectual attitudes: analytical, systematic, impartial, curious, judicious, Finder of the truth and committed in the reason. A different approach is suggested by Perkins, Jay and Tishman (1993); they indicate that critical thinking has provisions, which are studied from what is perceived, the interest and finally conduct. For these authors, the provisions or skills, are organized by three elements: the sensitivity - understood as the perception that a particular conduct is necessary or proper, tilt - motivation towards such conduct, and the ability - ability to run such conduct.

According to which has been said so far, it stands out, some opposite perspectives, that for other authors would be added other theoreticians that can found, to sustain routes of study of the critical thinking. Because each of these positions discuss the provisions that are required to be used, for example, consider the motivation as a central element to critical thinking to be given, on the contrary, it can be found the study towards the intellectual attitudes and others, that consider the provision as an integration demonstrating the ability to use critical thinking.

This latter disposition looks like an integration, it remarks the interest in studying the critical thinking (Caicedo; Mina; 2012), especially for the evaluation of critical thinking. Most of the tests, come through multiple choice questions or, through open-ended questions that only evaluate critical thinking skills. The skills of thinking critical are essential to study it, in most of the subjects and to grow as a true seeker and as a person.

This current research project was particularly conducted to start a process of inquiry on the matter of how well the University students were reasoning, fact that took the researchers to get an interest to search more details around this thematic and beginning the exploration with the application of an instrument that allowed them familiarize the theme and

thus, undertake some bases of knowledge that serve for characterizing the way how students were reasoning critically.

WHY DO WE STUDY CRITICAL THINKING?

Critical thinking, mainly has to do with the reasoning; not seen as a generator of ideas, but as a process that starts from the interest (motivations and attitudes) that activate the abilities, which allow to review, assess, review ideas and to understand, process and communicate through other types of thought, such as the verification of hypotheses, verbal reasoning, analysis of arguments, probability and uncertainty, and decision making and problem solving; being these of interest for this study.

If the objective is to assess the ability that an individual possesses, there are a wide variety of measuring instruments, some are quantitative and other qualitative. , such as assessment of the critical thinking of the Watson-Glaser (Watson and Glaser 1980), the Test trials of the critical thinking of Ennis-Weir (Ennis and Weir, 1985), the Test Cornell critical thinking - level X and Z-level (Ennis and Millman, 1985a; Ennis and Millman, 1985b). The present study used the instrument HCTAES Halpern, qualitative and quantitative measurement of critical thinking.

It is necessary to emphasize, that this study came from the interest in knowing the way of reasoning of the students of the license programs in basic education with emphasis in foreign languages and physical education, recreation and sport, the idea is that, although the topic has been studied through other investigations in different parts of the world, it can generate inputs that support the importance of continuing to study the issue and expand processes of understanding of society , their problems and human beings in general, requiring a high degree of critical reasoning, and even more that, the students of the UCEVA.

Regarding to this aspect in can be said that research on the topic, for example, the characterization of critical thinking in education students skills average through the HCTAES test, carried out by professors Maria Juliana Beltran and Nidia Yaneth Torres (2009) of the Universidad del Norte, Bogotá; as well, as in other parts of the world, for example, the professors Ana María Nieto, Carlos Saiz and Begoña Orgaz (2009) from Spain, who analyzed the psychometric properties of the Spanish of the HCTAES-Test version, have contributed with a number of studies and have shown efficiency which students of secondary and higher education have, in the development of critical thinking.

All said above, "an important attribute for every human being in this new scenario is the development and education of critical thinking. Huitt (1993) and Thomas and Smoot (1994) claim that this is an important element for the success of the people in life because it helps positively to understand it in all

its complexity". (Campos, 2007).

It is important to highlight, and as it was said by Saiz and Orgaz (2009) in their introduction, human beings are in a "historical moment of technological advances, do not take more than a few brief seconds to dispose of huge amounts of information, which has to be converted into knowledge". So, it is necessary to have cognitive abilities, as for instance, to discriminate the relevant information from that which is not, develop and value the arguments, among others.

There are many skills that allow the human being to reason critically. But what does reason critically mean? "Critical thinking, is the reasoned and reflective thinking that focuses on deciding what to believe and what to do", "it is not an automatic or mechanical thinking but on the contrary since it is deliberate, meditated and purposeful. It is directed towards concrete objectives as it is deciding our beliefs or our actions to certain problems or situations"(Ennis 1996, cited by grandson, Saiz and Orgaz, 2009).

According to Halpern (2006) (cited Nieto, Saiz and Orgaz, 2009) "is the kind of thinking that is involved in the resolution of problems, in the formulation of inferences, in the calculation of probabilities and in making decisions. Those thinkers critical use those skills properly in a great variety of contexts, without hesitation and consciously. I.e., they are predisposed to think critically. When we think critically, we evaluate the results of the thought processes... but it also involves assessing the same process of thought."

Unanimously it is accepted that critical thinking is formed by a set of skills and a set of provisions. Skills represent the cognitive component and provisions the motivational one. This distinction is very important because it comes to reflect the fact that if a person knows what skill to be applied in a particular situation, but not willing to do so, not display his critical thinking. It is important that the person knows to apply the skill and also wants to do it.

The way of categorizing the skills of critical thinking varies greatly by some authors to others, for example, Ennis (1987 cited by grandson, Saiz and Orgaz (2009) differentiates between the following skills: focus on the issue, analyze arguments, raise and answer questions of clarification or challenge, judge the credibility of the sources, observe and judge remarks, deduction, induction, value judgments) define terms, identify assumptions, decision, and interaction with others. Swartz and Perkins (1990, cited by grandson, Saiz and Orgaz, 2009) pose much more general categories such as creative thinking, critical thinking, decision making, the resolution of everyday problems and solving mathematical problems.

As we can see there is no unanimity about which cognitive skills really compose the thinking critical. This lack of agreement tried to be determined by a group of international experts (APA, 1990, cited by grandson, Saiz and Orgaz, 2009)

that wanted to get to a consensus on the concept and meaning of the critical thinking. This group of experts identified the following skills as being central to this thought: interpretation, analysis, evaluation, inference, explanation, and self-regulation. Although this category appears to be quite comprehensive, you may have the problem of being less operational when it comes to teach and assess critical thinking.

The improvement of this style of thinking was and is a constant concern within educational contexts. It is worth noting that in Colombia, the new educational reforms begin to point out the importance of raising critical thinkers. For example, the Decree 1295 of April of 2010 and their resolutions 6966 and 5443, raises the importance of work (to the equal as it is raised in the paper written by Nieto, Saiz and Orgaz, 2009) some of the competences seen throughout the curriculum that are in the capacity of analysis and synthesis, the ability of management of information, resolution of problems, the taking of decisions the ability to critics, the ability to generate new ideas... all of them are part of what is meant by critical thinking (e. g. Halpern, 2003^a, cited by grandson, Saiz and Orgaz, 2009).

As stated by Nieto, Saiz and Orgaz (2009) the critical thinking is the general rubric of different cognitive skills that comprise it. Halpern (1998, 2003a, 2006, quoted by grandson, Saiz and Orgaz, 2009) calls for a critical thinking composed of 5 great skills: hypothesis testing, Verbal reasoning, arguments analysis, probability and uncertainty, and decision-making and troubleshooting. Thus, according to this theoretical model, developed by the HCTAES which tries to evaluate those 5 skills through 25 scenarios or situations, 5 for each of the skills. Each of the scenarios is assessed through a question of open format and a closed format question. Reliability and validity depend upon a series of studies Director of the Dr. Diane Halpern (2006) and the teachers Nieto, Saiz and Orgaz (2009) who recognize its importance, as well as the main author of the instrument, and "underlines the urgent need to replicate them".

In this way, this research departed from the question: Throughout the application of the Test HCTAES, what skills of critical thought through everyday situations have the students of the undergraduate program in basic education with emphasis in foreign languages developed, of the Faculty of Sciences of education, during the second academic period 2011?

This study was the claim to identify whether students of basic education undergraduate programs with emphasis in foreign languages and in basic education with emphasis on physical education, recreation and sports, the Faculty of Sciences of the education of the UCEVA, are people who are able to use their critical thinking skills. This is to point out is the curiosity to examine the mental acuity to host reliable information from everyday situations that can be addressed.

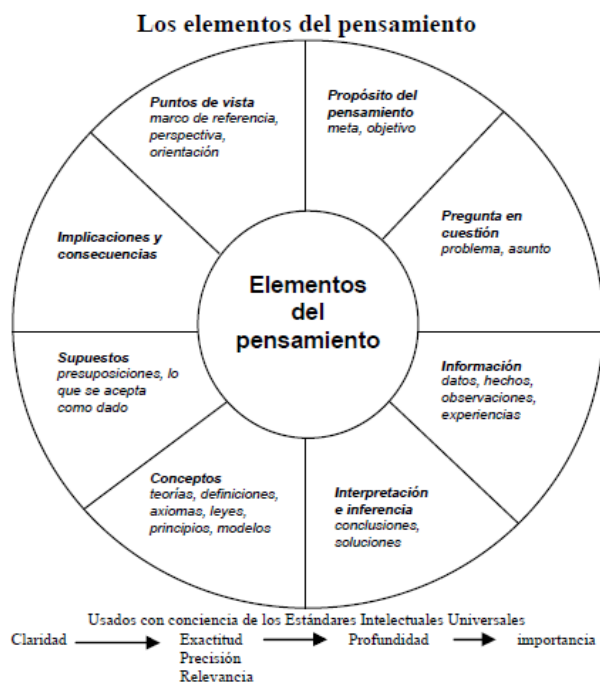


Figure 1: Universal Intellectual Standards

Taken from the Mini-Guide for Critical Thinking. Concepts and tools. PAUL, Richard; ELDER, Linda. 2003. www.criticalthinking.org/resources/PDF/SP-conceptsandtools.pdf

III. METHOD

The instrument used corresponds to the test HCTAES (Halpern Test for the Evaluation of Critical Thinking through Daily Situations) of Halpern that evaluates five skills of the critical thinking: checking of hypothesis, verbal reasoning, analysis of arguments, probability and uncertainty, taking of decisions and resolution of problems, through 25 daily situations, five to each of the skills. Similarly, it uses a dual-format question: first is an open question in which the subject must offer an argument or explanation or generate solutions to a problem or comment on something; after that, a question in which the subject must choose between a series of alternatives that best matches is displayed.

IV. ANALYSIS OF RESULTS

Life, in general, and citizenship, in particular, require people acting properly that involve the choice of options and decision-making of co-existence based on a careful exercise of critical thinking. Freedom of choice, fundamental basis of democratic life, is also based on the ability to think clearly (Brookfield, 1987). This indicates that critical thinking is inherent to human nature; and therefore, every human being has the characteristic of critical thinking, which can develop in different grades in each individual.

According to the results obtained in the implementation of the Test, it is important to recall that when we talk about critical thinking it refers to the process that is used to generate and process information which can contribute to facilitate a process of productive exchange involving questioning, asking, refuting, arguing, clarifying doubts, dissenting, and reaching agreements.

Thus, 34% of data support to demonstrate that it has the ability to think critically, but that it has not been developed, they are at a basic level, i.e., the attitude, the approach of hypotheses and strategies for action that are made to a doubtful situation and the checking, fail to develop new arguments favoring the construction of learning either by check or by contrast; 59% are at an INTERMEDIATE level, i.e. who use it but very rarely, and 7% is at an ADVANCED level.

With this in mind, these categories that are the subject of study, are consistent with the definitions of the structure that manages the instrument (Test HCTAES) that evaluates the skills of critical thinking through everyday situations, but can never be justified separately when analyzing information, because there is significant overlap between these five categories, and referring to this topic many critical thinkers are doing, therefore, a dedication, ensuring the validity of its development. That said, it is important to validate that it is to a very desirable faculty in the information society. The information cannot become knowledge without checking its solidity and interpret it properly. We cannot, therefore, confuse or melt the critical thinking with compulsive criticality, or skepticism.

It is necessary to emphasize that many researchers have argued for many years, that critical thinking should be taught in generic courses designed to teach critical thinking. From this point, Kurfiss (1988), believes there are many limitations, and that fundamentally generic courses which aim to teach to think critically, do not handle the right question, because the questions asked to determine the value of an investigation and that, without knowledge of the matter to investigate, it is difficult to ask intelligent questions.

The results of this study allow to provide empirical initial data to know what type of critical thought those students have; and thus does know about the effectiveness of teaching critical thinking skills which would be integrated into the content of a career, specifically the undergraduate programs.

This paradigm of thinking that expands rapidly in all areas of knowledge in search of a precise reasoning, nowadays is a very fertile field due to the growing social interest in critical reflection. During the decades of the 1980s and the 1990s there has been, in some countries, an institutional concern to know if the intellectual level of our high school and university students was adequate, and if the plans of studies contributed to that level would be acceptable.

This position of argument allows to focus, that the set of skills that make up the critical thinking under Halpern (2006) model are studied theoretically since: ability of hypothesis testing, verbal reasoning, ability to analysis of arguments, ability of probability and uncertainty, decision-making and problem-solving ability

From a psychological point of view, the ideas are considered to be functions serial of previously learned responses which give rising to an interpretation, organization and storage of the information perceived through sensory system differently to stimulation from the environment, alter behavioral modifications and realize a demonstration of what they learned in past situations, whose essence is stored in the brain.

On the other hand, the pedagogical, according to the context and to the current situation, corresponds to the processes that are conducted, are considered to give meaning and depth to the knowledge that the students are, by themselves, trying to deploy; This is why it is estimated as the ability to raise possible solutions or explanatory reasons for an event, situation, or problem that allow to explain, predict and control events of everyday life and think about them.

PENSAMIENTO CRITICO PUNTAJE TOTAL

■ BASICO ■ INTERMEDIO ■ AVANZADO ■ SUPERIOR

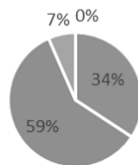


Figure 2. Critical thinking score TOTAL. 34% of the data supporting evidence that has the ability to think critically, but it has not been developed yet, are in a basic level, i.e., the attitude, the approach of hypothesis and of strategies of action that is made before a situation doubtful and its checking, not reach to develop the new arguments that favor the construction of learning either by check or by contrast; 59% are at an intermediate level, i.e. who use it but very rarely, and 7% is at an advanced level.

V. CONCLUSIONS

Critical thinking is that particular way of thinking, about anything, content or problem - in which the thinker improves the quality of his thought to the inherent structures of the Act of thinking and by subjecting them to intellectual standards (Paul; Elder; (2003). i.e. that in summary, the thinking critical is self-directed, self-disciplined, self-regulating and self-corrected. It is subject to rigorous standards of excellence and domain aware of its use. It involves effective communication and skills of problem solving and a commitment to overcome

selfishness and partner natural centrism of man (Paul; Elder; 2003).

With this in mind, the data found have many variables that allow to cross information and sustain some references that would allow to explain ¿ how much the students are reasoning critically, of the programs of Bachelor degree in education basic with emphasis in languages foreign and degree in education basic with emphasis in education physical, recreation and sport, in the Faculty of Sciences of the education? through the test HCTAES of Halpern, the data found allowed characterizing that type of thought critical have and as is used.

Getting into this phase is accomplished to describe the use of cognitive resources used in support of new knowledge and strategic use of it, in the resolution of problems that are present in everyday activities

However it is important to generate wider spaces to reflect on the theme, since the results are showing that reasoning critically carries to take a series of decisions that support the use of the cognitive resources, to run the skills and develop them with procedures and rules established to be applied in a correct way, require to be more deeply worked, especially for reaching a more frequent usage, or why not,. It would be always interesting to identify the motivational processes that activate each of the skills which allow to obtain clues and thus intervene each of these and improve them.

Regarding the General data, it can be concluded that for the Faculty of Sciences of Education, mastering the values and beliefs in a rational way and beliefs of students and especially the inferences that can be made, it will take time. Within the concept of the critical thinking, the main objective is that the academic community learn to think by itself same, to dominate their process mental of reasoning, which implies a commitment of analyze and evaluate them beliefs taking as point of split the reason and the evidence; It means questioning when reason says that we must question, believe when reason says that you should believe and settle when so, why make it. recognize the need to be honest in your thinking; be consistent in the intellectual standards that applies; undergo the same rigour of evidence and proof which requires of others; practice what you preach to others and accept with humility the inconsistencies of thinking and action in which one incurs, would be a good start to conceptualize, dominate and create tools to develop the intellectual characteristics of critical thinking.

Therefore, the development of reflective and critical capacity of the human being is one of the concerns of education in all its educational levels, beginning with basic education, then through the media and reaching higher or university education, about the latter relies a great social expectation, due to the impact which should produce the training previously received, in the different fields of society

itself. Which means according to (Marinetti, 2003) University or future professionals should perceive themselves as active within the society subjects, aware and knowledgeable of their own processes and in the same way, need to know how to generate awareness about the most effective ways to follow in the construction of thought and make the learning process a significant work. These are vital needs to become autonomous, creative, and responsible professionals.

Taking into account the foregoing, Halpern (2006) proposes a model of interesting critical thinking that gives possibility to deepen the study, where they expose four fundamental aspects that tend to be worked to improve thought processes:

- To focus on and pay attention to the development of the attitudinal components or dispositional.
- Revise and implement mechanisms that involve critical thinking skills.
- Start-up of activities in different contexts that favour the ability of abstraction
- Using and practicing cognitive goal processes

REFERENCES

- [1] Allen, G; Wright P; Laminach L. (1989). La experiencia lingüística como medio para activar las técnicas de pensamiento crítico del alumno. *Comunicación, Lenguaje y Educación*. España, No. 2, p 31-40. Recuperado el 2 de septiembre de 2011 de <http://dialnet.unirioja.es/servlet/articulo?codigo=126166>
- [2] Beltrán, C; Torres, M. (2009). Caracterización de habilidades de pensamiento crítico en estudiantes de educación media a través del test HCTAES. *Revista del Instituto de Estudios en Educación*. Universidad del Norte N° 11. Diciembre, 2009. Issn 1657-2416. Recuperado el 8 de julio de 2011. <http://rcientificas.uninorte.edu.co/index.php/zona/article/view/1595>
- [3] Brookfield, S. D. (1987). "Developing Critical Thinkers: Challenging Adults to Explore Alternative Ways of Thinking and Acting" San Francisco: Jossey-Bass. Recuperado el 18 de julio de 2011 <http://dsmgt310.faculty.ku.edu/SuppMaterial/BrookfieldCriticalThinking.htm>
- [4] CAICEDO, Heberth; MINA, Paola. (2012) ¿Qué significa pensar críticamente? *Revista Babel*, No. 5, Julio-Diciembre de 2012. UCEVA, ISSN 1794-3760, pág., 20-23.
- [5] CAICEDO, Heberth; MINA, Paola. (2014) Procesos Mentales: Capacidad de desarrollo cognitivo que permite solucionar diferentes preguntas. *Revista Babel*, No. 7, Julio-Diciembre de 2014. UCEVA, ISSN 1794-3760, pág., 9-13
- [6] Campos, A; 2007. *Pensamiento crítico. Técnicas para su desarrollo*. Bogotá: Cooperativa Editorial Magisterio.
- [7] Ennis, R. H. (1987). A taxonomy of critical thinking dispositions and abilities. En J. B. Baron & R. J. Sternberg (Eds.), *Teaching thinking skills* (pp. 9-26). New York: Freeman and Company.
- [8] Ennis, R. H. (1996). *Critical thinking*. Upper Saddle River, NJ: Prentice-Hall.
- [9] Facione, Peter A. (1998). *Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction*. Executive Summary "The Delphi Report". Recuperado el 2 de septiembre de 2011 de <http://www.insightassessment.com/Resources/Expert-Consensus-on-Critical-Thinking/Delphi-Consensus-Report-Executive-Summary-PDF>
- [10] Facione, Peter A. (2007). *Pensamiento Crítico: ¿Qué es y por qué es importante?* <http://www.eduteka.org/pdfdir/PensamientoCriticoFacione.pdf>. Este ensayo es publicado por Insight Assessment <http://www.insightassessment.com>. El original apareció en 1992, fue actualizado en 1998, 2004 y nuevamente ahora en el 2007.
- [11] Halpern, D. (1998). Teaching critical thinking for transfer across domains. *American Psychologist*, 53 (4), 449-455.
- [12] Halpern, D. (2006). *Halpern Critical Thinking Assessment Using Everyday Situations: Background and scoring standards (2º Report)*. [Unpublished manuscript]. Claremont, CA: Claremont McKenna College. (versión en español)
- [13] Halpern, D. F. (2003a). *Thought and knowledge. An introduction to critical thinking (4ª Ed.)*. Hillsdale, NJ: Erlbaum.
- [14] ICFES Saber Pro, 2011. *Guías. Orientaciones para el examen de Estado de calidad de la educación superior. SABER PRO (ECAES) Prueba de Competencias Genéricas*. ISBN de la versión electrónica: 978-958-11-0538-0. Recuperado el 8 de octubre de 2011 de http://www.icfes.gov.co/index.php?option=com_docman&task=doc_view&gid=4038&Itemid=59
- [15] KURFISS, J. 1998. *Critical thinking, theory, research, practice and possibilities*. Washington. ASHE-ERIC.
- [16] Marinetti, M. (2003). "Who wants to be an active citizen? The politics and practice of community involvement." *Sociology the Journal of the British Sociological Association*. Vol. 31 No. 1 pp. 103-120.
- [17] Nieto, A. y Saiz, C. (2008) *Relación entre las habilidades y las disposiciones del pensamiento crítico, en Motivación y emoción: Contribuciones actuales*. Vol. II: Motivación pp. 255 - 263. España: Universidad del Salamanca. Recuperado el 16 de Abril de 2015. En: <http://www.pensamiento-critico.com/archivos/motdispopc.pdf>.
- [18] PAUL, Richard; ELDER, Linda. (2003). *La mini-guía para el Pensamiento crítico. Conceptos y herramientas*. Fundación para el Pensamiento Crítico. www.criticalthinking.org. 707-878-9100. cct@criticalthinking.org. www.criticalthinking.org/resources/PDF/SP-ConceptsandTools.pdf
- [19] Perkins, D.N., Jay, E. & Tishman, S. (1993) *Beyond abilities: A dispositional theory of thinking*. *The Merrill-Palmer Quarterly*. Vol. 39, No. 1, Invitational Issue: The Development of Rationality and Critical Thinking (January 1993), pp. 1-21.
- [20] Saiz, C. y Nieto, A. (2002). *Pensamiento crítico: capacidades y desarrollo: conceptos básicos y actividades prácticas*. Madrid: Pirámide.
- [21] Saiz, C., Nieto, A. y Orgaz, B. (2009). Análisis de las propiedades psicométricas de la versión española del HCTAES-Test de Halpern para la evaluación del pensamiento crítico mediante situaciones cotidianas. *Revista Electrónica de Metodología Aplicada*. 2009, Vol. 14 n° 1, pp. 1-15. Facultad de Psicología. Universidad de Salamanca. Recuperado el 7 de julio de 2011 de <http://www.psico.uniovi.es/REMA/v14n1/vol14n1a1.pdf>
- [22] Swartz, R. J., & Perkins, D. N. (1990). *Teaching thinking: Issues and approaches*. Pacific Grove, CA: Critical Thinking Press & Software.
- [23] Swartz, R. J., & Perkins, D. N. (1990). *Teaching thinking: Issues and approaches*. Pacific Grove, CA; Midwest Publications.
- [24] Torres N; Beltrán M. (2011). Desarrollo de habilidades cognitivas a través de un programa de intervención en química. *Revista Currículum*, 24, octubre de 2011. pág. 117- 140

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