

A HISTORIC-GENETIC APPROACH TO TEACHING THE MEANING OF PROOF

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This paper seeks a way for teaching the meaning of proof in terms of historic-genetic approach.

For this purpose, we divided the development of geometry into three stages such as experimental, intuitional, and scientific stage, following Branford(1908). And, we constructed a model of lesson about the angle-sum property of triangle in accordance with these three stages, and applied it to 9 Korean students of eighth grade. Through interviews with the students before and after the instruction, we show that the historic-genetic approach can improve students' understanding of the meaning of proof.

Constituents related to the meaning of proof include inferences, implication, separation between assumption and conclusion, distinction between implication and equivalence, necessity for proof of obvious propositions, and generality of proof(Seo, 1999). Generality of proof and implication are essential constituents. However, these constituents are only very briefly or never dealt with in the mathematics textbooks of Korean middle school.

General truths are not verified in any experimental stage, namely, by measurement. In intuitional stage, evidence establishes general truths, but appeals implicitly to postulates of sense-experience whenever necessary. In scientific stage, proof employs no new sense-perception postulates, using things assumed at the beginning, and thereafter, employs nothing but purely logical reasoning. In our approach, students will be instructed to treat the same truths repeatedly by means of peculiar methods of each stage. Through the three stages, students will understand not only geometry but the meaning of proof meaningfully and properly.

References

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