

**PENGGUNAAN *MULTIPLE EXTERNAL REPRESENTATIONS (MERS)*
UNTUK MENINGKATKAN KETERAMPILAN BERPIKIR SISTEM
SISWA SMA MENGENAI SISTEM HORMON REPRODUKSI**

SKRIPSI

*diajukan sebagai salah satu persyaratan untuk memperoleh gelar Sarjana
Program Studi Pendidikan Biologi*



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FAKULTAS PENDIDIKAN MATEMATIKA DAN ILMU PENGETAHUAN
ALAM
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ABSTRAK

Berpikir sistem merupakan keterampilan yang sangat dibutuhkan untuk menghadapi kompleksitas kehidupan yang dinamis dengan memahami sistem sebagai suatu kesatuan yang tersusun atas banyak komponen yang saling berinteraksi dan bekerja sama. Namun realitanya, sekolah belum berfokus untuk mengukur dan melatih keterampilan berpikir sistem (KBS) siswa. Penelitian ini dilatarbelakangi oleh pentingnya meningkatkan keterampilan berpikir sistem siswa melalui *multiple external representations (MERs)*. *MERs* merupakan kombinasi berbagai representasi, seperti gambar, grafik, bagan, diagram, dan video yang dirancang untuk materi sistem hormon reproduksi. KBS diuraikan menjadi lima indikator, yaitu kemampuan mengidentifikasi komponen dan proses dalam sistem, mengidentifikasi hubungan sederhana antar komponen sistem, menganalisis hubungan dinamis antar komponen sistem, memahami siklus natural dari sistem, dan membuat generalisasi. Metode pra-eksperimen dengan desain penelitian *One Group Pretest Posttest*, digunakan dengan melibatkan 36 siswa SMA Kelas XI dan seorang guru Biologi. Pengumpulan data dilakukan melalui sejumlah instrumen (tes dengan 15 butir soal uraian, kuesioner respons siswa, wawancara guru, dan lembar keterlaksanaan *MERs*). Pembelajaran inti dilaksanakan tiga pertemuan menggunakan *MERs* dan LKPD sebagai alat bantu. Guru berperan mengarahkan siswa dalam memaknai rangkaian representasi. Temuan dari penelitian ini, yaitu didapatkan rata-rata nilai KBS siswa pada *pretest* 19.57 (sangat kurang) dan pada *posttest* 55.69 (cukup) dengan N-Gain kategori sedang (0.46). Lalu kuesioner respons siswa mendapat rata-rata skor dalam kategori baik (79.22) dan guru biologi mendukung penggunaan *MERs*. Secara umum desain *MERs* dapat direalisasikan secara keseluruhan pada pembelajaran. Dengan demikian, KBS siswa meningkat setelah melakukan pembelajaran menggunakan *MERs* pada materi sistem hormon reproduksi.

Kata kunci: *Multiple external representations*, berpikir sistem, hormon reproduksi

ABSTRACT

System thinking is a highly essential skill needed to cope with the complexities of a dynamic life by understanding a system as a whole composed of many interacting and cooperating components. However, in reality, schools have not focused on measuring and training students' system thinking skills (STS). This background motivated this study, which aims to enhance students' system thinking skills through multiple external representations (MERs). MERs are combinations of various representations, such as pictures, graphs, charts, diagrams, and videos designed for the material on the reproductive hormone system. STS are broken down into five indicators: the ability to identify components and processes within a system, identify simple relationships between system components, analyze dynamic relationships between system components, understand the natural cycles of the system, and make generalizations. This study used a pre-experimental method with a One Group Pretest Posttest design, involving 36 senior high school students on Grade XI and a Biology teacher. Data were collected using tests with 15 essay questions, student response questionnaires, teacher interviews, and MERs implementation sheets. Core learning was conducted over three sessions using MERs and student worksheets (LKPD) as tools. The teacher's role was to guide students in interpreting the series of representations. The findings of this study show that the average STS score of students in the pretest was 19.57 (very poor) and in the posttest was 55.69 (adequate) with an N-Gain of 0.46 in the medium category. The student response questionnaire received an average score in the good category (79.22), and the biology teacher supported the use of MERs. In general, the MERs design can be fully implemented in learning. In conclusion, students' STS improved after learning using MERs on the material of the reproductive hormone system.

Keywords: *Multiple External Representations, systems thinking, reproductive hormones*

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