PENGEMBANGAN APLIKASI BERBASIS *ANDROID* DALAM PEMBELAJARAN MATEMATIKA UNTUK PENCAPAIAN KEMAMPUAN BERPIKIR KOMPUTASI MATEMATIS SISWA SMP

TESIS

Diajukan untuk memenuhi sebagian syarat untuk memperoleh gelar
Magister Pendidikan Matematika

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LEMBAR PERNYATAAN

Dengan ini saya menyatakan bahwa tesis dengan judul **"Pengembangan Aplikasi Berbasis *Android* dalam Pembelajaran Matematika untuk Pencapaian Kemampuan Berpikir Komputasi Matematis Siswa SMP"** 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 ada klaim dari pihak lain terhadap keaslian karya saya ini. Demikian lembar pernyataan ini dibuat dengan sebenar-benarnya.

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Bandung, April 2023
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ABSTRAK

Faizah Nurwita (2023). Pengembangan Aplikasi Berbasis *Android* dalam Pembelajaran Matematika untuk Pencapaian Kemampuan Berpikir Komputasi Matematis Siswa SMP.

Pesatnya perkembangan teknologi berdampak pada pembaharuan dalam praktik pendidikan sehingga siswa perlu beradaptasi dan memiliki salah satu tuntutan kemampuan pada abad ke-21, yaitu berpikir komputasi matematis. Namun, pencapaian tuntutan kemampuan tersebut masih perlu ditingkatkan sehingga perlu dilakukan upaya dengan memanfaatkan media pembelajaran yang sesuai dengan karakteristik siswa SMP. Penelitian ini bertujuan untuk mengkaji aplikasi berbasis *android* yang layak dari segi kevalidan, keefektifan, dan kepraktisan, serta mengkaji respons siswa SMP terhadap penggunaan aplikasi tersebut dalam pembelajaran matematika untuk mencapai kemampuan berpikir komputasi matematisnya. Penelitian ini menggunakan metode penelitian dan pengembangan yang mengacu pada model *Borg* dan *Gall* yang terdiri atas tujuh tahapan, yaitu: (1) studi pendahuluan (*preliminary research*); (2) perancangan aplikasi berbasis *android* dan instrumen penelitian; (3) pengembangan aplikasi berbasis *android*; (4) validasi dan revisi pertama; (5) uji coba keterbacaan dan revisi kedua; (6) uji coba di skala kecil dan revisi ketiga; dan (7) uji coba di skala besar dan revisi keempat. Partisipan penelitian ini terdiri atas siswa Sekolah Menengah Atas (SMA) pada uji keterbacaan dan siswa Sekolah Menengah Pertama (SMP) pada uji coba aplikasi. Teknik pengumpulan data dalam penelitian ini menggunakan teknik wawancara, observasi, tes kemampuan berpikir komputasi matematis, dan angket. Temuan penelitian ini dianalisis secara deskriptif. Hasil penelitian menunjukkan bahwa pengembangan aplikasi berbasis *android* dalam pembelajaran matematika untuk pencapaian kemampuan berpikir komputasi matematis siswa SMP sudah dalam kategori valid, praktis, dan efektif. Valid berdasarkan penilaian validator (ahli materi dan pedagogik, ahli psikolinguistik, dan ahli media) serta praktisi (guru matematika) dari aspek kelayakan materi, bahasa, dan media. Praktis berdasarkan angket respons siswa SMP yang memiliki indikator kemudahan penggunaan aplikasi dan kemenarikan penyajian materi. Efektif berdasarkan hasil tes kemampuan berpikir komputasi matematis siswa SMP yang menunjukkan nilai ketuntasan belajarnya baik. Respons siswa SMP terhadap penggunaan aplikasi juga baik karena melibatkan kognitif, afektif, dan psikomotorik mereka.

Kata kunci: Aplikasi Berbasis *Android*, Berpikir Komputasi, Berpikir Matematis, Berpikir Komputasi Matematis

ABSTRACT

Faizah Nurwita (2023). Developing *Android*-based Applications in Learning Mathematics for The Achievement of Middle School Students' Mathematical Computational Thinking Ability

The rapid development of technology impacts reforms in educational practice, so students need to adapt and have one of the demands of ability in the 21st century, namely mathematical computational thinking. However, the achievement of the demands of these abilities still needs to be improved, so efforts need to be made by utilizing learning media that are by the characteristics of junior high school students. This study aims to examine android-based applications that are feasible in terms of validity, effectiveness, and practicality and the responses of junior high school students to using these applications in learning mathematics to achieve their mathematical computational thinking abilities. This study used research and development methods that refer to the Borg and Gall model, which consists of seven stages, namely: (1) preliminary research; (2) android-based application design and research instruments; (3) android-based application development; (4) first validation and revision; (5) readability test and second revision; (6) small-scale trial and third revision; and (7) large-scale trials and the fourth revision. The participants in this study consisted of high school (SMA) students in the readability test and junior high school (SMP) students in the application trial. Data collection techniques in this study used interview techniques, observation, computational mathematical thinking ability tests, and questionnaires. The findings of this study were analyzed descriptively. The results of the study show that the development of android-based applications in learning mathematics for the attainment of mathematical computational thinking abilities of junior high school students is in the category of valid, practical, and effective. Valid based on the assessment of validators (materials and pedagogic experts, psycholinguistic experts, and media experts) and practitioners (mathematics teachers) from the aspects of material, language, and media feasibility. Practical based on a questionnaire of junior high school students' responses which indicates the application's ease of use and the attractiveness of presenting the material. Effective based on the results of tests of mathematical computational thinking abilities of junior high school students, which show a good grade of learning completeness. The response of junior high school students to the use of the application is also good because it involves their cognitive, affective, and psychomotor.

Keywords: *Android*-based application, Computational Thinking, Mathematical Thinking, Mathematical Computational Thinking

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