
Critical thinking in elementary school children

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Abstract

Our study aimed to identify which are the most appropriate methods and procedures to develop critical thinking in young schoolchildren. In the organization of teaching, we identified two contexts of analysis: static context and a dynamic context (procedural). Static context we localized to the teaching-learning for critical thinking. Here we aimed to identify the methods of developing the critical thinking framework specific to each stage of the development of critical thinking. Dynamic or procedural context is identifiable by methods that can be activated with specific tasks at all stages of teaching and learning.

Keywords: Critical Thinking; Reading and Writing for Critical Thinking (RWCT); Evocation (E); Realization of Meaning (R); Reflection (ERR).

1. Introduction

Critical Thinking is a target of more frequently expressed both at the primary and pre-school. History is not so recent, as it seemed: the roots of its use by ancient philosophers stretch. Socrates, for example, has the merit of having established the importance of formulating questions before accepting ideas. In the Middle Ages and the Renaissance find ideas to use critical thinking on religion, art, society and other human values. Who explains the importance of studying the world empirically in a first systematic approach to critical thinking is the Englishman Roger Bacon, in "The Advancement of Learning". The need to develop a discipline of thought is marked in France by Descartes, through his Rules for the guidance of thinking. Representatives of the development of critical thinking are all cultural figures and all the scientists who have "moved" the world through discovery and innovation. Current constructivist development at the end of the twentieth century led to the advancement of constructivist learning.

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model by developing several types of thinking: logical thinking, thought, questioning, argumentative thinking, critical thinking, etc. This model is based primarily on the research of J. Piaget, L. Vygotsky and, more recently, of M. Lipman (70s, 80s). M. Lipman is considered the founder of Philosophy for children, as initiated a systematic curriculum that was shown to improve reasoning skills in children, long before the age of formal operations (12, J.Piaget). "Manuals" are short stories and children's stories (Harry Stottlemeier's Discovery (NJ: HICP, 1974; Elfie NJ: HICP, 1987), accompanied by a manual educator / parent. They contain plans for discussion, activities, exercises and activities for each topic or chapter. All this makes reading the book an experience of thinking that favors the development of reasoning and problem solving in other disciplines. Program proved a success and as a result, was approved as a state program in the U.S. since 1986. In Romania, his works have been translated since 1993 (M.Lipman, Şânziana - origial title Elfie, Gazzard, Ann & Lipman, M., Let's think together, teacher manual book „Şânziana), but only after another 20 years entered the Romanian school curriculum structure (August 2013).

1.1. What is critical thinking?

Critical thinking is a fundamental skill that develops early learning exercises and activities attractive, teaching and learning methods as diverse and varied, depending on the actual educational situation (static context) and critical thinking development stage (dynamic context). Critical thinking is based on knowledge updating (J.L.Steele, 2011, 23), analyzing differences and comparisons, namely the establishment of similarities and differences, observing and identifying cause-effect relationships, extracting ideas from examples (inductive) support ideas with examples and evaluation on the value truth, utility, positive or negative effects (R.V.D. Brink-Budgen, 2000, 129).

Critical thinking is a way of approaching and solving problems based on arguments persuasive, logical and rational, which involves verifying, evaluating and choosing the right answer to a given task and reasoned rejection of other alternatives solutions. While critical thinking is learning to interact with information actively to bring pros and cons, evaluate them to determine the truth, transform information and generate new ideas. Critical thinking is an active process, coordinated, complex, like reading and writing, speaking and listening, which involves thought processes that start with active accumulation of information that ends well reasoned decisions. Also critical thinking is a product, a point reached by our thinking, we think critically, as a natural way to interact with the ideas and information. Critical thinking is based on knowledge updating, analyzing differences, observe cause-effect relationships, extracting ideas from examples, supporting ideas with examples and evaluate information based on truth value, utility, positive or negative effects. Critical thinking means to hold valuable and useful knowledge with beliefs and beliefs based on them; to have independent opinions and to accept that they are subject to evaluation (critique); to submit their own ideas and the ideas of others; build arguments that provide consistency of their views; to exhibit tolerance, flexibility and respect; learn how to think effectively evaluating and testing solutions.

First, thinking is a complex cognitive process which is closely linked with the language, with specific activities of young pupils: reading, writing, speaking, listening. All this implies stages of development, starting with the build - active assimilation of information ending with adapting to a new stage of development, with well-reasoned decisions.

Second, critical thinking is a product, i.e. a level reached by the thinking that a natural way to interact with the ideas and information. Development and learning are in constant interaction, the interaction of which is achieved assimilation and immediate adaptation. Children construct mental structures that are generated by the internalization of actions with objects. By assimilation a correlate object existing scheme and by adapting changes its schema as the object. Discovery and action on new working process of assimilation and accommodation, and understanding occurs only when these processes are in balance. The child is trying to find meaning to the events and the world around him, and the adult has the task of creating opportunities for research and exploration, to provide emotional support, security and encourage knowledge. Socio-cultural learning theory of Lev Vygotsky is the central idea of proximal development that you need to identify the immediate vicinity of the current development. In the current development, the children independently solve problem situations, the zone of proximal development - work tasks and action is complicated because it requires action or knowledge which assimilated. With a little help from an adult / teacher, the child gets to solve the problem. Constructivist theories focus on cognitive development, harnessing the potential hereditary by "building" the right environment Children are encouraged to use their physical and intellectual capacities to actively interact with the environment and act on it. In this framework they develop
cognitive skills in increasingly complex behavioral models able to adapt quickly to the unexpected changes / workloads. In doing so, the steps taken to develop critical thinking are the same: Evocation (E), Realization of meaning (R), Reflection (R).

1.2. Steps in implementing Reading and Writing cognitive structures necessary for Critical Thinking (RWCT) – Static context-specific methods

Stages of development of critical thinking are a well-determined (ERR), given by the following sequence of steps: Evocation (E), Realization of meaning (R), Reflection (R) (J.L. Steele, K.S. Meredith, Ch. Temple, 2000; Florica Chereja, 2004). Preceding discussion and organization of work is the phase of Evocation. At this stage of interpretation formulated demands new knowledge based on prior knowledge: “Formulate / rephrase the topic title”, “What you already know about this subject?”, “What do you think you can find?”? “What do you want to you know about him?”, “What you need to know these things?”, “What would happen if you will not know everything?”, “What do you think are the ways that we can avoid these things?”, ”To achieve activity goals, formulate rules of conduct”. Realization of meaning stage is maximum consistency in which the activities proposed specific methods in the workshops / working groups. Each student is trying to solve the distributed activities (e.g. “Identify new words in the text below”), to seek information to meet their needs for knowledge, their goals set in the previous step. After frontal activity or group reflection phase are identified responses to workloads and teacher guides to answer questions like: “What have you got?”, “Ask questions to highlight other important information that you found that have not been mentioned in the first stage of Evocation”, “Why do you think ...?”

There are opinions of teachers, according to which critical thinking is a difficult process for preschool children. Questions that arise are of the type: "To what extent critical thinking helps children to mature too quickly?", "Li" kidnaps "small children childhood?" "We use a child to think like an adult?" "It is morally as a teacher to obtain spectacular effects currently paid price possible late consequences of children?". The answer is certainly "No". There will never be such consequences and children will certainly better reason as interactive methods, procedures and techniques work, increases their self-confidence in performances, contributing to the intellectual, moral and socialization. The children actually participate in the act of learning, increasing their responsibility and degree of involvement. No harm early practices critical thinking, but they can cause improper practice to develop a typical behavior of a passive child who does not want to do intellectual effort.

Effective thinking is developed through collaborative work which means working in pairs, in groups. Collaborative working is effective if there is a shift from respect for the ideas of others in confidence, moving from concrete to abstract, from intuitive thinking based on the expression of opinions without reflecting on them in logical thinking that supports conclusions based on assumptions, approach things from different perspectives. Methods for Critical Thinking, applied to group can develop the relationship between children, a set of attitudes and behaviors, communication skills, ability to understand information transfer, interdisciplinarity and transdisciplinarity. The versatility of these methods proved effective at this early age, because by practicing these methods, the child becomes a little scientist, eager to continuously explore everything around him.

2. Methods and techniques for working in small groups to develop critical thinking

2.1. General Methodological Recommendations

Whatever stage ERR framework and whatever chosen teaching methods in formulating learning tasks is well to consider the following recommendations: to formulate questions with interrogative sentences simple, we consider each term linking concepts to take into account the personal conditions of the moment, to ask personal description of possible states, in relation to an event with a given subject, to ask students to evaluate individual and group behavior, to formulize similarities and differences based on data criteria and / or based on criteria set out in the working Group (Venn diagrams) to establish possible relationships between sentences (two sentences reasons that lead to a conclusion), identifying the correct argument situations, to put emphasis on the use of drawing as often as possible and play role (dramatization), inviting students to interpret and discuss the situation with the final set for
themselves, to integrate them create images or pictures selected from those offered to support that discussion, other recommendations aimed at permanent documentation on identifying resources on line specific international programs to promote critical thinking. Depending on the complexity of the subject, ERR cycle can be repeated several times during the classes in the routing stage of learning. Stages of critical thinking are not the same lesson steps. Only if course of a single cycle ERR over an hour, we can identify common tasks specific to these stages as follows: stage by stage Evocation update knowledge, stage of the direction, the routing stage of learning and reflection phase step retention and transfer of reverse connection elements. In the first part of the stage management of learning, students create learning tasks based on evocation / interpretation of new knowledge based on prior knowledge: accumulation - data collection, cluster, brainstorm - individually, in pairs, organizer minutes; think working in pairs, key terms, prediction, I know - I know I learned, focus questions, free writing, establishing the sequence of events. In the second step of directing learning , students achieve tasks effectuated meaning - knowledge acquisition based on constructivist theory: analysis of semantic features: ISERRT (Interactive System Efficiency Rating and Reading and Thinking) interactive lecture, summarize - work pair - communicate, work directed listening (reading) and thought, literature circle roles, circle, pencil in the middle, teams, games, towers formulated - communicate - listen - create, study guide, questioning the author's interview in three stage, questions of mutual collaborative learning (group) reading / summarizing in pairs. In stage fixing those Reflections occurs creative application of knowledge: essay five minutes, network discussions, cube, poster, character map, map concepts, gallery tour and role play (support position opposing party), log on double column.

For a child to respond adequately to changing realities, he must have own thinking skills and a set of attitudes and values adjusted; He must have motivation and willingness to respond positively to change - as a prerequisite for personal development. Group interactive learning methods developed democratic thinking of children by exercising critical thinking as they learn to accept and review all suggested ideas, not the one who issued them, learn to criticize the behavior of a character in the story, or acts of baby, do not criticize the child or that character. The ability to think critically is acquired over time, allowing children to manifest spontaneously, without limitation, whenever there is a learning situation. They should not feel embarrass to be afraid of the reaction of others to their views, they learn to trust their analytical power of reflection. Critical Thinking in an appropriate framework involves three steps: Evocation - establishing links with previous lesson taught from the perspective new topic “What will be directed to the children asking questions and learning purposes?”; “How they get to examine prior knowledge?”; Realization of meaning (Making sense) - capturing interest for new issues to be addressed: “How will content be explored by children?”, “How will they understand the content monitor?”; Reflection - fixing, enhancing knowledge: “How will children use meaning lesson?”; “How will they apply the knowledge acquired?”; “What will be advised to seek additional information, answers to questions there?”

For this school year, an important place in the options educators to develop critical thinking child is offered a new school discipline with the status of "optional" Philosophy for Children (Order of the Ministry of National Education. 4887 / 08.26.2013, curricula for Philosophy for Children (school curriculum). In these hours, we aim to develop critical thinking by engaging in discussion and debate gradual for all children. Also, the task of formulating and track all steps of solving a problem in her group mates, students learn how to argue a point of view, and how to follow and respect the views of others' partners discussion. Critical Thinking covers a multitude of attributes / levels of development: rational thinking (logic), argumentative, non-algorithmic (with emphasis on methodological creativity and content), able to use multiple criteria (meta-criteria and mega-criteria) probabilistic (admitting uncertainty and able to work under this type), self-evaluative, self-corrective (detects and overcomes inconsistencies, ambiguities, request arguments, criteria, correct mistakes), context-sensitive (distinguish between process - product problem - solving project etc.). Meanwhile, the task of developing the ability to interact with information actively to bring pros and cons, evaluate them to determine the value of truth, transform information and generate new ideas to contribute to the development critical thinking.

2.2. Overview of the main methods used – Dynamic context-specific methods

In the small group work methods are successfully used brainstorming in pairs, teaching method dials with mutual learning, conceptual maps - graphic organizer, clusters -, twofold journal, RDQ method (Reply - Drop – Query), technique 3-2-1, self- critical exercises to find arguments (R.V.D. Brink-Budgen, 2000; Florica Chereja, 2004;
J.L. Steele, K.S. Meredith, Ch. Temple, 2000; 2011).

Methods and techniques presented below can be applied to all disciplines and in all specific teaching activities (teaching, learning, assessment). They exploit knowledge experiences of all students in the group, integrate new knowledge and associated knowledge system earlier restructuring and advancing the possibilities of operating with them, method quadrants of reciprocal teaching-learning activities. Applying this method, students are advised to divide the specification page in four parts by drawing two lines perpendicular. Quadrants are numbered from one to four in each quadrant. Write a workload (e.g.: formulating main ideas, comments, characterization and drawings). They form groups of four students who are assigned to the group task that will solve each. After about five minutes of individual work, reorganizing groups of students, as work load that they had solved so that all students dealing with quadrant 1 will form the "group of experts in the subject 1", all students dealing with dial 2 will form the "group of experts in the subject of 2" etc. After the exchange of experiences made each membership group returns and explains other colleagues who dealt with the subject resolution. This method covers all stages of the cycle ERR: the Evocation is set workloads are established groups and assign tasks draw dial. The stages of the meaning students read, seek solutions to communicate, debate, ask for advice to solve workload. Reflection stage students compare the results, discuss, analyze the solutions and determine the right solution, make judgments and assessments of activity, a conclusion on the "lessons learned" and will serve as good practice for future activities. Conceptual maps known as cognitive maps ("cognitive maps") structure and lay notions of children logical network, thus requiring materialization abstraction capabilities judgments and judgments on a particular theme or topic. Following work in groups, children externalize / express relationships they establish between various concepts, translate a graphic diagram how they build cognitive structures, linking and integrating new knowledge to prior knowledge structure. Children performed on a sheet of flip-chart the organization of specific concepts such theme: each student write on a post-it keywords (terms) which he proposes to explain representative basis; subsequently, the kids stick them on the flip chart and try to identify possible links between them, placing them and marking them with arrows relations established: coordination - if the same level of generality, the over-ordering, that subordination or derivation to concrete examples. Coordinator may introduce other intermediate concepts where children fail to establish links with the role of facilitating understanding and to develop inter-conceptual networks. Arise therefore, at least three types of maps: a) type of conceptual maps "cobweb" the center of the map is written in the key concept (subject theme), and from it, by arrows, are labeled links to other explanatory concepts; b) hierarchical conceptual map by plotting the concepts according to the identification of over-ordering relations, coordination and subordination / derivation; c) linear conceptual map, which identifies its chronological sequence (linear) and logical information.

R.D.Q. Method involves the circular of the following tasks: Reply - Drop - Query. It has been used successfully, in the step of updating the knowledge and fixing step, the feed-back (reverse connection), and evaluated. Method is to formulate questions on a specific topic and answer them using a ball: After formulating the question, the student will be assigned to start throwing the ball to a fellow who should answer; in turn, it will throw the ball to another colleague, addressing them a new question. The student will not be able to provide the correct answer to the question. The question will come from the "game", the correct answer is specified who formulated the question; it has any right to ask a question, and if he does not know the correct answer will leave the "game" in favor of who addressed the question. Double Journal can be used both in making meaning and in reflection. Students draw a vertical line on an A4 sheet, thus creating two columns work. In the left column write quotes, poems, comics, main ideas relevant paragraphs and write comments in the right column, evidence of choosing the made; also can record impressions, emotions, feelings, any questions for the teacher. This technique is valuable because require students to express what they feel, what they think, what they know or what they think they know, cannot make critical comments, arguments, etc.

3-2-1 technique is a way of raising the results obtained at the end of a training sequence or a teaching, to improve them and the approach that generated them. The name of this technique is due to an application that includes: three concepts that they have learned in sequence / teaching that; two ideas that would like to develop or supplement them with new information; capacity, a skill or a skill that have made it / have practiced it in the teaching-learning activity. 3-2-1 technique, students are led to appreciate the results of various types (knowledge, skills, abilities), be aware that such purchases should achieve at the end of a training sequence. In this way it is performed and growing responsibility for their own learning and outcomes, develop self-assessment skills; forms and develop metacognitive
skills and ensuring operational feedback.

(Auto) critical evaluation is a simple approach in which student work is first corrected by highlighting location errors. Misspelled words are surrounded by a red rectangle, the students with the task of writing their self-correction, and the empty boxes to put punctuation missing (see Fig. 1).

![Fig. 1. Worksheet.](image)

If you do not know the answer, help from colleagues or the teacher. To develop the capacity of self by making operations critical thinking, guidance teacher should not give away the correct answer. Methodical approach that develops critical thinking through the operation of comparison is that the teacher provides at least one example of good writing in a similar situation in which the student was wrong. In the example sheet shown in Annex teacher suggest several ways to achieve correct by the student, based on the formulation of the following requirements:
- If the dictated text to be found in the manual: "Open the book to page 34, find the correct spelling of the word in exercise no. 2 and then correct the spelling on the worksheet."
- It gives a card with at least one example of good writing, no theoretical explanation nouns in the vocative, exclamations, writing composed of words that designate different parts of the sentence (verb and pronoun), etc.
- It gives a theoretical explanation sheet accompanied by appropriate examples nouns in the vocative, exclamations, writing composed of words that designate different parts of the sentence (verb and pronoun), etc.

Following correction of the paper, its notation is made in collaboration with the student, acknowledging that each correlated with the score given.

An exercise to find arguments (R.V.D. Brink-Budgen, 2000, 130) is performed in small groups with a common task, but with different sentences (at least three):

A. Exercises to find arguments to do what you have to do for each of the sentences below, formulated at least two sentences to argue story produced in the sentence again: 1 Gabriel has to go on the trip. 2 Ileana has to go to the Olympics of mathematics. 3 Cornel have to buy a notebook.

B. Exercises to find arguments for the reverse situation:

1 Although Gabriel had to go on the trip, did not go. 2 Although Ileana had to go to the Mathematics Olympics, did not go. 3 Although Cornel had to buy a notebook, not bought. These short exercises prepare development thinking to formulate structured sentences correct judgments. Following the example below, the teachers organized attractive and active activities to young pupils. We give three sentences; you have to hear / read them carefully and determine the sentence, finding or sentence arising from the other two. If you cannot determine this relationship, then there is an argument built. For instance, in the example below, the following statements is not an argument: 1. “People began to invest in personal computers, as they will not lag behind technological change”. 2 “Computers were cheaper lot”. 3 “Of most children love playing computer games”. Regardless of the arrangement of these three propositions cannot find one that is a sum of the other two. Requirement grader IV was to reformulate the sentence, so to build an argument. Working groups have reached formulations can be classified into the following sentences: 1 Children can perform better in school activities if they have access to a computer at home. 2 The price of computers is becoming smaller. 3 In conclusion, parents should buy a home computer for use by their children. Students have demonstrated that it is an argument, because the conclusion is supported by reasons in the first two sentences. Also on grammar, arrangement formulated and debated in an argument of the following sentences: 1. Sender Subject is a main part of the sentence. 2 The subject answers the question "Who ...?" Or "Who is speaking in the sentence?". 3 Post show about who is speaking in sentences. Very easily, children constructed arguments thematically oriented sciences, mathematics, literature, and other daily cases.

A special case is the exercise of finding arguments to determine the formation of concepts. School children in class may be required to further explanation the following situation: "A child in kindergarten, Andrew, is on the bus with older brother, Bogdan. At one point, Andrew asks his big brother how many stations are there left until they leave the bus. Bogdan answers that they have 3-4 stations left and the little brother says, "You mean 34 stations??"

Conclusions

Application of active-participative methods and organization of work with small groups of students work demonstrates that young schoolchildren are able to abstract operations and critical thinking. Making this program RWCT (Reading and Writing for Critical Thinking) consistently our students gained speed in solving tasks, the effective data selection, have developed capacities to formulate arguments and opinions have proven autonomy thinking and problem solving logical paths showed multiple possibilities to solve and set the most appropriate solution for a given context. Once mastered techniques work so the teacher and the students, they “pan out” and not routine, as the content of learning tasks changes from hour to hour. Critical thinking is learned through practice and awareness. It is a capacity to be encouraged and developed in an appropriate learning environment in which children acquire practical skills and intellectual abilities. Teaching critical thinking is effective if certain conditions are met: creating learning situations and necessary time allocation; encourage children to think independently, to speculate, to ponder; acceptance of diversity of opinions and ideas; active involvement by the confrontation of ideas, cooperation and collaboration in finding appropriate solutions; belief that children will not be ridiculed for opinions;
every confidence in the ability to think critically; appreciation of critical thinking.

Critical thinking is one of the basic skills that school XXI century trying to develop in students and in this context we consider that the encounter with the text in language education activities and this must end. To handle better information, preschoolers should be able to apply operations of thought, learn critically to efficiently sort through data to provide directions which in turn, will be represented by certain behaviors. The impact does not occur automatically, preschoolers will be used to identify, process to acquire and use information and ideas also will be as analytical and critical thinking ability. The teacher should give children a framework for thinking and learning systematic and transparent: systematic - in order to understand and apply consistently process; transparent - for students to become aware, to track and monitor their own thinking processes during independent study. Living in a society rapidly changing student will have met the informational universe to make sense critically, creatively and productively. Instructive educational action aimed at producing changes formative cognitive, affective-motivational, attitudinal and behavioral personality level student of the subject always training. To handle better information, the child will have to apply a set of thinking skills that would provide the ability to sort information effectively. For this you have to go through a systematic process of analysis and critical reflection. The educator has to offer equally a framework for learning and thinking. This framework should be provided to give children the opportunity to realize where they are in terms of thinking can therefore pursue and to monitor their own thinking processes when independent learners.

School teaching practice in critical thinking should be developed in two main directions:
1. A Program based on the principle that higher order thinking begins by nurturing the natural curiosity of children to nature and to the moral issues in this case have conducted activities that focus on stimulating children's curiosity, the development of analytical and solving skills problems. 2. Have demonstrated the relationship between the quality of questions, quality thinking and quality responses of children as appropriate questions for children providing an abstract thinking, nuanced and sophisticated. At this age the ability to think critically is acquired over time, allowing children to manifest spontaneously, without limitation, whenever there is a learning situation. Among the qualities and benefits of developing critical thinking in preschoolers and young school children include: the underlying reading, writing, speaking and listening - basic elements of communication; help to discover errors and prejudices; is a path to freedom from truncated truths and lies; offers the possibility to change a point of view as we examine and re-examine ideas that seem obvious; provides freedom to express their opinions; help children solve problems that have not been solved with conventional methods; teaches them to look at things from multiple perspectives; develops the ability to think differently; discovering new ideas; exploit the potential of individuals and teams; can prevent blockages in thinking; see opportunities where others see problems impossible.

By using methods of developing critical thinking, small pupils reached the higher levels of cognitive objectives (synthesis, evaluation, creation) of Bloom’s Taxonomy. From the point of view of social learning through critical thinking strategies, we capitalized on a higher level work, including creative work carried out in the group. At the same time, reporting to own desires, impressions, feelings, needs, knowledge, customize each step and gives a permanent new direction. Going through the stages of critical thinking, we found an active cycle of continuous interrogation, the reflection phase is the knowledge need of the children goes to a new cycle ERR: Evocation (E), Realization of meaning (R), Reflection (R).

References