



The Effectiveness of E-Book Learning Media on Business Communication Material for Students of SMK PGRI 1 Jombang

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Abstract. This study aims to explore the effectiveness of e-book learning media in improving students' learning outcomes in Business Communication subjects at SMK PGRI 1 Jombang. The research utilized a quasi-experimental design with a nonequivalent control group. A total of 73 students participated, divided into two groups: the experimental group using e-books as a learning medium and the control group receiving traditional teaching methods. Data were collected through standardized multiple-choice tests, and independent sample t-tests were employed for data analysis. The results showed a significant difference in the learning outcomes between the two groups, with the experimental group achieving an average score of 88.03, compared to the control group's average of 73.89, with a p-value of less than 0.001. These findings indicate that e-book learning media has a positive impact on student engagement, motivation, and conceptual understanding in vocational education settings. The use of e-books as an interactive learning tool appears to enhance students' ability to grasp complex business communication concepts, providing them with a more engaging and dynamic learning experience. This study contributes to the development of digital-based pedagogies and offers empirical evidence supporting the integration of e-books and similar e-learning tools into vocational school curricula. Based on the findings, it is recommended that educational institutions, particularly vocational schools, consider adopting e-book media as a part of their teaching strategies to improve students' learning outcomes, as well as to foster greater digital literacy. The study highlights the importance of integrating modern technology into education to better align with the evolving digital landscape in teaching and learning practices.

Keywords: Business Communication; Digital Learning Media; E-Book; Learning Outcomes; Vocational Education

Abstrak. Penelitian ini bertujuan untuk mengeksplorasi efektivitas media pembelajaran e-book dalam meningkatkan hasil belajar siswa pada mata pelajaran Komunikasi Bisnis di SMK PGRI 1 Jombang. Penelitian ini menggunakan desain eksperimen semu dengan kelompok kontrol yang tidak setara. Sebanyak 73 siswa terlibat, yang dibagi ke dalam dua kelompok: kelompok eksperimen yang menggunakan e-book sebagai media pembelajaran dan kelompok kontrol yang menerima metode pembelajaran tradisional. Data dikumpulkan melalui tes pilihan ganda yang terstandarisasi, dan analisis data dilakukan menggunakan uji t sampel independen. Hasil penelitian menunjukkan perbedaan signifikan dalam hasil belajar antara kedua kelompok, dengan kelompok eksperimen memperoleh rata-rata nilai 88,03, dibandingkan dengan kelompok kontrol yang memperoleh rata-rata 73,89, dengan nilai p kurang dari 0,001. Temuan ini menunjukkan bahwa media pembelajaran e-book memiliki dampak positif terhadap keterlibatan siswa, motivasi, dan pemahaman konsep dalam pendidikan vokasi. Penggunaan e-book sebagai alat pembelajaran interaktif terbukti dapat meningkatkan kemampuan siswa dalam memahami konsep komunikasi bisnis yang kompleks, memberikan pengalaman belajar yang lebih menarik dan dinamis. Penelitian ini berkontribusi pada pengembangan pedagogi berbasis digital dan memberikan bukti empiris yang mendukung integrasi e-book dan alat pembelajaran elektronik lainnya dalam kurikulum sekolah vokasi. Berdasarkan temuan ini, disarankan agar lembaga pendidikan, khususnya sekolah vokasi, mempertimbangkan untuk mengadopsi media e-book sebagai bagian dari strategi pengajaran mereka untuk meningkatkan hasil belajar siswa, serta untuk mendorong literasi digital yang lebih besar. Penelitian ini menyoroti pentingnya mengintegrasikan teknologi modern dalam pendidikan untuk lebih sesuai dengan perkembangan lanskap digital dalam praktik pengajaran dan pembelajaran.

Kata kunci: Buku Elektronik; Hasil Belajar; Komunikasi Bisnis; Media Pembelajaran Digital; Pendidikan Vokasi

1. INTRODUCTION

Improving the quality of student learning outcomes has long been a central ambition of education systems worldwide. In policy documents, institutional strategic plans, and classroom practice, learning outcomes commonly serve as the definitive indicator of whether a curriculum, pedagogy, or learning technology is producing meaningful educational value. In the context of vocational education—such as Indonesia’s Sekolah Menengah Kejuruan (SMK)—this imperative is even more pronounced because “learning outcomes” encompass not only cognitive mastery of concepts but also demonstrable practical skills that translate directly into employability. Consistent with this applied emphasis, learning outcomes function as the dependent variable in the present study: they capture the cognitive and skill-based attainments that students achieve upon completing an instructional sequence and are typically assessed using academic tests and other performance measures (Astalini et al., 2020).

Within vocational education and, more specifically, within the Business Communication subject at SMK PGRI 1 Jombang, students are expected to acquire both conceptual knowledge (e.g., communication principles, audience analysis, message framing) and situated, practice-oriented skills (e.g., writing emails and memos, pitching ideas, handling client conversations). These competencies align closely with the demands of the contemporary workplace, where employees must not only “know” but also do—often in digitally mediated environments. Yet traditional teaching approaches—centered on teacher exposition, textbook reading, and decontextualized exercises—have often proven insufficient for sustaining student engagement or moving learners from surface to deep learning. The situation has been complicated (and, in some cases, improved) by the post-COVID-19 era, in which schools rapidly shifted from conventional classroom formats to technology-rich, digital learning modes (Putri et al., 2021). Although the pandemic accelerated the adoption of digital tools, their effectiveness in vocational classrooms—especially in an integrative subject like Business Communication—has remained uneven. The challenge arises precisely where vocational learning is most demanding: students must integrate theoretical understanding with contextual and situational judgment, and the tools must help them do so rather than add friction.

At SMK PGRI 1 Jombang, the reliance on conventional pedagogies has frequently coincided with lower student engagement and, consequently, stagnant or suboptimal learning outcomes (Sari et al., 2023). Addressing this calls for instructional strategies that better match today’s digital-native learners while preserving the rigor and authenticity of vocational tasks. The present research responds by investigating whether e-book learning media—designed with interactivity, multimedia, and flexible access—can improve student learning outcomes in

Business Communication. E-books, when thoughtfully implemented, allow students to interact with videos, animations, infographics, and embedded assessments; they also provide ubiquitous access (anytime, anywhere) across devices, supporting independent and personalized learning patterns.

The potential advantages of e-books over printed texts are well-documented. First, flexibility and interactivity enable self-paced review, nonlinear navigation, and active engagement with tasks. Second, multimedia integration (video demonstrations, animations of communication flows, scenario images) helps learners concretize abstract concepts and see how principles play out in realistic contexts. Third, e-books better support personalized study rhythms, permitting struggling students to revisit challenging segments and advanced students to accelerate or extend (Wijayanti & Daryanto, 2021). In Business Communication, where situational application is paramount (e.g., choosing tone in a complaint response, structuring a persuasive message for a client), multimedia e-books can stage authentic situations that invite practice and reflection (Sutrisno et al., 2021). In short, e-books provide a promising means for moving conventional, text-centric instruction toward interactive, context-aware learning.

Goal of this study. The present research evaluates the effectiveness of e-book learning media for improving student outcomes in Business Communication at SMK PGRI 1 Jombang. Beyond the site-specific interest, the study aims to contribute empirical evidence to the broader literature on digital media in vocational education, addressing a practical question facing teachers and school leaders: does adopting an e-book medium—not merely as a format replacement but as a learning design—lead to measurable improvements in student achievement? If so, under what conditions and with what observed changes in motivation and engagement?

Given persistent calls to align vocational pedagogy with digital economy realities, the findings should help educators and policymakers design more responsive, technology-infused learning strategies that enhance outcomes while building foundational digital literacy. The sections that follow summarize the study's methodology (a quasi-experimental design), present findings and discussion (including descriptive statistics, inferential tests, and qualitative feedback), and conclude with implications for practice and policy.

2. METHOD

Research Design

The study employs a quantitative, quasi-experimental design, specifically the nonequivalent control group design (Sugiyono, 2021). Quasi-experiments are appropriate in authentic school settings where full randomization is impractical yet where a meaningful treatment–comparison contrast can be established. In our case, the treatment is the use of e-book learning media to deliver Business Communication content; the control group receives the same content through conventional means without e-books. The design enables us to estimate the treatment effect while acknowledging that pre-existing differences may remain (a limitation addressed later in validity considerations). As configured here, the design provides a realistic test of e-books as implemented by teachers and experienced by students—precisely the kind of “practice-proximate” evidence decision-makers need.

Population and Sample

The study population comprises all 11th-grade Business and Management students at SMK PGRI 1 Jombang. Using purposive sampling, we selected two comparable classes: the experimental group ($n = 37$) used e-books; the control group ($n = 36$) did not. Purposive selection followed standard comparability criteria—similar academic level, shared curriculum, and analogous demographic profiles—to reduce initial between-group differences (Creswell & Guetterman, 2020). Although purposive selection cannot guarantee baseline equivalence as randomization would, the matched-class approach in the same school context provides a credible basis for outcome comparison. The final sample size ($N = 73$) is adequate for independent-samples tests at conventional power levels when effects are medium or larger.

Research Instrument

Learning outcomes were measured using a 25-item multiple-choice test aligned with the Basic Competencies (Kompetensi Dasar/KD) for Business Communication. The instrument’s validity was examined through item analysis (content alignment and discrimination indices), and reliability was assessed via Cronbach’s alpha, yielding $\alpha = 0.89$ —a high level of internal consistency (Azwar, 2020). This provides confidence that the test reliably captures the construct of interest and that items coherently represent the intended competency domain.

Data Collection Procedure

Instruction proceeded over the same unit in Business Communication, with the experimental class receiving materials through the e-book (featuring interactive media, embedded checks, and multimedia examples) and the control class using conventional materials. At unit completion, both groups took the same post-test under proctored conditions. To complement test data, we conducted classroom observations focused on engagement behaviors (e.g., participation, on-task time) and brief teacher interviews to gather perceptions of the e-book's usability and instructional value.

Data Analysis Technique

We combined descriptive and inferential analyses. Descriptively, we report means, standard deviations, and score distributions for each group. For inferential testing, we assessed normality using the Kolmogorov–Smirnov (K–S) test and homogeneity of variance via Levene's test. Given K–S $p > 0.05$ for both groups (normality retained) and Levene's $p = 0.183$ (homogeneous variances), we proceeded with the independent-samples t-test for the difference in means. Analyses were performed in SPSS v26. To strengthen internal validity, we triangulated quantitative results with observational notes and teacher interviews about engagement and perceived learning.

3. FINDINGS AND DISCUSSION

Descriptive analysis indicates a clear performance gap favoring the e-book group. The experimental group (e-book) achieved an average score of 88.03 with $SD = 2.12$, whereas the control group (no e-book) recorded a mean of 73.89 with $SD = 5.93$. The mean difference of 14.14 points is substantial on a 25-item multiple-choice scale, especially considering the relatively small dispersion in the experimental group. At the distribution level, scores for the e-book class clustered tightly around a high mean, while the control class exhibited broader variability and a lower central tendency.

Assumption checks confirmed the suitability of the planned parametric test: K–S normality was satisfied for both groups ($p > 0.05$), and Levene's test indicated equal variances ($p = 0.183$). The independent-samples t-test revealed a t-value of 13.89 with $p = 0.000$, demonstrating a highly significant difference between groups. Taken at face value, these findings support the claim that using e-book media had a statistically significant positive effect on student learning outcomes.

To add interpretive context, we derived illustrative effect sizes from the reported means and standard deviations. The pooled standard deviation is approximately 4.43, yielding a Cohen's $d \approx 3.19$ and Hedges' $g \approx 3.16$ —both indicating an extremely large effect. The standard error for the mean difference is about 1.05, producing an approximate 95% CI for the difference of [12.05, 16.23] points. Using the relationship $\eta^2 = t^2 / (t^2 + df)$, the proportion of variance explained by treatment is roughly 72% ($\eta^2 \approx 0.72$) under $df = 71$. While the small discrepancies between the t we inferred from summary statistics (≈ 13.5) and the reported $t = 13.89$ likely reflect rounding or pooled vs. Welch corrections, the overall picture is consistent: the magnitude of the e-book effect is not only statistically significant but educationally large.

Interpretation. On learning tasks that combine conceptual understanding with applied judgment (e.g., choosing communication strategies, structuring messages, assessing audience needs), the e-book likely conferred advantages by (a) embedding multimedia demonstrations that make abstract rules visible; (b) scaffolding practice through formative checks and instant feedback; and (c) enabling self-paced review, which can be especially beneficial when students differ in prior knowledge. The tight score dispersion in the e-book group ($SD = 2.12$) suggests not only that the average learner improved but also that performance became more consistent across students, a hallmark of equitable learning support.

The qualitative strand provides convergent evidence. Classroom observations and teacher interviews indicated that students using the e-book were more engaged: they participated more frequently in discussions, completed tasks more promptly, and continued engaging with materials outside class time. Teachers attributed this to the interactive design of the e-books—videos, animations, and embedded quizzes kept attention and created micro-cycles of practice that reinforced learning. Teachers also noted that the e-book's intuitive navigation lowered access barriers; students could jump to needed sections without losing track of the lesson's flow.

Students reported that the e-books were more engaging than printed textbooks and appreciated being able to access content anytime. The multimedia content helped them grasp complex or subtle concepts, especially those requiring situational interpretation (e.g., tone in a complaint letter, selecting the right channel for a sensitive message). Many described the benefit of learning at their own pace—replaying a video demonstration, revisiting an explanation, or practicing through quizzes—features they felt traditional formats could not match. These reports align with the broader literature that interactive multimedia can enhance motivation, engagement, and comprehension (Handayani & Haryanto, 2022), particularly in settings where skill transfer is critical.

Beyond raw achievement scores, the e-book appeared to strengthen motivational dynamics. Motivation matters because it governs time-on-task, persistence, and willingness to practice—all key drivers of durable learning. E-books can enhance motivation by offering immediate feedback, varied representations of content, and a sense of control over pacing and sequencing. In vocational contexts, these features close the gap between “knowing” and “doing,” inviting students to simulate real-world episodes (e.g., handling complaints, pitching a proposal) through embedded scenarios, role-plays, and adaptive quizzes. For Business Communication, where contextual nuance is decisive, the opportunity to rehearse with feedback in a low-stakes environment can be transformative.

The findings echo principles of multimedia learning and active processing: when text is complemented by dual-channel inputs (visual and auditory), well-designed media can reduce extraneous load and enable learners to allocate more cognitive resources to germane processing—connecting new ideas to prior knowledge, building schemas, and planning actions. The self-pacing afforded by e-books also supports metacognitive regulation: students can monitor understanding, decide when to slow down, and seek clarification proactively, which is especially valuable for heterogeneous classes.

The results sit comfortably within constructivist learning theory, which posits that learners actively construct knowledge through engagement, exploration, and reflection (Piaget in Santrock, 2020). E-books facilitate such active construction by prompting learners to manipulate representations (e.g., click-through examples), answer embedded questions, and apply rules to realistic cases. In doing so, they transform reading from a passive uptake of information into a sequence of actions and decisions—precisely the kind of cognitive activity that supports transfer

The outcomes also align with the principles of personalized learning. By allowing students to control pace and sequence, e-books cater to individual differences in prior knowledge and processing speed—factors especially salient in vocational classrooms, where learners arrive with varied backgrounds. Personalized pacing helps ensure that weaker students consolidate foundational concepts before moving on, while stronger students are not held back, enhancing efficiency for the whole class.

Taken together, the statistical evidence (large mean difference, robust significance, very large effect size) and the qualitative accounts (higher engagement, better access, perceived clarity and usefulness) yield a coherent causal narrative: the e-book medium improved learning outcomes because it changes how students learn (more active, more feedback, more situated) and how teachers teach (more examples, easier differentiation, more formative checking).

While quasi-experimental designs caution against over-strong causal claims, the convergence across data types bolsters the credibility of the conclusion.

The use of e-books has proven effective in the context of Business Communication learning because it addresses two main needs: mastering principles and applying them in real-life situations. E-books allow for layered presentation of content—ranging from conceptual explanation, case illustrations, to applied examples—all within a single medium. For instance, students can watch a short video demonstrating how a poorly framed message can escalate conflict, then read an annotated version of the revised message, and finally complete a short quiz with immediate feedback. This integration of explanation, demonstration, and practice is difficult to achieve with static text alone. Furthermore, e-books allow teachers to conduct formative assessments directly within the same learning environment. Embedded checks quickly provide data on student difficulties—such as tone selection or clarity of subject lines. This information helps teachers adjust their instruction accordingly—through reteaching, micro-lessons, or short-term group formations—based on real evidence, not guesswork.

In the context of vocational education, the use of e-books aligns closely with its core goal: skill transfer to the workplace. E-books can simulate authentic workplace scenarios such as composing a response to an unhappy customer or preparing a brief for a supervisor. This supports the level of authenticity demanded by vocational standards. Additionally, flexible access is a key strength: students on internships or job placements can revisit relevant modules as needed in real-time application. This supports the principle of learning-in-use, as opposed to learning for its own sake.

Common concerns regarding digital media—such as the potential to distract or overwhelm learners—can be addressed through high-quality design. In this study, the e-book was designed with clarity and structure in mind, offering short, focused segments with embedded guidance rather than excessive multimedia. Notably, the experimental group showed reduced score variability, indicating that well-designed e-books can help level the playing field by making core explanations and support consistently available—even beyond what a teacher can provide during class time.

From a methodological standpoint, the strength of this study lies in its convergent design, combining quasi-experimental comparison with classroom observations and teacher interviews. The high reliability of the test instrument ($\alpha = 0.89$) shows that the measured outcomes reflect genuine learning differences. Assumptions for the t-test were satisfied, and the effect size is educationally significant. However, since the design involved nonequivalent groups, there remains a risk of uncontrolled external factors—such as baseline differences or

teacher effects. The researchers mitigated this risk by selecting classes with similar characteristics and teaching the same unit in the same school context. To reduce potential bias from self-reported student perceptions, these were triangulated with behavioral indicators (e.g., participation, task completion) and objective test results.

For schools considering e-books in vocational subjects like Business Communication, several practical recommendations emerge from this study. First, design e-books to promote action: emphasize worked examples, micro-tasks, and scenario-based exercises. Multimedia should clarify and prompt engagement—not merely serve as visual decoration. Second, embed formative checks such as short quizzes with instant feedback to detect misconceptions early and reteach promptly. Third, support self-paced learning by encouraging students to set micro-goals and track their progress, with guidance on when to revisit specific segments. Fourth, invest in teacher capacity by providing professional development on interactive e-book content design, managing data from embedded assessments, and balancing whole-class with individualized support. Finally, ensure supporting infrastructure such as reliable devices, stable internet access, and technical assistance so that the e-book experience is seamless and predictable.

4. CONCLUSIONS

The study provides clear empirical evidence that e-book learning media can significantly improve student learning outcomes in Business Communication at SMK PGRI 1 Jombang. Quantitatively, the experimental group using e-books achieved a mean score of 88.03 (SD = 2.12) versus 73.89 (SD = 5.93) in the control group, a difference of 14.14 points. Tests satisfied assumptions of normality (K-S, $p > 0.05$) and homogeneity of variance (Levene, $p = 0.183$), and the independent-samples t-test detected a highly significant difference ($t = 13.89$, $p = 0.000$). Derived descriptors point to an extremely large effect (Cohen's $d \approx 3.19$, Hedges' $g \approx 3.16$; 95% CI for the difference $\approx [12.05, 16.23]$; $\eta^2 \approx 0.72$). Qualitative data corroborate the statistics: teachers observed greater engagement, more timely assignment completion, and sustained interaction with content; students described the e-books as more engaging and flexible, highlighting multimedia explanations and the ability to learn at their own pace. These findings have practical implications for vocational education. They suggest that digital media—when designed for interaction, authenticity, and feedback—can bolster both achievement and motivation while nurturing digital literacy and self-regulated learning. To realize these benefits at scale, schools should invest in infrastructure (devices, connectivity), professional development (for e-book pedagogy and assessment), and iterative design cycles

(continuous improvement based on usage data). Policymakers can support by providing funding, training programs, and implementation guidance tailored to vocational subjects and local needs.

More broadly, the study adds to the literature by demonstrating that technology-enhanced learning can be effective in vocational contexts that require situational application, not just declarative knowledge. It also shows that gains are likely when e-books are used as learning environments, not just digital replicas of print. Future research should examine longitudinal effects (retention, transfer to workplace performance), explore moderators (e.g., prior knowledge, teacher experience), and compare design variants (e.g., different feedback modes, adaptive sequencing) to identify the most cost-effective and scalable approaches. In conclusion, when thoughtfully designed and properly supported, e-books provide a compelling alternative to traditional materials in vocational education. They raise achievement, increase engagement, and equip students with the digital competencies essential for modern workplaces. For Business Communication at SMK PGRI 1 Jombang, the evidence indicates that e-books are not merely a convenient format—they are a powerful pedagogy.

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