

## **ABSTRACT**

### **Developing Crossword Puzzle Flash-Based Interactive Learning Multimedia for Teaching Biotechnology Topic on the Senior High School Students at Grade XII**

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Biotechnology is one of the materials taught to the students in the third year of Senior High School. This topic discusses about the meaning, basic principles, types of biotechnology, and analyzing the role of biotechnology as well as the implications of biotechnology in science, environment, technology and society. But there is still no media that can visualize the processes which are more applicable and abstract. The media that already exist still cannot describe the material better. This research aims to develop media and determine the validity, practicalities, and the effectiveness of interactive learning multimedia materials include the biotechnology-based flash crossword puzzles are developed.

This was a research and development which applied Four-D (4-D) models and consisted of four phases covering defining, design, development and disseminate phases. In this research, disseminating phase was excluded. The multimedia developed was tried out to the students on grade XII of SMAN 1 Kayutanam. The sample involved in this research were 20 students.

The research showed that the validity score was 89,57% (very valid), the practicality score viewed from the teachers point of view was 96,67% (very practical), the practicality score viewed from the implementation of the media was 95,65% (very practical), the number of the students who had achieved the minimum standard score was 85% and the score for the students activities after using the media was 83,8% (very active). Based on the result of the research it was concluded that the crossword puzzle flash-based interactive learning multimedia had been valid, practical and effective for teaching the Biotechnology topic.

## ABSTRAK

### **Pengembangan Multimedia Pembelajaran Interaktif Pada Materi Bioteknologi Dilengkapi Teka-Teki Silang (TTS) Berbasis Flash Untuk Siswa Kelas XII SMA**

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Materi bioteknologi merupakan salah satu materi yang dipelajari di kelas XII IPA SMA. Pada materi ini dipelajari tentang arti, prinsip dasar, jenis-jenis bioteknologi, dan menganalisis peran bioteknologi serta implikasi hasil-hasil bioteknologi pada salingtemas (sains, lingkungan, teknologi dan masyarakat), Namun belum ada media yang mampu untuk memvisualisasikan proses-proses pada materi ini yang lebih banyak bersifat aplikatif dan abstrak. Media yang sudah tersedia belum mampu mendeskripsikan dengan baik isi materi bioteknologi ini. Penelitian ini bertujuan untuk mengembangkan dan mengetahui validitas, praktikalitas, serta efektivitas multimedia pembelajaran interaktif materi bioteknologi dilengkapi TTS berbasis *flash* yang dikembangkan.

Jenis penelitian ini adalah penelitian pengembangan dengan menggunakan *four-D-models* yang terdiri dari tahap pendefinisian (*define*), perancangan (*design*), pengembangan (*develop*) dan tahap penyebaran (*disseminate*). Penelitian ini hanya dilakukan sampai tahap *develop* saja. Multimedia pembelajaran interaktif materi bioteknologi dilengkapi TTS berbasis *flash* diujikan pada siswa SMAN 1 2x11 Kayutanam, dengan jumlah subjek uji coba 20 orang.

Dari hasil penelitian didapatkan nilai validasi 89,57% (kategori sangat valid), nilai praktikalitas dari siswa 95,65% (kategori sangat praktis), nilai praktikalitas dari guru 96,67% (kategori sangat praktis). Hasil belajar siswa yang mencapai KKM sebanyak 85% dengan nilai aktivitas belajar siswa sangat aktif (83,8%). Dari hasil penelitian dapat disimpulkan bahwa multimedia pembelajaran interaktif materi bioteknologi dilengkapi TTS berbasis *flash* merupakan media yang valid, praktis dan efektif.