



Improving Nationalism through Local Wisdom: Development of Adventure-Based Civic Education Learning Media in Junior High School

Fajar Rahmad.S¹; Mukhamad Murdiono¹; Supri Hartanto²

¹ Yogyakarta State University, Indonesia

² PGRI University Yogyakarta, Indonesia

<http://dx.doi.org/10.18415/ijmmu.v12i4.6830>

Abstract

This research aims to develop local wisdom-based Civic Adventure learning media. The main focus of this research is how the learning media development process is carried out systematically, as well as testing the feasibility and practicality of the media based on validation from experts and students' responses. This media development is expected to be a solution to the learning of Pancasila and Citizenship Education which is less interesting and not optimal in shaping national character. The method used in this research is the ADDIE development model, which includes five stages: (1) Analyze, which is the stage of analyzing the needs of students and teachers for learning materials and nationalism values; (2) Design, media design in the form of storyboards, graphic design, and validation instruments; (3) Development, interactive game-based media development and validation by material and media experts; (4) Implementation, limited and broad trials to students to see the practicality of the media; and (5) Evaluate, improvements based on input from the entire validation and implementation process. Data were collected through interviews, observations, and feasibility and practicality questionnaires. The results showed that the learning media developed obtained a feasibility score of 96% from media experts and 92% from material experts, both of which were in the very feasible category. Meanwhile, in the small and large scale trials, the media obtained a score of 84% and 91% respectively, which indicates that this media is included in the very practical category to be used in learning Pancasila and Citizenship Education. Thus, this media is considered effective in increasing the patriotism of junior high school students.

Keywords: *Love for the Country; Interactive; Local Wisdom; Learning Media; Civic Education*

Introduction

National education in Indonesia has an important function in building the nation's human resources. Education aims to develop the intellectual abilities and character of the younger generation who are sensitive to a dignified civilization. Education is expected to educate the life of the nation as a whole without distinguishing existing social classes. National education functions to develop the potential of each learner so that they can become a person who has faith and piety towards the creator, has noble character, is physically and mentally healthy, knowledgeable, competent, creative, independent, and becomes a democratic and responsible citizen (Ulfah et al., 2020). Education is basically a process of

“humanizing human beings” each individual is expected to be able to understand himself, others and the natural environment around him. Education is a structured activity carried out by humans to develop good character and hone the abilities or talents needed to achieve certain goals.(Assabilah & Murni, 2023).

Veugelers (2019) identified that civic education has a role in supporting students' identity by broadening and deepening the concept of citizenship in the country. In addition, civic education also teaches tolerance, inclusiveness of diversity, and an understanding of national identity(Torny-Purto et al., 1999). Civic education in a global context is known as civic education or citizenship education. Kerr (1999) explains that civic education is broadly understood as an effort to prepare young people to understand their roles and responsibilities as citizens, with an emphasis on the importance of education through schools, teaching in the learning process.

The learning process is an activity of teachers and students who have a reciprocal relationship in an educational situation to achieve certain goals. (Junaedi Ifan, 2019). Today, education is undergoing rapid changes, especially in the 21st century, which is known as the era of globalization. Namiroh (2022) identifying the 21st century is marked by the rapid development of technology, information and communication, it is marked by many jobs that were originally done by humans are now replaced by machines. The development of technology has a major impact on human life. However, in practice, civic education learning that takes place still does not use technology-based interactive media as a whole which causes less interest in the learning process in front of students (Muhajir, 2019).

Learning media innovation is needed as an adjustment to the times. Learning media is a device used as a tool to support the learning process. (Widodo & Wahyudin, 2018). The use of interactive media is considered to be a motivation for students to learn independently, creatively, and efficiently. In addition, interactive media can be useful as a solution to student boredom in the learning process. According Novaliendry (2020) Learning media is a tool used to convey messages to students, so that it can help clarify the meaning conveyed in the process of acquiring knowledge, skills, and character.

Interesting learning media can increase students' active participation, such as interaction, discussion, and reflection so as to support the creation of a pleasant learning atmosphere (Mayer, 2022). Learning media development must consider cognitive aspects in order to stimulate students' critical and reflective thinking skills. Siew, N. M., & Mapeala (2016) emphasizes the importance of content validation and media constructs for higher order thinking skills (HOTS) so that the media not only conveys information, but also develops students' reasoning power. The use of interactive digital media such as educational games and augmented reality has been proven to increase student engagement in the learning process. Yilmaz (2016) shows that the development of technology-based learning media, such as educational games and augmented reality, can increase students' interest in learning, emotional engagement, and information retention.

In the world of education, technological developments in the 21st century have a huge impact on the learning process. However, the results of observations made at school still found that the learning process has not maximized the use of technology-based media when learning takes place. Bai, Hua (2008) emphasized that educators' belief in the use of technological media greatly influences the success of digital media integration in the learning process. In addition to the learning aspect, according to Pancasila education teachers, student characteristics related to nationalism still need to be improved. The era of globalization should be an opportunity to contribute to modern life. However, today's youth need to strengthen their nationalism attitude towards their nation and country. In the dynamics of life today, the spirit of nationalism has decreased due to the influence of globalization, which is marked by the influx of foreign cultures and the rapid development of information and communication technology, making the world seem to be one without state borders(Soenarjo et al., 2017). The basis of local wisdom in the developed media lies in the theme and design of the learning media design. the scope of the material contained in the learning media is adjusted to the learning textbook with the theme of local wisdom, namely “recognizing local culture and national culture”.

Various studies related to interactive learning media in the context of Civic Education but there are still gaps in terms of integration of adventure approaches and local wisdom as a character building strategy. Nuryadi et al., (2023) highlighted the importance of digital media in building the nationalism character of the digital native generation, but strengthening local values has not been the main focus. Rahayu et al., (2022) developed Lectora Inspire-based media on norms and justice materials, but the approach has not emphasized narrative or adventure aspects that can increase students' emotional involvement. (Isslandy Ayu Hermalia¹, Ludfi Arya Wardana (2024) uses the Wordwall platform for learning ethical values, but has not yet integrated the exploration of local culture as part of the learning content. Meanwhile, Ni Komang Astari, I Ketut Gading (2024) proves that contextual video media can improve Civics learning outcomes, but has not combined visual, narrative, and adventure elements as a whole strategy for the formation of patriotism. Dedi Kurniawan (2016) developed interactive media for Pancasila and Civic Education, but the approach is still textual and does not target immersive learning experiences. From these studies, it appears that there is no learning media that integrates digital technology, adventure flow, and local wisdom content to build patriotism. This research offers novelty by developing an interactive adventure learning media based on local wisdom specifically designed for this purpose.

Based on the explanation above, it is necessary to develop learning media with local wisdom-based adventure media. Zurqoni, Heri Retnawati, Janu Arlinwibowo (2018) explains that character building strategies through learning must be contextual and involve local values that are relevant to students' lives. However, not many studies have developed adventure-based interactive learning media with local wisdom content as a learning strategy for Pancasila Education to foster an attitude of patriotism in junior high school students. Therefore, this research aims to present a feasible and practical learning media by combining elements of local culture and digital technology in a contextual and applicable manner in civic learning.

Research Methods

The research model in the development of local wisdom-based Civic Adventure learning media for strengthening the nationalism attitude of junior high school students uses the ADDIE model which consists of Analyze, Design, Development, Implementation, and Evaluate from Branch (2009:2). Data collection using observation, interview, feasibility questionnaire, and learning media practicability questionnaire. observation and interviews were conducted to Pancasila education teachers and VIIA class students at Muhammadiyah 1 Yogyakarta Junior High School. Validation of material experts and media experts is used to test the feasibility of learning media before being implemented in students. The learning media practicality questionnaire was filled in by students to test the practicality of learning media as a medium designed as a learning tool for strengthening the attitude of love for the country. The trial was conducted twice, namely small-scale trials and large-scale trials.

The analysis technique in the research conducted is using descriptive analysis to analyze data from the analysis of material needs, media needs, the results of feasibility test scores and practicality tests in the form of a Likert scale with a scale of 5.

Table 1. Media Feasibility Anket Assessment Score

No	Category
1	Very unfavorable
2	Not good
3	Good Enough
4	Good
5	Very Good

The highest score of the validation research is 5 and the lowest score of the validation research is 1 then find the average using the following formula:

$$x = \frac{\sum Xi}{n}$$

Information:

X : Average

$\sum Xi$: Total validation score

n : Number of validations

Table 2. Percentage category of learning media feasibility.

Interval	Category
0-20 %	Not Feasible
21-40 %	Less Feasible
41-60 %	Less Worthy
61-80%	Feasible
81-100%	Very Feasible

Source. Arikunto (2010)

The learning media developed can be said to be valid if the percentage value of validity is above or equal to 61%.

Table 3. Learner Response Assessment.

Interval	Category
1	Very unfavorable
2	Not good
3	Good Enough
4	Good
5	Very Good

The assessment of learner responses is between the ranges of 1-5, with a very poor conversion for a range of 1 and a very good conversion for a range of 5. The final score is calculated using the following formula:

$$NP = \frac{R}{SM} \times 100\%$$

Information:

NP : Percent value searched

R : Score obtained

SM : Maximum Score

After the percent results are found, then determine the practicality of the learning media developed using the same formula as the practicality category sheet.

practicality category sheet, as follows:

Table 4. Category of Practicality of Learning Media.

Interval	Category
0-20%	Not practical
21-40%	Less practical
41-60%	Practical Enough
61-80%	Practical
81-100%	Very Practical

The learning media developed can be said to be practical if the percentage of practicality is above or equal to 61%.

Results and Discussion

The development of local wisdom-based adventure learning media at SMP Muhammadiyah 1 Yogyakarta produces media that is feasible and practical for students to use to increase the attitude of love for the country.

Analyze

Analyze is an analysis process used to understand existing problems and determine the needs that must be met in the learning media development process. The results of this stage are the basis for designing the media developed so that the development carried out is in accordance with the needs found at the School.

At the Analyze stage, the researcher conducted an analysis in Class VIIA of Muhammadiyah 1 Yogyakarta Junior High School. One of the steps I took was to interview the Pancasila Education subject teacher to find out the material needs and attitudes of students. From the interview, it was found that students needed improvement in understanding national values and the formation of an attitude of love for the country. This can be seen from the low involvement of students in activities that reflect a sense of nationality and the lack of understanding of the importance of maintaining the integrity and diversity of the nation. This analysis becomes an important basis in developing learning media that can increase students' nationalism.

Design

The design stage in research and development is carried out in preparation for making local wisdom-based adventure game learning media, namely by preparing research instruments, there are three questionnaires used to test the developed media. At the design stage, the researcher designs a concept map (story board) which is used as a guide in making learning media.

Image selection in the development process is carried out at the design stage by selecting several local wisdom-themed vector images, font selection, and audio selection used to support the creation of local wisdom-based adventure game learning media.

Development

The development stage in this study is the design of learning media from start to finish, by integrating images, animation, audio, fonts, and background design in accordance with the development theme.



Image 1. Learning media display

The development stage also carried out media validation and material validation by media experts and material experts which aims to test the feasibility of the learning media developed. Media expert validation was carried out by Mr. Lukman M.Pd and material expert validation was carried out by Mrs. Ari Retno purwanti, M. H.

The results of the media expert validation showed a percentage value of 96% with a very valid category, to be implemented as a practical media to increase the attitude of love for the country of Muhammaidyah 1 Yogyakarta junior high school students.

Table 5. Media expert validation results

Aspect	Value	obtained Maximum	Percentage	category
Media Engineering Aspects				
Ease of materials	5	35	97%	Very Feasible
Easy to store	5			
Easy to use	5			
Appropriateness of choosing tools for development	4			
Clarity of instructions for using the media	5			
Media packaging	5			
The level of durability of the media	5			
Visual Communication Aspects				
Communicative (language is easy to understand, good, correct and effective)	4	60	95%	Very Feasible
Simplicity of game display	5			
Selection of type and size of letters used	5			
Spacing (letters, lines, characters)	4			
Readability of text	5			
Image display presented	5			
Balance of image proportions	5			
Suitability of images that support the material	4			
Layout arrangement	5			
Color composition	5			
Harmony of color selection	5			
Neatness of design	5			
Design attractiveness	5			
Quantity:			96%	Very Feasible

Material expert validation shows a percentage value of 92% with a very valid category to be implemented in students to test its practicality.

Table 6. Material expert validation results

Aspect	Value	Obtained Maximum	Percentage	Category
Aspects of the suitability of learning media material with teaching materials				
Suitability of material with learning objectives	5	50	92 %	Very Feasible
The suitability of the material with the content of the character of love for the country	5			
Suitability of material with learning objectives	5			
Student interaction with the media	4			
The material presented can be understood	5			
The novelty of the material presented	4			
Adequacy of learning materials	5			
Material comprehension level	4			
Suitability of media with learning material	5			
Ease of understanding learning	4			
Quantity:			92%	Very Feasible

After the development process is complete, the next stage is the implementation of learning media to students to determine the practicality of the developed media.

Implementation

The implementation stage is the stage of testing the learning media, media trials were carried out twice, namely small-scale trials and large-scale trials. Media trials were conducted to determine the practicality of the media developed. The small-scale test was conducted by seven students and the large-scale test was conducted by 29 students.

The limited trial conducted in class VII with a total of five students in the learning aspect resulted in a percentage of 84% with the category of kayak to be implemented at large.

Table 7. Limited Trial Results

Aspect	Value	Obtained Maximum	Percentage	Category
Learning Aspects				
The suitability of the material with the learning book	23	375	84%	Very Feasible
The suitability of the material with the character content of love for the country	23			
Students can interact with the media	24			
Increase learning motivation	22			
Creativity of media making	25			
Ease of learning	24			
Ease of duplication distributed	20			
Clarity of instructions for using the media	22			
Media packaging	23			
Game innovation	20			
Selection of fonts, images and animations	18			
Readability level of the material	20			
Color composition and layout	24			
Ease of media use	10			
Design attractiveness	17			
Quantity:			84%	Very Feasible

The results of the large-scale trial resulted in a percentage value of 91% with a very valid category. based on this, the learning media developed is practically used to increase the attitude of love for the country at 1 Muhammadiyah Yogyakarta Junior High School.

Table 8. Large Scale Trial Results

Aspect	Value	Obtained Maximum	Percentage	Category
Learning Aspects				
The suitability of the material with the learning book	128	2400	91%	Very Practical
The suitability of the material with the character content of love for the country	153			
Students can interact with the media	151			
Increase learning motivation	146			
Creativity of media making	157			
Ease of learning	146			
Ease of duplication distributed	141			
Clarity of instructions for using the media	146			
Media packaging	148			
Game innovation	145			
Selection of fonts, images and animations	142			
Readability level of the material	139			
Color composition and layout	155			
Ease of media use	140			
Design attractiveness	147			
Quantity:			91%	Very Practical

Evaluate

The evaluation stage is the stage of improving learning media based on the results of feedback from media experts, material experts, and students from the practicality test results. There are several improvements that must be made such as color changes, text color suitability, font types, and improper use of animation as a stage of perfecting effective learning media for wider use.

Final Product Review

The final product in this research is an interactive learning media civic adventure based on local wisdom, which is specifically designed to increase the attitude of patriotism among junior high school students. This media is produced through the ADDIE model approach (Analyze, Design, Development, Implementation, Evaluation), with validation from material experts and media experts and practicality tests on students. Based on the test results, this media is declared feasible and practical to use in the learning process.

The feasibility of media products is strengthened by the results of expert validation, which shows that the material content is in accordance with the basic competencies in the curriculum and successfully integrates local wisdom values in the game narrative. Media validation also showed that the visual appearance, game flow, and interactivity had met the standards of good learning media. In the pilot phase, both small and large scale, this media received positive assessments from students, indicating that this product is able to increase learning motivation and strengthen patriotism. Temuan ini sejalan dengan pendapat (Mayer, 2022) which states that visually appealing and interactive learning media can increase students' attention and retention of the material. Support from previous research results by (Assabilah &

Murni, 2023) also shows that interactive learning media can improve understanding of Pancasila values and encourage active student involvement.

Further, (Widodo & Wahyudin, 2018) emphasizes the importance of selecting media that is suitable for students' characteristics to create an effective and enjoyable learning process. In this context, the use of local wisdom elements in learning media is not only as a cultural ornament, but as a means of contextualizing national values that are closer and more relevant to students' lives. This is corroborated by the opinion of (Veugelers, 2019) which states that civic education that promotes local values will strengthen students' national identity in a global context.

This final product is not only technically feasible, but also pedagogically and ideologically relevant, because it is able to answer the needs of students in strengthening national character through media that suits their times. This product is expected to be an innovation model for learning Pancasila and Citizenship Education that is adaptive and transformative.

The uniqueness of this research lies in the integration of local wisdom in the form of interactive digital media based on adventure games, which not only increases students' learning engagement but also strengthens their national identity and attitude. This contribution becomes a new approach in civic education in the digital era.

Conclusion

This study successfully developed a local wisdom-based Citizenship Adventure learning media which was declared very feasible and very practical for use in learning Pancasila and Citizenship Education. Expert validation showed a feasibility level of 96% by media experts and 92% by material experts which was categorized as very feasible, while the practicality test on a small and large scale obtained a score of 84% and a large-scale test of 91% with a very practical category. This media is effective in increasing the patriotism of junior high school students and can be an innovative alternative to technology-based learning that is contextual and relevant to students' lives.

Further Research Recommendations

Wider Testing

This research is recommended to be tested more widely on a more diverse population and a larger sample size to determine the effectiveness of media in general in various school backgrounds and characteristics of students.

Further Development

Further development is needed in the form of integration of this learning media into interactive adventure games that can be accessed through various platforms, such as Android-based applications, to increase the attractiveness and flexibility of its use.

Research Limitations

Does not Support Android platform

The learning media developed in this research cannot be run through Android-based devices, thus limiting the flexibility of use.

Not Widely Tested

Testing the effectiveness of this media is still limited to a small scope and has not been conducted thoroughly in various schools or different regions.

Dependence on PowerPoint

This media can only be run using the Microsoft PowerPoint application, limiting its use to certain devices and systems that have the application.

School Infrastructure Limitations

The media can only be used in schools that have electricity and projector facilities, so it cannot be implemented in areas that lack technological infrastructure.

Reference

- Arikunto, S. (2010). *Prosedur Penelitian; Suatu Pendekatan Praktik*. Rineka Cipta.
- Assabilah, A. D., & Murni, A. W. (2023). Pengembangan media pembelajaran interaktif jera pada mata pelajaran ppkn materi mengenal pengamalan nilai-nilai pancasila dalam kehidupan sehari-hari kelas v sdn sumokali candi Sumokali Candi. *Nusantara Educational Review*, 1(1), 15–22. <https://doi.org/10.55732/ner.v1i1.996>.
- Bai, Hua, P. E. (2008). Teacher Educators' Beliefs and Technology Uses as Predictors of Preservice Teachers' Beliefs and Technology Attitudes. *Journal of Technology and Teacher Education*, 16(1), 93–112. <https://www.learntechlib.org/p/22851/?nl=1>.
- Branch, R. M (2009). *Intruactional design: the ADDIE approach*: springer.
- Dedi Kurniawan, H. S. (2016). Pengembangan Bahan Pembelajaran Media Interaktif Pada Mata Pelajaran Ppkn. *Jurnal Teknologi Informasi & Komunikasi Dalam Pendidikan*, Vol 3, No. <https://jurnal.unimed.ac.id/2012/index.php/teknologi/article/view/5001>.
- Hermalia, I. A., Wardana, L. A., & Jannah, F. (2024). *Pengembangan Media Interaktif Game Wordwall Mata Pelajaran PPKn untuk Meningkatkan Nilai Etika Siswa Kelas VI SDN Mayangan 4 Kota Probolinggo*. 6(3). <https://doi.org/10.36232/jurnalpendidikandasar.v6i3.1857>.
- Isslandy Ayu Hermalia□, Ludfi Arya Wardana, F. J. (2024). Pengembangan Media Interaktif Game Wordwall Mata Pelajaran PPKn untuk Meningkatkan Nilai Etika Siswa Kelas VI SDN Mayangan 4 Kota Probolinggo. *Jurnal Papeda*, Vol.6, <https://doi.org/https://doi.org/10.36232/jurnalpendidikandasar.v6i3.1857>.
- Junaedi Ifan. (2019). Proses Pembelajaran Yang Efektif. *Jisamar*, VOL. 3 NO.(2), 1925. <https://www.journal.stmikjayakarta.ac.id/index.php/jisamar/article/view/86>
- Kerr, D. (1999). Citizenship education in the curriculum: an international review. *The School Field*, X(3/4), 2.
- Mayer. (2022). *The Cambridge handbook of multimedia learning*. Cambridge University Press.
- Muhajir, N. S. (2019). Analisis Pelaksanaan Pembelajaran PPKn dalam Pembentukan Karakter Siswa SMP Muhammadiyah 1 Makassar. *Jurnal Etika Demokrasi Pendidikan Pancasila Dan Kewarganegaraan*, Vol 4 No.1.
- Namiroh, S., Syahrudin, D., & Herlambang, Y. T. (2022). Pengembangan Media Audio Visual Bahasa Indonesia Berbasis Hot. *Journal of Primary Education*, 5(1), 1–11. <http://dx.doi.org/10.24014/ejpe.v5i1.14325>.

- Ni Komang Astari, I Ketut Gading, I. M. C. W. (2024). Media Video Pembelajaran Interaktif Kontekstual pada Muatan PPKn untuk Meningkatkan Hasil Belajar Siswa. *Jurnal Penelitian Dan Pengembangan Sains Dan Humaniora*, Vol 8 No 1. <https://doi.org/s:https://doi.org/10.23887/jppsh.v8i1.77429>.
- Novaliendry, D., Darmi, R., Hendriyani, Y., Nor, M., & Azman, A. (2020). Smart learning media based on android technology. *International Journal of Innovation, Creativity and Change*, 12(11), 715–735. https://www.ijicc.net/images/vol12/iss11/121109_Novaliendry_2020_E_R.
- Nuryadi, M. H., Widiatmaka, P., & Yanto, B. E. (2023). *Developing Nationalism Character among the Digital Native Generation through Formal Education in Indonesia*. 1(3), 78–83. <https://doi.org/10.47750/pegegog.1>.
- Rahayu, D. A., Mangsur, F. Al, & Anggia, A. A. (2022). Sosialisasi Pengenalan Seni Budaya Lokal kepada Masyarakat Desa Boyolangu Melalui Digitalisasi untuk Meningkatkan Nasionalisme. *Jurnal Abdi Masyarakat Indonesia*, 2(6), 1945–1952. <https://doi.org/10.54082/jamsi.563>.
- Siew, N. M., & Mapeala, R. (2016). The development and validation of a higher order thinking skills test. *International Education Studies*, 9(10), 233–242. <https://doi.org/doi.org/10.5539/ies.v9n10p233>.
- Soenarjo, S., Kokotiasa, W., & Wicaksana, J. S. (2017). Pengaruh pembelajaran pkn terhadap pengembangan sikap nasionalisme siswa kelas vii semester genap smp negeri 2 barat kecamatan barat kabupaten magetan tahun pelajaran 2014/2015. *Citizenship Jurnal Pancasila Dan Kewarganegaraan*, 3(2), 267. <https://doi.org/10.25273/citizenship.v3i2.1255>.
- Torny-Purto, J., Schwille, J., Amadeo, J.-A.,(1999). *Civic education across countries: twenty-four national case studies from the IEA civic education project*. International Association for the Evaluation of Educational Achievement. <https://eric.ed.gov/?id=ED431705>
- Ulfah, N., Hidayah, Y., Hardian, M., & Trihastuti, M. (2020). Project Citizen: Development Of Social Skills And Understanding Of Contemporary Issues (Study At Ahmad Dahlan University). *Lentera Pendidikan : Jurnal Ilmu Tarbiyah Dan Keguruan*, 23(1), 9. <https://doi.org/10.24252/lp.2020v23n1i2>.
- Veugelers, W. (2019). Education for democratic intercultural citizenship (EDIC). In *Education for Democratic Intercultural Citizenship*. https://doi.org/10.1163/9789004411944_001.
- Widodo, S. A., & Wahyudin. (2018). Selection of Learning Media Mathematics for Junior School Students. *Turkish Online Journal of Educational Technology - TOJET*, 17(1), 154–160. <https://eric.ed.gov/?id=EJ1165728>.
- Yilmaz, R. M. (2016). Educational magic toys developed with augmented reality technology for early childhood education. *Computers in Human Behavior*, 54, 240–248. <https://doi.org/https://doi.org/10.1016/j.chb.2015.07.040>.
- Zurqoni, Heri Retnawati, Janu Arlinwibowo, E. A. (2018). Strategy and Implementation of Character Education in Senior High Schools and Vocational High Schools. *Journal of Social Studies Education Research*, 9(3), 370–397. <https://dergipark.org.tr/en/pub/jsser/issue/43625/534243>.

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal. This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).