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Implementation Model Learning Cooperative Type CIRC (Cooperative Integrated Reading and Composition) Accompanied Biology Comics Media to Improve Students' Learning Interest in Lesson Biology on Student Class VII-A

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Abstract
The aim of this study is to increase students' interest in learning biology lessons in class VII A of SMP Negeri 14 Surakarta through the application of model learning cooperative CIRC type accompanied by comic media biology on Environmental Pollution material. This research is a classroom action research which ongoing in 3 cycles. Each cycle consists of The four basic stages are planning, action, observation, and reflection. Research data collection used questionnaires, observation sheets, and interviews. Data validity was measured using triangulation techniques, namely method triangulation. Data analysis used descriptive analysis techniques. The results of this study show that in cycle I based on The observation sheet shows that the average percentage of students' learning interest in the class was 57.53%, 65.12% in cycle II (an increase of 7.59%), and 83.28% in cycle III (increase 18.16%). Temporary based on questionnaire, average The percentage of students' learning interest in cycle I was 71.04%, 71.77% in cycle II (an increase of 0.73%), and 73.66% in cycle III (an increase of 1.89%). The results of student interviews showed that students were happier and found it easier to in learning biology lessons. Students are also interested in learning, students also feel that learning during the action is an interesting activity. The conclusion of this study is that the application of the CIRC learning model accompanied by biology comic media on the material of Environmental Pollution can increase students' interest in learning in class VII A students of SMP Negeri 14 Surakarta.

INTRODUCTION

Today's rapid flow of information demands that visions, missions, goals, and strategies be adjusted to meet current needs to stay current. Therefore, the quality of education must be continually developed at the local, national, and global levels (Kartini, Widiyowati, and Kusumawardani 2018). The KTSP

(Educational Unit Level Curriculum) is a follow-up to educational policies within the context of regional autonomy and decentralization (Wasida and Tanjung 2021). The KTSP is an operational curriculum developed and implemented at each educational unit level, taking into account the competency standards and basic competencies established by the National Education Standards Agency (BSNP) (Royani, Roesminingsih, and Yani 2020).

Factors that influence learning include: internal student factors, external student factors, and learning approach factors. Internal factors are factors that originate from the student themselves, consisting of: aspect physiological And aspect psychological. Aspect physiological covering the physical condition of students, while psychological aspects include student intelligence, student attitudes, student talents, Student interests and motivation (Sirait, G., Tobing, P. U. A. L., & Djulia 2021). External factors include the social environment, non-social environment, learning methods, and learning media.

Learning approach factors refer to the types of learning efforts students make, including the strategies and methods students use to carry out activities (Hasriyanti 2019). Students' interest in learning is influenced by three aspects, including: attention student on moment the teaching and learning process is taking place, students are happy, students are curious, class, friends, and school. This factor is one of the internal factors included in the psychological aspects that influence the success of students' learning process (Sartika, Musyifah, and Syarifuddin 2022). Based on observations conducted at SMP Negeri 14 Surakarta, numerous problems arose in the teaching and learning process (Philp 2022). Among them, learning remained teacher-centered. Teacher explain material in front class with method lecture and less involvement of students in the teaching and learning process. Students appear passive, some talk to Friend sitting on the same bench And There are also those who cause disturbances in the classroom. In addition to observations, interviews with students in grade VII-A of SMP Negeri 14 Surakarta revealed that students lack interest in reading and studying (Jehamin, Syam, and Setyasih 2020). This indicates that students' attitudes and interests in biology learning are still lacking. The problem of students' interest in learning and reading is a very fundamental problem that must be resolved immediately. The most prominent cause is students' lack of concentration and excessive talking with their desk mates, which disrupts their interest in biology lessons .The success of learning depends on the process before the lesson begins, including interest, motivation, and family support (Saputra 2021). According to Slameto(Christina and Kristin 2016) interest is something flavor more Like And flavor interest on something matter o An activity without prompting. Interest can influence the quality of a student's learning outcomes in a particular subject. For example, a student with a strong interest in biology will focus more attention than other students (Sasferi 2018). This intense focus is what enables the student earlier to study harder and ultimately achieve the desired results. Interest is a factor that comes from within the student (Mulyani and Doyan 2023). Efforts to increase students' interest in learning by selecting learning methods that are interesting, able to activate students, and appropriate to the subject matter (Haulia, Hartati, and Mas'ud 2022). Namely by improving the biology learning system for class VII A of SMP Negeri 14 Surakarta using the cooperative learning model of the Cooperative Integrated Reading and Composition (CIRC) type accompanied by... media comic biology . According to Elaine and Melissa (Fatimah, Khoiri, and Rachman 2018) CIRC is one model of the student team learning approach that still needs to be developed and evaluated.

In CIRC using heterogeneous teams whose members work together, take tests, and receive awards for their achievements. Elaine and Melissa also mentioned that CIRC is a specialized instructional program designed to improve students' reading and writing performance (Suci and Yamin 2022). In Margarata et al.'s report (Safitri 2026)the activities contained in the CIRC model are that students are assigned to study in groups consisting of 4 students and whose members are heterogeneous. The activities carried out by students include reading, identifying the main reading/topic in the reading, vocabulary, reading comprehension exercises, and writing using the writing process (Limatahu, Roini, and Limatahu 2023).

The use of media can make it easier for teachers to convey lesson material. However, teachers need to be careful in selecting media and organizing learning. This is because coordination and communication are essential. Which not enough Good between Teacher And student can result in Students are simply playing around while learning. Furthermore, teachers must be careful because the media they create is often commercial in nature without considering the potential consequences (Soeharto and Csapó 2021).

According to Fatra (Khaatimah and Wibawa 2017) the main role of educational comics is their ability to create interest. the students. Use Comics in learning should be guided by teaching methods, so that comics can become an effective learning medium (Israwaty, Jannah, and Sari 2020). The process of implementing the Cooperative Integrated Reading and Composition (CIRC) learning model is carried out in several stages as follows (Eliantari, Kristiantari, and Sujana 2020):

1) The first stage of preparation, which includes: a) in terms of learning materials, CIRC is designed in such a way as to facilitate group learning, b) assigning students to groups in a way that the groups in this learning consist of 4-5 students. consists of from student clever, currently, And low. Beside the teacher considers other heterogeneity criteria such as gender, background social, And and so on. c) Determining the initial score where the initial score is the average individual score on the previous test, and d) distribution of the results sheet (book report), namely the teacher provides a results sheet which is used by students when working on assignments in the form of discourse (Saputri, Sunardi, and Musadad 2021).
2) The second stage is the material presentation stage, which includes: a) introduction, b) development, teachers carry out development in the form of development appropriate learning materials with what students will learn in groups, cooperative learning emphasizes that Study is to understand the meaning and not memorize, mutually control students' understanding by asking questions (Puriasih and Trisna 2022). questions, provide explanations Why answer question the Correct or wrong, c) guided practice, students are asked to work on questions based on the questions given and the teacher gives students assignments, the assignments given should not take up too much time. The teacher gives students + 10 minutes to give assignments. Next activity is d) group activities, In this activity, the teacher distributes discussion materials in the form of discourse to students. Each group member is required to discuss and find the main idea contained in the discourse given by the teacher previously, the group writes down the results of the discussion in a book report and then read the results in front of the class, other groups are required to provide feedback on the results of the discussion of other groups.
3) The third stage is the evaluation stage, at this time the teacher gives evaluation to student Which must done individually within the specified time + 15 minutes. In give evaluation need to use the guidelines as listed in table 1.

Table 1.
Indicator Discourse assessment

Score Indicator	
Main idea	>80 (very good) 71 – 80 (good) 60 – 70 (sufficient)
	Implied message >80 (very good) 71 – 80 (good) 60 – 70 (enough)
Summary overview	>80 (very Good) 71 – 80 (good) 60 – 70 (Enough)

Table 2.
Calculation Score Development

Score Value Test	development
More from 10 points at lower score beginning	0
1 until 10 points at lower score beginning	10
Initial score up to with 10 points on	20
More from 10 points at on score beginning	30
Mark perfect (not based on score beginning)	30

The fourth stage is the stage of giving awards for group achievements, there are three levels of awards as follows:

a) A group with an average score of 15 is called a good team.
b) A group with an average of 20 is called a great team.
c) A group with an average score of 25 is called a super team.

For awarding awards, the score calculation used is as in table 2. core activity time becomes more effective. Students who work in cooperative team of this activity which is coordinated with group teaching in order to meet the objectives to be achieved (Fitria et al. 2023).

According to Elaine and Melissa (Rina et al. 2020) CIRC will have a positive effect on students' achievement in reading, especially in reading comprehension. The objective to be achieved in this research is to increase the interest in learning biology lessons of class VII A students at SMP Negeri 14 Surakarta through a cooperative learning model. Type Cooperative Integrated Reading Composition (CIRC) accompanied by biology comic media.

METHOD

The research used Classroom Action Research (CAR), conducted collaboratively with teachers. Classroom action research consists of four basic, interrelated and continuous stages: planning, acting, and observing. and reflection, starting with the pre-PTK stage to determine the initial state of the learning process (Arizen and Suhartini 2020). The analysis technique used in this research is descriptive (Purbosari and Ma'rifah 2021).

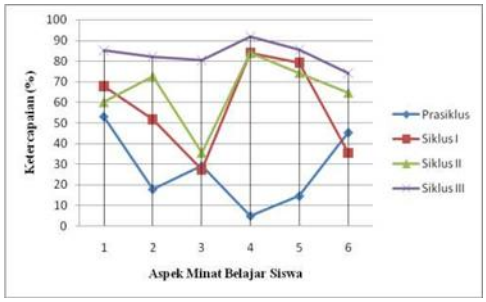
RESULTS AND DISCUSSION

This research was conducted in class VII A of SMP Negeri 14 Surakarta in the academic year. Based on the results of this study, learning shows that the application of the learning model learning cooperative type (Utomo et al. 2020). Cooperative Integrated Reading and Composition (CIRC) is able to increase students' interest in learning biology lessons which include attention student in class, student enjoyment, student curiosity, and student interest in friends, class, and school. This improvement was measured through questionnaires, observation sheets, and interviews with students and teachers (Maryani and Amalia 2018). The results showed that the implementation of the CIRC cooperative learning model accompanied by biology comics media can increase students' learning interest in the learning process. The results of observations of students' learning interest before the implementation of the action were relatively low. The percentage of observations of students' learning interest in the pre-cycle, cycle I, cycle II, and cycle III are presented in Table 3.

Table 3.
Comparison of Student Learning Interest Achievements Based on Sheet Observation of Each Cycle

Indicator r	Achievements (%) Cycle			
	Pre cycle	Cycle I	II	Cycle III
1	52.90	67.74	60.00	85.16
2	17.74	51.61	72.58	82.26
3	29.03	27.42	35.48	80.65
4	4.84	83.87	83.87	91.94
5	14.52	79.03	74.19	85.48
6	45.16	35.48	64.52	74.19
Amount	**164.19**	**345.16**	**390.65**	**499.68**
Flat-	**27.37**	**57.53**	**65.11**	**83.28**
flat				

The graph of the percentage of achievement of aspects of student learning interest in the pre-cycle, cycle I, cycle II, and cycle III can be seen in Figure 1.



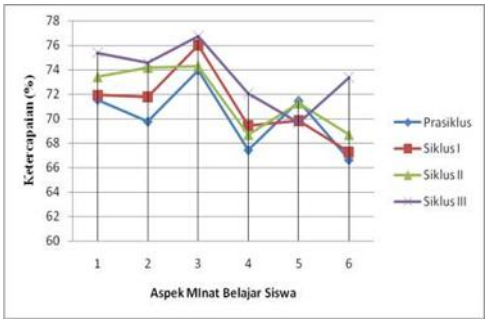
Picture 1. Comparison Aspect Interest Study Student Each Cycle

Based on the results of students' interest in learning with the student interest in learning questionnaire, it can be seen in Table 4.

Table 4.
Comparison of Student Learning Interest Achievements Based on Questionnaires Interest Study Student

Indicators	Achievements (%)			
	Pre cycle	Cycle I	Cycle II	Cycle III
1	71.55	71.94	73.42	75.42
2	69.76	71.77	74.19	74.59
3	73.98	76.02	74.30	76.77
4	67.42	69.44	68.71	72.09
5	71.45	69.84	71.29	69.68
6 66.61	67.26	68.71	73.39	
Amount	**420.77**	**426.26**	**430.62**	**441.95**
Flat-				

The graph of the percentage of students' learning interest achievement in the pre-cycle, cycle I, cycle II, and cycle III based on the student learning interest questionnaire can be seen in Figure 2.

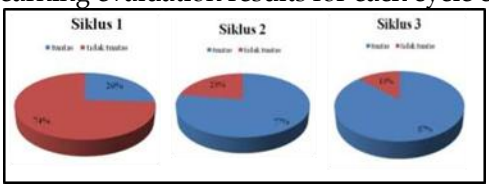


Picture 2. Comparison pre-cycle,

cycle I, cycle II, and cycle III based on questionnaire student learning interest Based on Tables 3 and 4, student learning interest achievement shows improvement in each cycle. Although the first and second cycles did not reach the desired target, but the research target was achieved in cycle III. through the application of the CIRC type cooperative learning model accompanied by Biology comic media applied in learning, it was able to improve students' learning experiences so that later student capable remember information (Sari et al. 2021).

That has been done. In this learning process, students not only hear and see but also do something information which is obtained through a designed group discussion learning model is a cooperative learning model that can encourage students to actively exchange ideas or information with other students (Irdalisa; et. al 2022). By exchanging information, student engagement will increase. in process learning and make the learning process more meaningful (Susanto et al. 2024).

In addition, students' curiosity can be seen during the learning process. Many students ask And Opinions on the topic of Environmental Pollution. Students with a strong interest in learning will be more enthusiastic about learning than students with less interest. Student interviews indicate that students enjoy learning. with the help of module (Lestari and Irwansyah 2020). Student state that learning biology more easy to understand and no to be memorized. The statement above is supported by the results of research conducted by Calderon, et al. (1997: 2) who put forward the problem of the model CIRC, namely by using the CIRC model, has found consistent positive effects, namely increasing student achievement, especially in measuring understanding. read. Performance students can be seen in the evaluation scores students have done. A comparison of student learning evaluation results for each cycle can be seen in Figure 3.



Picture 3. Percentage Mark Evaluation Student Cycle I, Cycle II, and Cycle III

Student grades experienced the greatest increase tall on cycle III compared to the evaluation scores in Cycle I and Cycle II. This is because students are always active in the learning process, so they understand what the teacher has taught. Opinion student, with discussion activities on the model CIRC type cooperative learning accompanied by Biology comic media makes students more motivated to study in groups to get rewards, in addition, students become easier to understand the material and can learn in different ways (Susanto et al. 2023). This statement shows that learning meaningfully with students who are fully involved in teaching and learning activities makes students' mastery of concepts in the material deeper, students' understanding becomes deeper when compared to learning by rote. Based on the results of the discussion above, it can be concluded that that implementation The CIRC type cooperative learning model accompanied by Biology comic media can increase students' interest in learning Biology in class students. VIIA Junior High School Country 14 Surakarta 2011/2012 academic year (IRDALİSA et al. 2022).

CONCLUSION

Based on the research results it can be concluded that implementation Cooperative Integrated Reading and Composition (CIRC) accompanied by biology comic media can increase students' interest in learning biology lessons for class VII A students at SMP Negeri 14 Surakarta.

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Author Contributions

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Conflicts of Interest

This research is conducted to provide information to the public regarding the research that has been conducted so that it can be used for educational purposes. in addition, this research is used by researchers for lecturer performance loads and accreditation needs of study programmes and institutions

REFERENCES

Arizen, Aga, And S. Suhartini. 2020. "Mobile Learning Student Worksheet Based On Socio-Scientific-Issues: Enhancing Students' Scientific Literacy Skills In Biology." *Jpbi (Jurnal Pendidikan Biologi Indonesia)* 6(1):15–24. Doi:10.22219/Jpbi.V6i1.11196.

Christina, Lucia Venda, And Firosalia Kristin. 2016. "Efektivitas Model Pembelajaran Tipe Group Investigation (Gi) Dan Cooperative Integrated Reading And Composition (Circ) Dalam Meningkatkan Kreativitas Berpikir Kritis Dan Hasil Belajar Ips Siswa Kelas 4." *Scholaria : Jurnal Pendidikan Dan Kebudayaan* 6(3):217. Doi:10.24246/J.Scholaria.2016.V6.I3.P217-230.

Eliantari, Ni Putu Regina, Mg. Rini Kristiantari, And I. Wayan Sujana. 2020. "Pengaruh Model Pembelajaran Cooperative Integrated Reading And Composition Berbantuan Circular Card Terhadap Keterampilan Menulis." *Jurnal Penelitian Dan Pengembangan Pendidikan* 4(1):23. Doi:10.23887/Jppp.V4i1.24780.

Fatimah, Fatimah, Ahmad Khoiri, And Syaiful Rachman. 2018. "Pengaruh Model Pembelajaran Kooperatif Tipe Cooperative Integrated Reading And Composition (Circ) Terhadap Hasil Belajar Ilmu Pengetahuan Sosial Siswa Kelas V Sd Negeri 3 Ella Hulu." *Jurnal Pendidikan Dasar* 6(2):74–84. Doi:10.46368/Jpd.V6i2.144.

Fitria, Yanti, Adam Malik, Mutiaramses, Siti Hajar Halili, And Rizky Amelia. 2023. "Digital Comic Teaching Materials: It's Role To Enhance Student's Literacy On Organism Characteristic Topic." *Eurasia Journal Of Mathematics, Science And Technology Education* 19(10). Doi:10.29333/Ejmste/13573.

Hasriyanti, Hasriyanti. 2019. "Pengaruh Model Pembelajaran Cooperative Integrated Reading And Composition (Circ) Terhadap Hasil Belajar Siswa Sekolah Menengah Atas." *Lageografia* 18(1):36. Doi:10.35580/Lga.V18i1.10974.

Haulia, Lia Sania Nur, Sri Hartati, And Asrianty Mas'ud. 2022. "Learning Biology Through The Ethnoscience-Pbl Model: Efforts To Improve Students' Scientific Thinking Skills." *Scientiae Educatia* 11(2):119. Doi:10.24235/Sc.Educatia.V11i2.11229.

Irdalisa; Et. Al. 2022. "Technological Pedagogical Content Knowledge: Ability Prospective Teachers Biology Education Department In Jakarta Indonesia." *International Journal Of Educational Research Review* 114–23. Doi:10.24331/Ijere.1050594.

Irdalisa, Irdalisa, Tuti Marjan Fuadi, Mega Elvianasti, And Bagus Endri Yanto. 2022. "Technological Pedagogical Content Knowledge: Ability Prospective Teachers Biology Education Department In Jakarta Indonesia." *International Journal Of Educational Research Review* 7(2):114–23. Doi:10.24331/Ijere.1050594.

Israwaty, Ila, Nur Jannah, And Nilan Sari. 2020. "Pengaruh Model Kooperatif Tipe Cooperative Integrated Reading And Composition Terhadap Hasil Belajar Siswa Pada Tema 7 Sd Negeri 85 Parepare." *Peteka* 3(1):9–16. Doi:Http://Dx.Doi.Org/10.31604/Ptk.V3i1.9-16.

Jehamin, Gaudensius, Muliati Syam, And Iya Setyasih. 2020. "Pengaruh Model Pembelajaran Cooperative Integrated Reading And Composition (Circ) Terhadap Hasil Belajar Geografi Kelas X Di Sma Budi Luhur Samarinda." *Geoedusains: Jurnal Pendidikan Geografi* 1(1):42–50. Doi:10.30872/Geoedusains.V1i1.184.

Kartini, Ninik, Iis Intan Widiyowati, And Ratna Kusumawardani. 2018. "Pengaruh Model Cooperative Integrated Reading And Composition Terhadap Hasil Belajar Kimia Siswa Smk Pada Pokok Bahasan Sistem Koloid." Pp. 55–57 In *Prosiding Seminar Nasional Kimia Dan Pendidikan Kimia*. Vol. 1.

Khaatimah, Husnul, And Restu Wibawa. 2017. "Efektivitas Model Pembelajaran Cooperative Integrated Reading And Composition Terhadap Hasil Belajar." *Jurnal Teknologi Pendidikan: Jurnal Penelitian Dan Pengembangan Pembelajaran* 2(2):76–87. Doi:Https://Doi.Org/10.33394/Jtp.V2i2.596.

Lestari, Annisa Fitriana, And Irwansyah Irwansyah. 2020. "Line Webtoon Sebagai Industri Komik Digital." *Source : Jurnal Ilmu Komunikasi* 6(2):134. Doi:10.35308/Source.V6i2.1609.

Limatahu, Iqbal, Chumidach Roini, And Nur Asbirayani Limatahu. 2023. "Ecoprint Batik Training For Biology And Craft Teachers Using Local Materials From Ternate Island." *Transformasi: Jurnal Pengabdian Masyarakat* 19(2):309–20. Doi:Https://Doi.Org/10.21009/Jtp.V26i1.45471.

Maryani, Ika, And Luluk Amalia. 2018. "The Development Of Science Comic To Improve Student's Understanding In Elementary School." *Jurnal Inovasi Pendidikan Ipa* 4(1):75–82. Doi:10.21831/Jipi.V4i1.21076.

Mulyani, Irna, And Aris Doyan. 2023. "The Effect Of Biology Learning On Increasing Students' Scientific Literacy: A Review." *Amplitudo : Journal Of Science And Technology Inovation* 2(2):89–94. Doi:10.56566/Amplitudo.V2i2.104.

Philp, Jim. 2022. "Skills And Education For Engineering Biology." Pp. 47–79 In *Importance Of Microbiology Teaching And Microbial Resource Management For Sustainable Futures*. Elsevier.

Purbosari, Purwanti Pratiwi, And Destri Ratna Ma'rifah. 2021. "Knowledge And Attitude Of Biology Teacher Candidate Students Towards Genetically Modified Organisms (Gmos)." *Scientiae Educatia* 10(2):128. Doi:10.24235/Sc.Educatia.V10i2.9173.

Puriasih, Kadek Nita, And Gusti Ayu Putu Sukma Trisna. 2022. "Digital Comics Learning Media Based On Problem Based Learning In Science Subjects For Fourth Grade Elementary School." *Mimbar Pgsd Undiksha* 10(2):367–75. Doi:10.23887/Jjpgsd.V10i2.48575.

Rina, Nofha, Jenny Ratna Suminar, Ninis Agustini Damayani, And Hanny Hafiar. 2020. "Character Education Based On Digital Comic Media." *International Journal Of Interactive Mobile Technologies* 14(3). Doi:10.3991/Ijim.V14i03.12111.

Royani, Peni, Maria Veronica Roesminingsih, And Muhammad Turhan Yani. 2020. "Pengaruh Model Pembelajaran Kooperatif Tipe Cooperative Integrated Reading And Composition (Circ) Berbantu Teknik Mind Mapping Untuk Meningkatkan Keterampilan Sosial Dan Hasil Belajar Ips Kelas V Sekolah Dasar." *Jurnal Education And Development* 8(2):567.

Safitri, Dini. 2026. "Penerapan Model Pembelajaran Cooperative Integrated Reading And Composition (Circ) Dalam Meningkatkan Keterampilan Membaca Pemahaman Siswa Kelas V Sd Negeri 130 / Vi Sungai Manau Iii." 11(3):3622–31.

Saputra, Yushendri. 2021. "Pengunaan Model Pembelajaran Cooperative Integrated Reading And Composition (Circ) Dalam Meningkatkan Aktivitas Dan Hasil Belajar Siswa Kelas Xi Materi Pengaruh Perkembangan Agama Dan Kebudayaan Hindu-Buddha." *Almufi Journal Of Measurement, Assessment, And Evaluation Education* 1(2):95–105.

Saputri, Atika Diyah, Sunardi Sunardi, And Akhmad Arif Musadad. 2021. "Digital Comics As A Media In Efl Reading Classrooms." *Al-Ishlah: Jurnal Pendidikan* 13(2):1097–1102. Doi:10.35445/Alishlah.V13i2.758.

Sari, Y., R. P. Sari, M. S. Sumantri, And A. Marini. 2021. "Development Of Digital Comic For Science Learning In Elementary School." *Iop Conference Series: Materials Science And Engineering* 1098(3):032060. Doi:10.1088/1757-899x/1098/3/032060.

Sartika, Dewi, Siti Musyifah, And Syarifuddin Syarifuddin. 2022. "Pengaruh Model Pembelajaran Cooperatif Integrated Reading And Composition (Circ) Terhadap Hasil Belajar Siswa Di Kelas Viii Mtsn 4 Bima." *Diksi: Jurnal Kajian Pendidikan Dan Sosial* 3(1):38–50. Doi:10.53299/Diksi.V3i1.139.

Sasferi, N. 2018. "Language Skills Melalui Cooperative Integrated Reading And Composition (Cird) Dalam Pembelajaran Bahasa Di Ma Negeri 1 Kerinci." *Jurnal Tabarwi: Jurnal Ilmu Pendidikan* 14(1):45–55.

Sirait, G., Tobing, P. U. A. L., & Djulia, E. 2021. "Biology Teacher's Understanding Of Nature Of Science (Nos)." *Journal Of Mathematics And Natural Sciences* 1(2).

Soeharto, Soeharto, And Benő Csapó. 2021. "Evaluating Item Difficulty Patterns For Assessing Student Misconceptions In Science Across Physics, Chemistry, And Biology Concepts." *Heliyon* 7(11):E08352. Doi:10.1016/J.Heliyon.2021.E08352.

Suci, Amalia Ika, And Moh Yamin. 2022. "Pengaruh Model Cooperative Integrated Reading And Composition (Circ) Terhadap Hasil Belajar Membaca Siswa." *Journal Of Elementary School (Joes)* 5(1):97–105. Doi:Https://Doi.Org/10.31539/Joes.V5i1.3967.

Susanto, Hendra, Ibrohim, Andi Basuki, Hidayah Mohd Fadzil, Afis Baghiz Syafruddin, And Ari Gunawan. 2024. "Development Of An Advanced Biology Learning Website In The Fields Of Biotechnology, Biochemistry, And Biomedicine With The Steam Approach." *International Journal Of Interactive Mobile Technologies* 18(7):158–72. Doi:10.3991/Ijim.V18i07.48083.

Susanto, Hendra, Ibrohim, Andi Basuki, Wiedia Carullina Purwanti, Ari Gunawan, And Afis Baghiz Syafruddin. 2023. "Revolutionary Biology Education: Development Of Advanced Biology Learning Through Websites And Learning Kits." *International Journal Of Science And Society* 5(5):225–39. Doi:10.54783/Ijsoc.V5i5.882.

Utomo, Anjar Putro, Luthfiyatul Hasanah, Slamet Hariyadi, Erlia Narulita, And Nurul Umamah. 2020.

"The Effectiveness Of Steam-Based Biotechnology Module Equipped With Flash Animation For Biology Learning In High School." *International Journal Of Instruction* 13(2):463–76. Http://Www.E-Iji.Net.

Wasida, Ira, And Hasian Romadon Tanjung. 2021. "Pengaruh Penerapan Model Pembelajaran Circ (Cooperative Integrated Reading And Composition) Terhadap Keterampilan Menulis Puisi Modern Siswa Kelas X Sma Negeri 1 Sibabangun." *Jurnal Basasasindo* 1(2a).