Understanding Reproductive System Concepts: Applying the CLIS (Children Learning in Science) Learning Model Combined with the Media Flyer

Muh. Alwi Naharuddin[1*], Jamilah[2], Ummul Hasanah[3]
[1,2,3] Universitas Islam Negeri Alauddin Makassar, Indonesia
*Corresponding Author: jamilah@uin-alauddin.ac.id

ABSTRACT

This study aimed to ascertain how students' understanding of reproduction system concepts was impacted by the CLIS (Children Learning Science) learning model combined with flyer media. This was a quasi-experimental study with a non-equivalent control group design. The population consisted of students in six classes of grade XI at SMA Negeri 3 Polewali. Purposive sampling was utilized in the sampling process to obtain XI IPA 3 as a control class and XI IPA 4 as an experimental class. The data were analyzed using descriptive and inferential statistics. The results showed that the t value was 5,517 and the t table was 1,668. The test results obtained were tcount > ttable (5,517 > 1,668). The test result showed that 5,517 > 1,668, tcount > ttable. As an outcome, at a significant level of 5%, Ha was accepted and Ho rejected. It appears that CLIS learning model, in combination with media flyers, affects students' understanding of biological concepts related to the reproduction system. The research implication is that the CLIS learning model, combined with the flyer media expected to enhance students' conceptual understanding, can be utilized by educators and can also be used as a resource by subsequent researchers.

Keywords: CLIS, concept understanding, flyer, reproduction system

INTRODUCTION

Education is a systematic activity to increase potential and create quality human resources (Sujana, 2019). Education is a complex thing, integrating many aspects such as the learning process, the process of transferring knowledge, the changing of values, and the process of forming character to gain maturity and perfection in individual development in society (Nurkholis, 2013). Through education, a person is expected can reach the maturity of thinking and can be useful for himself and others.

The purpose of education is to develop the potential of individuals so that they can face the challenges of the changing times. In another sense, it is said that the purpose of education is the depiction of philosophy or a view of human life including the norms of a culture, beliefs, myths, ideology, philosophy, and so on. Educational goals can be achieved by providing good

and optimal service (Pasaribu, 2017). A good teacher is a facilitator of the learning process to improve the competence of students. Learning is assistance provided by educators so that the process of acquiring knowledge can occur, mastering skills and character, as well as forming attitudes and beliefs in students (Hadri, 2021). Good and quality learning will produce ideal learning that makes students active, and encourages their creativity so that they can achieve learning goals. The learning process is mostly determined by the teacher, media, infrastructure, and learning models. The appropriate learning model will improve the learning process (Marliani, 2015). The learning model is a systematic procedure in the teaching and learning process and a basis for planning a learning activity (Asyafah, 2019). The model in its application will influence students' understanding of the material, such as explaining and interpreting an idea, rising an idea, or understanding. Anderson & Krathwohl (2021) said that there are several indicators used in understanding the concepts. These indicators are interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining. Many types of media can be selected, developed, and utilized based on the situation of the time (Falahudin, 2014). Considering that, it is expected for teachers to choose the right learning model and learning media. However, there is still the use of inappropriate learning models in some schools.

Based on the results of observations and interviews at SMA Negeri 3 Polewali., some students have difficulty understanding certain materials that are abstract in biology subjects. As revealed by the biology teacher that some of the topics in biology show less interest by students. So that in overcoming learning difficulties most of the students use memorization which is assisted by a summary of the material. However, the rote method will cause verbalism disease, so students will find it difficult to convey ideas because they are not used to it. Difficulty understanding the concept for students requires teachers' help to overcome these problems. Overcoming problems in the field of education can be done by implementing learning strategies. One effort that can be made is to use a learning model that can optimize the learning process in order to improve students' understanding of concepts, as well as the use of media that can provide an overview of abstract material. Various types of learning models can be used to improve students' understanding of concepts, one of which is the CLIS learning model (*Children Learning in Science*).

Seeing the problems encountered, there is a need for a change in the learning process where students play an active role as one of constructivist learning, so this study applied the CLIS learning model combined with flyer media. The CLIS learning model combined with flyer media is expected students will be more interested and enthusiastic and able to assist the learning process so that there is an increase in students' understanding of material concepts, especially scientific concepts. Flyers are also called leaflets and are widely and quickly distributed, in learning this flyer contains material along with pictures so that it helps students to better understand the material. Wahid (2014) has conducted research using flyer media as teaching materials, he concluded that this media increases students' understanding of concepts.

In this learning process, media flyers play a role in helping students understand the material and then reconstruct ideas or concepts in their minds at the idea rearrangement step.

In a previous study by Ajul et al. (2020), the CLIS Model was found effective in enhancing students' science process skills and understanding of physics concepts. The experimental class showed better results than the control class, indicating that the method can improve students' conceptual understanding. Anwar et al. (2017) demonstrated that the CLIS learning model improved learning outcomes in the context of energy materials. In cycle 1, the data showed a 72.22% achievement with an average value of 71.25, while in cycle 2, the achievement reached 86.11% with an average value of 78.89. This indicated a 13.89% increase in learning outcomes. Another study by Rahmayanti (2019) highlighted the positive impact of the CLIS model on students' understanding of science learning concepts. Furthermore, Wahid (2014) found that the experimental class, which utilized PowerPoint media along with the CLIS model, achieved higher average scores than the control class.A study by Danil & Ariyati (2015) concluded a significant difference in the learning outcomes of class VIII students at SMP Negeri 6 Pontianak when using the CLIS learning model accompanied by booklets compared to conventional learning.

The CLIS learning model combined with flyer media is expected students will be more interested and enthusiastic and able to assist the learning process so that there is an increase in students' understanding of material concepts, especially scientific concepts. Flyers are also called leaflets and are widely and quickly distributed, in learning this flyer contains material along with pictures so that it helps students to better understand the material. In this learning process, media flyers play a role in helping students understand the material and then reconstruct ideas or concepts in their minds at the idea rearrangement step.

Although there are several studies on learning models and media, research on applying the CLIS (Children Learning in Science) learning model combined with media flyers on understanding biological concepts has never been carried out. Based on this description, the researcher wanted to find out how students' understanding of the reproductive system concepts was affected by using the CLIS learning model and flyer media at SMA Negeri 3 Polewali.

METHOD

It was a quasi-experimental study with a non-equivalent control group design. The study included a control and an experimental group with effect and experimental unit measurements (Sugiyono, 2014). To gauge their prior conceptual knowledge of the reproductive system, the students received a pre-test. Further, the CLIS model was used with students while also using flyer media. The model was then subjected to a post-test to determine how the student's understanding of the concept had changed. The model has five phases: orientation, idea generation, idea arrangement, idea implementation, and idea strengthening. For the media combination, flyers were utilized to generate ideas. This media flyer acts as supplementary teaching material to discover the scientific concepts being studied and then

reconstruct the students' ideas (Danil & Ariyati, 2015). This research carried out in SMA Negeri 3 Polewali with research samples from class XI IPA 3 as the experimental class and class XI IPA 4 as the control class, representing the population of class XI IPA SMA Negeri 3 Polewali. The type of instrument used was a concept comprehension test in the form of a multiple-choice test.The test underwent thorough validation by a panel of subject matter experts, ensuring the inclusion of highly valid questions with a rating of 3.6 (indicating a high level of validity). The test covers various essential aspects, including a comprehensive understanding of the structure and function of reproductive organs in both males and females, in-depth knowledge of the process of sperm and egg cell formation, proficient analysis of the correlation between the structure of reproductive tissues and their functions within the human reproductive system, and profound comprehension of disorders and diseases associated with the reproductive system. There are 30 questions based on those indicators, each accompanied by multiple-choice options (a, b, c, d, and e) for alternative answers. The fact that the question includes both correct and incorrect answers, means that this assessment is very objective and has a high level of reliability. In this study, the number of answers provided consisted of 5 (a, b, c, d, and e) to be more consistent (M. I. Ismail, 2012). The test was performed twice: once before (the pre-test) and once after the model was applied (the post-test). The instrument was validated and constructed by the expert before being used. The instrument then tested with the correlation technique *product moment* (Ajul et al., 2020).

The data analysis technique in this study began with a requirements analysis, a normality test, with the Kolmogorov-Smirnov test in the SPSS application, and a homogeneity test with the Analysis of Variance (ANOVA) test. After the data normally distributed and homogeneous, it continued to test the hypothesis using the independent sample t-test technique. The significance level for the testing criteria was 0.05.

RESULT AND DISCUSSION

Based on the Kolmogorov-Smirnov analysis of the experimental group data, the value of sig. was 0.18, while the value of α was 0.05, meaning that sig. >α. These numbers indicate a normally distributed post-test result for the experimental class. The control class obtains a value of sig. was 0.07, while the value of α was 0.05, meaning that the post-test results of the control class are also normally distributed. The homogeneity test was carried out because the two classes have normal distributions. The homogeneity test conducted using IBM SPSS Statistics 23 revealed a sig. of 0.06, whereas the value of was 0.05, indicating that the sig. sig. > α. This means that both groups come from homogeneous populations. Table 1 displays the findings of the pre-test and post-test analyses.

Table 1. Analysis of experimental and control class learning outcomes

Parameter	Experiment		Control	
	pretest	posttest	pretest	posttest
Number of samples	35	35	35	35
Maximum value	33	93	40	83
Min value	13	40	7	47
Average	24.26	73.06	20.63	59.40
Standard deviation	5.3	11.78	6.48	8.70
Variance	28.13	138.76	41.77	75.71

The student's understanding of the concepts in the control class in the reproductive system material experienced an increase in the average value from 20.63 to 59.40 after the implementation of the conventional learning model. The percentage increase that occurred was 48% in the low category. For the experimental class, the student's experienced an increase in the average score from 24.26 to 73.06 after the application of the CLIS (Children Learning in Science) learning model combined with flyer media. occurred was 64% with the category quite effective.

After the analysis was carried out, the second data was obtained between the control and experiment, then the learning outcomes of the students were categorized as follows:

Table 2. Categorization of student learning outcomes

Value Range	Experiment		Control		Category
	pretest	posttest	pretest	posttest	
80 – 100	0	11	0	0	Very good
61 – 80	0	20	0	16	Good
41 – 60	0	3	0	19	Sufficient
21 – 40	22	1	15	0	Low
0 – 20	13	0	20	0	Very low

Based on Table 2, there were 13 students in the very low group and 22 students in the low category in the experimental class for the pretest on students' understanding of biological concepts. Meanwhile, in the post-test, there was 1 person in the low category, 3 people in the sufficient category, 20 students in the good category, and 11 people in the very good category. In the control class, at the pre-test, there were 20 people in the very low category and 15 people

in the low category. In the post-test, there were 19 people in the sufficient category and 16 people in the good category.

Tabel 3. Categorization of N-Gain pretest dan posttest experiment and control class

Classes	Pretest	Posttest	N-Gain	Category
Experiment	24.26	67.8	0.64	Moderate
Control	24.26	54.11	0.48	Low

Table 3. showed the number of increases that occurred between the pretest and posttest averages of the experimental class as measured using the N-Gain test was 0.64, with a moderate increase. As well as the 64% effectiveness interpretation category with a fairly effective interpretation. While the average pretest and posttest control class measured using the N-Gain test was 0.48, with a low increase. As well as the 48% effectiveness interpretation category with a less effective interpretation.

The independent samples test was performed since the two data sets were homogeneous and normally distributed. The conclusion was that tcount > ttable (5,517 > 1,668). At a significant level of 5% (= 0.05), Ho is rejected and Ha is accepted. This proved that the application of the CLIS learning model in tandem with media flyers had a significant effect on students' understanding of reproductive concepts. The data of this hypothesis test analysis details can be seen in supplementary 1.

Data on the average pretest and posttest scores of students in the experimental class were higher than the control class because the experimental class was given learning using the CLIS model combined with flyer media containing a series of steps, namely (1) the orientation stage; (2) the stage of generating ideas (3) the stage of rearranging ideas with flyers to help students find scientific concepts learned then reconstructing ideas/concepts in students' minds, this stage is divided into three parts, namely: disclosure and exchange of ideas, opening up in conflict situations, as well as construction of new ideas and evaluation, (4) application of ideas and (5) stages of idea consolidation (Anderson & Krathwohl, 2021).

The orientation stage is carried out by focusing the attention of students. The second stage, namely the emergence of ideas, is an indicator of guessing on indicators of conceptual understanding. Students are invited to answer questions spontaneously according to the results of their own thinking. In the next stage of disclosing and exchanging ideas, students will be divided into small groups heterogeneously to discuss the worksheets which contains questions about classifying the types of hormones and giving examples of abnormalities in the reproductive system. They will argue with each other about their answers and then they will be matched between groups. After their discussion, the students will enter a conflict situation because at this stage, the students are given flyers containing material on the reproductive system to compare their own hypotheses. The next stage is the stage of preparing new ideas.

This activity is carried out so that students directly construct their own knowledge. Next is the stage of applying the idea in which at this stage students' conceptions are reviewed again by interpreting and explaining the report on the results of the discussion in front of the class. This stage intends to improve students' conceptions, so at this stage, students should be able to answer existing questions according to the correct concept.

The last stage is the consolidation of ideas in which the teacher conducts questions and answers with students, the teacher re-affirms the correct concept so that students are able to summarize the concepts that have been studied thoroughly in order to strengthen the changes in conception that have just been experienced so that students can understand the concept as a whole

From the five phases of the CLIS model, media flyers are combined which contain indicators of understanding the concept, namely interpreting, giving examples, classifying, summarizing, conjecturing, comparing, and explaining. The material included in the flyer media helps students understand concepts about the reproductive system in men and women, explains how to prevent reproductive organ diseases, classifies the types of hormones in the gametogenesis process, and provides examples of reproductive organ diseases. Media flyers at the end of the learning stage help students summarize learning outcomes.

A series of steps taken by students to evoke conceptual changes in students in learning by being given the opportunity to express various ideas and compare ideas with the ideas of other students and discuss them to equalize perceptions which are then given the opportunity to reconstruct ideas after comparing ideas with the results of examining flyers (Ismail, 2017). Based on the learning activities applied, the CLIS learning method combined with flyer media has an effective influence on improving learning process skills in developing students' understanding of reproductive system material.

While learning in the control class begins with preliminary activities, the teacher concentrates students on the material to be studied by providing apperception. The apperception questions contained in the preliminary activities in the control class are more aimed at concentrating students in following the lesson followed by explaining the subject matter. Furthermore, group discussions aim to find out how much students understand the material, the teacher gives assignments to students in the form of student worksheets which is done in groups consisting of 5-6 people in one group. In working on student worksheets, students are assisted with ESB (Electronic School Books) which are used as the main reference for learning and to involve students in the learning process. This activity includes the elaboration process. After elaboration, the activities carried out by the teacher in the first and second meetings were to confirm students' answers. The role of students at this stage is to listen to the information provided by the teacher, here it can be seen that students are passive because they are only waiting for what the teacher will give. As a result, students find it difficult to construct knowledge because most only accept the results. From the learning process, it can be

seen that the stages of conventional learning only contain a few indicators of understanding concepts including giving examples, classifying, summarizing, and explaining.

We can see the difference in the average N-gain of students' conceptual understanding in the two research groups. In the control group which was taught using the conventional learning model, the increase that occurred was only 48% which was still included in the less effective category, while the increase in the results of the test understanding of the concept of the experimental group which was taught using the CLIS learning model combined with media flyer, which was 64% with the category quite effective. The topic of the reproductive system, according to Raida (2018), is one of the hardest to understand in biology. This is a result of the content's abstract qualities, which make it challenging for students to understand the basic concepts. Therefore, to master reproductive system material, it is not just to memorize it; an active learning model is needed that can facilitate students in understanding and learning to find the concepts in it for themselves.

Based on this, this study proves that there is a positive influence on the application of the CLIS learning model combined with media flyers on the understanding of concepts from students who use conventional learning in SMA Negeri 3 Polewali students, although in its application there are still some obstacles including students not familiar with the CLIS learning model in a structured way so that it requires more time to explain and implement this learning model.

CONCLUSION

In conclusion, this study found that the CLIS learning model combined with flyer media can enhance students' concept comprehension. The flyer media simplifies the material, making it easier for students to understand the content. Thus, the CLIS learning model combined with flyer media proves to be more effective in improving students' understanding of concepts compared to conventional methods, where the experimental class demonstrated better average values of learning outcomes than the control class.

However, it is important to acknowledge the limitations of this research. Further investigations could focus on various biology concepts with validity and reliability, expanding the sample size, involving different educational settings, or exploring the long-term effects of implementing the CLIS learning model with flyer media. Additionally, future research could explore the impact of other complementary media or instructional strategies in combination with the CLIS learning model. These recommendations will contribute to a deeper understanding of the potential and effectiveness of the CLIS learning model in enhancing students' conceptual comprehension in various educational contexts.

REFERENCES

Ajul, L., Ain, N., & Hudha, M. N. (2020). Metode pembelajaran children learning in science (CLIS): Efektifkah meningkatkan keterampilan proses sains dan pemahaman konsep fisika. *Jurnal Riset Pendidikan Fisika*, *4*(2) 98–103.

Anderson, L. W & Krathwohl, D. R. (2021). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. Longman.

Anwar, M., Wahyuni, A., & Hamid, A. (2017). Penerapan pembelajaran clis (children learning in science) untuk meningkatkan hasil belajar siswa. *Jurnal Ilmiah Mahasiswa Pendidikan Fisika*, *2*(1) 154–159.

Asyafah, A. (2019). Menimbang model pembelajaran (kajian teoretis-kritis atas model pembelajaran dalam pendidikan islam). *TARBAWY: Indonesian Journal of Islamic Education*, *6*(1) 19–32.

Danil, A. A & Ariyati, E. (2015). Penerapan Model CLIS disertai Booklet Terhadap Hasil Belajar Siswa Pada Materi Sistem Pencernaan di SMP. *Jurnal Pendidikan Dan Pembelajaran Khatulistiwa (JPPK)*, *4*(6).

Falahudin, I. (2014). Pemanfaatan media dalam pembelajaran. *Jurnal Lingkar Widyaiswara*, *1*(4) 104–117.

Hadri, M. (2021). Pembelajaran Jarak Jauh Guru Pendidikan Agama Islam Terhadap Minat Belajar Peserta Didik. *Al-Ahya*, *7*(1) 23–33.

Ismail, A. (2017). Penerapan Model Pembelajaran Children Learning in Science (CLIS) Berbantuan Multimedia Untuk Meningkatkan Keterampilan Proses Sains Siswa SMA Pada Pokok Bahasan Fluida. *JIPFRI (Jurnal Inovasi Pendidikan Fisika Dan Riset Ilmiah)*, *1*(2) 83–87.

Ismail, M. I. (2012). Pengaruh bentuk penilaian formatif terhadap hasil belajar IPA setelah mengontrol pengetahuan awal siswa. *Lentera Pendidikan: Jurnal Ilmu Tarbiyah Dan Keguruan*, *15*(2) 175–191.

Marliani, N. (2015). Peningkatan kemampuan berpikir kreatif matematis siswa melalui model pembelajaran Missouri Mathematics Project (MMP). *Formatif: Jurnal Ilmiah Pendidikan MIPA*, *5*(1).

Nurkholis, N. (2013). Pendidikan dalam Upaya Memajukan Teknologi. *Jurnal Kependidikan*, *1*(1) 24–44.

Pasaribu, A. (2017). Implementasi manajemen berbasis sekolah dalam pencapaian tujuan pendidikan nasional di madrasah. *EduTech: Jurnal Ilmu Pendidikan Dan Ilmu Sosial*, *3*(1).

Rahmayanti, Siti. (2019). *Pengaruh Model Pembelajaran Children Learning In Science (CLIS) Terhadap Pemahaman Konsep Belajar IPA Peserta Didik Kelas IV SD Sumanda Pugund Tangamus*. Skripsi. Universitas Islam Negeri Raden Intan Lampung.

Raida, S. A. (2018). Identifikasi Materi Biologi SMA Sulit Menurut Pandangan Siswa dan Guru SMA SeKota Salatiga. *Journal of Biology Education*, 1(2).

Sugiyono. (2014). *Metode Penelitian Pendidikan, Pendekatan Kuantitatif, Kualitatif dan R&D* (19th ed.). Alfabeta.

Sujana, I. W. C. (2019). Fungsi dan tujuan pendidikan Indonesia. *Adi Widya: Jurnal Pendidikan Dasar*, *4*(1) 29–39.

Wahid, W. (2014). Media Flyer Lab IPA untuk Meningkatkan Prestasi Belajar Siswa. *Jurnal Pendidikan Sains*, *2*(1).