QUANTUM: Jurnal Inovasi Pendidikan Sains, Vol. 16, No. 1, 27-43
p-ISSN : 2086-7328 e-ISSN : 2550-0716
Website: https://ppjp.ulm.ac.id/journal/index.php/quantum/index
DOI: https://dx.doi.org/10.20527/quantum.v16i1

VALIDITY OF CHEMISTRY COMIC LEARNING MEDIA ON REACTION RATE MATERIAL INTEGRATED WITH ISLAMIC VALUES

Lutfiana Marisa[1]*, Khairiatul Muna[1], Muhammad Bahit[2]
[1]Universitas Islam Negeri Antasari Banjarmasin
Jl. Jenderal Ahmad Yani KM. 4,5 Banjarmasin, Kalimantan Selatan, Indonesia
[2]Universitas Lambung Mangkurat
Jl. Brigjen H. Hasan Basry Banjarmasin, Kalimantan Selatan, Indonesia
*corresponding author: lutfianamarisa1803@gmail.com

Abstract. Reaction rate material requires an understanding of chemical multirepresentations, which is a challenge for students. Although digital comics are increasingly used in learning, research on the integration of Islamic values and multirepresentation in chemical comics is still limited. In addition, the use of Webtoon as a learning platform in science education is still rarely researched. The research aims to find out how the validity of chemical comic learning media on reaction rate materials that are integrated with Islamic values. The research method used is R&D with the ADDIE design model; validation was carried out by experts in media, material, and Islamic integration, with the scores obtained categorized into very valid, valid, invalid, and very invalid using quantitative descriptive analysis. Research with the ADDIE model goes through five stages, namely, Analysis, Design, Development, Implementation, and Evaluation. The validity results obtained a score of 89% for media validity, 84% for material validity, and 83% for integration validity with all categories very valid. The results of the study show that the developed comic media is proven to be very valid so that the developed media is suitable for further testing to the Implementation stage.

Keywords: comic learning media, integrated with islamic value, reaction rate material, validity

INTRODUCTION

The use of learning media in the process of teaching and learning activities has an important role (Kurniawan & Hadi, 2023a; Salamiyah et al., 2023; Sarah et al., 2022). Learning media is used as a tool to make it easier for students to understand abstract subject matter, able to attract attention and overcome students' boredom when learning (Amaliah et al., 2022; Fatya et al., 2021; Oktapianti, 2021; Yudha et al., 2023). Nuralisa et al., (2021) stated that using learning media can improve student learning outcomes. The use of learning media in teaching and learning activities can be a solution so that students can easily learn chemical materials that contain macroscopic, symbolic, and microscopic (Hatimah & Khery, 2021). The level of macroscopic and symbolic representation exists in every chemical phenomenon (Busada & Aini, 2024). Learning that contains macroscopic, symbolic, and microscopic is also referred to as multirepresentation or three levels of representation (Mawaddah & Haryani, 2021). The reaction rate is a chemical material that contains multiple macroscopic, symbolic, and microscopic representations (Cylindrica et al., 2021; Mawaddah & Haryani, 2021).

One of the materials that contains macroscopic, symbolic, and microscopic is reaction rate material. Material Reaction rate material requires presentation in three levels of chemical representation to make it easier for students to understand the

Published by: Program Studi Pendidikan Kimia FKIP Universitas Lambung Mangkurat
How to Cite: Marisa, L., Muna, K. & Bahit, M. (2025). Validity of Chemistry Comic Learning Media on Reaction Rate Material Integrated with Islamic Values. *QUANTUM: Jurnal Inovasi Pendidikan Sains*, 16(1), 27–43. https://dx.doi.org/10.20527/quantum.v16i1.21012

Article History:
Received : 26-11-2024, *Accepted* : 03-03-2025, *Published* : 08-05-2025

material thoroughly (Huda & Syuhada, 2021; Sari & Silfianah, 2024). Based on a research study conducted by Fitri & Iryani, (2023), it is difficult for students to understand reaction rate material because they lack mastery of macroscopic, symbolic, and microscopic concepts. In addition to learning media being able to make it easier for students to understand the subject matter, learning media must also be designed to be attractive to increase students' learning motivation (Ardiansyah & Oktariani, 2024). Sari & Silfianah (2024) in their research on reaction rate materials based on multiple representations stated that reaction rate materials require learning media innovations that can contain macroscopic, symbolic as well as microscopic and can increase students' learning motivation towards reaction rate chemistry materials.

Based on field studies, motivation and learning outcomes in chemistry began to decline due to the elimination of the minimum completeness criteria in schools and more emphasis on students' positive character values. In these schools, it is allowed to use gadgets, but they are not used optimally in learning. Ardiansyah & Oktariani, (2024) in their research stated that as many as 63.3% of students liked to read comics, but it was not balanced with the use of comic media in learning. The results of the field study found that students in this day and age are more difficult to discipline because the media and subject matter are not integrated with Islamic values; materials that are integrated with Islamic values can foster positive character and morals, and reaction rate materials are also said to be quite difficult to make learning media.

The learning media that can be used is chemical comic media (Naila et al., 2022). Like digital comics on the Webtoon application. Comics are effectively used as a learning medium because they convey clear information and contain illustrations that can help understand macroscopic, symbolic, and microscopic materials (Pratama & Islam, 2023). Comics are also able to provide their own attraction to science (Suprianingsih et al., 2022). The attractive display of comics makes students more motivated in learning because learning becomes more fun and without coercion (Hasanah et al., 2023). Agustine & Aini, (2024) in their research also stated that students supported the use of learning media using comics. This is also supported by students who tend to like technology so that digital comics are superior to other printed materials (Ramadhan & Rasuardie, 2020). Compared to using textbooks, the use of comics in learning is easier for students to understand (Minarni, 2020; Suprianingsih et al., 2022) in their research also stated that the comics developed are considered easier to understand than books that have been used. Based on research conducted by Kartika et al., (2023), comics contain illustrations so that they can display macroscopic, symbolic, and microscopic concepts so that they can help students understand the material compared to just writing that is difficult to imagine because it is abstract.

The reaction rate matter has abstract characteristics that require presentation in three levels of chemical representation, which aims to provide an understanding of the concept of reaction rate matter through a more real picture (Sari & Silfianah, 2024). Webtoons are popular for reading digital comics in Indonesia because they contain a variety of genres. In addition, Webtoon is also very easy to use, so learning can be done anywhere and anytime independently by students (Pratama & Islam, 2023). The Webtoon platform contains digital comics (Aliifah et al., 2023) so that Webtoons can also display chemical representations. In accordance with research by Kartika et al., (2023), macroscopic, symbolic, and microscopic can be presented in comics. The use of this digital platform supports education that makes more use of

digital technology as a form of adaptation to the increasingly modern times (Silalahi et al., 2023).

However, since Indonesia has known the modern education system, it has caused the emergence of a dichotomy of knowledge that distinguishes the existence of science and religious science. This is due to colonialism in the past and modernization that occurred in Indonesia (Yusuf et al., 2021) which had an impact on the birth of two educational institutions, namely public schools that emphasized general education under Ministry of Education, Culture, Research, and Technology and madrasas that emphasize Islamic lessons under the Ministry of Religion (Fajri, 2024; Khoiriyah et al., 2023). In fact, all knowledge related to the universe belongs to Allah SWT., besides that, also in Indonesia, students experience a moral deterioration, which is one of them due to the rapid advancement of technology, which has a negative impact, and the lack of religious knowledge. The deterioration of morals among students is shown by many acts of deviance and bullying (Rohimah & Agustin, 2023; Zulhelmi, 2022). Efforts to reduce this impact are by integrating Islamic values with the concept of chemical matter. In order for the two to find a match, it is necessary to conduct a special study to integrate the concept of chemistry with Islamic values or verses of the Qur'an (Muna, 2022). Integration is carried out by instilling Islamic values and combining them with digital technology and science, which has a positive impact on students (Suprianingsih et al., 2022). So, in learning, in addition to students knowing the application of chemical materials in daily life, students also have positive morals and characters (Qurniati, 2021; Sugiono, 2019). Based on research by Irawan et al., (2024), learning has increased in process skills in reaction rate materials when using comic media in learning. Afriana & Prastowo (2022) stated that the digital comics developed make students have a positive attitude and character.

Research by Ariningsih & Amalia (2020) entitled "Building Student Character through Mathematics Learning that Integrates Islam" stated that integrating subject matter with Islamic values will give rise to positive characters for students, so that the achievement that will be obtained is not only general knowledge but also in terms of understanding and applying Islamic values. Siraj et al., (2023) in their research stated that the purpose of integrating learning, especially physics subjects, with the integration of Islamic values is a form of effort to instill religious understanding, form positive characters, have noble morals and convey that Allah SWT., is the one who rules this universe (Ariningsih & Amalia, 2020; Siraj et al., 2023). The difference between this study and the previous research is the integration of Islam which is meant by the integration of aqidah values limited to the delivery of interpretation of Qur'an verses and relate them to the reaction rate material; moral values are raised in comics through the attitude of the characters, and worship values are raised from the appearance of Qur'an verses in the comics developed. So far, there has been no research that has developed a chemical comic learning media on the Webtoon platform that integrates the value of aqidah, moral values, and worship values, as well as presenting the concept of reaction rate material in chemical multirepresentation. In addition, although the use of digital comics in learning has been researched, the application of comics as a learning medium that explicitly accommodates chemical multirepresentations is still rarely found in the literature. The use of the Webtoon platform as a learning medium has also not been researched in depth. Therefore, this research was conducted to bridge this gap. This study aims to find out how the validity of chemical comic learning media on Islamic value-integrated reaction rate materials.

RESEARCH METHOD

This study uses a type of research and development (R&D) with the ADDIE model developed by Dick and Carry in 1996 (Sugiono, 2019). The development research was carried out using the ADDIE model. The ADDIE model consists of five stages, namely, analyze, design, development, implementation, and evaluation (Halawa et al., 2022). The flow chart of the ADDIE model is presented in Figure 1 as follows.

Figure 1. ADDIE Model Flow Diagram

The research carried out is only up to the development stage. The following are the stages of developing learning media for chemistry comics and integrated reaction rate materials with Islamic values. a) The analysis stage was carried out by interviewing chemistry teachers with interview guidelines and compiling a concept map of reaction rate material. b) The design stage was carried out by determining the learning objectives according to the material discussed, integrating the material with the verses of the Qur'an and making comic illustrations. c) The development stage was carried out by validating the validity of the chemistry comic learning media on the Islamic value integrated reaction rate material. It was measured using research instruments, which were in the form of validation questionnaires for media experts, material experts, and integration experts, then the validation results were categorized into very valid, valid, invalid, and very invalid. d) The evaluation stage was carried out by considering each stage of development. The subjects of the study are validators of media experts, material experts and experts in the integration of Islamic values who come from lecturers of Tadris Chemistry, faceless illustrators and chairmen of the Mutiara Peradaban Islam foundation. The data analysis technique uses quantitative descriptive analysis using the retting-scale assessment scale presented in Table 1.

Table 1. Validity assessment scale

Category	Score
Strongly Agree	4
Agree	3
Disagree	2
Strongly Disagree	1

Then the scores obtained from each validator are summed up and the ideal percentage is determined using the following formula (Halawa et al., 2022).

$$\% \text{ Validity} = \frac{\text{Overall Average}}{\text{Highest score}} \times 100\%$$

After obtaining validity results, then the validity results obtained are categorized based on the criteria of very valid, valid, invalid, and very invalid. The percentage of the validity assessment of this study can be seen in Table 2 as follows.

Table 2. Validity assessment percentage

Percentage	Information
81.26% - 100%	Very Valid
62.51% - 81.25%	Valid
43.76% - 62.50%	Invalid
25.00% - 43.75%	Very Invalid

RESULTS AND DISCUSSION

The products produced in this study are in the form of chemistry comic learning media on reaction rate material integrated with Islamic values. The chemistry comic learning media on the integrated reaction rate material of Islamic values was developed using the ADDIE model with five stages, namely, analyze, design, development, implementation, and evaluation (Faeha et al., 2019; Sugiono, 2019).

In the analyze stage, the researchers conducted a preliminary analysis and material analysis. The analysis was carried out by conducting direct interviews using interview instruments with chemistry teachers in class XI and then analyzing the reaction rate material based on literature studies. Based on the results of the analysis, learning media is needed that helps students understand the reaction rate material because this material is abstract and has three levels of chemical representation, namely microscopic, symbolic and macroscopic. The reaction rate is a chemical material that contains macroscopic, symbolic, and microscopic multirepresentations (Cylindrica et al., 2021). Reaction rate material needs to be presented at the level of macroscopic, symbolic, and microscopic representation to make it easier for students to understand the material (Sari & Silfianah, 2024).

The design stage was carried out by determining the learning objectives that consist of (1) students are able to describe the theory of impact and activation energy; (2) students are able to write down the reaction rate equation; (3) students are able to describe the relationship between reaction rate and reaction order; (4) students are able to analyze the relationship between collision theory and reaction rate; (5) students are able to conclude the meaning and role of factors that affect the reaction rate and collision theory; and (6) students are able to show the application of reaction rate in daily life. Furthermore, integrating the verses of the Qur'an with the reaction rate material and designing chemistry comic learning media on reaction rate material integrated with Islamic values that will be developed. Chemistry comic learning media on reaction rate material integrated with Islamic values Consisting of an introduction containing an introduction to the character, a concept map and learning objectives, the subchapter of the reaction rate material includes: collision theory, formulas and equations, order of reactions, factors that affect the reaction rate (concentration, surface area, temperature, and catalyst), reaction rate in life, as well as reinforcement and bibliography problems.

The next stage of development, this stage is the stage of the product manufacturing process chemistry comic learning media on reaction rate material integrated with Islamic values which is then published on the Webtoon application. The following is a chemical comic learning medium on the integrated reaction rate material of Islamic values that has been developed as seen in Figure 2.

(a) (b)

Figure 2. (a) Chemical comics initial display (b) Chemical comics content

Figure 2 is a display of the comic learning media developed, chemistry comic learning media on reaction rate material integrated with Islamic values It consists of 11 episodes and can be accessed via the following link https://bit.ly/E-COMICLAJUREAKSI. The content of the reaction rate material containing macroscopic, symbolic, and microscopic in the developed chemical comics can be seen in Figure 3.

(a) (b) (c)

Figure 3. (a) Macroscopic (b) Symbolic (c) Microscopic

Figure 3 shows that the developed comic media contains three levels of chemical representation. Based on research by Sari & Silfianah, (2024) the presentation of natural phenomena that can be seen directly is a macroscopic representation. In the developed media, macroscopic representations are one of them shown by the change in the color of the solution on the beaker glass as shown in Figure 3. (a). Symbolic representations are symbols, formulas, and equations, while microscopic representations are phenomena at the atomic and molecular scales research (Sari & Silfianah, 2024). Based on Figure 3. (b) shows a symbolic representation in the form of a presentation of the reaction rate formula, while in Figure 3. (c) showing microscopic representations by presenting the difference in the number of collisions of atomic particles at different temperatures. Menawhile, the integration that emerged in the developed chemical comic media can be seen in Figure 4.

(a) (b) (c)

Figure 4. (a) Integration of verses with material (b) Emergence of Qur'anic verses (c) mention of *Thayyibah* sentences

Based on Figure 4 (a) and (b), the chemical comics developed give rise to the verses of the Qur'an on the reaction rate material and integrate the verses of the Qur'an with the reaction rate material, besides that both also contain the values of Aqidah and Worship. Figure 4 (c) shows positive character, namely the mention of the sentence thayyibah "*Alhamdulillah*" which shows moral values. This moral value is also shown from the way the characters dress and the interaction between characters who maintain each other's boundaries.

The validation process is one of the stages of development. Chemistry comic learning media on reaction rate material integrated with Islamic values validated in there aspects, namely media validation, material validation, and integration validation carried out by two validators each. The results of media validation can be seen in Table 3 as follows.

Table 3. Media validity results

Assessment Indicators	%	Category
Cover design	78%	Valid
Content design	93%	Very valid
Ease of use	87%	Very valid
Total score	89%	Very valid

Media validity includes three assessment indicators, namely cover design, content design, and ease of use. Based on Table 3, the results of the validity of the media on the chemistry learning media on the integrated reaction rate material of Islamic values obtained a percentage of the total score of 89% with very valid criteria. In line with research by Halawa et al., (2022) and Minarni (2020), the results of the validity of media experts on comic learning media with a percentage of ≥ 72% were declared feasible or valid.

Cover design assessment indicators are assessed based on: (a) title writing; (b) attractive cover design; (c) color selection; and (d) illustrations in accordance with the content of the comic. Based on the results of the percentages of the two validators, a score of 78% was obtained with a valid category which showed that the cover used in the chemistry comic learning media on the reaction rate material was in accordance with the content in the comic and the appearance was attractive. Content design assessment indicators are assessed based on (a) the quality of illustrations; (b) the attractiveness of the story; (c) clarity of writing; (d) illustrations in accordance with the material and containing Islamic values; and (e) the media to increase reading interest. The percentage result of getting a score of 97% is in the very valid category. This is supported by research Suprianingsih et al., (2022) which shows that the cover design component obtained a score of 90%, while the content design component obtained a score of 88% with both being included in the very valid category.

The ease of use indicator received a percentage of 87% with a very valid category, with aspects that were assessed including: (a) ease of operation; (b) flexible; and (c) data storage and consumption space. Thus, in the validity of media experts, there are no problems with the chemical comic learning media developed. The following are the results of the media before and after the revision of the validity of the media.

Table 4. Media results before and after the media validity revision

Before the Revision	After the Revision
Add UIN Antasari Banjarmasin logo	Adding the UIN Antasari logo

Before the Revision	After the Revision
Aperception has not yet emerged	Add aperception
Background is less factual	Change the background

In Table 4, the cover part was improved by adding the UIN Antasari logo as an identity, this is also seen in the lowest cover design value, even though the content aspect got a high score, but improvements were still made based on the input of the validator by adding an aperception at the beginning of the explanation of the reaction rate material as a trigger by using questions related to daily life, and finally replacing the background with a more factual laboratory image. Furthermore, the validation results from the material experts can be seen in Table 5.

Table 5. Material validity results

Assessment Indicators	%	Category
Material suitability	84%	Very valid
Serving equipment	84%	Very valid
Benefits	85%	Very valid
Total score	84%	Very valid

Based on Table 5, the validity of the material meets three aspects of the assessment including the suitability of the material, the completeness of the presentation, and the usefulness. The material suitability indicator is assessed based on (a) the suitability of the material with the learning objectives; (b) completeness of the material; (c) the material is clear and easy to understand; (d) illustrations supporting the concept; and (e) material integrated with Islamic values by getting a

score of 84% with a very valid category that shows that the material in the developed comic learning media is appropriate. In line with research by Halawa et al., (2022), material in the media is said to be valid if the percentage of validity is ≥ 62.50%.

The indicators of assessment of the completeness of the presentation are assessed based on (a) the material is prepared systematically; (b) completeness of the presentation of the concept map, learning objectives, subchapters and table of contents; (c) examples of relevant questions; and (d) the question of strengthening in accordance with learning objectives. Based on Table 5, the presentation assessment indicator is included in the very valid category with a percentage value of 84% which shows that the chemistry comic learning media on the integrated reaction rate material of Islamic values has a complete presentation. This is in line with research conducted by Sari et al., (2020) which states that the material delivered in a concise, clear, and systematic manner can increase students' understanding of the subject matter.

Then, the usability indicator is included in the very valid category with a value of 85%, the aspects assessed on the convenience indicator include (a) ease of understanding the material; (b) increase insight, curiosity and motivation; and (c) independent use, this shows that the material on the chemistry comic learning media is in accordance with the indicators that have been set. The total score of the validity of the material obtained a percentage of 84% with the category of very valid. Minarni (2020) in her study explained that the results of the validity of the material in the comic media received a niai of 72% with the upper range included in the very valid category, which shows that the material in the overall comic learning media is appropriate and can be used. The following are the results of the media before and after the revision of the validity of the material.

Table 6. Media results before and after the revision of material validity

Before the Revision	After the Revision
Adjust the number of compounds to the reaction results	Adding an illustration of the reaction compound

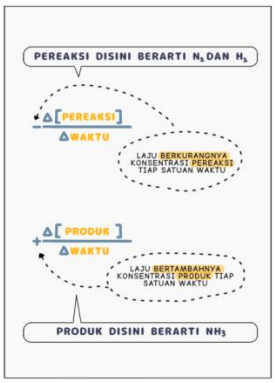
Before the Revision	After the Revision
	
Connect reaction rate with formation and decomposition	Add formation and decomposition formulas
Replace the sentence "do not react"	Replacing with the sentence "finding an alternative way ..."

Table 6 shows that even though all assessment indicators are in the very valid category. Improvements are still made so that the media developed is maximized. The revision was made by adding an illustration of HCl compounds so as not to confuse students because the illustration was not in accordance with the formula for the formation of HCl. Adding a formula for formation and re-decomposition to remind students of the previous material, as well as correcting sentences that were not appropriate in the explanation of the catalyst. Furthermore, the results of the validity of the integration of Islamic values are presented in Table 7.

Table 7. Integration validity results

Assessment Indicators	%	Category
The value of aqidah	75%	Valid
Worship values	75%	Valid
Moral values	89%	Very valid
Total score	83%	Very valid

Based on Table 7, the results of the validity of the integration above show that the validity of the integration includes three assessment indicators, namely the value of aqidah, the value of worship, and the value of morals. The assessment indicators of the value of aqidah are assessed in terms of (a) the use of verses of the Qur'an according to the material; and (b) interpretation of verses of the Qur'an, based on the assessment of the two validators, the indicator of the assessment of the value of the aqidah gets a percentage of 75% with a valid category which shows that the value of the aqidah in the chemistry comic learning media on reaction rate material integrated with Islamic values. Based on research by Kurniawan & Hadi, (2023), the integration of Islamic science in learning media will make students more familiar with Allah SWT and His creation. The purpose of integrating general science and religion in a balanced manner is so that students can prepare for the ever-changing developments in the modern world (Muna et al., 2024).

Indicators of assessment of the value of worship are assessed based on (a) the appearance of verses of the Qur'an; (b) the delivery of interpretation of verses of the Qur'an in accordance with the value of worship; and (c) giving rise to the sentences of thayyibah. The percentage obtained from the two validators on the worship value assessment indicator is 75% with a valid category. Research conducted by Kurniawan & Hadi, (2023a) explained that the integrated chemistry learning media with Islamic values that has been developed obtained an integration expert validity score of $\geq$ 61% which is declared feasible in accordance with their respective assessment criteria. In line with research by Halawa et al., (2022); and Suprianingsih et al., (2022), the validity of religious experts on the developed media shows a percentage of 76% with the valid category. This shows that the developed media is feasible and has been in accordance with the assessment indicators made. This is in line with research Suprianingsih et al., (2022) who stated that the comics developed can present new knowledge related to religious science integrated with chemistry.

Moral values are assessed according to the aspects of (a) character morality; (b) character clothing; (c) reflects a positive character; (d) the mention of the sentence thayyibah; and (e) maintain boundaries. The moral value assessment indicator obtained a score of 89% with a very valid category, and with a total score of 83% with a very valid category. Based on research by Faeha et al., (2019); Kurniawan & Hadi, (2023b), learning media integrated with Islamic values will bring out positive characters and make students know more about Allah SWT. This is in line with the results of moral value indicators that are included in the very valid category, so that the media developed is stated to be able to grow Islamic values in students. Afriana & Prastowo (2022) also mentioned that students' positive character and attitude appear when using comic media developed in learning. The emergence of Islamic values in comic media is seen as more attractive to students as evidenced by the positive response of students (Kurniawan & Hadi, 2023). The following are the results of the media before and after the revision of the validity of the integration.

Table 8. Media results before and after the integration validity revision

Before the Revision	After the Revision
The clothes are better than the robes	Changing long dresses
Advice, you can use verse 49 Qs. Al-Qamar	Adding verse 49 of Qs. Al-Qamar to the surface area material

Table 8 shows that improvements have been made to women's character clothing by replacing them with long clothes instead of short ones. Then, on the surface area material, there is no integration of Qur'an verses because the authors have not found a suitable verse to add it with verse 49 in Qs. Al-Qamar according to the input of the validator.

CONCLUSION

This study tests the validity of the chemistry comic learning media on the integrated reaction rate material of Islamic values. The validity results obtained a score of 89% for the validity of the media, 84% for the validity of the material, and 83% for the validity of the integration of Islamic values with the overall category of "very valid." Thus, the learning media developed is worthy of being included in the implementation stage, to be carried out in field trials or directly used in classroom learning. The implication of the research is to contribute learning media that is proven to be valid and integrated with Islamic values and has great potential in learning chemistry in improving the understanding of the abstract concept of reaction rate through multi-representation presentation. In addition, the integration of Islamic values in the subject matter helps to form a positive character of students.

The use of the Webtoon platform also allows students to learn independently and more flexibly, thereby increasing learning motivation. Further research can test whether the comics developed can improve the understanding of concepts if applied in learning. Webtoon-based comics can be expanded to other materials that require a multi-representation and integrated approach to Islamic values.

REFERENCES

Afriana, S., & Prastowo, A. (2022). Penggunaan Media Pembelajaran *E-Comic* dalam Menumbuhkan Motivasi dan Antusiasme Belajar Peserta Didik Sekolah Dasar. *Didaktis: Jurnal Pendidikan dan Ilmu Pengetahuan*, *22*(1), 41. https://doi.org/10.30651/didaktis.v22i1.11089

Agustine, A., & Aini, I. N. (2024). Analisis Kebutuhan Penggunaan Bahan Ajar Komik untuk Pembelajaran Matematika Materi Komposisi Fungsi. *JMES (Journal Mathematics Education Sigma.* 5(2), 124 - 130. https://doi.org/10.30596/jmes.v5i2.19625

Aliifah, N. J., Ramli, M., & Yunita, L. (2023). Development Of Stem Integrated Webtoon Comics Learning Media In Intermolecular Material Chemistry Subject. *Spin: Jurnal Kimia & Pendidikan Kimia*, 5(1), 112 - 126. https://doi.org/10.20414/spin.v5i1.7020

Amaliah, N., Irawati, R. K., & Haitami, I. (2022). Development of Android-Based Learning Media for Class XI IPA MAN 4 Banjar Coloid System Materials. *Nukleo Sains: Jurnal Pendidikan IPA*. 1(2), 91–110. https://doi.org/10.33752/ns.v1i2.3509

Ardiansyah, I., & Oktariani. (2024). Pengembangan Media Pembelajaran Komik Kimia Berbasis Green Chemistry. *Journal of Research and Education Chemistry*, 6(1), 1. https://doi.org/10.25299/jrec.2024.vol6(1).14545

Ariningsih, I., & Amalia, R. (2020). Membangun Karakter Siswa melalui Pembelajaran Matematika yang Berintegrasi Keislaman. *Journal on Teacher Education*, *1*(2), 1–8. https://doi.org/10.31004/jote.v1i2.511

Busada, S., & Aini, F. Q. (2024). Analisis Multirepresentasi Buku Teks Kimia Kurikulum Merdeka pada Materi Laju Reaksi. *Jurnal Pendidikan MIPA*, *14*(4), 950–958. https://doi.org/10.37630/jpm.v14i4.2036

Cylindrica, V. B., Dasna, I. W., & Sumari, S. (2021). Pengaruh Model Pembelajaran Learning Cycle 5E berbantuan *E-scaffolding* pada Materi Laju Reaksi terhadap Pemahaman Konsep Siswa dengan Motivasi Berprestasi Berbeda. *Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan*, *6*(7), 1115. https://doi.org/10.17977/jptpp.v6i7.14934

Faeha, A., Wahid, A., & Udaibah, W. (2019). Pengembangan Bahan Ajar Kimia Berbasis Integrasi Islam-Sains Materi Minyak Bumi sebagai Implementasi Pendidikan Karakter. *BMC Biophysics*, *9*(1), 6. https://doi.org/10.1186/s13628-016-0030-5

Fajri, N. (2024). Evolusi Lembaga Pendidikan Islam dalam Sejarah Indonesia. *ADIBA: Journal Of Education.* 4(1), 121–131. www.adisampublisher.org/index/php/adiba

Fatya, A. I., Nurdiniah, S. H., & Sholahuddin, A. (2021). Pengembangan Media Puzzle Berbasis Flash untuk Pembelajaran Reaksi Asam Basa di Kelas XI Sekolah Menengah Atas: Uji Coba di SMAN 4 Banjarmasin. *Prosiding Seminar Nasional Pendidikan IPA*, 67–74. http://www.s2ipa.unlam.ac.id/category/publikasi-ilmiah/proceeding/seminar-nasional-pendidikan-ipa-2016/.

Fitri, I. A., & Iryani, I. (2023). Validitas E-Modul Kimia SMA Kelas XI Berbasis *Problem Based Learning* pada Materi Laju Reaksi Fase F. *Prima Magistra: Jurnal Ilmiah Kependidikan*, *4*(4), 579–589. https://doi.org/10.37478/jpm.v4i4.3221

Halawa, A. A., Yulita, I., & Adriani, N. (2022). The Development of Acid-Base Electronic Chemistry Comic Learning Media for High School Students. *Journal of Science Education Research*, *6*(1), 24–30. https://doi.org/10.21831/jser.v6i1.44997

Hasanah, F., Purnamasari, R., & Lathifah, S. S. (2023). Pengembangan Bahan Ajar Komik Berbasis Webtoon Tema 8 Subtema 3 Aku Suka Berpetualang Kelas III. *Didaktik : Jurnal Ilmiah PGSD STKIP Subang*, *9*(04), 1273–1281. https://doi.org/10.36989/didaktik.v9i04.1657

Hatimah, H., & Khery, Y. (2021). Pemahaman Konsep dan Literasi Sains dalam Penerapan Media Pembelajaran Kimia Berbasis Android. *Jurnal Ilmiah IKIP Mataram.* 8(1), 111 - 120. https://ojs.ikipmataram.ac.id/index.php/jiim

Huda, N., & Syuhada, F. A. (2021). Pengembangan Lembar Kerja Siswa (LKS) Dengan Menggunakan Pendekatan Kontekstual Berbasis Multiple Representasi Pada Materi Laju Reaksi. *Prosiding Seminar Nasional Kimia & Pendidikan Kimia#2*. 165–172. https://digilib.unimed.ac.id/id/eprint/46875

Irawan, R. S., Haris, M., & Hidayanti, E. (2024). Pengaruh Pembelajaran Berbasis Proyek Berbantuan Media Komik Terhadap Keterampilan Proses Sains Kimia Materi Laju Reaksi pada Siswa Kelas XI MIPA SMAN 1 Lembar. *Chemistry Education Practice*, *7*(2), 388–394. https://doi.org/10.29303/cep.v7i2.6625

Kartika, G., Azhar, A., & Nasir, M. (2023). Development of E-Comic as a Physics Learning Media for Class X Students on Momentum and Impulse Materials. *Jurnal Penelitian Pendidikan IPA*, *9*(1), 332–336. https://doi.org/10.29303/jppipa.v9i1.2391

Khoiriyah, S., Amiruddin, A., Salik, M., & Zaini, A. (2023). Menuju Kebijakan Pendidikan Satu Atap: Kritik atas Dualisme dan Dikotomi Pendidikan di Indonesia. *Jurnal Intelektual: Jurnal Pendidikan dan Studi Keislaman*, *13*(1), 58–71. https://doi.org/10.33367/ji.v13i1.3523

Kurniawan, M. A. B., & Hadi, K. (2023a). Pengembangan Media Pembelajaran Kimia Terintegrasi Nilai Islam Berbasis Lectora Inspire. *Prosiding Seminar Nasional Kimia (SNK)*.

Kurniawan, M. A. B., & Hadi, K. (2023b). Pengembangan Media Pembelajaran Kimia Terintegrasi Nilai Islam Berbasis Lectora Inspire. *Prosiding Seminar Nasional Kimia (SNK)*.

Mawaddah, I., & Haryani, S. (2021). Pengaruh Pembelajaran Berbasis Multirepresentasi terhadap Keterampilan Metakognisi padda Materi Laju Reaksi. *CiE: Chemistry in Education.* 10(1)2021, 22 - 29. http://doi.org/10.15294/chemined.v10i1.40409

Minarni. (2020). Pengembangan Bahan Ajar dalam Bentuk Media Komik dengan Adobe Photoshop CS6 pada Materi Laju Reaksi. *Jurnal Inovasi Pendidikan Kimia*, *14*(2), 2595–2607. https://sikenal.unnes.ac.id/

Muna, F., Nurhuda, A., Yuwono, A. A., & Aziz, T. (2024). Dikotomi Ilmu Agama Dan Umum Dalam Reorientasi Pendidikan Islam. *Jurnal Pendidikan Islam*, 2(3), 1 - 10. http://doi.org/10.61104/ihsan.v2i3.331

Muna, K. (2022). Development of Chemo-Entrepreneurship Book Entitled "Peduli Lokal, Melek Global": Popularizing Chemistry and Developing Life Skills in Industrial Revolution Era 4.0. *International Journal of Educational Review*, *4*(2), 210–226. https://doi.org/10.33369/ijer.v4i2.24176

Naila, N., Winarti, A., & Mahdian. (2022). The Development of Chemistry Comics to Improve Students' Conceptual Understanding and Communication Ability. *QUANTUM: Jurnal Inovasi Pendidikan Sains*. 13(1), 1–18. https://dx.doi.org/10.20527/quantum.v13i1.11817

Nuralisa, S. F., Vitasari, M., & Nestiadi, A. (2021). Development of Learning Media (Mysterious Card Box) Environmental Conservation Theme to Improve Cognitive Learning Outcomes. *QUANTUM: Jurnal Inovasi Pendidikan Sains*. 12(1), 33–48. https://dx.doi.org/10.20527/quantum.v12i1.10251

Oktapianti, S. (2021). Thermochemistry Comic as a Self-Learning Resource for Grade 11 Students. *Trabiyah: Jurnal Ilmiah Kependidikan.* 1 10(1), 57–63. https://doi.org/10.18592/tarbiyah.v10i1.3869

Pratama, F. H., & Islam, M. A. (2023). Pengenalan Tari Banjar Kemuning melalui Komik Digital dalam Platform Webtoon. *Jurnal Barik.* 5(1), 222 - 235 https://ejournal.unesa.ac.id/index.php/JDKV/

Qurniati, D. (2021). Pengembangan Bahan Ajar Kimia Kontekstual Terintegrasi Keislaman. *Chemistry Education Practice*, *4*(2), 186–193. https://doi.org/10.29303/cep.v4i2.2535

Ramadhan, B. S., & Rasuardie. (2020). Kajian Industri Komik Daring Indonesia (Studi Kasus: Komik Tahilalats). *Jurnal Senirupa Warna.* 8(1), 2–18. https://doi.org/10.36806/.v8i1.79

Rohimah, I., & Agustin, M. (2023). Penerapan Pendidikan Karakter di Nusantara Berdasarkan Konsep Pendidikan Islam. *Prosiding Konferensi Nasional Etnoparenting*, *1*(1), Article 1.

Salamiyah, Astutik, T. P., & Wicaksono, A. T. (2023). Efektifitas Lembar Kerja Peserta Didik (LKPD) Berbasis Kearifan Lokal dalam Pendekata STEAM pada Materi Asam Basa. *Orbital: Jurnal Pendidikan Kimia. 7*(1), 57–65. https://doi.org/jurnal.radenfatah.ac.id/index.php/orbital

Sarah, M., Muna, K., & Rahmawati, H. (2022). Pengaruh Media Infografis Dengan Menggunakan Model Pembelajaran Discovery Learning Terhadap Pemahaman Konsep Kesetimbangan Kimia Peserta Didik. *Spin Jurnal Kimia & Pendidikan Kimia*, *4*(2), 197–206. https://doi.org/10.20414/spin.v4i2.5847

Sari, D., 1, 1, & 1. (2020). (2020). Pengaruh Model Pembelajaran Kooperatif Tipe Think Pair Share (TPS) Berbantuan Media Video pada Materi Termokimia terhadap Hasil Belajar Kimia Siswa SMAN 1 Binjai Kabupaten Langkat. *Pros. SemNas. Peningkatan Mutu Pendidikan*, *1*(1), 157–161.

Sari, Y. P., & Silfianah, I. (2024). *E-LKPD Interaktif Berbasis Multipel Representasi pada Materi Laju Reaksi. JIPK: Jurnal Inovasi Pendidikan Kimia. 18(1), 32–42. http://journal.unnes.ac.id/nju/index.php/JIPK.*

Silalahi, Y. F., Saputri, M., Wijaya, P. R., & Marida, L. (2023). Kajian Literatur: Implementasi Komik Digital dalam Pembelajaran Kimia pada Sekolah Menengah Atas. *Prosiding Seminar Nasional Kimia*. https://jurnal.kimia.fmipa.unmul.ac.id/index.php/prosiding/article/view/1333

Siraj, Sarah, S., Chairil Abnu, M., Illah, A., & Sara Simehate, B. (2023). Integrated Education: Integration of Islamic Values, Nationality, and Diversity in

Learning. *Proceedings of Malikussaleh International Conference on Multidisciplinary Studies (MICoMS)*, *3*, 00021. https://doi.org/10.29103/micoms.v3i.180

Sugiono. (2019). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

Suprianingsih, N., Elvi, Y., & Yenni, K. (2022). Pengembangan Bahan Ajar Komik Terintegrasi Islam pada Materi Hakikat Ilmu Kimia. *Journal of Chemisrty Education and Integration.* 1(1), 16–25. http://dx.doi.org/10.24014/jcei.v1i1.1590

Wicaksono, A. G., Jumanto, J., & Irmade, O. (2020). Pengembangan Media Komik KOMSA Materi Rangka pada Pembelajaran IPA di Sekolah Dasar. *Premiere Educandum : Jurnal Pendidikan Dasar dan Pembelajaran*, *10*(2), 215. https://doi.org/10.25273/pe.v10i2.6384

Yudha, S., Nurfajriani, & Silaban, R. (2023). Analisis Kebutuhan Guru terhadap Pengembangan Media Pembelajaran Kimia Berbasis Android. *Jurnal Warta Desa.* 5(1), 42–47. https://doi.org/10.29303/jwd.v5i1.219

Yusuf, M., Said, M., & Hajir, M. (2021). Dikotomi Pendidikan Islam: Penyebab dan Solusinya. *Bacaka': Jurnal Pendidikan Agama Islam.* 1(1), 12–19. https://ejournal-bacaka.org/index.php/jpai/index.

Zulhelmi, A. (2022). Bahasa Al-Qur'an di dalam Surat Yusuf Mengatasi Kemerosotan Akhlak Pemuda di Zaman Modern: Studi Analisis Menggunakan Metode Kisah Teladan Nabi Yusuf. *Proceedings of Onternational Conference on Islam Studies : Islam & Sustainable Development.* 1(1), 191 - 199. https://jurnal.arraniry.ac.id/index.php/icis/article/view/12667