DESIGN RESEARCH PADA PEMBELAJARAN FUNGSI LINEAR DENGAN *FLIPPED REALISTIC MATHEMATICS EDUCATION* (RME) *CLASSROOM* UNTUK MENGEMBANGKAN NUMERASI SISWA SMP

DISERTASI

diajukan untuk memenuhi sebagian syarat untuk memperoleh gelar doktor
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Design Research pada Pembelajaran Fungsi Linear dengan *Flipped Realistic Mathematics Education* (RME) *Classroom* untuk Mengembangkan Numerasi Siswa SMP

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ABSTRAK

Sarah Inayah (2025). *Design Research* pada Pembelajaran Fungsi Linear dengan *Flipped Realistic Mathematics Education* (RME) *Classroom* untuk Mengembangkan Numerasi Siswa SMP.

Penelitian ini bertujuan untuk mengembangkan *Local Instruction Theory* (LIT) pada materi fungsi linear dengan *Flipped Realistic Mathematics Education* (RME) *Classroom* untuk meningkatkan kemampuan numerasi siswa. Penelitian ini menggunakan pendekatan *design research* dengan dua tahap utama yang masing-masing terdiri atas fase *preliminary design*, *teaching experiment*, dan *retrospective analysis*. Hasil studi pendahuluan menunjukkan bahwa sebagian besar siswa hanya mampu menyelesaikan soal pada level kognitif rendah hingga menengah (mengingat, memahami, menerapkan), namun mengalami kesulitan signifikan pada level tinggi (menganalisis, mengevaluasi, mencipta), baik dalam tes diagnostik maupun soal numerasi. Kesulitan juga muncul dalam translasi antar representasi matematis dan penggunaan alat digital seperti Microsoft Excel. Berdasarkan temuan ini, dikembangkan *Conjectured Local Instruction Theory* (CLIT) yang kemudian direvisi menjadi LIT melalui dua tahap pengembangan. Desain pembelajaran *Flipped* RME *Classroom* yang diimplementasikan dalam penelitian ini terbukti efektif dalam mendorong keterlibatan aktif siswa, memperkuat pemahaman konseptual, dan meningkatkan pencapaian numerasi, terutama pada dimensi konteks dan pengetahuan matematika. Mayoritas siswa mencapai kategori "cakap" dan tidak ada siswa yang tergolong "perlu intervensi" setelah penerapan desain pembelajaran. Penelitian ini menghasilkan LIT yang valid dan dapat digunakan sebagai alternatif model pembelajaran untuk materi fungsi linear yang kontekstual, interaktif, dan berorientasi pada penguatan numerasi. Implikasi dari penelitian ini mencakup pentingnya pemilihan konteks autentik, penguatan argumentasi matematis, pelatihan penggunaan alat digital, serta evaluasi berbasis proses berpikir siswa. LIT ini diharapkan dapat direplikasi pada konteks dan jenjang lain untuk memperluas generalisasi hasil.

Kata kunci: *Design research*, *flipped classroom*, fungsi linear, *local instruction theory*, numerasi, *realistic mathematics education.*

ABSTRACT

Sarah Inayah (2025). Design Research on Learning Linear Functions with Flipped Realistic Mathematics Education (RME) Classroom to Develop Junior High School Students' Numeracy.

This study aims to develop Local Instruction Theory (LIT) on linear function material using Flipped Realistic Mathematics Education (RME) Classroom to improve students' numeracy skills. This study uses a design research approach with two main stages, each consisting of a preliminary design phase, teaching experiment, and retrospective analysis. Preliminary study results indicate that most students can only solve problems at low to medium cognitive levels (remembering, understanding, applying), but face significant difficulties at higher levels (analyzing, evaluating, creating), both in diagnostic tests and numeracy problems. Difficulties also arise in translating between mathematical representations and using digital tools such as Microsoft Excel. Based on these findings, the Conjectured Local Instruction Theory (CLIT) was developed and later revised into LIT through two stages of development. The Flipped RME Classroom learning design implemented in this study proved effective in encouraging active student engagement, strengthening conceptual understanding, and improving numeracy achievement, particularly in the dimensions of context and mathematical knowledge. The majority of students achieved the “proficient” category, and no students were classified as “needing intervention” after the implementation of the learning design. This study produced a valid LIT that can be used as an alternative learning model for contextual, interactive, and numeracy-enhancing linear function material. The implications of this study include the importance of selecting authentic contexts, strengthening mathematical argumentation, training in the use of digital tools, and evaluation based on students' thinking processes. This LIT is expected to be replicated in other contexts and levels to expand the generalization of the results.

Keywords: Design research, flipped classroom, linear functions, local instruction theory, numeracy, realistic mathematics education.

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