TRANSPOSISI KONSEP DASAR TURUNAN PADA MAHASISWA CALON GURU MATEMATIKA

DISERTASI

Diajukan untuk memenuhi sebagian dari syarat memperoleh gelar Doktor Pendidikan Matematika

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Bandung, Agustus 2022

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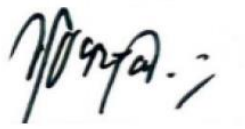

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TRANSPOSISI KONSEP DASAR TURUNAN PADA MAHASISWA CALON GURU MATEMATIKA

ABSTRAK

Konsep turunan merupakan konsep essensial dalam bidang kalkulus yang diajarkan di tingkat sekolah dan universitas. Namun, pemahaman konsep turunan belum sepenuhnya melibatkan pemaknaan terhadap berbagai representasi sehingga berpotensi memicu kesenjangan antara concept image dengan formal concept definition serta learning obstacles pada aspek ontogenik, epistemologis dan didaktik. Oleh karena itu, penelitian ini bertujuan untuk menginvestigasi concept image dan learning obstacles yang terjadi pada peserta didik di tingkat sekolah dan mahasiswa calon guru matematika di tingkat universitas sebagai dampak dari transposisi eksternal yang telah dilakukan. Peneliti juga melakukan transposisi internal kepada mahasiswa calon guru matematika agar diperoleh pemahaman konsep turunan sebagai pengetahuan untuk diajarkan. Partisipan yang terlibat dalam penelitian sebanyak 97 orang yang berasal dari salah satu sekolah dan universitas yang ada di jawa barat. Penelitian menggunakan metode kualitatif dengan pendekatan fenomenologi hermeneutik. Analisis dilakukan dengan tiga tahap, diantaranya tahap prospektif, metapedadidaktik, dan retrospektif. Pada tahap analisis prospektif diperoleh temuan: 1) kesenjangan concept image dengan formal concept definition konsep turunan yang diakibatkan oleh hambatan ontogenik, epistemologis, dan didaktik; 2) susunan hypothetical learning trajectory (HLT); serta 3) desain pembelajaran yang memuat situasi didaktik, prediksi respon, dan antisipasi didaktik pedagogik (ADP). Pada tahap metapedadidaktik dan retrospektif ditemukan: 1) adanya hubungan antara hubungan didaktik, hubungan pedagogik, dan ADP selama implementasi desain; 2) terbentuknya pengetahuan transposisional dari pengetahuan ilmiah (scholarly knowledge) berupa susunan HLT yang memuat pengetahuan untuk diajarkan (knowledge to be taught) serta desain berupa rencana pelaksanaan pembelajaran (RPP) yang memuat pengetahuan yang diajarkan (taught knowledge) dan pengetahuan yang dipelajari (learnt knowledge).

Kata Kunci: Transposisi Didaktik, *Concept Image*, *Learning Obstacles*, Turunan

TRANSPOSITION OF BASIC CONCEPTS OF DERIVATIVE IN PROSPECTIVE MATHEMATICS TEACHERS

ABSTRACT

The concept of derivation is an important concept in the field of calculus taught at the school and university level. However, understanding the concept of derivatives does not yet fully involve the meaning of various representations so that there can be potential between concept descriptions and formal concept definitions as well as learning barriers in ontogenic, epistemological and didactic aspects. Therefore, this study aims to investigate the conceptual description and learning barriers that occur in students at the school level and prospective students for mathematics teachers at the university level as a result of the external transposition that has been carried out. Researchers also conducted internal transpositions of prospective mathematics teacher students in order to gain an understanding of derivative concepts as knowledge to be taught. Participants involved in the study were 97 people who came from one of the schools and universities in West Java. This research uses a hermeneutic phenomenological approach. The analysis was carried out in three stages, including the prospective, metapedadidactic, and retrospective stages. In the prospective analysis stage, the findings are: 1) concept drawings with formal concept definitions of derived concepts caused by ontogenic, epistemological, and didactic barriers; 2) the arrangement of the hypothetical learning trajectory (HLT); and 3) learning design that includes didactic situations, response prediction, and didactic pedagogic anticipation (ADP). The metapedadidactic and retrospective stages it was found: 1) there was a relationship between didactic relationships, pedagogic relationships, and ADP during design implementation; 2) the formation of transpositional knowledge from scholarly knowledge in the form of an HLT arrangement containing knowledge to be taught and a design in the form of a learning implementation plan (RPP) containing the taught knowledge and knowledge learnt knowledge.

Keywords: Didactic Transposition, Concept Image, Learning Obstacles, Derivative

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