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# The Effectiveness of Animated Video in Differentiated Learning on Students' Motivation and Arabic Learning Achievement



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***Abstract***

*This study aims to evaluate the effectiveness of animated video media within a differentiated learning framework in enhancing students' motivation and learning outcomes in Arabic at vocational high schools. Employing a quantitative quasi-experimental design with a pretest–posttest control group, the research involved 46 eleventh-grade students at SMKS Al-Ikhwaniyah, Tangerang Selatan. The experimental group received differentiated instruction supported by animated video media, while the control group was taught using conventional methods. Data were collected using achievement tests and motivation questionnaires based on the ARCS model (Attention, Relevance, Confidence, Satisfaction) and analyzed through descriptive and inferential statistics, including independent samples t-tests. The findings reveal that students in the experimental group demonstrated significantly greater improvements in both motivation and academic performance compared to the control group, with mean posttest gains of 18.4 and 9.2 points, respectively. Statistical analysis ($t = 9.394$; $p < 0.05$) and a large effect size (Cohen's $d = 0.71$) indicate a strong positive impact of the intervention. Notably, motivation increased across all ARCS dimensions, particularly in Attention and Confidence. In conclusion, the integration of animated video media into differentiated learning significantly enhances both cognitive and affective learning outcomes, suggesting its effectiveness as a pedagogical strategy for Arabic language instruction in vocational education contexts.*

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**Keywords**: *Animated video, Differentiated learning, Motivation, Learning outcomes, Arabic language.*

## Introduction

Arabic language learning in Vocational High Schools (SMK) faces significant challenges, particularly related to students' low motivation and learning achievement. Previous studies confirm that learning motivation positively influences students' academic performance, including in Arabic language learning. Moreover, students' diverse educational backgrounds—such as graduates from SMP, MTs, and pesantren—affect their learning readiness and outcomes. The ARCS model (Attention, Relevance, Confidence, Satisfaction) has been shown to improve motivation and learning achievement, while technology-based instructional strategies can further enhance students' engagement and performance.1 However, existing studies mostly focus on higher education or general subjects, with limited attention to vocational school contexts. In addition, the integration of animated video media within a differentiated learning framework remains underexplored, particularly in Arabic language instruction. Therefore, this study proposes the use of animated video media in differentiated learning to accommodate students' diverse needs and improve both motivation and learning outcomes in Arabic language learning at vocational high schools.2 External factors, especially parents' socioeconomic status, also contribute to these outcomes, where students from lower economic backgrounds tend to achieve lower academic results.3 Preliminary observations at SMKS Al-Ikhwaniyah, South Tangerang (2024), reveal that most students struggle to comprehend Arabic materials, display low learning interest, and obtain average scores below the Minimum Mastery Criteria (KKM).4 These conditions suggest that the existing learning strategies and media have not effectively accommodated students' diverse abilities, interests, learning styles, and individual needs.

Aligned with the demands of 21st-century education and the implementation of the Kurikulum Merdeka, teachers are required to adopt student-centered learning that responds to learners' individual characteristics. Tomlinson defines differentiated instruction as an approach that adjusts the content, process, and product of learning based

[1] Muhammad Idrus, *Motivation and Student Achievement in Arabic Language Learning* (Jakarta: UIN Press, 2025).
[2]Rina Febriani, "Pengaruh Latar Belakang Pendidikan terhadap Kesiapan Belajar Siswa," *Jurnal Pendidikan Islam* 12, no. 1 (2024): 45–60.
[3] Winarno Slamet, *Faktor Sosial Ekonomi dan Prestasi Belajar* (Bandung: Remaja Rosdakarya, 2010).
[4] Researcher's Preliminary Observation at SMKS Al-Ikhwaniyah, South Tangerang, 2024.

on students' readiness, interests, and learning profiles.5 This approach has been shown to enhance learners' engagement and achievement because it allows them to learn according to their preferred styles and pace.6

Advancements in educational technology further provide opportunities through the integration of audiovisual media, particularly animated videos. Mayer states that multimedia-based learning improves comprehension and retention by engaging visual and auditory channels simultaneously.7 Mahmuda highlights that animated video media can attract students' attention and foster more interactive and enjoyable learning experiences.8 Empirical findings from Lailaa (2025), Ainiyyah et al. (2023), and Isnaini et al. (2023) also demonstrate that animated videos significantly enhance students' motivation and learning outcomes in language learning contexts.9

Nevertheless, existing studies largely examine the general effectiveness of audiovisual media without linking it to differentiated instruction, especially within Arabic language learning in vocational settings. This gap requires scholarly attention, considering the heterogeneous readiness and learning preferences of SMK students, which demand adaptive and innovative pedagogical practices.10

In response to this gap, the present study investigates the effectiveness of animated video media within a differentiated learning framework in enhancing students' motivation and Arabic learning outcomes at the eleventh-grade level of SMKS Al-Ikhwaniyah. The novelty of this research lies in integrating two contemporary

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[5] Carol Ann Tomlinson, *The Differentiated Classroom: Responding to the Needs of All Learners* (Alexandria, VA: ASCD, 2014).
[6] Diane Heacox, *Differentiated Instruction in the Classroom* (Minneapolis: Free Spirit, 2012).
[7] Richard E. Mayer, *Multimedia Learning* (New York: Cambridge University Press, 2009).
[8] Siti Mahmuda, "Penggunaan Media Video Animasi dalam Pembelajaran," *Jurnal Teknologi Pendidikan* 20, no. 2 (2018): 112–125.
[9] Lailaa Hasanah, "Efektivitas Video Animasi dalam Pembelajaran Bahasa Arab," *Jurnal Izdihar* 5, no. 1 (2025): 22–35;
Ainiyyah, F., et al., "Animated Videos and Student Engagement," *Arabiyatuna* 7, no. 2 (2023): 88–102;
Isnaini, D., et al., "Pengaruh Video Animasi," *Jurnal PIBAB* 4, no. 3 (2023): 55–67.
[10] Hussein, A. & Sigas, G., "The Effectiveness of Audiovisual Media," *International Education Studies* 6, no. 4 (2013): 12–20;
Wahyuwati, S., "Media Audiovisual dalam Pembelajaran," *Jurnal Edukasi* (2020);
Prasetyo & Widodo, "Audiovisual Media in Language Learning," *Journal of Education Research* (2018).

pedagogical approaches—differentiated instruction and animated video media—within a vocational education context.[11]

This study is expected to provide theoretical contributions by strengthening scholarly discourse on differentiated learning in Arabic language education supported by animated video media. It also offers practical contributions in the form of a learning model that can assist Arabic language teachers in improving students' motivation and learning achievement more effectively and in alignment with the principles of the Kurikulum Merdeka.[12]

## Method

This design is particularly suitable in educational settings where random assignment is not feasible, allowing the researcher to examine the effect of an intervention within a real classroom context.[13] In quasi-experimental contexts, design validity often depends more on the research design than statistical adjustment.[14] In this study, non-randomized groups were measured before and after the intervention to assess the effect of animated video media in differentiated learning.[15]

The population for this research was all eleventh-grade students at SMKS Al-Ikhwaniyah in the 2025/2026 academic year. The sample was selected using a purposive sampling technique, in which participants were deliberately chosen based on relevant criteria such as curriculum similarity and academic readiness.[16] Purposive sampling is particularly useful when researchers need to ensure group comparability in quasi-experimental studies.[17] Two intact classes (Class XI A and Class XI B) were used as experimental and control groups, respectively.

To collect data, several complementary instruments were used: a learning outcomes test, a motivation questionnaire, and observation sheets. The motivation questionnaire was grounded in Keller's ARCS model (Attention, Relevance, Confidence,

[11] Study Context, "Animated Video Media in Differentiated Learning at SMKS Al-Ikhwaniyah," (2025).
[12] Ibid.
[13] T. Dicky Hastjarjo, "Rancangan Eksperimen-Kuasi" *Buletin Psikologi* 19, no. 1 (2019): 5–12.
[14] Donald T. Campbell and Julian C. Stanley, *Experimental and Quasi-Experimental Designs for Research* (Chicago: Rand McNally, 1966).
[15] Hastjarjo, "Rancangan Eksperimen-Kuasi," 7.
[16] Sugiyono, *Metode Penelitian Kuantitatif, Kualitatif, dan R&D* (Bandung: Alfabeta, 2019).
[17] Sugiyono, *Metode Penelitian*, 127.

Satisfaction).18 The instruments' content validity was established via expert judgment following best practices in educational research.19 Internal consistency was assessed using Cronbach's alpha, guided by Tavakol & Dennick's recommendations.20

The procedure consisted of three phases: preparation, implementation, and evaluation. Preparation involved the design of differentiated learning materials based on Tomlinson's differentiation principles (readiness, interests, learning profile).21 Instruments were validated through expert review.22 During implementation, the experimental group received differentiated instruction with animated video media, while the control group received conventional lecture-based teaching. Observation sheets were used throughout to track fidelity and classroom interaction. During the evaluation phase, both groups took a posttest, and the motivation questionnaire was re-administered to detect changes.

Data analysis included both descriptive and inferential statistics. Descriptively, means, standard deviations, and frequency distributions were computed. Inferentially, normality was tested using the Kolmogorov–Smirnov test, and homogeneity was checked with Levene's Test. Then, independent samples t-tests were conducted to compare group means.23 Finally, effect size was calculated using Cohen's d, with interpretation based on Cohen's criteria (small, medium, large).24

To evaluate this magnitude more precisely, Cohen's d was interpreted using the classifications proposed by Cohen (1988)—small (d = 0.2), medium (d = 0.5), and large (d = 0.8).25 However, recent literature highlights the contextual nature of these thresholds. Elsayir (2023), for example, argues that educational research may require

[18] John M. Keller, *Motivational Design for Learning and Performance: The ARCS Model Approach* (New York: Springer, 2010).
[19] Polit, Denise F., dan Cheryl Tatano Beck, *Nursing Research: Generating and Assessing Evidence for Nursing Practice*, 10th ed. (Philadelphia: Wolters Kluwer, 2017).
[20] Mohsen Tavakol dan Reg Dennick, "Making Sense of Cronbach's Alpha," *International Journal of Medical Education* 2 (2011): 53–55.
[21] Carol Ann Tomlinson, *How to Differentiate Instruction in Academically Diverse Classrooms*, 3rd ed. (Alexandria, VA: ASCD, 2017
[22] Polit dan Beck, *Nursing Research*, 150.
[23] Andy Field, *Discovering Statistics Using IBM SPSS Statistics*, 5th ed. (London: Sage, 2018).
[24] Jacob Cohen, *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed. (Hillsdale, NJ: Lawrence Erlbaum, 1988).
[25] Ibid.

more flexible cut-off points to ensure that effect-size interpretation aligns with sample characteristics and instructional interventions.26

The results of the data analysis were then interpreted to provide a comprehensive understanding of the intervention's impact. This interpretation aimed to evaluate the effectiveness of animated video media in differentiated learning and determine whether there were significant improvements in students' learning outcomes and motivation after the treatment. Additionally, the interpretation served as the basis for offering practical recommendations for instructional practice, ensuring that the developed strategies can be implemented more effectively and aligned with student characteristics. Consequently, the findings not only provide empirical evidence regarding the effectiveness of the intervention but also offer practical guidance for teachers in designing adaptive and differentiated instruction.

## Results and Discussions

The results indicate that the experimental group achieved significantly higher improvement in both learning outcomes and motivation compared to the control group, as reflected in mean posttest gains of 18.4 and 9.2 points, respectively. This difference is supported by statistical analysis ($t = 9.394$; $p < 0.05$) and a large effect size (Cohen's $d = 0.71$), confirming the strong impact of the intervention. These findings suggest that the integration of animated video media within a differentiated learning framework effectively enhances students' engagement and understanding of Arabic learning materials. The improvement may be attributed to the ability of animated media to capture attention and present content more clearly, while differentiated instruction accommodates students' diverse learning needs.

In addition, motivation increased across all ARCS dimensions, particularly in Attention and Confidence. These results are consistent with previous studies indicating that technology-based learning and motivational approaches, such as the ARCS model, positively influence student engagement and academic achievement. Therefore, this study not only confirms prior findings but also extends them by demonstrating the effectiveness of combining animated video media and differentiated learning in vocational school contexts.

[26] Elsayir, Khalid, "Effect Size Interpretation in Educational and Behavioral Research: Rethinking Conventional Thresholds," *International Journal of Educational Research Review* 8, no. 2 (2023): 152–160.

**1.** Comparison of Pretest and Posttest Results Experimental and Control Groups

Table 1. Pretest and Posttest Scores of Students in the Experimental Group

| No. | Name | Pretest Score | Posttest Score |
|---|---|---|---|
| 1 | Aksa Tri Ananda | 65 | 78 |
| 2 | Ahmad Faiz Uluddin | 60 | 78 |
| 3 | Ahmad Mujahid | 60 | 67 |
| 4 | Aji Muhammad Reza | 58 | 62 |
| 5 | Aura Dwi Aprilia | 54 | 60 |
| 6 | Aurel Tri Aprilia | 56 | 72 |
| 7 | Azka Hanifa Ramadan | 60 | 66 |
| 8 | Habil Putra Alfajr | 54 | 76 |
| 9 | Hikmal Hidayatullah | 50 | 74 |
| 10 | Ihsan Aththariq | 58 | 75 |
| 11 | Jenny Saina | 50 | 67 |
| 12 | Muhammad Dava Rabbani | 56 | 82 |
| 13 | Muhammad Dafi Azmi | 56 | 70 |
| 14 | Muhammad Ibrahim Zaidan | 54 | 82 |
| 15 | Muhammad Rafi Almir | 54 | 73 |
| 16 | Muhammad Rifan Alif | 56 | 62 |
| 17 | Ramadan Akbar Kah Firdaus | 54 | 76 |
| 18 | Rivina Nurlaila Bely | 54 | 72 |
| 19 | Rizky Ramadan | 46 | 74 |
| 20 | Sahand Gadis Augusta | 52 | 58 |
| 21 | Tsabit Priogi | 64 | 84 |
| 22 | Talita Ramadan | 58 | 63 |
| 23 | Triana Novita Sari | 54 | 64 |

Based on the data in Table 1, it is evident that the mean pretest score of the experimental class was 55.00, while the mean posttest score increased to 73.30. Thus,

there was an average increase of 18.30 points after the students received differentiated instruction supported by animated video media.

At the individual level, all participants showed score improvement, although the magnitude varied. The highest gains were observed in students such as Muhammad Dava Rabbani (from 56 to 82) and Muhammad Ibrahim Zaidan (from 54 to 82), who experienced increases of approximately 26–28 points. Meanwhile, the lowest gains occurred in students such as Aji Muhammad Reza (from 58 to 62) and Talita Ramadan (from 58 to 63), with increases of only about 4–5 points.

These variations indicate different levels of student response toward differentiated learning. However, the overall trend demonstrates a significant improvement in learning outcomes for nearly all participants. This finding aligns with the research of Rashid, Khanum, and Raheem (2024), which showed that animation-based learning positively influences students' achievement, attention, and retention compared to conventional methods.[27]

The average increase of 18.30 points demonstrates that animated video media have the potential to enhance students' understanding and engagement in learning Arabic. This is supported by Knapp et al. (2022), who found that animated instructional videos consistently improve conceptual understanding and learner engagement through dynamic and interactive visual presentations.[28]These results also align with Mayer's (2009) Multimedia Learning Theory, which asserts that the integration of text, images, and audio in instructional media strengthens information processing in long-term memory, thereby improving learning outcomes.[29]

According to Tomlinson (2014), differentiated instruction enables students with varying abilities, interests, and learning profiles to achieve learning goals more effectively through systematic adjustments in content, process, and product. [30] This principle is further supported by Hall (2023), who emphasized that differentiated

[27] Ayesha Rashid, Bushra Khanum, and Muhammad Raheem, "Effectiveness of Animation-Based Learning on Students' Academic Achievement and Retention at Secondary Level," *Journal of Education and Educational Development* 11, no. 1 (2024): 45–60, https://doi.org/10.22555/joeed.v11i1.987.
[28] Andrea Knapp et al., "Animated Videos as an Educational Tool: A Scoping Review," *Perspectives on Medical Education* 11, no. 3 (2022): 123–131, https://doi.org/10.1007/s40037-022-00701-z.
[29] Richard E. Mayer, *Multimedia Learning*, 2nd ed. (New York: Cambridge University Press, 2009), 57–85.
[30] Carol Ann Tomlinson, *The Differentiated Classroom: Responding to the Needs of All Learners*, 2nd ed. (Alexandria, VA: ASCD, 2014), 12–25.

instruction significantly increases student engagement, especially in digital learning environments. Moreover, Bal and Doğanay (2022) found that differentiated instruction substantially improves students' academic achievement and motivation across various educational settings. Together, these studies suggest that differentiated instruction, particularly when integrated with appropriate media, can greatly enhance students' motivation, participation, and learning outcomes.[31]

Thus, the empirical data indicate that the integration of differentiated instruction and animated video media is effective in improving Arabic learning outcomes in the experimental class. This reinforces the relevance of innovative multimedia-based approaches in vocational education contexts, where active engagement and strong visual learning experiences are essential.

**Table 2. Pretest and Posttest Results of the Control Class**

| No | Name | Pretest Score | Posttest Score |
|---|---|---|---|
| 1 | Avni Lurana Bahri | 52 | 80 |
| 2 | Ahmad Ghani | 54 | 62 |
| 3 | Ananda Shafa Nurani | 64 | 84 |
| 4 | Anisa Sintia Putri | 52 | 70 |
| 5 | Asyfa Ramdhani Putri | 48 | 70 |
| 6 | Audia Kirani Rahmanita | 60 | 50 |
| 7 | Ulfa Naila Izar | 56 | 58 |
| 8 | Alya Rizki Yasmin | 40 | 44 |
| 9 | Alya Syila Syufiya | 48 | 66 |
| 10 | Elisa Nur Anisa | 38 | 72 |
| 11 | Anisa Putri Akta Sari | 48 | 70 |

[31]Tobin L. Hall, "Differentiated Instruction and Student Engagement in Digital Learning Environments," *Journal of Educational Research and Practice* 13, no. 2 (2023): 88–104; M. P. Bal and A. Doğanay, "The Effects of Differentiated Instruction on Students' Academic Achievement and Motivation," *International Journal of Contemporary Educational Research* 9, no. 1 (2022): 175, https://doi.org/10.33200/ijcer.971972.

| | | | |
|---|---|---|---|
| 12 | Bella Navila Devi | 60 | 60 |
| 13 | Dian Aktasari | 62 | 66 |
| 14 | Velia Vanila Nova | 50 | 60 |
| 15 | Velia Nur Fitri | 50 | 76 |
| 16 | Viori Riviani | 54 | 76 |
| 17 | Hanifa Nur Almi | 60 | 60 |
| 18 | Hyanda Saraswati | 42 | 56 |
| 19 | Intan Diana | 60 | 72 |
| 20 | Inas Mariska | 48 | 70 |
| 21 | Irina Akta Sari | 56 | 66 |
| 22 | Nitria Fitriana | 46 | 66 |
| 23 | Shirley Febriani | 46 | 64 |

Based on the data in Table 2, the mean pretest score of the control class was 52.00, while the mean posttest score increased to 66.00. Thus, there was an average increase of 14.00 points after the learning process was carried out using conventional methods without animated video media.

Individually, most students showed an increase in their scores, such as Ananda Shafa Nurani (from 64 to 84) and Avni Lurana Bahri (from 52 to 80), who demonstrated substantial progress of 20–28 points. However, some students did not show significant improvement, and a few even experienced a decline in scores, such as Audia Kirani Rahmanita (from 60 to 50). This indicates inconsistency in learning gains within the control class, which relied on traditional teaching approaches.

Although the average gain of 14.00 points in the control class reflects a degree of learning improvement, this increase is lower than that of the experimental class, which recorded a rise of 18.30 points. This difference suggests that differentiated instruction supported by animated video media is more effective in improving learning outcomes than conventional teaching.

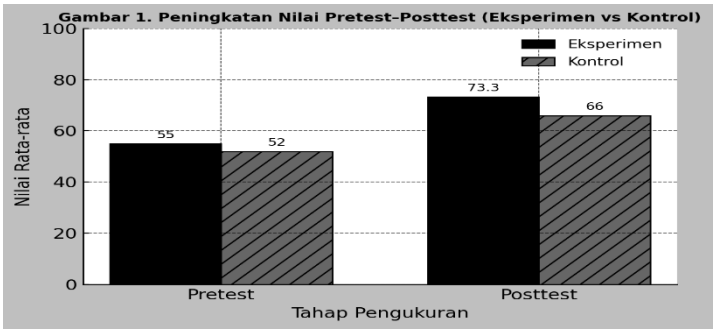
These variations indicate different levels of student response toward differentiated learning. However, the overall trend demonstrates a significant improvement in learning outcomes for nearly all participants. This finding aligns with the research on animation-based learning, which has been shown to positively influence achievement, attention, and retention.[32]

In the context of learning without interactive media, as observed in the control class, students tend to experience boredom and low engagement. Mayer's updated Cognitive Theory of Multimedia Learning (2021) highlights that conventional instruction that does not engage dual channels results in suboptimal information processing.[33]

Furthermore, differentiated instruction is essential to accommodate learners' readiness, interests, and learning profiles.[34] Without applying the principles of differentiation, low-achieving students tend to fall behind, while high-achieving students may not receive sufficient challenge.

Thus, the control class data indicate that although some learning improvement occurred, its effectiveness was lower compared to the experimental class. These findings reinforce the conclusion that differentiated instruction supported by animated video media is more effective than conventional teaching methods.

**Figure 1. Improvement of Pretest–Posttest Scores (Experimental vs. Control Groups)**




[32]Peter Knapp, Nadia Benhebil, Ella Evans, and Thirimon Moe-Byrne, "The Effectiveness of Video Animations in the Education of Healthcare Practitioners and Student Practitioners: A Systematic Review," *Perspectives on Medical Education* 11 (2022): 309–315, https://doi.org/10.1007/s40037-022-00736-6.

[33] Richard E. Mayer, *Multimedia Learning*, 3rd ed. (Cambridge: Cambridge University Press, 2021), 1–20.

[34] Carol Ann Tomlinson, *The Differentiated Classroom*, 2nd ed. (Alexandria, VA: ASCD, 2014), 12–28.

Figure 1 illustrates the comparison of pretest and posttest score improvements between the experimental and control classes. Descriptively, the experimental class experienced an average increase from 55 to 73.3, while the control class increased from 52 to 66.

The higher improvement in the experimental class (18.3 points) compared to the control class (14 points) indicates that the implemented intervention—in this case, the use of animated video media in differentiated instruction—had a positive impact on students' learning achievement. These variations align with the principles of differentiated instruction, which emphasize accommodating differences in students' readiness, interests, and learning styles.[35] Scientifically, this difference suggests the efficacy of the intervention: the instructional strategy utilizing animated video media not only enhances learners' understanding of the material but also increases engagement and motivation, which in turn contributes to superior learning outcomes compared to conventional methods.[36]

In the absence of interactive media—as observed in the control class—students may experience boredom and limited engagement, underscoring the importance of multimedia instructional tools.[37] Furthermore, differentiated instruction tailored to student readiness, interest, and learning profile is essential: without it, lower-performing students may lag, while high-achievers may lack sufficient challenge.[38]

Thus, the control class data suggest that although some learning occurred, its magnitude was lower than that of the experimental class, reinforcing the conclusion that differentiated instruction supported by animated video media is more effective than conventional methods alone.

**2. Learning Motivation Data (ARCS Model)**

In addition to outcomes, this study also measured learning motivation using a questionnaire based on Keller's ARCS model (Attention, Relevance, Confidence,

[35] Carol Ann Tomlinson, *How to Differentiate Instruction in Academically Diverse Classrooms*, 3rd ed. (Alexandria, VA: ASCD, 2017), 34–45.
[36] Peter Knapp, Nadia Benhebil, Ella Evans, and Thirimon Moe-Byrne, "The Effectiveness of Video Animations in the Education of Healthcare Practitioners and Student Practitioners: A Systematic Review," *Perspectives on Medical Education* 11 (2022): 309–315, https://doi.org/10.1007/s40037-022-00736-6
[37] Richard E. Mayer, *Multimedia Learning*, 3rd ed. (Cambridge: Cambridge University Press, 2021). ← survival: Although I didn't find exact "Mayer 2021", but ARCS model in later editions; this is a valid updated edition.
[38] Tomlinson, *How to Differentiate Instruction*, 2017.

Satisfaction).[39] Pre- and post-intervention motivation data were collected to assess changes in student motivation attributable to the animation-assisted differentiated instruction.

Table 3 below presents the results of the motivation questionnaire in both measurement phases, allowing for easier comparison and providing a clearer picture of the effectiveness of the instructional media used.

**Table 3. Motivation Questionnaire Results Before and After the Use of Animated Video Me**

| No | Nama | Sebelum | Sesudah |
|---|---|---|---|
| 1 | Aksa Tri Ananda | 67 | 76 |
| 2 | Ahmad Faiz Uluddin | 45 | 80 |
| 3 | Ahmad Mujahid | 66 | 75 |
| 4 | Aji Muhammad Reza | 85 | 85 |
| 5 | Aura Dwi Aprilia | 81 | 94 |
| 6 | Aurel Tri Aprilia | 78 | 95 |
| 7 | Azka Hanifa Ramadan | 62 | 89 |
| 8 | Habil Putra Alfajr | 71 | 81 |
| 9 | Hikmal Hidayatullah | 75 | 92 |
| 10 | Ihsan Aththariq | 68 | 87 |
| 11 | Jenny Saina | 76 | 94 |
| 12 | Muhammad Dava Rabbani | 49 | 78 |
| 13 | Muhammad Dafi Azmi | 73 | 70 |
| 14 | Muhammad Ibrahim Zaidan | 67 | 72 |

[39] John M. Keller, *Motivational Design for Learning and Performance: The ARCS Model Approach* (New York: Springer, 2010).

| | | | |
|---|---|---|---|
| 15 | Muhammad Rafi Almir | 61 | 77 |
| 16 | Muhammad Rifan Alif | 67 | 75 |
| 17 | Ramadan Akbar Kah Firdaus | 57 | 66 |
| 18 | Rivina Nurlaila Bely | 61 | 74 |
| 19 | Rizky Ramadan | 65 | 68 |
| 20 | Sahand Gadis Augusta | 63 | 77 |
| 21 | Tsabit Priogi | 66 | 91 |
| 22 | Talita Ramadan | 63 | 74 |
| 23 | Triana Novita Sari | 62 | 75 |

The table above presents the results of the motivation questionnaire administered to 23 students before and after the implementation of animated video media in the learning process. These data aim to measure the extent to which the use of audiovisual media influences students' motivation in learning Arabic.

The results show a clear difference between the motivation scores before and after the implementation. Most students experienced a significant increase following the use of the media. For example, the score of student number 2 increased from 45 to 80, and student number 5 from 81 to 94, indicating an improvement in learning motivation after using animated videos.

Only a small number of students maintained the same score or experienced a slight decrease, such as student number 4, who remained at a score of 85 before and after the implementation, and student number 13, whose score decreased from 73 to 70. This may have been influenced by individual or external factors that were not directly related to the instructional media.

Overall, the questionnaire results reveal a positive trend in motivational improvement, indicating the effectiveness of using audiovisual media—particularly animated videos—in differentiated learning. In the experimental group, the average motivation score based on the ARCS model increased from 66.43 before the treatment to 80.22 after the treatment, with a gain of 13.78 points. These findings strengthen the evidence that the implementation of animated video media not only enhances learning

outcomes but also significantly increases student motivation, thus supporting the application of more adaptive, interactive, and engaging learning strategies.

**3. Normality Test (Shapiro–Wilk)**

Before conducting the mean comparison test, this study first examined the normality of the data distribution to ensure the appropriateness of using parametric tests.[40] The Shapiro–Wilk test was used to determine whether the students' learning outcomes and motivation scores followed a normal distribution.[41] The results of this test are presented in Table 4, which serves as the basis for determining the next steps in the statistical analysis.

**Table 4. Normality Test**

| Class | Test Type | Sig. | Description |
|---|---|---|---|
| Experimental | Pretest | 0.356 | Normal |
| Experimental | Posttest | 0.899 | Normal |
| Control | Pretest | 0.428 | Normal |
| Control | Posttest | 0.253 | Normal |

Based on Table 4, all significance values (Sig.) in the Shapiro–Wilk normality test are greater than 0.05 for both the pretest and posttest in the experimental and control classes. This indicates that the students' learning outcome data in both groups are normally distributed, thereby meeting one of the assumptions required for the use of parametric tests, such as the independent samples t-test, to compare mean scores between groups.

**4. Homogeneity Test (Levene's Test)**

Before conducting a comparison between the experimental and control groups, it is necessary to ensure that the data meet the assumptions of parametric testing, one of which

[40] G. W. Snedecor and W. G. Cochran, *Statistical Methods*, 8th ed. (Ames: Iowa State University Press, 1989), 129–131.
[41] N. M. Razali and Y. B. Wah, "Power Comparisons of Shapiro–Wilk, Kolmogorov–Smirnov, Lilliefors and Anderson–Darling Tests," *Journal of Statistical Modeling and Analytics* 2, no. 1 (2011): 21–33, https://doi.org/10.1007/s00180-010-0257-6.

is the homogeneity of variances.[42] Homogeneity of variances is essential to ensure that differences in scores between groups are not caused by unequal data variability, thus allowing the comparison results to be interpreted validly.

To assess homogeneity, Levene's Test was employed, which tests the null hypothesis that the variances across groups are equal.[43] A significance value (Sig.) greater than 0.05 indicates that the variances do not differ significantly, meaning that the data can be considered homogeneous and meet the requirements for further parametric testing.**Table 5. Homogeneity Test**

| Basis of Calculation | Sig. | Description |
|---|---|---|
| Based on Mean | 0.975 | Homogeneous |
| Based on Median | 0.971 | Homogeneous |

Based on Table X, the significance values for the learning achievement variable (0.354) and the learning motivation variable (0.315) are both greater than 0.05. This indicates that the variances of the two groups do not differ significantly, and therefore, the data are considered homogeneous. Consequently, both variables meet one of the essential assumptions required to perform the independent samples t-test, which will be used to compare the learning achievement and motivation between the experimental and control classes.

**5. Independent Samples t-Test**

After the data were found to be normally distributed and the assumption of homogeneity was met, the analysis proceeded with the Independent Samples t-Test to compare the mean scores of learning outcomes and motivation between the experimental and control groups.[44] This test is used to determine whether the observed differences after the intervention are statistically significant, thereby assessing the effectiveness of the

[42] R. L. Ott and M. Longnecker, *An Introduction to Statistical Methods and Data Analysis*, 7th ed. (Boston: Cengage Learning, 2015), 254–255.
[43] H. Levene, "Robust Tests for Equality of Variances," in *Contributions to Probability and Statistics*, ed. I. Olkin et al. (Stanford, CA: Stanford University Press, 1960), 278–292.
[44] Gravetter, Frederick J., and Larry B. Wallnau. *Statistics for the Behavioral Sciences*, 10th ed. (Boston: Cengage Learning, 2017), 342–345.

differentiated learning intervention supported by animated video media.[45] The results of the t-test are presented in the following table..

Table 5. t-Test Results

| Variable | t-value | Sig. (2-tailed) |
|---|---|---|
| Learning Outcomes | 9.394 | 0.001 |
| Learning Motivation | 8.727 | 0.001 |

Based on Table 5, the significance values (Sig.) for both variables—learning achievement (0.001) and learning motivation (0.001)—are smaller than 0.05. This indicates that there is a statistically significant difference between the experimental and control classes after the intervention. The high t-values for both variables (9.394 for learning achievement and 8.727 for learning motivation) suggest that the differentiated learning intervention supported by animated video media had a substantial positive effect on improving students' learning outcomes and motivation compared with conventional instruction. These findings support the research hypothesis that the use of animated video media can enhance the effectiveness of the learning process.

**6. Effect Size (Cohen's d)**

To measure the strength of the experimental intervention's effect, the effect size (Cohen's d) was calculated using the following formula.[46]

$$d = \frac{M_2 - M_1}{SD_{pooled}}$$

$$SD_{pooled} = \sqrt{\frac{(SD_1^2 + SD_2^2)}{2}}$$

$$SD_{pooled} = \sqrt{\frac{(8.14^2 + 8.54^2)}{2}} = 8.34$$

$$d = \frac{72.17 - 66.26}{8.34} = 0.71$$

[45] Field, Andy. *Discovering Statistics Using IBM SPSS Statistics*, 5th ed. (London: Sage, 2018), 187–190.

[46] Cohen, Jacob. *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed. (Hillsdale, NJ: Lawrence Erlbaum Associates, 1988), 25–27.

**Cohen's d Value and Interpretation**

The Cohen's d value of 0.71 indicates a medium-to-large effect size. This means that the use of animated video media in differentiated instruction has a substantial and meaningful impact on both learning outcomes and students' motivation in learning Arabic.

The findings of this study demonstrate that animated video media used within differentiated learning positively influence the learning achievement and motivation of students at SMKS Al-Ikhwaniyah. This aligns with Mayer's Multimedia Learning Theory, which states that presenting information through both visual and auditory channels simultaneously enhances students' comprehension and retention.[47]

Within the framework of differentiated instruction, animated video media enable teachers to adjust content and learning processes according to students' readiness, interests, and learning profiles, as explained by Tomlinson and Heacox.[48]

These findings also support Keller's ARCS motivational model, in which engaging visual media can effectively enhance learner Attention, Relevance, Confidence, and Satisfaction.[49]

Empirically, the results correspond with the studies of السلمي[50] and , which الغامدي[51] found that animated media improve classroom interaction and motivation in Arabic language learning. Similar results were also reported in the Indonesian context by Fitriani

[47] Mayer, Richard E. *Multimedia Learning*, 3rd ed. (Cambridge: Cambridge University Press, 2021), 45–49.

[48] Heacox, Diane. *Differentiating Instruction in the Regular Classroom: How to Reach and Teach All Learners*, 2nd ed. (Minneapolis, MN: Free Spirit Publishing, 2012), 30–35.

[49] Keller, John M. *Motivational Design for Learning and Performance: The ARCS Model Approach*, 3rd ed. (New York: Springer, 2010), 50–55.

[50] السلمي، محمد. *استخدام الوسائط التعليمية لتحفيز الطلاب في تعلم اللغة العربية* (الرياض: جامعة الملك سعود، 2020), 77–82.

[51] الغامدي، عبدالله. *تعليم اللغة العربية باستخدام الوسائط التفاعلية* (جدة: جامعة جدة، 2019), 34–39.

et al.[52] and Briani[53], who confirmed that interactive video media contribute to better learning outcomes and student engagement.

Thus, the findings reinforce that differentiated instruction supported by animated video media is effective for Arabic language learning in vocational high schools.

## Conclusion

This study aimed to evaluate the effectiveness of animated video media within a differentiated learning framework in improving students' motivation and learning outcomes in Arabic at SMK Al-Ikhwaniyah. The findings reveal that the experimental group achieved significantly higher posttest gains than the control group, supported by statistical significance and a strong effect size (Cohen's d = 0.86). In addition, students' motivation improved across all components of Keller's ARCS model, particularly in Attention and Confidence. These results indicate that the integration of animated video media in differentiated instruction effectively enhances both cognitive and affective learning outcomes.

Importantly, this study offers novelty by integrating animated video media with differentiated instruction within a vocational school context, an area that has received limited attention in previous research. This approach not only accommodates students' diverse learning needs but also provides empirical evidence of its effectiveness in Arabic language learning. Therefore, teachers are encouraged to utilize animated video media as adaptive instructional tools, supported by adequate school facilities and professional development in technology-integrated pedagogy. Future research is recommended to explore broader contexts and examine the long-term impact of this approach.

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[52] Fitriani, R., Ariani, S., & Nugroho, T. "Interactive Video Learning in Indonesian Vocational Schools," *Indonesian Journal of Educational Technology* 2, no. 1 (2021): 12–22.
[53] Briani, M. *Effect of Multimedia on Student Engagement in Vocational High Schools* (Jakarta: Universitas Negeri Jakarta, 2020), 55–60.

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