

ABSTRAK

Penelitian ini bertujuan untuk (1) mengembangkan media pembelajaran berupa e-komik matematika dengan karakter wayang yang dapat memfasilitasi kemampuan komunikasi dan representasi matematis peserta didik pada materi statistika dan (2) mengetahui kualitas e-komik matematika karakter wayang dalam memfasilitasi kemampuan komunikasi dan representasi matematis pada materi statistika. Penelitian dilatarbelakangi oleh rendahnya keterlibatan peserta didik dalam pembelajaran matematika, khususnya dalam menyampaikan ide dan memvisualisasikan konsep matematika.

Penelitian ini menggunakan metode *Research and Development (R&D)* dengan model ADDIE. Subjek penelitian adalah 25 siswa X6 SMA Negeri 9 Yogyakarta tahun ajaran 2024/2025. Instrumen yang digunakan dalam penelitian meliputi lembar validasi ahli materi dan media, lembar observasi, angket kepraktisan, tes kemampuan komunikasi dan representasi matematis.

1) Hasil proses pengembangan, tahap *analysis* ditemukan bahwa peserta didik X 6 mengalami kesulitan dalam komunikasi dan representasi matematis karena pembelajaran yang masih didominasi metode ceramah. Tahap *design* disusun materi statistika khususnya ukuran pemusatan data berkelompok, serta rancangan media berupa e-komik, dibuat juga prinsip media dan dilengkapi dengan *storyboard*. Tahap *development* media e-komik dalam format *flipbook* untuk 4 pertemuan. Hasil validasi oleh ahli materi dan media menunjukkan bahwa produk berada pada kategori “valid” hingga “sangat valid”, dengan beberapa saran perbaikan yang telah ditindaklanjuti. Tahap *implementation*, Uji coba dilaksanakan pada 2 dari 4 pertemuan yang direncanakan kepada 25 siswa kelas X6. Implementasi belum optimal karena keterbatasan waktu, sehingga siswa hanya membaca tanpa diskusi atau eksplorasi mendalam. Post-test pun tidak dapat dijalankan secara maksimal. Tahap *Evaluation*, menunjukkan bahwa e-komik layak digunakan dan sesuai dengan indikator kemampuan yang dituju. 2) Hasil validasi menunjukkan bahwa e-komik yang dikembangkan dinyatakan valid dan praktis. Hasil validasi menunjukkan tingkat kevalidan sebesar 82,5% dari ahli materi dan 88,46% dari ahli media, keduanya masuk dalam kategori “Sangat Valid”. Hasil kepraktisan oleh peserta didik menunjukkan bahwa mayoritas memperoleh skor $\geq 61\%$, sehingga produk dikategorikan “Praktis”. Namun, dari sisi keefektifan, perolehan N-Gain hanya sebesar 12% dengan interpretasi “Tidak Efektif”, disebabkan oleh implementasi yang tidak optimal karena waktu penggunaan e-komik hanya dilakukan dalam 2 dari 4 pertemuan yang direncanakan. Dengan demikian, e-komik matematika dengan karakter wayang dapat digunakan sebagai alternatif media pembelajaran yang memenuhi kepraktisan dan kepraktisan namun kurang efektif dalam memfasilitasi kemampuan komunikasi dan representasi matematis siswa. E-komik diduga akan memfasilitasi representasi dan komunikasi jika media komik benar-benar digunakan dalam pembelajaran secara maksimal.

Kata kunci: E-komik Matematika, Komunikasi Matematis, Representasi Matematis, Statistika, Ukuran Pemusatan, Wayang

ABSTRACT

This study aims to (1) develop learning media in the form of mathematical e-comics featuring wayang characters that can facilitate students' communication and mathematical representation skills in statistics and (2) determine the quality of mathematical e-comics featuring wayang characters in facilitating communication and mathematical representation skills in statistics. The research was motivated by the low level of student engagement in mathematics learning, particularly in expressing ideas and visualizing mathematical concepts.

This study employed the Research and Development (R&D) method using the ADDIE model. The research subjects were 25 students from Class X6 of State Senior High School 9 Yogyakarta in the 2024/2025 academic year. The instruments used in the study included expert validation sheets for the material and media, observation sheets, practicality questionnaires, and tests of communication and mathematical representation skills.

1) The results of the development process, in the analysis stage, revealed that students in class X6 faced difficulties in communication and mathematical representation due to learning methods that were still dominated by lectures. In the design stage, statistics material was developed, specifically focusing on measures of central tendency for grouped data, along with a media design in the form of an e-comic. The principles of the media were established and supplemented with a storyboard. In the development stage, the e-comic media was created in flipbook format for four sessions. Validation by subject matter and media experts indicated that the product fell into the "valid" to "highly valid" category, with some suggestions for improvement that have been addressed. During the implementation phase, a pilot test was conducted in 2 of the 4 planned sessions with 25 students from class X6. Implementation was not optimal due to time constraints, so students only read the material without discussion or in-depth exploration. The post-test could not be conducted to its full potential. The evaluation phase showed that the e-comic is suitable for use and aligns with the targeted competency indicators. 2) The validation results showed that the developed e-comic was valid and practical. The validation results indicated a validity rate of 82.5% from subject matter experts and 88.46% from media experts, both falling into the "Highly Valid" category. The practicality results from the students indicate that the majority achieved a score of $\geq 61\%$, so the product is categorized as "Practical." However, in terms of effectiveness, the N-Gain achievement was only 12%, interpreted as "Not Effective," due to suboptimal implementation because the e-comic was only used in 2 out of 4 planned sessions. Thus, the mathematics e-comic featuring wayang characters can be used as an alternative learning medium that meets practicality and usability criteria but is less effective in facilitating students' mathematical communication and representation skills. The e-comic is expected to facilitate representation and communication if the comic medium is fully utilized in learning.

Keyword: *E-comics Mathematics, Mathematical Communication, Mathematical Representation, Statistics, Measures of Central Tendency, Wayang*

