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Training Design to Improve Quality of Response: Training to Stimulate Application of Clarity Standard on The Elements of Thinking

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Critical thinking is a must have cognitive characteristics of first year students that enable them to responds to the problems adequately. On the other hand students are rarely having the chance to develop the ability since they are used to get instant results instead of paying attention on the process (Day, 1981; King, Wood, & Mines, 1990). Training that urged students to implement clarity standard on the elements of thinking can stimulate critical thinking. Using randomized pretest posttest control group design, the training is significantly increasing e quality to solve problem amongst subjects. The experimental group has to solve two ill structured problems: one served as pre and posttest, the other is served as a part of problem based learning which both cases force them to applied clarity standard on the elements of thinking. Control group receive only pre and posttest case.

Keywords: critical thinking, clarity standard, elements of thinking, first year students

Kemampuan berpikir kritis merupakan salah satu karakteristik perkembangan kognitif yang harus dikuasai mahasiswa agar dapat memberikan respons yang tepat pada saat menyelesaikan persoalan. Mahasiswa umumnya terbiasa memperoleh hasil secara instan dan kurang memperhatikan proses pencapaian hasil (Day, 1981; King, Wood, & Mines, 1990). Salah satu cara untuk menstimulasi perkembangan kognitif individu dapat dilakukan melalui pelatihan untuk menstimulasi penerapan standar *clarity* pada elemen berpikir. Dengan desain *randomized pretest-posttest control group* yang diikuti subjek, pelatihan secara signifikan dapat meningkatkan kualitas respons yang ditampilkan pada saat menyelesaikan persoalan. Kelompok eksperimen harus menyelesaikan dua persoalan yang ambigu (*ill structured*) yaitu satu persoalan sebagai *pretest* dan *posttest* sedangkan persoalan lainnya merupakan implementasi *problem based learning* yang menuntut subjek kelompok ini untuk menerapkan standar *clarity* pada elemen-elemen berpikir agar dapat memberikan respons yang tepat.

Kata kunci: berpikir kritis, standar *clarity*, elemen berpikir, mahasiswa tahun pertama.

According to Piaget's cognitive development, first year students should have shown critical thinking ability (Berk, 2007**)**, but only around 50% individuals above 12 years of age, including adolescents and adults, who performed formal operational characteristics of thinking (Day, 1981). The cognitive characteristics which are not yet count as formal operational from students of Institut Teknologi Telkom (IT Telkom) are shown from their behavior in class. They tend to rely to the lecturer as a sole provider of information or reading only form handouts instead of searching for them independently by reading the reference books.

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Observation form one of the Calculus of class of 2010 for half semester, confirmed this less active learning behavior. When it comes to answering the lecturer questions, they answered the questions right away without further consideration of what are being asked and they did not asking any questions to clarify it. This end up with none of the students was able to do the exercise correctly during the lecture on Limit. When the lecturer asking for feedback, which part of the questions that need further elaboration, what things that they do not understand yet, the basic questions reveale: what is the square root of ∞ (infinite), conditions of Limits, and the definition of Limit. The answers to those questions are available on the handouts, reference books and already informed during the class. Since reading form