

The Effect of the TaRL (Teaching at the Right Level) Model on Student Learning Outcomes in the Subject Cell Structure and Bioprocesses Class XI at SMA Insan Cendekia Syech Yusuf

Pengaruh Model TaRL (*Teaching At The Right Level*) Terhadap Hasil Belajar Peserta Didik Pada Materi Struktur Sel dan Bioprosesnya Kelas XI di SMA Insan Cendekia Syech Yusuf

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Abstract	Article Information								
<p>The implementation of learning models that are tailored to students' needs and levels of understanding is one way to improve learning outcomes in the learning process. This study aims to determine the learning outcomes of students taught using the TaRL (Teaching at the Right Level) model on the subject of Cell Structure and Bioprocesses in the 11th grade at Insan Cendekia Syech Yusuf High School. This study is a quasi-experimental study with a non-equivalent control group design. The population of this study consists of all 11th-grade students, totaling 42 students. The sample selection in this study used a saturated sampling technique, with the research sample comprising Class XI.2 as the experimental class and Class XI.1 as the control class. Data were analyzed using descriptive and inferential statistics, specifically the independent samples t-test. The results of the study indicate that the learning outcomes of students in the class taught using the TaRL model were categorized as very high at 85.52, while those in the control class were categorized as moderate at 62.95. The t-test in this study showed a significance value of $0.001 < 0.05$, indicating that the TaRL model has a significant effect on student learning outcomes.</p>	<p>Keywords: learning outcomes; TaRL (Teaching at the Right Level); cell</p>	<p>Kata kunci: hasil belajar; TaRL (Teaching at the Right Level); sel</p>							
	<p>History</p> <table><tr><td>Manuscript received</td><td>: 05/10/2026</td></tr><tr><td>Revised</td><td>: 25/10/2026</td></tr><tr><td>Accepted</td><td>: 28/10/2026</td></tr><tr><td>Published</td><td>: 31/10/2026</td></tr></table>		Manuscript received	: 05/10/2026	Revised	: 25/10/2026	Accepted	: 28/10/2026	Published
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<p><i>Penerapan model pembelajaran yang sesuai dengan kebutuhan dan tingkat pemahaman peserta didik merupakan salah satu upaya untuk meningkatkan hasil belajar dalam proses pembelajaran. Penelitian ini bertujuan untuk mengetahui hasil belajar peserta didik yang diajar menggunakan model TaRL (Teaching at the Right Level) pada materi Struktur Sel dan Bioprosesnya di kelas XI SMA Insan Cendekia Syech Yusuf. Jenis Penelitian ini ialah quasi-eksperimen dengan desain penelitian non equivalent control group design. Populasi pada penelitian ini ialah seluruh peserta didik kelas XI terdiri dari 42 peserta didik. Pemilihan sampel dalam penelitian ini menggunakan teknik sampling jenuh dengan sampel penelitian yaitu kelas XI.2 sebagai kelas eksperimen dan kelas XI.1 sebagai kelas kontrol. Data diperiksa menggunakan statistik deskriptif dan inferensial dengan independent sampel t-test. Hasil penelitian menunjukkan bahwa hasil belajar peserta didik di kelas yang diajar dengan model TaRL dikategorikan sangat tinggi sebesar 85,52, sedangkan kelas kontrol dikategorikan sedang sebesar 62,95. Uji T dalam penelitian ini menunjukkan nilai signifikansi $0,001 < 0,05$, yang menunjukkan bahwa model TaRL berpengaruh signifikan terhadap hasil belajar peserta didik.</i></p>									

A. INTRODUCTION

Education does not merely focus on conveying content or developing skills; it also plays a role in helping each person recognize what they want, need, and are capable of doing (Rahman et al., 2022). Education is an essential part of everyone's life. Therefore, the educational process must be grounded in sound values to serve as a true and strong guiding principle. These core values serve as standards for assessing whether learning activities are proceeding effectively. The choice of instructional model also significantly influences students' success and understanding of the subject matter (Syafuddin, 2017).

The quality of education in a nation's society is reflected in one key aspect: the educational system itself. The educational process is ongoing and serves to pass on important knowledge and values from previous generations to the next. There are two influential factors: individual (internal) factors, which include students' interests, physical condition, and intelligence; and social (external) factors, which include students' abilities and educational aids such as learning media used during the learning process (Suherman et al., 2023).

Learning requires activities that involve both actions and mental processes, which are inseparable; thus, these activities are a key principle in the teaching-and-learning interaction (Taufiq, 2025). The learning process is, in essence, a form of active interaction between the learner and their surroundings, which ultimately leads to behavioral changes in a more positive direction. The primary role of educators is to organize and manage the environmental conditions so that they support this behavioral transformation. Educators serve as facilitators that is, they provide resources and create a conducive atmosphere to enhance students' learning capacity (Sartika, 2022).

Based on an interview with a biology teacher at Insan Cendekia Syech Yusuf High School conducted on Thursday, July 17, 2025, it was found that students' academic achievement in biology while in 10th grade generally remained below the proficiency standard set in the learning objectives. The average score achieved was 68, while the minimum passing score (KKTP) is set at 70. The teaching methods employed by the teacher namely direct instruction and the assignments given by the teacher still rely heavily on textbooks, and there is a lack of teaching models that emphasize student participation during the learning process. In addition, the available learning support facilities have not been effective in fostering student interest; for example, there is a heavy reliance on printed textbooks, minimal use of technology, visual aids that are not well-suited to the subject matter, and a learning environment that is not supportive. These conditions have led to low student participation during learning activities, resulting in continued weak academic performance.

The teaching process is designed to align with each student's learning ability levels and is implemented through the TaRL (Teaching at the Right Level) model, or simply the TaRL model. The TaRL (Teaching at the Right Level) model is an intervention approach carried out by educators by providing targeted and focused learning guidance, thereby accommodating the diversity of existing abilities (Kurnia Amalia & Adi, 2024). This model is considered appropriate for addressing the issue of low learning outcomes, as it ensures that each student receives learning experiences tailored to their individual abilities. Consequently, students can grasp foundational concepts before moving on to more challenging material.

The TaRL (Teaching at the Right Level) model is a learning model initiated by Pratham, developed specifically to optimize student learning outcomes. Students with similar ability levels are grouped together in the learning process regardless of their grade level or age, but based on their learning outcomes; their progress is measured through periodic assessments (Ovratmi et al., 2025). The implementation of the TaRL (Teaching at the Right Level) model begins with a

diagnostic assessment, grouping based on ability, and differentiated instruction, resulting in a significant improvement in learning achievement (Sabira et al., 2025).

Although various previous studies have shown that the Teaching at the Right Level (TaRL) model can improve student learning outcomes by tailoring instruction to their ability levels, research on the application of the TaRL model still needs to be developed in the more specific context of biology education. Previous research has discussed the potential of TaRL to improve student learning outcomes and mastery, but based on the literature review used in this study, empirical testing is still needed regarding the effect of the TaRL model on learning outcomes in the subject of cell structure and its bioprocesses at the high school level. Furthermore, learning conditions at Insan Cendekia Syech Yusuf High School indicate that students' biology learning outcomes have not yet met the established mastery standards, thus necessitating an alternative instructional model tailored to students' learning needs. Therefore, this study was conducted to examine the effect of the TaRL learning model on the learning outcomes of 11th-grade students regarding cell structure and bioprocesses at Insan Cendekia Syech Yusuf High School by comparing the learning outcomes of students who received instruction using the TaRL model with those who received conventional instruction.

Based on this background, this study aims to determine the effect of the TaRL (Teaching at the Right Level) model on student learning outcomes in the subject of cell structure and bioprocesses for 11th-grade students at Insan Cendekia Syech Yusuf High School.

B. METHOD

This study employed a nonequivalent control group design, in which the experimental group received the treatment and the control group did not. Both groups took a pretest to assess the students' initial abilities before the instruction began. Next, the experimental group received the treatment in the form of the learning model under study, while the control group was taught using conventional methods. After the learning process was completed, both groups took a posttest to assess the students' learning outcomes following the instruction. The pretest and posttest results from both groups were then analyzed to determine the effect of the treatment on the students' learning outcomes. The nonequivalent control group design is shown in Table 1 below:

Table 1. Research Design			
Group	Pretest	Treatment	Posttest
A	O1	X	O2
B	O3	-	O4

Note: A= Eksperimental Group, B= Kelompok Kontrol, O1= *Pretest* score of the experimental group, O2= *Posttest* score of the experimental group, O3= *Pretest* score of the control group, O4= *Posttest* score of the control , X= Treatment the TaRL model

This study was conducted at Insan Cendekia Syech Yusuf High School, Pattallassang Subdistrict, Gowa Regency. The study population consisted of all 11th-grade students, totaling 42 students. From this number, two classes were selected as the sample: Class XI.2, the experimental group, which was taught using the TaRL model and consisted of 21 students; and Class XI.1, the control group, which was taught using the conventional model and consisted of 21 students. The sample was selected using the saturation sampling technique. The instruments used to collect data in this study were pretests, posttests, and observation sheets to assess the implementation of the learning process.

The data collected were then analyzed using descriptive and inferential statistics, including normality tests, homogeneity tests, and hypothesis testing using the independent samples t-test, to examine the effect of the TaRL model on student learning outcomes in the subject of cell structure and bioprocesses for 11th-grade students at Insan Cendekia Syech Yusuf High School.

Table 2. Results of the Instrument Validity Analysis

Instruments	Validity Results
Assesment of Learning Outcomes	0,86
Teaching module	0,94

Based on the data in Table 2, the results of the validity analysis for various instruments are as follows: the validity of the learning outcome test yielded a V value of 0.86, indicating a high level of validity. The validity of the teaching module yielded a V value of 0.94, which also indicates a high level of validity. Empirical validity was assessed through pilot testing with students outside the research sample. The results of the pilot test were analyzed using IBM SPSS Statistics Version 27. The empirical validity results showed that out of 35 test items, 5 items (questions 3, 11, 15, 17, and 18) were invalid, while 30 items were deemed valid; thus, the achievement test used in this study consisted of 30 items. The reliability of the learning achievement test was 0.614, which is interpreted as moderate.

C. RESULTS AND DISCUSSION

This study was conducted at Insan Cendekia Syech Yusuf High School with a sample consisting of 11th-grade students. Class XI.1 served as the control group, while Class XI.2 served as the experimental group. Data were collected using a test instrument in the form of a learning achievement test administered both before (pretest) and after the intervention (posttest).

Table 3. Descriptive Statistical Analysis of Student Learning Outcomes Taught Using the TaRL Learning Model

Descriptive Statistics	Pretest	Posttest
Sampel size	21	21
Maximum score	50	100
Minimum score	13	76
Mean	30,62	85,52
Standard Deviation	10,651	7,872
Variance	113,448	61,962

Table 4. Descriptive Statistical Analysis of Student Learning Outcomes Taught Using the Conventional Model

Descriptive Statistics	Pretest	Posttest
Sampel size	21	21
Maximum score	46	80
Minimum score	20	43
Mean	33,62	62,95
Standard Deviation	6,741	9,151
Variance	45,448	83,748

Before conducting a t-test to determine the difference between the two groups, preliminary analyses were performed, including tests of normality and homogeneity. The test of normality was conducted to ensure that the pretest and posttest data for the learning activities in this study were normally distributed. The following are the results of the test of normality in this study.

Table 5. Test of Normality Of Learning Outcomes Using the Shapiro Wilk Test

Variable	Sig.	α	Description
Eksperimental Class Pretest	0,501	0,05	Normal
Eksperimental Class Posttest	0,052	0,05	Normal
Control Class Pretest	0,558	0,05	Normal
Posttest Control Class	0,813	0,05	Normal

Based on the data in Table 4, the results of the Shapiro–Wilk test for the experimental class (XI.2), which was taught using the TaRL learning model, are shown in the table. In the pretest, the significance value was 0.501, and in the posttest, it was 0.052. Since both values are greater than $\alpha = 0.05$, it can be concluded that the learning outcome data from the experimental class (XI.2) follow a normal distribution. The same applies to the control class (XI.1), which used conventional teaching methods. The significance value during the pretest was 0.558, and during the posttest it was 0.813, which are also higher than $\alpha = 0.05$. Therefore, the data from both the experimental and control classes follow a normal distribution.

Table 6. Homogeneity Test of Student Learning Outcomes

Variable	Based on mean		Description
	Sig.	α	
Learning Outcomes	0,595	0,05	Homogeneous

The homogeneity test analysis yielded a significance value based on the mean of 0.595, while the significance level α was 0.05. The significance value based on the mean was obtained because the mean was greater than α ($0.595 > 0.05$), indicating that the sample was drawn from a homogeneous population.

After the data were determined to be normally distributed and homogeneous, a hypothesis test was conducted. The hypothesis test aims to confirm the validity of the assumptions or estimates proposed in a study. This study used an independent samples t-test. The results of the hypothesis test are shown in Table 5 below.

Table 7. Hypothesis Testing

Variable		Levene's Test for Equality of Variances		T-test for Equality of means		
		F	Sig.	t	df	Sig (2-tailed)
Student learning outcomes	<i>Equal variances assumed</i>	0,287	0,595	8,569	40	0,001
	<i>not assumed</i>			8,569	39,125	0,001

Based on a study conducted on students in Class XI.2, student learning outcomes improved during the learning process that implemented the TaRL learning model. This improvement was significant; based on the results of the descriptive statistical analysis, it was found that the average pretest learning achievement score was 30.62, which falls into the “very low” category, and the average posttest learning achievement score increased to 85.52, which falls into the “high”

category. This data indicates an average increase of 54.9. Based on these findings, it can be concluded that the posttest learning outcomes of the experimental class showed an improvement compared to the pretest results.

The TaRL learning model begins with an initial assessment to identify students' ability levels as the primary foundation for learning. Based on the results of this assessment, educators then divide students into small groups according to their ability levels. Throughout the learning process, educators employ interactive, engaging, and contextual methods to reinforce understanding. Each group receives materials and guidance tailored to its specific needs. With this model, students who are falling behind can catch up without pressure, while those who are already proficient still have the opportunity to develop to their full potential (Widaningsih et al., 2025).

The TaRL (Teaching at the Right Level) model has the potential to foster active engagement and strengthen students' cognitive abilities. This strategy not only plays a role in improving learning outcomes but is also flexible enough to be applied to students with diverse characteristics, including learning styles, habits, socioeconomic conditions, and cultural backgrounds. Furthermore, the TaRL model can be examined more closely to assess various other aspects, such as creativity, critical thinking skills, and communication skills (Made et al., 2024).

The TaRL (Teaching at the Right Level) model is a learning model that tailors instruction to students' abilities to ensure they learn effectively, provide flexibility for educators, and improve the quality of learning (Suwignyo & Tsurayya, 2025). By implementing the TaRL model, educators can measure students' learning progress, develop effective lesson plans, and provide accurate and systematic assessments (Busri et al., 2023).

The implementation of the TaRL (Teaching at the Right Level) model has proven effective in the learning process for improving student learning outcomes and has a positive impact on students' active participation during learning activities. Students responded well during question-and-answer sessions with educators and were active in group discussions. This is because the model is tailored to students' learning needs, and the instructional material is linked to real-life contexts, which captures students' attention and makes it easier for them to understand the material presented by educators (Sundari, 2025).

The core of the TaRL model lies in the principle of meeting students' learning needs according to their current ability levels. This principle is based on the recognition that students in the same class often exhibit varying levels of learning ability, with some mastering skills appropriate for their grade level while others struggle with basic concepts. By tailoring instruction to individual learning needs, TaRL aims to bridge this gap and ensure that students acquire the skills and knowledge necessary to progress successfully (Ismail et al., 2024).

Based on the results of this study, it was found that the learning outcomes of 11th-grade students at Insan Cendekia Syech Yusuf High School on the topic of cells and their bioprocesses fell into the "High" category. This indicates that the implementation of the TaRL model in the learning process can improve students' average scores, enhance their motivation to learn, and encourage active participation in class. These findings align with research (Rahmawati et al., 2024), which states that students taught using the TaRL model experienced a significant improvement in their learning skills. Similarly, the results of a study (Azhari & Yuliana, 2025) indicate that the TaRL model has been proven not only to contribute to improved student learning outcomes but also to help meet established classical mastery standards. This finding confirms that a learning process aligned with each student's level of mastery of the material is capable of addressing their learning needs, thereby significantly improving the quality of their learning outcomes.

The research results show that students in Class XI.1 (the control group), who were taught without using the TaRL learning model, also demonstrated improved learning outcomes during the

learning process that utilized the conventional learning model. However, this improvement was not yet significant. According to the results of the descriptive statistical analysis conducted, the average pretest score was 33.62, and the average posttest score was 62.95; thus, the average score increased by 29.33. The conventional model is a method frequently used in classroom instruction. This model typically describes a learning process that focuses on the educator's role as the central authority. This teaching technique is often referred to as the method of delivering material orally or through direct narration by the educator (Dafid Fajar Hidayat, 2022).

The conventional model is considered one of the oldest teaching and learning models across all types of education; however, there are concerns that the conventional teaching model is outdated and does not promote lifelong learning just as other educational programs require continuous improvement to achieve good learning outcomes. There is a need to introduce learner-centered methods to foster better reasoning and the development of necessary skills (Vemuri & Sukumaran, 2019).

The learning outcomes of 11th-grade students at Insan Cendekia Syech Yusuf High School, who were taught using the conventional model, fell into the "Moderate" category. Although the conventional model can convey information, it is less effective in the learning process because it makes it difficult for educators to assess students' understanding; educators cannot easily determine whether students truly understand the material presented, and students tend to be passive listeners. This finding aligns with research (Wibawa et al., 2019), which states that a learning process that emphasizes continuous listening by students can lead to boredom; as a result, students tend to be passive and lack the motivation to seek out and discover new things.

Results from the pre-test and post-test indicate that students who learned using the Teaching at the Right Level (TaRL) model achieved higher learning outcomes compared to those who learned using the conventional model. This difference is believed to be related to the learning process implemented. In the TaRL model, students are grouped based on their initial ability levels and are then provided with material and exercises tailored to their learning needs. Students are engaged in completing assignments, participating in discussions, and refining their understanding through guidance and feedback from educators. These activities provide students with the opportunity to learn at their own level and engage more actively in the learning process. This is consistent with (Pranoto, 2023), who emphasizes the importance of learning approaches in increasing student engagement, as well as (Uhlir, 2018) regarding the role of challenges, support, and feedback in fostering independent learning.

The low academic achievement of students taught using conventional methods and those taught using the TaRL model is due to many factors, one of which is the use of a teaching model that is more teacher-centered and does not actively engage students or encourage their independence. This is because, through independence, students will strive to seek out knowledge and the additional information they need (Wichadee, 2021). Therefore, as educators, we must be able to evolve and exercise creativity in selecting the learning models to be used. Educators with strong teaching competencies are critically needed, especially in navigating the current digital era (Banafa, 2022).

The TaRL learning model has proven effective in improving learning outcomes, particularly in enhancing students' ability to process information and to understand and apply knowledge in various forms. By grouping students based on their abilities, this method enables more targeted and individualized learning. Students enjoy learning more when they are in groups or communities with peers at the same knowledge level (Khulaifayah et al., 2025).

Based on the above, an appropriate instructional model is essential for improving students' learning outcomes. Instructional models are important because they can encourage students to be more engaged and active participants during the learning process. When students are active, the learning process improves, and their learning outcomes also increase (Amin et al., 2020). This aligns with the findings of (Meinawati et al., 2024), who state that the TaRL learning model is an effective strategy for optimizing learning outcomes. By tailoring the learning process to individual needs and abilities, the TaRL model has been proven to increase students' learning outcomes.

D. CONCLUSION

Based on the research findings, it can be concluded that the learning outcomes of students who were not taught using the TaRL (Teaching at the Right Level) model on the topic of cell structure and bioprocesses in the 11th grade at Insan Cendekia Syech Yusuf High School fall into the moderate category, whereas the learning outcomes of students taught using the TaRL (Teaching at the Right Level) model on the subject of cell structure and bioprocesses in the 11th grade at Insan Cendekia Syech Yusuf High School fall into the high category. This proves that the use of the TaRL model has a significant effect on improving student learning outcomes on the subject of cell structure and bioprocesses. As for the implications of this study, future researchers may build upon this research by analyzing other factors that may influence learning outcomes, such as students' learning styles or the role of technology in the learning process.

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