

THE EFFECT OF USING ARTICULATE STORYLINE 3 MEDIA ON STUDENTS' LEARNING OUTCOMES IN THE TOPIC OF CHEMICAL COMPOUND NOMENCLATURE

Eny Enawaty, Chemistry Education Tanjungpura University, Pontianak, Indonesia

Email* eny.enawaty@fkip.untan.ac.id *

081256580880

Abstract: In this digital era, the advancement of information technology has had a significant impact on the field of education. One such development is the use of interactive media, such as Articulate Storyline 3. This medium integrates visual, audio, and quiz elements to provide an engaging and interactive learning experience that helps students better understand concepts (Ariadiny, 2023). The learning media produced can be accessed or operated via smartphones or laptops. This study aims to determine the effect of Articulate Storyline 3 media on students' learning outcomes in the topic of Chemical Compound Nomenclature. The research design employed was a one-group pretest–posttest design. Based on the analysis results, the Articulate Storyline 3 media had an influence on learning outcomes, with an effect size of 0.59 (moderate category).

Keyword: Articulate storyline 3, chemical compound nomenclature

Introduction

In this digital era, advances in information technology have had a significant impact on the field of education, one of which is the use of interactive media. Interactive media can be designed using software such as Articulate Storyline. This medium combines visual, audio, and quiz elements to provide an engaging and interactive learning experience that helps students better understand concepts (Ariadiny, 2023). The resulting learning media can be accessed or operated through smartphones or laptops.

One of the chemistry topics considered difficult by students is Nomenclature of Inorganic Compounds. This issue was raised by several teachers during the Chemistry Teacher Working Group (MGMP) meetings in 2024, including those from Singkawang, Landak, and Pontianak. The same problem was also found among first-semester Chemistry Education students in 2024, where 65% of students were unable to correctly name inorganic compounds when given their chemical formulas, and 72% made errors in writing the formulas when given the compound names.

One of the most innovative tools supporting this transformation is Articulate Storyline 3, an interactive multimedia authoring software that allows educators to design engaging and dynamic digital lessons. In chemistry learning, where students often struggle with abstract and microscopic concepts such as atomic structure, bonding, and molecular interactions, Articulate Storyline 3 has proven to be highly effective. According to (Nur et al., 2024), the development of STEM-based interactive multimedia using Articulate Storyline 3 significantly improved students' critical thinking skills on the topic of chemical bonding. Similarly (Dewi et al., 2025) found that digital

teaching materials built with Storyline 3 were “very valid” and helped students visualize atomic structures and periodic systems more concretely.

Beyond conceptual understanding, the use of Articulate Storyline 3 also enhances students’ motivation and engagement. (Sundari & Silitonga, 2022) reported that students who learned through Storyline 3-based media were more active and attentive compared to those taught through conventional instruction. This improvement can be attributed to the software’s interactive elements—such as embedded quizzes, immediate feedback, and multimedia integration—that create a sense of participation and curiosity in learners. (Hajar et al., 2020) demonstrated that integrating Articulate Storyline 3 with Project-Based Learning (PBL) significantly improved students’ cognitive and affective learning outcomes in chemistry classes. (Nora’in, 2022) further emphasized that Storyline-based media incorporating socio-scientific issues not only enriched students’ learning experiences but also strengthened their chemical literacy and awareness of the relevance of chemistry in everyday life.

From a practical perspective, Articulate Storyline 3 offers flexibility and accessibility that support self-paced and blended learning. (Aini, 2025) highlighted that students could easily access chemistry lessons developed with Storyline 3 both online and offline, making the media suitable for independent learning in the Merdeka Curriculum context. The studies consistently reported that Articulate Storyline 3-based media are valid, practical, and effective (Lestarani et al., 2023).

Previous studies have shown that the use of learning media based on Articulate Storyline 3 has proven effective in improving learning outcomes on the topic of atomic structure. (Pratiwi et al., 2022), and research by (Yahya, 2020) demonstrated an improvement in students’ cognitive abilities in the topic of chemical bonding. Therefore, innovation in learning is necessary, one of which can be achieved through the use of engaging and technology-based learning media such as Articulate Storyline 3, which can be accessed anywhere, whether via smartphone or laptop. Overall, these findings suggest that Articulate Storyline 3 is a powerful and innovative digital tool that can improve the quality of chemistry education by making learning more interactive, engaging, and conceptually meaningful.

Methods

The research method used in this study is an experimental research with a One Group Pretest-Posttest Design. This design aims to determine the effect of a treatment or intervention by comparing the participants’ performance before and after the treatment.

In this design, only one group of participants is involved. The group is given a pretest to measure their initial ability or knowledge, then receives the treatment (X), and finally takes a posttest to measure any changes that occur after the treatment. (Sugiyono, 2015)

Research Design Model

The model of the One Group Pretest-Posttest Design can be illustrated as follows:

Group	Pretest		Treatment		Posttest
G	O_1	X		O_2	

Explanation:

- G = The group of participants (one group only)
- O_1 = Pretest (measurement before treatment)
- X = Treatment or intervention (for example, learning using Articulate Storyline 3)
- O_2 = Posttest (measurement after treatment)

Results And Discussion

Before analyzing the pretest and posttest data using either parametric or non-parametric statistical tests, prerequisite tests were conducted, including the tests of homogeneity and normality.

Homogeneity Test

The homogeneity test was conducted using Levene's Test for Equality of Variances (Handayani & Subakti, 2020). The result of the Based on Mean value showed a significance value (Sig.) of 0.231, which means that Sig. = 0.231 > 0.05. Therefore, it can be concluded that the data variances are homogeneous. This indicates that the assumption of homogeneity for the pretest and posttest data is fulfilled.

Normality Test

A normality test was then conducted using the Kolmogorov–Smirnov test. The decision criterion states that if Sig. < 0.05, the data are not normally distributed, while if Sig. > 0.05, the data are normally distributed (Widana & Muliani, 2020). The results showed that the pretest significance value was $0.025 < 0.05$, indicating that the pretest data were not normally distributed. Similarly, the posttest significance value was $0.026 < 0.05$, indicating that the posttest data were also not normally distributed.

Since both datasets were not normally distributed, the subsequent difference test was carried out using a non-parametric test. The normality test was conducted using SPSS version 29, and the results are presented in the following table.

Non-Parametric Test (Wilcoxon Signed-Rank Test)

Nonparametric statistics are generally used to analyze data measured on a nominal or ordinal scale. (Annisak et al., 2024) The difference between pretest and posttest results was analyzed using the Wilcoxon Signed-Rank Test. Based on the output, the Asymp. Sig. (2-tailed) value was 0.001, which means that Sig. = 0.001 < 0.05. This indicates that there is a significant difference between the pretest and posttest scores. This finding suggests that there was a statistically significant improvement in students' learning outcomes after the learning process using the Articulate Storyline 3 interactive media. Therefore, it can be concluded that the use of Articulate Storyline 3 has a positive effect on students' learning achievement.

Results And Discussion

The homogeneity test was conducted using Levene's Test. The value Based on Mean showed a significance level (Sig.) of 0.231, which is greater than 0.05 (Sig. = 0.231 > 0.05). Therefore, it can be concluded that the data variance is homogeneous. This indicates that the assumption of homogeneity for the pretest and posttest scores was fulfilled.

Subsequently, the normality test was carried out using the Kolmogorov–Smirnov test. If the significance value (Sig.) is less than 0.05, it indicates that the residuals are not normally distributed; conversely, if Sig. > 0.05, the residuals are normally distributed. The pretest showed a Sig. value of 0.025 (< 0.05), indicating that the data were not normally distributed. Similarly, the posttest showed a Sig. value of 0.026 (< 0.05), meaning that the data were also not normally distributed.

Since both datasets did not meet the normality assumption, a non-parametric statistical test was used for the subsequent difference test. The normality test was conducted using SPSS version 29, and the results are presented in the table below.

Table 1. Table Normality Test

		Tests of Normality					
		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
kelas A1		Statistic	df	Sig.	Statistic	df	Sig.
hasil belajar siswa	Pretest	,217	50	<,001	,884	50	<,001
	Posttest	,236	50	<,001	,892	50	<,001

a. Lilliefors Significance Correction

The non-parametric test used in this study was the Mann–Whitney test. The Mann–Whitney test was employed to determine whether there was a significant difference between two related groups. The data analyzed in this test followed a before–after or pretest–posttest design. If the significance value (Sig.) is greater than 0.05, it indicates that there is no significant difference between the pretest and posttest scores. Conversely, if the significance value (Sig.) is less than 0.05, it indicates that there is a significant difference between the pretest and posttest scores after the treatment was given.

Table 2. Results of the Mann–Whitney Test

Test Statistics ^a	
	hasil belajar siswa
Mann-Whitney U	336,000
Wilcoxon W	1611,000
Z	−6,421
Asymp. Sig. (2-tailed)	<,001

a. Grouping Variable: kelas A1

Based on the table above, the Asymp. Sig. (2-tailed) value was 0.001. This means that the significance value of $0.001 < 0.05$, indicating a significant difference between the pretest and posttest data. This suggests that there was a significant difference in students' learning outcomes before and after using the Articulate Storyline 3 learning media. These results are consistent with the findings of P, which showed that the use of learning media has a significant effect on improving students' learning outcomes, as evidenced by changes in their pretest and posttest scores. Thus, the use of Articulate Storyline can enhance the quality of learning, which is in line with the research conducted by (Ariadiny, 2023)

Studies consistently reported that *Articulate Storyline 3* meets the criteria of being valid, practical, and effective for classroom use (Widarti, 2024). This result is also supported by the effect size calculation, which produced a value of 0.59, categorized as a moderate effect according to the established criteria.

Conclusion

Articulate Storyline 3 was found to be effective in improving students' learning outcomes on the topic of inorganic compound nomenclature. The significant difference between pretest and posttest scores, supported by an effect size of 0.59 (moderate effect), demonstrates that the use of Articulate Storyline 3 can enhance students' engagement and conceptual mastery in chemistry learning. It is therefore recommended as a powerful tool to support technology-enhanced learning in higher education, particularly in science-based disciplines.

Acknowledgments (if any)

This study was supported by DIPA Universitas Tanjungpura 2025. Thank you for students who participated in this study.

References

- Aini, Z. (2025). Development of Interactive Multimedia Assisted with Articulate Storyline for Naming Chemical Compounds. . *Jurnal of Education*, 1(3).
- Annisak, F., Sakinah Zainuri, H., & Fadilla, S. (2024). Peran Uji Hipotesis Penelitian Perbandingan Menggunakan Statistika Non Parametrik Dalam Penelitian. *Jurnal Pendidikan*, 3(1), 105–116.
<https://jurnal.asrypersadaquality.com/index.php/alittihadu>
- Ariadiny, F. (2023). My Indonesia is Rich in Culture: Problem-based Articulate Storyline on Social Sciences Lesson Content. *Journal of Education Research and Evaluation*, 7(4), 569–577. <https://doi.org/10.23887/jere.v7i4.67978>
- Dewi, L., Lalang, A. C., & Manggi, I. (2025). Development of Articulate Storyline 3-Based Digital Teaching Materials on Atomic Structure and Periodic Elements. . *Jurnal Chemistry Education*, 1(2).

- Hajar, S., Nurfajriani, & Halimah, N. (2020). Pengaruh Multimedia Articulate Storyline Berbasis Discovery Learning Terhadap Kemampuan Berpikir Kreatif pada Materi Laju Reaksi. *Proseding Seminar Nasional Kimia Berwawasan Lingkungan* , 75–80.
- Handayani, E. S., & Subakti, H. (2020). Pengaruh Disiplin Belajar terhadap Hasil Belajar Bahasa Indonesia di Sekolah Dasar. *Jurnal Basicedu*, 5(1), 151–164. <https://doi.org/10.31004/basicedu.v5i1.633>
- Lestarani, D., Tanone, K. L. K., Parera, L. A. M., Lalang, A. C., & Naat, J. N. (2023). Development of Articulate Storyline 3-Based for Chemical Bonding Teaching Materials. *Hydrogen: Jurnal Kependidikan Kimia*, 11(2), 106. <https://doi.org/10.33394/hjkk.v11i2.7403>
- Nora'in. (2022). Development and Evaluation of Articulate Storyline-Based Interactive Media: Integration of Socio-Scientific Issues in Hydrocarbon Learning . *Jurnal Sebelas Maret University*, 1(2).
- Nur, M. C., Zurweni, Z., & Ekaputra, F. (2024). Development of STEM-Based Interactive Learning Multimedia Assisted by Articulate Storyline 3 Oriented to Students' Critical Thinking Skills on Chemical Bonding Material. *Jurnal on Education*, 1(2).
- Pratiwi, S. A., Sudyana, I. N., & Fatah, A. H. (2022). Pengembangan media pembelajaran digital berbasis articulate-storyline-3 pada pokok bahasan struktur atom. *Journal of Environment and Management*, 3(2), 153–160. <https://doi.org/10.37304/jem.v3i2.5507>
- Sugiyono. (2015). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta.
- Sundari, C., & Silitonga, P. M. (2022). Penerapan Media Interaktif Articulate Storyline dalam Pembelajaran Ikatan Kimia Di SMA. *Jurnal Ilmiah Pendidikan*, 1(4), 421–427.
- Widana, W., & Muliani, P. L. (2020). *Uji Persyaratan Analisis*. Klik Media.
- Widarti. (2024). Interactive Digital Lessons for Alkaline Group Elements via Articulate Storyline 3 . *Jurnal Tadris Kimiya*, 1(1).
- Yahya. (2020). Pengembangan Perangkat Pembelajaran Flipped Classroom Bercirikan Mini-Project . *Jurnal SJME (Suepreum Journal of Mathematics Education)*, 7.