ARGUMENTASI DAN JUSTIFIKASI MATEMATIS MAHASISWA CALON GURU MATEMATIKA DALAM MEMBUKTIKAN PERNYATAAN MATEMATIS BERDASARKAN *SELF-EFFICACY*

TESIS

Diajukan untuk memenuhi salah satu syarat
memperoleh gelar Magister Pendidikan (M.Pd.) pada Program Studi
Magister Pendidikan Matematika, FPMIPA, Universitas Pendidikan Indonesia

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PROGRAM STUDI MAGISTER PENDIDIKAN MATEMATIKA
FAKULTAS PENDIDIKAN MATEMATIKA DAN ILMU PENGETAHUAN ALAM
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LEMBAR HAK CIPTA

ARGUMENTASI DAN JUSTIFIKASI MATEMATIS MAHASISWA CALON GURU MATEMATIKA DALAM MEMBUKTIKAN PERNYATAAN MATEMATIS BERDASARKAN *SELF-EFFICACY*

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S.Pd. Universitas Syiah Kuala, Banda Aceh
2020

Sebuah tesis yang diajukan untuk memenuhi salah satu syarat memperoleh gelar Magister Pendidikan pada Program Studi Magister Pendidikan Matematika, FPMIPA, Universitas Pendidikan Indonesia

LEMBAR PENGESAHAN TESIS

ARGUMENTASI DAN JUSTIFIKASI MATEMATIS MAHASISWA CALON GURU MATEMATIKA DALAM MEMBUKTIKAN PERNYATAAN MATEMATIS BERDASARKAN *SELF-EFFICACY*

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LEMBAR PERNYATAAN TENTANG KEASLIAN TESIS DAN PERNYATAAN BEBAS PLAGIARISME

Dengan ini saya menyatakan bahwa tesis dengan judul "**Argumentasi dan Justifikasi Matematis Mahasiswa Calon Guru Matematika Dalam Membuktikan Pernyataan Matematis Berdasarkan *Self-Efficacy***" ini beserta seluruh isinya adalah benar-benar karya saya sendiri. Saya tidak melakukan penjiplakan atau pengutipan dengan cara-cara yang tidak sesuai dengan etika ilmu yang berlaku dalam masyarakat keilmuan. Atas pernyataan ini, saya siap menanggung risiko/sanksi apabila di kemudian hari ditemukan adanya pelanggaran etika keilmuan atau klaim dari pihak lain terhadap keaslian karya saya ini.

Bandung, 2023

Yang membuat pernyataan,

ttd.

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ABSTRAK

Surya Kurniawan (2105617) Argumentasi dan Justifikasi Matematis Mahasiswa Calon Guru Matematika Dalam Membuktikan Pernyataan Matematis Berdasarkan *Self-Efficacy*.

Penelitian ini bertujuan untuk mendeskripsikan struktur argumentasi dan level justifikasi mahasiswa pada pembuktian matematis dan mengetahui kesulitan dalam pembuktian matematis berdasarkan tingkatan *self-efficacy* matematis. Penelitian ini menggunakan pendekatan kualitatif dengan desain studi kasus, dilakukan di program studi pendidikan matematika pada salah satu Universitas di Kota Banda Aceh dengan menggunakan 43 mahasiswa sebagai subjek penelitian. Data dikumpulkan menggunakan teknik tes soal pembuktian matematis Teori Bilangan dan non-tes berupa skala *self-efficacy* matematis serta wawancara. Hasil penelitian ini adalah: 1) *self-efficacy* mahasiswa dalam pembuktian matematis cenderung sedang, 2) kecenderungan struktur argumentasi mahasiswa *self-efficacy* tinggi adalah *data, claim, warrant, rebuttal, backing,* dan *qualifier* dengan jenis *warrant*: a) deduktif dengan bukti *counter-example*, bukti langsung, induksi, dan bukti kontradiksi; dan b) induktif-deduktif dengan jenis bukti kontradiksi, serta justifikasinya cenderung pada level 4. Kecenderungan struktur argumentasi mahasiswa *self-efficacy* sedang adalah data, *claim* salah, *warrant* miskonsepsi, salah dan tidak mendukung klaim, serta tidak lengkap, dengan jenis *warrant*-nya: a) salah dan tidak mendukung klaim; b) tidak ada *warrant*; c) deduktif bukti langsung dan kontradiksi dengan miskonsepsi; dan d) induktif-deduktif bukti kontradiksi atau induksi dengan tidak lengkap, serta justifikasinya cenderung pada level 2. Mahasiswa dengan *self-efficacy* rendah memiliki struktur argumentasi data, *claim* salah, *warrant* salah dan tidak menuju klaim, miskonsepsi, dan atau tidak lengkap, mahasiswa belum mampu menggunakan teknik/metode pembuktian dalam proses membuktikan, adapun justifikasinya cenderung pada level 1. Kesulitan mahasiswa dengan *self-efficacy* tinggi dalam pembuktian pernyataan matematis adalah kesulitan mengaplikasikan konsep, memahami notasi dan simbol, dan menghubungkan premis dengan konklusi, adapun kesulitan mahasiswa dengan *self-efficacy* sedang adalah kesulitan memulai pembuktian, tidak paham metode pembuktian, kesulitan menghubungkan langkah asumsi dan langkah induksi, kesulitan mencari kontradiksi, kesulitan mengaplikasikan konsep keterbagian, dan kesulitan memahami notasi dan simbol matematis, sedangkan kesulitan yang dialami mahasiswa dengan *self-efficacy* rendah serupa dengan kesulitan mahasiswa self-efficacy sedang.

Kata Kunci: Argumentasi Matematis, Justifikasi Matematis, Kemampuan Calon Guru Matematika, Pembuktian Matematis, *Self-Efficacy* Pembuktian Matematis, Teori Argumentasi Toulmin

ABSTRACT

Surya Kurniawan (2105617) Mathematical Argumentation and Justification of Pre-Service Mathematics Teacher in Proving Mathematical Statements Based on Self-Efficacy.

This study aims to describe students' argumentation structure and justification level in mathematical proof and to find out the difficulties in mathematical proof based on the level of mathematical self-efficacy. This research used a qualitative approach with a case study design, conducted in one of the mathematics education study programs at a university in Banda Aceh City, and used 43 students as research subjects. Data were collected using the number theory mathematical proof test and non-test techniques in the form of mathematical self-efficacy scales and interviews. The results of this study are: 1) students' self-efficacy in mathematical proof tends to be moderate; 2) the tendency of high-efficacy students' argumentation structure is data, claim, warrant, rebuttal, backing, and qualifier with warrant types: a) deductive with counter-example proof, direct proof, induction, and proof of contradiction; and b) inductive-deductive with the type of proof of contradiction, and the justification tends to be at level 4. The tendency of moderate self-efficacy students' argumentation structure is data, wrong claim, misconception warrant, wrong and does not support the claim, and incomplete, with the type of warrant: a) wrong and does not support the claim; b) no warrant; c) deductive direct proof and contradiction with misconception; and d) inductive-deductive proof of contradiction and induction with incomplete, and the justification tends to be at level 2. Students with low self-efficacy have a data argumentation structure, false claims, false warrants and not towards claims, misconceptions, and or incomplete, students need to be able to use proof method techniques in the proof process, and their justifications tend to be at level 1. The difficulties of students with high self-efficacy in proving mathematical statements are difficulties in applying concepts, understanding notations and symbols, and connecting premises with conclusions, while the difficulties of students with moderate self-efficacy are difficulties in starting the proof, not understanding the proof method, difficulty connecting the assumption step and the induction step, difficulty finding contradictions, applying the concept of divisibility, and difficulty understanding mathematical notations and symbols, while the difficulties experienced by students with low self-efficacy are similar to the difficulties of moderate self-efficacy students.

Keywords: Mathematical Argumentation, Mathematical Justification, Prospective Mathematics Teacher Ability, Mathematical Proof, Self-Efficacy in Mathematical Proof, Toulmin Argumentation Theory

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Tesis dengan judul "Argumentasi dan Justifikasi Matematis Mahasiswa Calon Guru Matematika Dalam Membuktikan Pernyataan Matematis Berdasarkan *Self-Efficacy*" ini diajukan untuk memenuhi salah satu syarat untuk memperoleh gelar Magister Pendidikan (M.Pd.) pada program studi Pendidikan Matematika, Universitas Pendidikan Indonesia.

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DAFTAR GAMBAR

DAFTAR TABEL

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