

# Multiliteracy-Based Differentiated Instruction for Language Learning in the Center of Excellence Vocational High Schools

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## Abstract

Multiliteracy-based differentiated instruction has gained importance as an approach to address diverse learning needs, particularly in vocational education settings where students benefit from tailored content that aligns with their learning styles and competencies. This study explores how multiliteracy-based differentiated instruction impacts students' engagement and multiliteracy skills at Center of Excellence Vocational High Schools in the Special Region of Yogyakarta, Indonesia. A qualitative case study design was employed, with data collected through documentation, observations, and interviews. Data were analyzed using an interactive model that included data condensation, display, and verification. The findings reveal that introducing digital content and platforms, such as e-books, laptops, and multimedia resources, significantly enhances student engagement and multiliteracy when used alongside diagnostic assessments and personalized feedback mechanisms. However, issues related to device compatibility and network access present barriers to optimal learning experiences. The findings indicate that enhancing technology infrastructure and implementing continuous teacher training is crucial to fully actualize the advantages of multiliteracy-based differentiated instruction. This approach holds significant implications for vocational education, as it equips students more effectively to meet the demands of an increasingly digitized workforce. Future research should investigate the long-term impacts of these methods on student achievement and explore the role of institutional support in sustaining effective instructional practices.

**Keywords:** Center of Excellence, differentiated instruction, language learning, multiliteracy, vocational high school

## 1. Introduction

Language students in Indonesia come from diverse social, cultural, linguistic, religious, and economic backgrounds, enriching the educational environment (Hasanah et al., 2022). This diversity results in varied learning preferences, as each student brings unique interests, readiness levels, and learning needs. Educators can optimize student potential by using differentiated instruction and tailoring teaching methods to meet these diverse needs (Magableh & Abdullah, 2020). Differentiated instruction addresses classroom diversity by accommodating different learning styles and paces (Ginting et al., 2024).

In language classrooms, differences in language proficiency, learning styles, and cultural backgrounds necessitate differentiated instruction (Cahyono et al., 2023). This approach involves adapting curriculum objectives, teaching strategies, resources, and activities to align with each student's learning needs, fostering meaningful learning (Kahmann et al., 2022). As standardized instruction's limitations become apparent, differentiated instruction gains popularity, enhancing student engagement and academic performance (Astuti & Afendi, 2022; Kahmann et al., 2022; Rafi & Pourdana, 2023; Sofiana et al., 2024).

Vocational high schools in Indonesia aim to equip students with employability skills crucial for competing in the global market, yet graduates often struggle in the job market (Aryani & Fanisyah, 2024). The government launched the Center of Excellence Vocational High School Program (*SMK PK*) through Decree No. 17/M/2021 to address this issue, emphasizing a student-centered curriculum tailored to Industry 4.0 needs (Kemdikbud, 2021). However, student engagement remains a challenge, particularly in terms of writing skills (Amaliyah, 2021). Integrating digital platforms into learning may help overcome these issues, as Gen Z students prefer online engagement (Ciekurs et al., 2022; Demir & Sönmez, 2021; Herlina et al., 2023; Kravalis et al., 2021; Lesinskis et al., 2023). Despite these efforts, language learning remains challenging due to an unsupportive environment and irrelevant materials (Gironkina et al., 2023; Rochmiyati et al., 2022; Widiastini et al., 2023). Multiliteracy, which includes various communication modes like audio and visual, offers a solution (Lisenbee et al., 2020). However, the transition from traditional literacy to multiliteracy is challenging due to differences between teachers and "digital native" students (Handrayani et al., 2024).

Multiliteracies, which involve communication with context, culture, and media (Rahman et al., 2022), can enhance learning outcomes in

EFL students from diverse backgrounds (Huh & Tseng, 2022). This approach aligns with modern education goals, preparing students for a digital and globalized world (Dewi et al., 2023). Although numerous studies have explored differentiated instruction concept (Cahyono et al., 2023; Hasanah et al., 2022; Kahmann et al., 2022), principles (Maruf, 2023; Sofiana et al., 2024; Wote & Sabarua, 2020), implementation across different levels and subjects (Astuti & Afendi, 2022; Barlian et al., 2023; Fatmawati et al., 2023; Gheysens et al., 2020), and impact on student engagement and achievement (Jufrianto et al., 2023; Kamal, 2021; Rafi & Pourdana, 2023), studies on multiliteracy-based differentiated instruction in Indonesian vocational schools are limited. Therefore, the present study aimed to investigate its implementation and achievements in multiliteracy at Center of Excellence Vocational High Schools. The research questions guiding this study are:

- 1) What are the forms of multiliteracy-based differentiated instruction applied in the Center of Excellence Vocational High Schools?
- 2) How do students achieve multiliteracy through differentiated instruction in the Center of Excellence Vocational High Schools?

## 2. Literature Review

### 2.1 Differentiated Instruction

Differentiation addresses students' diverse needs, requiring teachers to cater individually (Deunk et al., 2018; Reis & Renzulli, 2018; van Geel et al., 2019). It offers varied learning options, allowing students to learn deeply without a uniform trajectory (Tomlinson, 2014). Research shows differentiated instruction improves academic performance (Smale-Jacobse et al., 2019; Valiandes, 2015), addressing students' readiness, interests, and learning profiles. However, it does not mean treating students differently or categorizing them by intelligence (Sofiana et al., 2024) but providing multiple ways to acquire and process content (Crim et al., 2013). Santangelo and Tomlinson (2012) outlined a differentiated instruction framework with four components: learning environment, content, process, and product, based on Tomlinson's (2001) theory.

*The learning environment* refers to the physical, social, and emotional context of learning (Santangelo & Tomlinson, 2012), including classroom climate, student cooperation, and interaction (Sofiana et al., 2024). In differentiated instruction, teachers create a supportive environment that caters to diverse needs and interests (Sofiana et al., 2024). Effective differentiation requires deep subject knowledge and an understanding of students' characteristics (Valiandes, 2015). The environment should accommodate differences in readiness, learning styles, interests, prior knowledge, socioeconomic status, and social skills (Valiandes, 2015). A supportive school climate and resources are crucial for successful differentiation, with leadership playing a key role (Roy et al., 2013).

*Content* involves the subject matter and presentation methods (Santangelo & Tomlinson, 2012). Differentiated content aligns with students' prior knowledge and abilities (Tomlinson, 2001). While the material is the same, learning processes vary based on skills. Differentiated instruction enhances student aptitude and acceptance of individual differences (Taylor, 2017; Tomlinson, 2001). Teachers use various texts, materials, and resources to differentiate content (Sofiana et al., 2024), offering diverse learning methods and assessments (Sofiana et al., 2024). However, secondary schools often overlook student choice in information handling (Antelm-Lanzat et al., 2020; Sayed et al., 2024).

*Process* describes how students understand and absorb lessons involving diverse learning experiences (Santangelo & Tomlinson, 2012; Tomlinson, 2001) and digital literacy (Mohammadyari & Singh, 2015; Sofiana et al., 2024). Students choose subject matter, learning approaches, and assessments tailored to their styles. Authentic teaching methods incorporate meaningful materials (Lawrence-Brown, 2004). Teachers assess progress and needs using data from various sources (Chapman & King, 2005), aiming to boost motivation, engagement, and effective learning (Astuti & Afendi, 2022).

*Product* relates to how students demonstrate understanding. Teachers offer various assessment options, such as project proposals, portfolios, and presentations (Santangelo & Tomlinson, 2012; Sofiana et al., 2024; Tomlinson, 2001). Santangelo and Tomlinson (2012) stress the importance of assessing students' learning preferences, abilities, and attitudes. "Readiness" refers to students' willingness to engage, ensuring appropriate and challenging instruction. Interests can boost motivation and engagement, leading to deeper learning, while learning profiles reflect preferred styles, allowing educators to adjust methods accordingly.

### 2.2 Multiliteracy

Multiliteracy involves engaging with texts in diverse ways, often requiring digital skills (Lim et al., 2022). It includes acquiring, understanding, creating, displaying, and evaluating information using various tools across contexts (Kangas & Rasi, 2021). Teachers can use different media to support diverse learning styles, allowing students to learn from both print and digital sources. Multimodal skills, which extend beyond linguistic abilities, are crucial in education and more complex than traditional literacy (García-Barroso & Fonseca, 2023; Ollonen & Kangas, 2024). Multiliteracies blend audio, visual, and spatial modalities, helping students adapt to workplace, community, and cultural contexts (García-Barroso & Fonseca, 2023). Teachers can teach literacies related to students' culture and interests, such as visual, audio, and audiovisual.

Language multiliteracy includes reading, writing, speaking, and listening, which are increasingly important in communication and IT (Lestari et al., 2024). Six key literacy types are reading and writing, numeracy, science, digital, financial, and cultural literacy (Ilomäki et al., 2016; Zheng et al., 2018). This concept is essential for enhancing literacy skills (Arwita et al., 2022; Iskandar et al., 2022). Multiliteracy learning contrasts with multi contextual learning, which integrates various contexts or subjects and incorporates multimedia approaches and cultural dimensions (Arwita et al., 2022; Imran et al., 2021). New technologies have reshaped literacy and communication,

where written language is now just one mode of communication (Langum & Sullivan, 2020). In multiliteracy instruction, students engage with texts and other media like images, audio, video, and interactive content, aligning with the *Merdeka* curriculum for Indonesian language learning (Çetin, 2021; Kaufmann, 2018).

Interactive digital media enhances students' language skills by combining audio and visual elements (Husna & Fajar, 2022; Praheto et al., 2020). Students learn phonation, colors, numbers, and discourse through media, with guidance from parents, teachers, and the environment in nurturing these abilities (Addi-Racah et al., 2018; Soriano et al., 2020). Exposure to diverse language inputs fosters the acquisition of phonology, vocabulary, and grammar (Al-Sobhi, 2019; Fitriyani et al., 2019).

### 2.3 The Center of Excellence Vocational High School

The Center of Excellence Vocational High School program is an innovative approach focusing on competence, character, and work ethic, aligning with the Pancasila learner profile. The program addresses community needs and supports regional development (Sunawardhani & Casmudi, 2022; Wibowo et al., 2022). It aims to enhance educational quality and strengthen ties between schools and the business sector by offering relevant materials for future work (Annisa et al., 2023; Basuki et al., 2021). Collaboration with businesses and industry stakeholders is crucial for developing personalities and skills that align with student profiles and meeting the business world's and society's demands. The program emphasizes cooperation between business partners and schools to create a business-oriented curriculum (Wahjusaputri et al., 2024). This approach equips students with the skills and readiness to excel in the evolving technological landscape (Basuki et al., 2021; Prianto et al., 2021).

At these schools, classes are divided into two categories: productive classes, focusing on vocational material, and normative or general classes, including subjects like mathematics, Indonesian, English, history, and religion (Tamtomo, 2018). Language skills in Indonesian and English are essential components of the general curriculum and crucial for effective communication. Non-vocational teachers support language development tailored to students' vocational interests and industry requirements (Sunawardhani & Casmudi, 2022). Graduates will be well-prepared to meet industry needs, open job opportunities, or pursue higher education.

## 3. Method

### 3.1 Research Design

This study adopted a case study design to examine and elucidate the implementation and effects of multiliteracy-based differentiated instruction in vocational high schools. According to Yin (2015), a case study is an empirical approach that investigates a contemporary phenomenon within its real-world setting, particularly useful when the boundaries between the phenomenon and context are ambiguous. Case studies are ideal for probing complex issues in depth, especially when multiple sources of evidence are needed. A multiple-case study approach was selected to thoroughly understand the phenomenon in distinct educational contexts, encompassing three vocational high schools participating in the Center of Excellence program in Yogyakarta, Indonesia. Merriam (2009) highlights that multiple-case studies facilitate comparative analysis by examining various cases within a single study, allowing researchers to observe how a phenomenon functions across different settings or groups and to identify recurring patterns, themes, and variations. Through this comparative framework, researchers can generate richer and potentially more generalizable findings. This approach comprehensively examined how differentiated instruction, customized to address diverse student needs and vocational skills, influences student engagement and multiliteracy development.

### 3.2 Research Sample

To achieve a representative sample, participants were purposely selected according to skill competencies, geographic regions, and institutional types (public/private) in line with the study's objectives. The purposive sampling technique facilitated deliberate selection based on specific criteria (Yin, 2015). This research centered on multiliteracy-based differentiated language instruction within the Center of Excellence Vocational High Schools. In this study, 96 students and three teachers from three schools were observed to gain insights into the implementation of multiliteracy-based instruction across three vocational high schools in Yogyakarta. The three schools included SMK Muhammadiyah 3 Yogyakarta, a private institution in Yogyakarta City with a specialization in electrical power installation; SMKN 1 Godean in Sleman Regency, a public school focused on visual communication design; and SMKN 3 Kasihan in Bantul Regency, a public school specializing in animation. These schools were chosen to represent a diverse yet comparable sample within the context of vocational education focused on multiliteracy-based differentiated instruction. One class from each school was selected for observation, comprising 31 students from SMK Muhammadiyah 3 Yogyakarta, 32 students from SMKN 1 Godean, and 31 students from SMKN 3 Kasihan. These schools, located in three out of the five regencies in the Special Region of Yogyakarta, represent a variety of vocational competencies and institutional contexts. Despite their distinct areas of specialization, these schools share a commitment to implementing multiliteracy principles within vocational school, offering a comprehensive view of how multiliteracy-based instruction is applied across different fields and institutional types. This selection allowed for insights into both shared and unique approaches within public and private settings, providing a representative snapshot of vocational high schools in Yogyakarta. For in-depth insights, interviews were conducted with a subset of participants: three teachers (one from each school) and six students (two from each school), allowing for a deeper exploration of individual perspectives and experiences related to multiliteracy-based learning. The details of the research sample are presented in Table 1 below.

Table 1. Research sample

Schools	Teachers	Students	Gender	
			Female	Male
SMK Muhammadiyah 3 Yogyakarta	1	31	0	31
SMKN 1 Godean	1	32	32	0
SMKN 3 Kasihan	1	31	19	12
Total	3	94	51	

3.3 Data Collection Tools and Instruments

To ensure the credibility and validity of the findings, a triangulation method was employed by combining observations, interviews, and documentation, with each method rigorously executed to cross-validate information within itself. Data was collected during October 2023. Observations focused on classroom activities and technology use, specifically digital content and its alignment with multiliteracy principles. In writing lessons, students were offered instructional content through YouTube or PowerPoint presentations, with all opting for YouTube. This process facilitated visual and auditory literacy development via multimedia content, enhancing engagement. Interviews were semi-structured, targeting teachers' understanding of multiliteracy-based differentiated instruction and students' learning experiences. The interview sample included three teachers (one from each school) and six students (two from each school), offering in-depth insights into their understanding and experiences with multiliteracy-based instruction. This approach enabled cross-checking of responses across participants, helping to identify consistent themes and reduce potential biases. Additionally, documentation through Padlet assessments, student submissions, Spotify listening materials, and reading texts on Google Sites was thoroughly examined, providing a reliable record of student engagement and progress. Below is the observation grid table.

Table 2. Observation grid

Aspects	Indicators
Core learning process	<ul style="list-style-type: none"> <li>a. Use of learning resources</li> <li>b. Language practice</li> <li>c. Utilization of media (visual, audio, and audiovisual)</li> </ul>
Supporting learning facilities	<ul style="list-style-type: none"> <li>a. Ownership of mobile devices</li> <li>b. Proficiency in operating mobile devices</li> </ul>

The interviews were conducted using an open-ended format, focusing on questions related to the "what," "why," and "how" of the topics under investigation. Specifically, the students were asked about their language learning experiences, their teachers' understanding of multiliteracy-based differentiated instruction, and the availability of supportive learning facilities. The interview grid used in this study is outlined below.

Table 3. Interview grid

Aspects	Indicators
Teachers' understanding of differentiated instruction and multiliteracy	<ul style="list-style-type: none"> <li>a. Teachers' understanding of students' readiness, interests, and learning profiles</li> <li>b. Integration of written (visual) and audiovisual materials</li> <li>c. Utilization of diverse learning resources</li> </ul>
Supporting learning facilities	<ul style="list-style-type: none"> <li>a. Ownership of mobile devices</li> <li>b. Proficiency in operating mobile devices</li> </ul>

The data collected through various techniques mentioned previously were then validated to enhance the validity of the findings, using method and source triangulation techniques (Miles et al., 2014).

3.4 Data Analysis

The data were analyzed using an interactive model of data analysis technique (Miles et al., 2014), including the components of data collection, data condensation, data display, and conclusion drawing/verification. During the data condensation stage, the data obtained from observations, interviews, and documentation were sorted, organized, and analyzed. Key points related to the practice of differentiated instruction and the achievement of multiliteracy were identified and analyzed. The multiliteracy achievement was derived from analyzing learning outcomes (listening, reading, and writing). The data were then presented in the form of representative excerpts from interviews, tables, and figures, which were subsequently discussed in relation to various relevant theories. The figure below briefly illustrates the data analysis process.

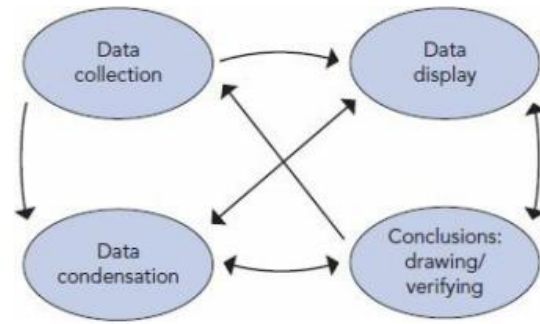


Figure 1. Interactive model of data analysis (Miles et al., 2014)

**4. Results and Discussion**

*4.1 Forms of Multiliteracy-Based Differentiated Instruction Applied in the Center of Excellence Vocational High Schools*

To facilitate a clear understanding of the detailed descriptions that follow, the conceptual table below was created by the researchers to provide a structured overview of the forms of multiliteracy-based differentiated instruction applied in the Center of Excellence Vocational High School, organized according to the four key components of differentiated instruction as proposed by Santangelo and Tomlinson (2012): learning environment, content, process, and product.

Table 4. Key components of multiliteracy-based differentiated instruction in the Center of Excellence Vocational High Schools

No	Components of Multiliteracy-Based Differentiated Instruction	Description	Supporting Evidence/Examples
1.	Learning Environment	The integration of technology in the classroom and the use of both print and electronic materials to create an inclusive environment.	a. Teachers encouraged the use of electronic books for their practicality. b. Teachers used laptops for multimedia presentations with diverse forms of content, including visuals, text, and audio, which helped students develop skills in interpreting information across multiple formats. c. All students had access to mobile devices.
2.	Content	Customizing learning materials to align with students' vocational competencies, interests, and varying learning styles.	a. Reading materials tailored to students' chosen fields. b. Use of multimodal content like audiovisual materials and learning videos. c. Texts adjusted to specific vocational skills.
3.	Process	The use of diagnostic assessments to tailor the learning process and ongoing feedback to guide and improve student outcomes.	a. Diagnostic assessments identified student strengths and weaknesses. b. Teachers provided immediate feedback on writing assignments. c. Use of multimodal content to accommodate different learning styles.
4.	Product	Encouraging students to produce work that reflects their understanding and aligns with their personal interests and vocational goals.	a. Students chose writing topics based on interests. b. Projects and assignments were relevant to vocational skills, enhancing engagement. c. Use of audiovisual products like learning videos.

Differentiated instruction in language subjects was evident in both learning materials and activities. Teachers used government-issued textbooks, both print and electronic, as primary teaching resources. Younger teachers preferred electronic books for their practicality, as depicted in the following excerpts.

*"I always encourage students to use the electronic version of the book because it's practical and accessible on smartphones." (Teacher 2)*

*"Using electronic books eliminates excuses like 'forgetting to bring books' since everyone carries smartphones." (Teacher 3)*

These excerpts highlight technology's role in differentiated instruction, ensuring continuous material access and addressing physical book issues. However, some teachers still preferred printed books.

*"I used to use e-books, but it was uncomfortable because the text was too small, and I'm not used to reading material digitally." (Teacher 1)*

The excerpt highlights a teacher's discomfort with e-books due to small text size and unfamiliarity with digital reading, indicating challenges in adapting to digital tools. Despite this, all teachers and students now have mobile devices, with some bringing laptops or tablets to class. Teachers used laptops to enhance learning with materials like PowerPoint presentations. At the start of the school year, a diagnostic assessment was conducted to determine students' competencies, strengths, weaknesses, and interests. This type of assessment

helps teachers design tailored learning experiences. Since students have different interests and competencies, teachers must create customized materials and media to foster a comfortable and effective learning environment. The following are some insights from teachers and students.

*"Every student is unique, and teachers must understand the characteristics of each student to design learning that helps them achieve their goals and creates a fun learning experience." (Teacher 2)*

*"The readings presented need to be adjusted to the competencies of the expertise they have chosen, so teachers must prepare a variety of reading topics." (Teacher 1)*

*"I am happier when the reading material aligns with the competence of my chosen field, as it adds insight relevant to the productive material." (Student 1)*

The interview excerpt highlights that at the Center of Excellence Vocational High Schools, learning is student-centered, with education tailored to each student's needs. The curriculum is aligned with students' vocational competencies to ensure relevance and engagement, leading to better learning outcomes. Likewise, the study's participants implemented differentiated instruction through adaptable teaching techniques, fostering a supportive environment that prioritizes students' needs and encourages individual achievements.

*"The material should not only be in written form; teachers should also consider presenting it in audiovisual formats or even record readings for the material." (Teacher 3)*

*"Now, I prefer to listen to the material through YouTube, although there are times when I still need further explanations from the teacher. I am happy when learning involves using a smartphone." (Student 2)*

The interview excerpts highlight that technology integration, multimodal content delivery, and student-centered learning are key at the Center of Excellence Vocational High School. To accommodate various learning styles, teachers provide materials in multiple formats, such as audio recordings and visual content. Students prefer accessing content via digital platforms like smartphones and YouTube, making technology integration a valuable approach. The goal is to create a more engaging educational experience.

Learning materials were offered through various media formats—oral, written, and audiovisual—via learning videos. Students could choose media that matched their learning styles for studying writing material. Before writing, students needed to understand text structure and examples. Teachers customized sample texts to suit students' skills and interests in areas like culinary arts, fashion, automobiles, design, animation, and hospitality. These texts also enhanced reading and listening skills. For instance, texts like "Kopi Jos" and "Javanese Beer" could deepen knowledge of traditional Yogyakarta drinks, while "Organizing Exhibitions," "Anne Avantie," "Chairul Tanjung," "Industrial Work Practices," and "Personal Protective Equipment" linked classroom content to industry and career relevance.

Lesson materials were provided in written and audiovisual formats, including videos. Teachers delivered information using visual and auditory methods. Students accessed teacher-selected digital texts and were encouraged to find additional ones that matched their interests. After reading or listening, students answered comprehension questions and submitted them digitally. Teachers reviewed these responses to gauge understanding and offer feedback. Before writing, students needed a solid grasp of text structure, with material available in both written form and videos on YouTube. Students were encouraged to select writing topics based on their interests, enhancing content relevance and motivation. However, common writing errors in grammar and typography often occur due to challenges in organizing coherent thoughts and structuring content (Wu et al., 2024).

The findings on differentiated instruction at the Center of Excellence Vocational High School align with modern digital-age education theories and Gen Z learning preferences. They emphasize using technology, such as e-books and digital platforms, highlighting Gen Z's need for a technology-driven learning environment for motivation. This approach addresses Gen Z's preference for digital over traditional methods (Demir & Sönmez, 2021). Progressive educational philosophies advocate for technology integration to create student-centered, individualized learning environments (Kaszynska, 2021). Teachers play a crucial role in promoting familiar technologies and ensuring access to digital resources, reflecting their commitment to inclusive education tailored to diverse learning styles. This approach aligns with differentiated instruction principles, adapting educational practices to students' varied needs (Babal et al., 2020; Hasanah et al., 2022).

Incorporating smartphones and e-books addresses issues like students forgetting physical books and improves access to learning resources. Gen Z's reliance on mobile phones supports technology-based learning (Tuan, 2021). Teachers who promote ebooks reinforce the practicality and accessibility of learning resources, evidenced by students' smartphone use. The findings also emphasize the importance of delivering content in multiple formats—written, spoken, and audiovisual—to support different learning styles, consistent with differentiated instruction theory (Kaval et al., 2022). The trend toward versatile content, including audiovisual materials like YouTube, suggests that platforms like YouTube offer innovative learning methods that enhance students' knowledge, understanding, and motivation (Kaval et al., 2022; Muslem et al., 2022). This approach is particularly effective for vocational students, providing content tailored to their studies and promoting self-directed learning (Godor, 2021).

Diagnostic assessment at the start of the school year is crucial for identifying students' strengths, weaknesses, and abilities, a core tenet of differentiated instruction (Junaidah et al., 2023). Understanding each student's needs is vital for creating personalized learning experiences that improve educational outcomes (Anggoro et al., 2024; Godor, 2021). By tailoring learning to these needs, teachers foster an environment that supports academic success and wellbeing, the ultimate goal of differentiated instruction (Anderson et al., 2022).

Additionally, immediate feedback on writing tasks is crucial for guiding revision, improving quality, and addressing common errors (Yuen et al., 2022; Saragih et al., 2023). Feedback from teachers and peers enhances idea refinement, improves writing skills, and encourages a cooperative learning environment (Mafulah et al., 2023; Nurkamto et al., 2024). This theory is based on the idea that prompt feedback allows students sufficient time to correct (Gorham et al., 2024).

4.2 Achieving Multiliteracy through Differentiated Instruction

To provide a clear understanding of the specific actions and experiences that contributed to students achieving multiliteracy through differentiated instruction, the following table outlines the key activities they engaged in throughout the learning process.

Table 5. Student activities in achieving multiliteracy through differentiated instruction

No	Student Activities	Details
1.	Engaging with digital platforms	Students accessed learning materials on YouTube and Spotify.
2.	Accessing multimodal content	Students were encouraged to use YouTube for entertainment and educational purposes, integrating videos and podcasts into their study routines.
3.	Using digital tools for learning	Students used Padlet to participate in class activities, submit work, and receive feedback.
4.	Providing feedback on learning tools	Students shared feedback about the Padlet usability, particularly the issues with older smartphones and network quality.
5.	Adapting to personalized learning	Students experienced personalized learning through customizable Padlet features, allowing them to work at their own pace and receive tailored feedback.
6.	Participating in assessments	Students took written tests and quizzes to demonstrate their understanding of the digital content they consumed, such as videos and podcasts.

Learning materials were delivered by the teachers through videos on platforms like YouTube, allowing students to access content at any time, complementing traditional classroom instruction. Accordingly, students were encouraged to use YouTube for entertainment and to enhance their learning experiences. Integrating podcasts and digital readings further created an engaging and dynamic learning environment. The following students' reflection highlights this experience.

*"When I listen to readings on Spotify, it doesn't feel like a traditional classroom setting, which makes me more comfortable since I use YouTube and Spotify almost every day." (Student 2 and Student 3)*

The excerpt highlights the importance of integrating familiar digital platforms like Spotify and YouTube into education. This strategy helps create a relaxed, engaging learning environment that aligns with students' daily lives, supporting digital literacy and multiliteracy. Teachers used various digital media to enhance digital literacy while addressing students' individual needs, fostering a comfortable and enjoyable learning atmosphere. Assessment was conducted through written exams with quizzes and descriptive tasks to evaluate students' understanding of the digital content. However, technological accessibility emerged as a significant concern among students.

*"When I use a Padlet on an older smartphone, it is difficult to open and operate, but it works smoothly on a newer smartphone. This affects my motivation to participate in learning." (Student 4)*

*"The network quality also impacts the ease of accessing Padlet." (Student 5)*

These excerpts highlight that students' engagement in multiliteracy activities heavily depends on technology accessibility. Differentiated instruction must address these challenges to ensure all students can fully participate. While device compatibility and network quality might affect motivation, teachers note that Padlet remains adaptable in such situations.

*"Padlet can be customized to meet individual needs, edited, and even deleted. Teachers can provide immediate feedback on students' work, and it can be used as a portfolio since entries can be stored." (Teacher 2 and Teacher 3)*

This excerpt highlights how Padlet excels in differentiated instruction by meeting students' needs, providing immediate feedback, and supporting ongoing assessment. It serves as a portfolio for student work, making it a valuable tool for improving multiliteracy through customized learning, immediate guidance, and continuous progress tracking. The study's findings align with previous research on Gen Z teaching strategies to enhance multiliteracy. Gen Z, accustomed to digital technology and platforms like YouTube and Spotify, find learning more engaging and improve their digital literacy through these familiar tools (Demir & Sönmez, 2021), supporting the theory that digital tools can enhance various learning types and promote multiliteracy (Aisyah et al., 2021).

Texts available in multiple formats, such as podcasts and digital readings, can enhance students' academic understanding and social interactions, particularly in a digital world (Besser et al., 2021). Studies by Lin and Huang (2024), Putri et al. (2021), and Zellatifanny (2020) show that educational podcasts, like those on Spotify, yield better learning outcomes compared to traditional classroom methods. The results highlight the importance of multimodal materials in supporting diverse teaching methods and promoting multiliteracy. However, some students struggled with using Padlet on older smartphones or in areas with poor connectivity, suggesting internet access issues. Studies indicate that digital tools require proper technical conditions to be effective in education (Kharis et al., 2020). While Padlet's customizable features can boost digital literacy, students need appropriate devices to use it effectively, as device incompatibility or connectivity issues can hinder learning (Kharis et al., 2020).

Despite technological challenges, recent studies demonstrate that Padlet is a valuable tool for enhancing literacy skills and accommodating different learning preferences. Padlet, a multifunctional portfolio tool, allows instant feedback and supports interactive learning (Lyn, 2022; Budiarti et al., 2022). Educators note that Padlet encourages active participation and continuous evaluation, both

critical for multiliteracy. These findings are consistent with research by Mahmud et al. (2023), Cerveró-Carrascosa et al. (2024), and Ying and Chandra (2023), which found significant improvements in students' collaboration, engagement, and language development, all key components of multiliteracy.

## 5. Conclusion

This study investigated the impact of multiliteracy-based differentiated instruction on students' engagement and multiliteracy skills in the Center of Excellence for Vocational High Schools. The findings indicate that presenting content in various formats and integrating digital platforms tailored to students' vocational skills and learning preferences significantly enhances both engagement and multiliteracy development. This approach aligns with the program's objectives, allowing teachers to effectively leverage physical and digital resources to meet diverse student needs. The study underscores the importance of customizing materials to students' cultural backgrounds, interests, and experiences, which fosters deeper engagement and learning satisfaction. Nevertheless, technological barriers such as device compatibility and network quality were observed to limit student motivation, highlighting the need for improved infrastructure.

The study's scope was limited to three vocational high schools in Yogyakarta, with a focus on language instruction, constraining the generalizability of its findings. Future research should provide a more comprehensive understanding of multiliteracy-based differentiated instruction, especially for language class such English or Indonesian in various schools as it is important to learn English or Indonesian for students in every school. While digital technology has proven essential in educational research, further focus on teacher training and the availability of resources is necessary to optimize this approach. Expanding the study's sample size and geographical range would enhance its rigor and applicability. Longitudinal studies examining the sustained effects on student achievement and research on educators' role in professional development, would contribute valuable insights. Addressing technological access issues, improving infrastructure, and ensuring all students have the necessary digital tools are critical. Furthermore, continuous teacher training is essential for effective technology integration and for fostering inclusive, multiliteracy-rich learning environments that support diverse learning needs.

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## Authors' contributions

Each author contributed significantly to the research's development and completion, bringing their specialized expertise and providing collaborative support throughout. Desy Rufaidah spearheaded the conceptualization, project management, and overall research direction, while also drafting and meticulously refining the manuscript. Andayani and Nugraheni Eko Wardani were instrumental in conducting formal analysis and designing the methodology, establishing a strong framework, and performing in-depth data analysis. They also contributed to the manuscript's drafting, revision, and supervision. Additionally, Desy Rufaidah supplied key resources and played an active role in the writing, reviewing, and editing processes, ensuring the final manuscript met high scholarly standards. The collective dedication of all authors, from the initial planning stages to the study's completion, was essential to its success.

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The authors confirm that there are no financial conflicts of interest or personal relationships that could have influenced the research presented in this paper.

## Informed consent

Obtained.

## Ethics approval

The Publication Ethics Committee of the Sciedu Press.

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## Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available



due to privacy or ethical restrictions.

#### Data sharing statement

No additional data are available.

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