

ABSTRAK

Pemanfaatan perangkat digital dalam pembelajaran matematika di SMA Budi Utama Yogyakarta masih dapat dioptimalisasi agar dapat mendukung proses pembelajaran secara lebih efektif. *Smart Board TV* dan *tablet* yang tersedia di sekolah dapat memfasilitasi keterlibatan siswa dalam pembelajaran dan kemampuan komunikasi matematis siswa pada materi statistika. Penelitian ini bertujuan untuk (1) mengembangkan media pembelajaran digital *Wayground* berbasis *Flipped Learning* untuk materi statistika dengan memanfaatkan teknologi di SMA Budi Utama Yogyakarta, (2) mengetahui kualitas media pembelajaran digital *Wayground* dengan model *Flipped Learning* untuk materi statistika yang dikembangkan, dan (3) mendeskripsikan kemampuan komunikasi matematis lisan dan tertulis siswa setelah mengikuti pembelajaran menggunakan media *Wayground* berbasis model *Flipped Learning*.

Penelitian ini merupakan penelitian dan pengembangan (*Research and Development*) dengan menggunakan model ADDIE yang meliputi tahap analisis, perancangan, pengembangan, implementasi, dan evaluasi. Subjek penelitian adalah siswa kelas X.1 SMA Budi Utama Yogyakarta. Data dikumpulkan melalui observasi, wawancara, validasi ahli, penyebaran kuesioner, dan tes.

Penelitian ini menghasilkan produk berupa media pembelajaran *Wayground* dengan model *Flipped Learning* materi statistika yang dikembangkan berdasarkan tahap model ADDIE. Pada tahap analisis teridentifikasi bahwa media pembelajaran yang digunakan selama ini masih belum dapat memfasilitasi kemampuan komunikasi matematis siswa. Pada tahap implementasi ditemukan bahwa siswa belum terbiasa dengan model *Flipped Learning*. Hanya beberapa siswa yang melakukan aktivitas di *Wayground* sebelum pembelajaran di kelas. Hal ini berbeda dengan situasi saat pembelajaran. Siswa sangat antusias dan menunjukkan respon positif saat menggunakan media yang dikembangkan di kelas. Berdasarkan tahap evaluasi, produk yang telah dikembangkan masih perlu diperbaiki agar aktivitas siswa dapat terdokumentasi.

Hasil uji kevalidan menunjukkan persentase 89% dari ahli media (sangat valid) dan 79% dari ahli materi (valid). Nilai kepraktisan yang diperoleh dari respons guru dan siswa mencapai rata-rata 84% (sangat praktis). Siswa mengatakan bahwa mereka mudah menggunakan media dan tertarik pada fitur yang ada dalam media pembelajaran.

Ditinjau dari aspek keefektifan, hasil tes evaluasi akhir menunjukkan 80% siswa berhasil mencapai kategori kemampuan komunikasi matematis yang tinggi. Kemampuan komunikasi matematis lisan dan tertulis siswa tampak dari aktivitas *Wayground* selama pembelajaran. Ketika mengerjakan tes, siswa mampu mengkomunikasikan penyelesaian masalah secara tertulis dengan baik. Pada saat wawancara, siswa mampu menjelaskan jawaban yang telah dituliskan pada tes secara lisan dan memberikan alasan atas penyelesaian jawaban.

Kata kunci: *wayground*, *flipped learning*, kemampuan komunikasi matematis, media digital, statistika.

ABSTRACT

The utilization of digital devices in mathematics learning at Budi Utama Senior High School can still be further optimized to support the learning process more effectively. The Smart Board TVs and tablets available at the school have the potential to facilitate students' engagement in learning and enhance students' mathematical communication skills in learning statistics. This study aimed to: (1) develop a Wayground digital learning medium based on the Flipped Learning model for statistics material by utilizing technology at Budi Utama Senior High School, (2) determine the quality of the developed Wayground digital learning medium with the Flipped Learning model for statistics material, and (3) describe students' oral and written mathematical communication skills after participating in learning activities using the Wayground media based on the Flipped Learning model.

This study employed a Research and Development (R&D) approach using the ADDIE model, which consists of the Analysis, Design, Development, Implementation, and Evaluation stages. The research subjects were students of Class X.1 at Budi Utama Senior High School. Data were collected through observations, interviews, expert validation, questionnaires, and tests.

The study produced a Wayground learning medium based on the Flipped Learning model for statistics, developed through the stages of the ADDIE model. During the analysis stage, it was identified that the learning media previously used had not adequately facilitated students' mathematical communication skills. During the implementation stage, it was found that students were not yet familiar with the Flipped Learning model. Only a few students completed activities in Wayground before the classroom learning sessions. This situation differed during classroom instruction, where students showed high enthusiasm and positive responses when using the developed learning medium. Based on the evaluation stage, the developed product still requires improvement to ensure that students' learning activities can be properly documented.

The validity test results showed a score of 89% from the media expert (very valid), and 79% from the subject matter expert (valid). The practicality assessment, based on teacher and student responses, achieved an average score of 84% (very practical). Students reported that the medium was easy to use and that they were interested in its features.

In terms of effectiveness, the final evaluation test results indicated that 80% of the students achieved a high level of mathematical communication skills. Students' oral and written mathematical communication skills were evident from their activities in Wayground during the learning process. When completing the evaluation test, students were able to communicate their problem-solving processes effectively in written form. During interviews, students were also able to explain their written answers orally and provide clear reasoning for their solutions.

Keywords: *wayground, flipped learning, mathematical communication skills, digital media, statistics.*