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Development of an E-module Based on STEAM on the Topic of Human Blood Circulation

Esty Setyo Utaminingsih[1], Tri Joko Raharjo[1], Ellianawati[2*]

[1] Department of Elementary Education, Postgraduate School, Universitas Negeri Semarang, Semarang, Indonesia.
[2] Department of Physics, Faculty of Mathematics and Natural Science, Universitas Negeri Semarang, Semarang, Indonesia.

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Corresponding Author:
Ellianawati
ellianawati@mail.unnes.ac.id

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Abstract: The purpose of this research is to develop a STEAM-based e-module for mastering the topic of human blood circulation. The developed e-module is named "Radar." "Radar" e-module from the content validity analysis test obtained a content validity value of 0.9167, construct validity of 0.9208, and language validity of 0.8819. The final validity value of the e-module was 0.9065 with valid criteria. The practicality test results get a percentage of 86.67% and are included in the convenience category. Based on the validity and practicality of test results, the "Radar" e-module is feasible and practical to use to improve students' concepts of human blood circulation.

Keywords: E-Module; Human Blood Circulation; STEAM

Introduction

The rapid development of technology and information in the 21st century has brought significant changes in the world of education (Ellianawati et al ., 2020; Al-Mutawah et al., 2021). Facing new challenges in the digital era, the International Society for Technology in Education (ISTE) calls for educational institutions to adapt to technological developments (An, 2020). It supports using devices to promote deeper learning by engaging students in investigations and creative technology creation (Quigley et al., 2020). It means a demand for innovation from educators (Zulaeha, 2016).

Innovation in education can be realized through designing and implementing activities that enhance learning (Han et al., 2019), such as converting printed to digital teaching materials (Hasanudin et al., 2021). Educational experts have developed many e-modules based on Science, Technology, Engineering, Art, and Mathematics (STEAM) to accommodate these efforts. Over time, STEAM has quickly become a global interest for academics and educators worldwide (Shih-Yun et al., 2022). This approach aims to provide an exciting and curious learning experience for students to explore science more actively and creatively (Bilgiler et al., 2020).

The STEAM approach can be integrated into the learning process. One of STEAM's advantages includes transforming teaching concepts and models based on new technology (Chung et al., 2022). Science learning provides space to develop skills, broaden horizons, and utilize various technologies (Ulfa et al., 2021). However, several concepts in science material require more understanding because the material is quite complex for students to understand, and many foreign terms are used (Wardani & Syofyan, 2018). One of the materials in science lessons that are challenging to master is material for Class V Theme 4 Sub-theme 1, Human Blood Circulation (Nugraha et al., 2020). This difficulty occurs because human blood circulation in the body system can only be mastered by using a learning media (Sihaloho et al., 2022). Educators use less mixed media, which seems monotonous, and there is innovation in the learning process (Utaminingsih, 2022). Educators only use textbooks from the Ministry of Education as full media and resources in the learning process (Hasanudin et al., 2021). The textbooks used so far have also placed more emphasis on the content dimension than the process and

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context dimensions, as required by The Program for International Student Assessment (PISA) (Amalia et al., 2021). This certainly makes students bored to study the material (Heryani et al., 2022). In contrast, the success of learning is determined by the role and creativity of educators (Chusna & Utami, 2020) and the activeness of students (Sasmito, 2022).

Based on the phenomenon above, educators should innovate teaching materials (Zulaeha et al., 2021). Teaching materials function to direct all educator activities to recognize the competencies that will be taught and as a guide for students in learning (Hasanudin et al., 2021). Educators need exciting and interactive teaching material so students are motivated and directly involved in learning (Utaminingsih et al., 2023). Given the learning difficulties of students and the competencies they must master in the 21st-century era (Sihaloho et al., 2022), the development of teaching materials by educators should lead to e-modules (Nugraha et al., 2020)

E-module has a fundamental role in the teaching-learning process because the technology enhances the assimilation of knowledge and the development of competencies (Salas-Rueda et al., 2020). Using an e-module is also a realization of school activities in the 21st century (Deng et al., 2019). Developing an e-module must consider student trends (Ningrum et al., 2022). The widespread use of technology makes smartphones more desirable in daily activities (Jazuli et al., 2018). Of course, this can be used as a forum for delivering learning materials (Amalia et al., 2021), so educators can develop an Android-based e-module (Maulida et al., 2019). Android-based e-module is quite interactive e-modules because they can be inserted with images, videos, audio, and animations (Wardani & Syofyan, 2018). Of course, the e-module can attract students more to use it and motivate them to be more active in learning, such as observing pictures and videos and filling out exercises and quizzes, which can provide automatic and direct feedback (Rofiyadi & Handayani, 2021). Moreover, electronic devices can easily access interactive e-modules (Maulida et al., 2019). It is hoped that learning objectives can be easily achieved through easy and fun access to devices and that students can master the concept of human blood circulation.

The results of interviews conducted with educators and students of Supriyadi 01 Elementary School, Semarang, found that students still struggle to master the material on human blood circulation. The teaching materials used are not varied; educators use more printed books and occasionally the YouTube platform, but they could be more optimal in utilizing technology in the learning process. Based on the interview results with students and educators, this research will take samples at Semarang 01 Elementary School, Semarang. The formulation of the problem in this study is what is the feasibility level of e-module validation based on STEAM on the topic of human blood circulation? This study aims to develop e-modules that are suitable for mastering the concept of human blood circulation.

Method

Study This is study development or *Research and Development* (R&D) uses a 4D model that includes *Define, Design, Develop, and Disseminate* (Irawan et al., 2018).

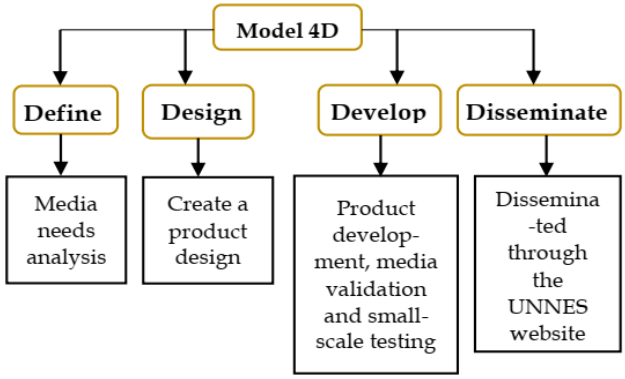

Figure 1. 4D development models

The first stage is define. The stage by this step is reviewing information related to problems found, needs of students, and characteristics of students through questionnaire needs and interviews with teachers and students. Issues arise that material class V Subtheme 1 topic human blood circulation hard to master by students because teaching materials are limited. Next step, study references and analyze related solutions from problems found. The next step for obtaining a solution is to overcome issues that arise.

Furthermore, the stage is designed. In this stage, the researcher plans the problem solution already set. The solution to problems is to make the e-module STEAM based on material human blood circulation. This stage contains about make design beginning with steps of development in the product from the start, selecting software that will be used, and collecting completeness material to make the e-module get to the features in the e-module.

The next step is *to* develop. Make e-module following design early. The e-module that has been designed will be tested for validation by expert validation. Expert validation consists of content, construct, and linguist expert validation. The results of this expert validation will be used as a reference for revising the product *(*e-module) that has been developed, which is qualitative and quantitative data. Qualitative data is in the form of criticisms and suggestions, while quantitative data is in the form of product evaluations made through assessment instruments provided for each content expert validation, construct expert validation, and linguist validation.

Instrument assessment by validation expert used as source evaluation e-module developed. This study had nine expert validations: three content expert validations, three construct expert validations, and three linguist expert validations.

The content validation test used in this study is the content validity coefficient–Aiken's V. Aiken formulates the Aiken's V formula to calculate the content-validity coefficient based on the results of an assessment by a panel of experts of n people on an item in terms of the extent to which the item represents the construct being measured. According to Aiken, the minimum limit for determining the number of raters is two people (Hendryadi, 2017). Aiken's V formula is presented in Eq. 1.

$$V = \frac{\Sigma S}{[n(c-1)]} \quad (1)$$

Information:
V = Content Quality Factor
S = r-lo
lo = Lowest rating points
c = Highest qualification scores
r = Number provided by the validator
n = Number of validators

The next step is to interpret the feasibility of the e-module developed through the Aiken Validity index, presented in Table 1.

Table 1. Interpretation of V-Aiken Results (Nabil et al., 2022)

Range Index V	Classification validity
< 0.4	Invalid
0.4 – 0.8	At the moment
>0.8	Valid

After testing the validity analysis, a small group test was carried out to obtain data on the practicality of the developed e-module. The practicality test was carried out by distributing validated e-modules and student practicality test instruments to 10 students. Small group test subjects represent students who have high, medium, and low scores. The completed practicality test questionnaire instrument was then analyzed by adding the total scores for all indicators and giving practicality scores by using the formula presented in Eq.2.

$$P=\frac{f}{N} \times 100\% \quad (2)$$

Information:
P = final value
F = score acquisition
N = maximum score

The next step after calculating the score is to categorize the practical value. The practicality category is presented in Table 2.

Table 2. Practicality Category (Annisa & Putra, 2020)

Value (%)	Category
80 < x ≤ 100	Very practical
60 < x ≤ 80	Practical
40 < x ≤ 60	Practical Enough
20 < x ≤ 40	Less Practical
0 < x ≤ 20	Not Practical

The last stage of this research is dissemination. After the product is deemed appropriate based on validity tests by experts, the product will be disseminated to elementary schools where the pre-research was carried out and disseminated more widely through the Institute for Educational and Professional Development, Universitas Negeri Semarang website.

Result and Discussion

The e-module that have been developed are then tested for feasibility by expert validation which includes material expert validation, media or module validation, and language expert validation which each consists of 3 (three) expert validations so that there are six expert validations. Content experts are lecturers competent in biology and class five teachers, construct experts are media experts, and linguists experts are Indonesian language lecturers. The results of material validation by content expert validation are presented in Table 3.

Table 3. Content Expert Validation Results

Point	V Value	Classification
1	0.9167	Valid
2	1	Valid
3	0.8333	Valid
4	0.8333	Valid
5	1	Valid
6	1	Valid
7	0.75	At the Moment
8	0.9176	Valid
9	0.9176	Valid
10	0.8333	Valid
11	1	Valid
12	0.8333	Valid
13	0.9176	Valid
14	1	Valid
15	1	Valid
Final V Value	0.9167	Valid

The following validation is constructing expert validation. The results of material validation by material expert validation are presented in Table 4.

Table 4. Construct Expert Validation Results

Point	V Value	Classification
1	0.9167	Valid
2	1	Valid
3	1	Valid
4	0.75	At the Moment
5	0.8333	Valid
6	1	Valid
7	1	Valid
8	1	Valid
9	0.8333	Valid
10	0.8333	Valid
11	0.8333	Valid
12	1	Valid
13	1	Valid
14	0.8333	Valid
15	0.9167	Valid
16	0.75	At the Moment
17	1	Valid
18	1	Valid
19	1	Valid
20	0.9167	Valid
Final V Value	0.9208	Valid

The subsequent expert validation is the linguist validation. The results of language validation by linguist validation are presented in Table 5.

Table 5. Linguist Validation Results

Point	V Value	Classification
1	0.9176	Valid
2	0.9176	Valid
3	0.8333	Valid
4	0.75	At the Moment
5	1	Valid
6	0.75	At the Moment
7	0.8333	Valid
8	1	Valid
9	0.9176	Valid
10	0.8333	Valid
11	0.9176	Valid
12	0.9176	Valid
Final V Value	0.8819	Valid

Based on the results of the content validity analysis test from the validation of content experts, construct and linguist experts are then averaged to determine the validity value of the product that has been made. The results of the validity analysis test on all aspects are presented in Table 5.

Table 5. Overall Aspect Validation Results

Aspect	V Value
Content	0.9167
Construct	0.9208
Language	0.8819
Final V Value	0.9065
Criteria	Valid

Based on Table 5 regarding the results of the analysis of the validity of all aspects, the developed e-module is declared valid, so it is feasible to use. The developed e-module must be declared "valid" by competent experts to be suitable for learning. This is supported by the statement of Rofiyadi & Handayani (2021) that module development must have appropriate criteria rather than expert validation before being disseminated and used in learning. Elci et al. (2021) added that before the e-module is used in class, the e-module must be declared "valid" according to improvements from experts so that students will be interested in using the e-module. This has implications for achieving learning objectives (Zulfahrin et al., 2019).

The developed e-module product will run on an Android smartphone. E-module contains material on Human Blood Circulation intended for students' mastery of the concept of the material. The e-module that has been developed is named "RADAR" (Blood Circulation Summary). The features include Core and Basic Competencies; Learning Summary; a Tutorial video; Quiz, and Reference. The features are expected to attract interest and motivate students to learn more so that this e-module becomes a friend for studying at home. The initial appearance of the "RADAR" application being developed is presented in Figure 1.

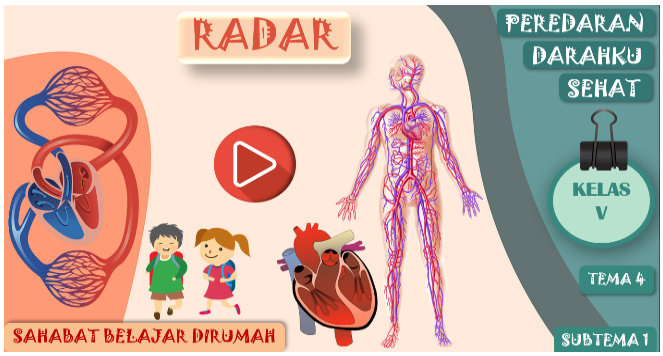

Figure 1. RADAR Application Cover

Expert validation, in addition to an assessment, also provides suggestions and input for improving the e-module to make it better and more feasible. Improvements to the e-module after receiving requests from validation experts are presented in Figures 2 to 9. The first suggestion is to change the font from uppercase to lowercase so students can read it more.

Figure 2. Before the Font is Changed to Lowercase

Figure 3. Font Improvements from Uppercase to Lowercase

The next suggestion is to add detailed images of veins and arteries.

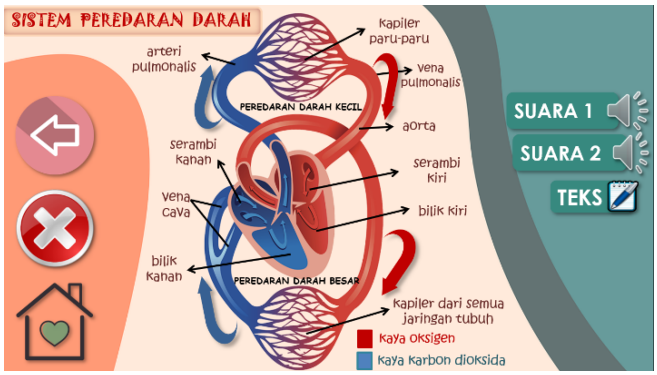

Figure 4. Before repairing the details of veins and arteries

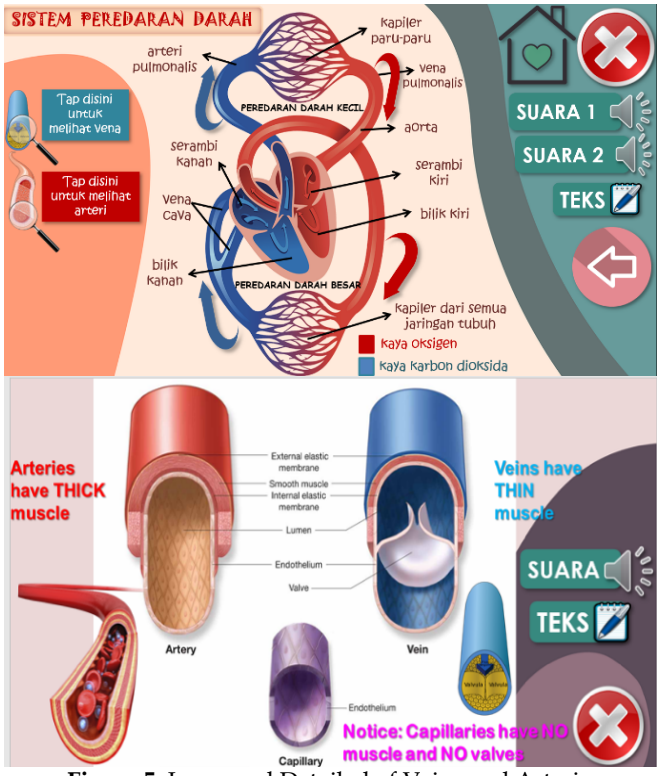

Figure 5. Improved Detailed of Veins and Arteries

Another input by expert validation is adding a video on how to maintain the circulatory organs so that students know and know how to keep the circulatory organs.

Figure 6. Before Addition Other Video

Figure 7. Improved Video Addition How to Maintain Circulatory Organs

The next suggestion is to change the quiz, divide it into three parts and add the duration of each piece.

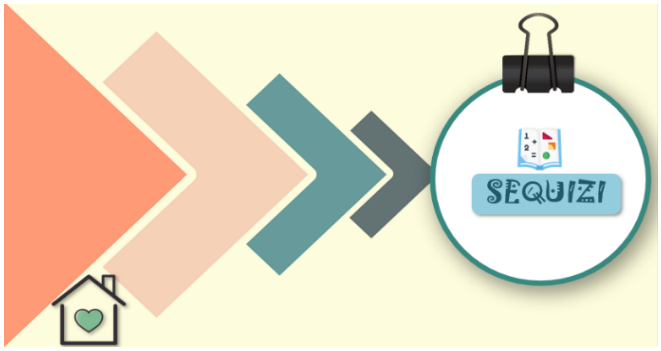

Figure 8. Before The Quiz Repair Was Carried Out

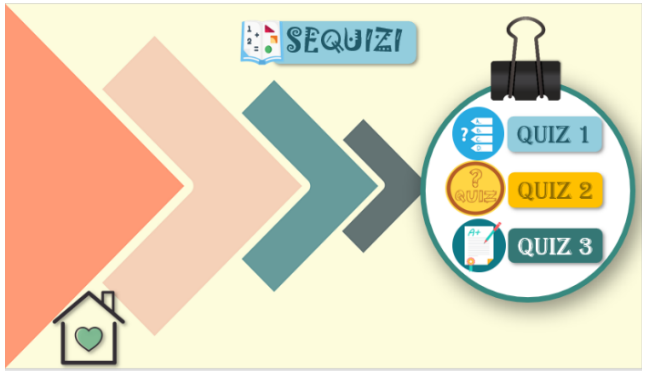

Figure 9. Improved Quiz Distribution and Working Time

During the stages in the development, after the expert validation analysis test was carried out, a practicality test was carried out by distributing the "Radar" application to ten students. Students were asked to fill out the practicality test instrument. The results of the practicality test of the instruments are presented in Table 6.

Table 6. Student Practicality Test Results

Student	Score	Percentage (%)
1	77	85.56
2	76	84.44
3	78	86.67
4	80	88.89
5	75	83.33
6	76	84.44
7	77	85.56
8	79	87.78
9	74	82.22
10	79	87.78
Amount Average		86.67

It is based on Table 6. The practicality test percentage is 86.67%, so the "Radar "e-module is categorized as very practical. The results of this study are supported by Widiastuti (2021), which in the developed e-module, obtained very high practicality test results with a percentage of 92.6%. Accraf *et al*. (2019) also found something similar; the results of the practicality test on students showed a percentage of 85%, so that the product developed was "efficient" so that the e-module was very interesting for students to use in the learning process.

The e-module is declared valid and practical based on content validity and practicality tests. The products are registered with copyrights at the Ministry of Law and Human Rights. The registration number obtained is EC00202233121 which will then be disseminated to pre-research elementary schools and through the website of the Universitas Negeri Semarang Educational and Professional Development Institute, which can be accessed at the IP address: http://media.lp3.unnes.ac.id/produk/SD/materi/624.

Conclusion

The development of the "Radar" e-module from the content validity analysis test obtained a content validity value of 0.9167, construct validity of 0.9208, and language validity of 0.8819. The final validity value of the e-module was 0.9065 with valid criteria. The practicality test results get a percentage of 86.67% and are included in the convenience category. Based on the validity and practicality of test results, the "Radar" e-module is feasible and practical to use to improve students' concepts of human blood circulation. This e-module will run on an Android smartphone so students will feel like they are playing and happy while learning. It is hoped that the "Radar" E-Module will motivate and be enthusiastic when learning. Thus, students will more quickly master the material concept of human blood circulation.

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Author Contributions

The principal author, Esty Setyo Utaminingsih, contributed to designing research, conducting research, developing e-module, data curation, writing original drafts, writing reviews, and editing. The second author, Tri Joko Raharjo, guided the research and validated the e-module, and the next author, Ellianawati, played a role in conducting the study, developing the evaluation, and writing the review instrument. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

References

Al-Mutawah, M. A., Alghazo, Y. M., Mahmoud, E. Y., Preji, N., & Thomas, R. (2021). Designing a need-based integrated steam framework for primary schools in Bahrain. *International Journal of Education and Practice*, *9*(3), 602–612. https://doi.org/10.18488/journal.61.2021.93.602.612

Amalia, R. N., Pasani, C. F., & Yulinda, R. (2021). Pengembangan Modul Sistem Peredaran Darah Berbasis Literasi Sains dan Bermuatan Karakter Kreatif. *Journal of Mathematics Science and Computer Education*, *1*(1), 44. https://doi.org/10.20527/jmscedu.v1i1.3371

An, S. (2020). The impact of STEAM integration on preservice teachers' disposition and knowledge. *Journal of Research in Innovative Teaching & Learning*, *13*(1), 27–42. https://doi.org/10.1108/jrit-01-2020-0005

Bilgiler, S., Dergisi, E. A., Monkeviciene, O., Autukeviciene, B., Kaminskiene, L., &

Monkevicius, J. (2020). *Journal of Social Studies Education Research Impact of innovative STEAM education practices on teacher professional development and 3-6-year-old children's competence development*. *2020*(4), 1–27. www.jsser.org

Chung, C. C., Huang, S. L., Cheng, Y. M., & Lou, S. J. (2022). Using an iSTEAM project-based learning model for technology senior high school students: Design, development, and evaluation. In *International Journal of Technology and Design Education* (Vol. 32, Issue 2). Springer Netherlands. https://doi.org/10.1007/s10798-020-09643-5

Chusna, P. A., & Utami, A. D. M. (2020). Dampak Pandemi Covid-19 Terhadap Peran Orang Tua Dan Guru Dalam Meningkatkan Kualitas Pembelajaran Daring Anak Usia Sekolah Dasar. *PREMIERE : Journal of Islamic Elementary Education*, *2*(1), 11–30. https://doi.org/10.51675/jp.v2i1.84

Deng, R., Benckendorff, P., & Gannaway, D. (2019). Progress and new directions for teaching and learning in MOOCs. *Computers and Education*, *129*, 48–60. https://doi.org/10.1016/j.compedu.2018.10.019

Elci, T. N., Bare, Y., & Mago, O. Y. T. (2021). Pengembangan Media Pembelajaran Biologi Berbasis Android Menggunakan Model Pembelajaran Problem Based Learning Pada Materi Sistem Ekskresi Di Kelas VIII SMP. *Jurnal Pendidikan Mipa*, *11*(2), 54–62. https://doi.org/10.37630/jpm.v11i2.484

Ellianawati, E., Mufiatunnikmah, S., Setyaningsih, N. E., & Subali, B. (2020). Asesmen Multi Representasi Berbasis Keterampilan Abad Ke-21 pada Materi Gerak Lurus. *Physics Education Research Journal*, *2*(1), 19. https://doi.org/10.21580/perj.2020.2.1.5038

Han, X., Wang, Y., & Jiang, L. (2019). Towards a framework for an institution-wide quantitative assessment of teachers' online participation in blended learning implementation. *Internet and Higher Education*, *42*, 1–12. https://doi.org/10.1016/j.iheduc.2019.03.003

Hasanudin, C., Subyantoro, S., Zulaeha, I., & Pristiwati, R. (2021). Strategi Menyusun Bahan Ajar Inovatif Berbasis Mobile Learning untuk Pembelajaran Mata Kuliah Keterampilan Menulis di Abad 21. *Prosiding Seminar Nasional Pascasarjana*, 343–347. http://pps.unnes.ac.id/prodi/prosiding-pascasarjana-unnes/

Hendryadi, H. (2017). Validitas Isi: Tahap Awal Pengembangan Kuesioner. *Jurnal Riset Manajemen Dan Bisnis (JRMB) Fakultas Ekonomi UNIAT*, *2*(2), 169–178. https://doi.org/10.36226/jrmb.v2i2.47

Heryani, A., Pebriyanti, N., & Wahyuningsih, Y. (2022). Peran Media Pembelajaran Berbasis Teknologi dalam Meningkatkan Literasi Digital Pada Pembelajaran IPS di SD Kelas Tinggi The Role Of Technology-Based Learning Media In Improving Digital Literacy In IPS Learning In High Class SD. *Maret*, *31*(1), 17–28.

Irawan, A. G., Padmadewi, N. nyoman, & Artini, L. P. (2018). Instructional materials development through 4D model. *SHS Web of Conferences*, *42*(00086), 1–4. https://doi.org/10.1051/shsconf/20184200086

Jazuli, M., Azizah, L. F., & Meita, N. M. (2018). Pengembangan Bahan Ajar Elektronik Berbasis Android Sebagai Media Interaktif. *LENSA (Lentera Sains): Jurnal Pendidikan IPA*, *7*(2), 47–65. https://doi.org/10.24929/lensa.v7i2.22

Lu, S., Lo, C., & Syu, J. (2022). Project-based learning oriented STEAM: the case of micro–bit paper-cutting lamp. *International Journal of Technology and Design Education*, *32*(5), 2553–2575. https://doi.org/10.1007/s10798-021-09714-1

Maulida, H., Sinaga, P., & Susilawati, M. (2019). Pengembangan Bahan Ajar IPA Terpadu Berbasis Android Berorientasi Keterampilan Berpikir Kritis. *Jurnal Petik*, *5*(1), 70–76. https://doi.org/10.31980/jpetik.v5i1.492

Nabil, N. R. A., Wulandari, I., Yamtinah, S., Ariani, S. R. D., & Ulfa, M. (2022). Analisis Indeks Aiken untuk Mengetahui Validitas Isi Instrumen Asesmen Kompetensi Minimum Berbasis Konteks Sains Kimia. *Paedagogia*, *25*(2), 184. https://doi.org/10.20961/paedagogia.v25i2.64566

Ningrum, K. D., Utomo, E., Marini, A., & Setiawan, B. (2022). Media Komik Elektronik Terintegrasi Augmented Reality dalam Pembelajaran Sistem Peredaran Darah Manusia di Sekolah Dasar. *Jurnal Basicedu*, *6*(1), 1297–1310. https://doi.org/10.31004/basicedu.v6i1.2289

Nugraha, M. S. L., Hunaifi, A. A., & Damariswar, R. (2020). Pengembangan Multimedia Peredaran Darah Manusia Pembelajaran Tema 4 Subtema 1 Peredaran Darahku Sehat pada Siswa Kelas V SD. *Prosiding Seminar Nasional Pendidikan FKIP UNMA*, *2*(Agustus), 33–44.

Quigley, C. F., Herro, D., King, E., & Plank, H. (2020). STEAM Designed and Enacted: Understanding the Process of Design and Implementation of STEAM Curriculum in an Elementary School. *Journal of Science Education and Technology*, *29*(4), 499–518. https://doi.org/10.1007/s10956-020-09832-w

Rofiyadi, Y. A., & Handayani, S. L. (2021). Pengembangan Aplikasi E-Modul Interaktif Berbasis Android Materi Sistem Peredaran Darah Manusia Kelas V Sekolah Dasar. *JPDI (Jurnal Pendidikan Dasar Indonesia)*, *6*(2), 54. https://doi.org/10.26737/jpdi.v6i2.2575

Salas-Rueda, R. A., Salas-Rueda, É. P., & Salas-Rueda, R.

D. (2020). Analysis and design of the web game on descriptive statistics through the addie model, data science and machine learning. *International Journal of Education in Mathematics, Science and Technology*, *8*(3), 245–260. https://doi.org/10.46328/IJEMST.V8I3.759

Sasmito, L. F. (2022). Upaya Meningkatkan Hasil Belajar Tentang Peredaran Darah Manusia dengan Menggunakan Model Pembelajaran Two Stay Two Stray Pada Siswa Kelas V SDN Tunggulsari II Tahun Pelajaran 2020/2021. *Jurnal Ilmiah Mitra Swara Ganesha*, *9*(1), 22–31.

Sihaloho, S. B., PA, R. H. B., & Tambunan, P. (2022). Analisis Kesulitan Belajar Siswa Pada Materi Peredaran Darahku Sehat Sub Tema 1 Pada Mata Pelajaran Ipa Di Kelas V Upt Spf Sd Negeri 101816 Pancur Batu Tahun Ajaran 2021 / 2022. *Prosiding Seminar Nasional Pendidikan, Saintek, Sosial Dan Hukum (PSSH)*, *1*, 1–12. https://books.google.co.id/books?id=UwcxEAAAQBAJ

Ulfa, L., Friansyah, D., & Hajani, T. J. (2021). Pengembangan Media Pembelajaran Berbasis Powerpoint Interaktif pada Materi Peredaran Darah Kelas V SDN Rejosari. *Journal of Elemantary School (JOES)*, *4*(2), 106–117.

Utaminingsih, E. S. (2022). Model Role Playing Berseri Dalam Pembelajaran Menyampaikan Saran Pada Peserta Didik Kelas III. In *Inovasi Pembelajaran Era Society 5.0* (V, pp. 71–89). Semarang : LPPM Unnes.

Utaminingsih, E. S., Sulasih, & Mulyaningtiyas, T. (2023). *Group Investigative Learning Model to Improve Student's Critical Thinking Skills Through Learning Social Sciences*. *XII*(01), 99–107. https://www.jurnal.syekhnurjati.ac.id/index.php/edueksos/index

Wardani, R. K., & Syofyan, H. (2018). Pengembangan Video Interaktif pada Pembelajaran IPA Tematik Integratif Materi Peredaran Darah Manusia. *Jurnal Ilmiah Sekolah Dasar*, *2*(4), 371. https://doi.org/10.23887/jisd.v2i4.16154

Zulaeha, I. (2016). *Teori, Model, dan Implementasi Pembelajaran Menulis Kreatif*. UNNES Press.

Zulaeha, I., Sulisyaningrum, S., Suratno, S., Pristiwati, R., Arsanti, M., & Supriyono, A. Y. (2021). Bimtek Pengembangan Bahan Ajar Digital Bahasa Indonesia Bermuatan Multikultural bagi Guru MTs/SMP di Kota Semarang. *Journal of Community Empowerment*, *1*(2), 01–06. https://doi.org/10.15294/jce.v1i2.48993

Zulfahrin, L. U., Wardani, S., Hijau Bumi Tridharma, K., & Tenggara, S. (2019). The Development of Chemical E-Module Based on Problem of Learning to Improve The Concept of Student Understanding Article Info. *Innovative Journal of Curriculum and Educational Technology*, *8*(2), 59–66. https://journal.unnes.ac.id/sju/index.php/ujet/article/view/31340