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**Evo & Lusi: A Novel to Increase Motivation to Learn Evolution**

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**Abstract:** This study aims to determine the feasibility of evolution learning novels as an alternative learning resource in high school biology learning and to determine the effectiveness of evolution learning novels in increasing learning motivation in students. The research method used is Research and Development (R&D). The type of research and development used is the ADDIE model (Analyze, Design, Develop, Implement and Evaluate). The implementation stage is carried out with a pre-experimental design type one-group pretest and post design. The validation results that have been carried out, the product developed has an average validation percentage of 82.5%, which is very valid. The percentage of validation is obtained from the validation results by learning novel development experts and evolutionary material experts, but with various revisions that need to be made, the majority of which lie in writing errors and laying the concept of evolution. The products produced increased student learning motivation when tested on a limited basis at SMA N 1 Bandar Batang Regency. The initial motivation level of SMA N 1 Bandar Batang Regency students is included in the excellent category with a percentage of 59.17%. After being given a novel to read, the student motivation level increased to 79.86% or in high criteria. The results obtained, the product produced as an evolution learning novel is included in the category of feasible and quite effective.

**Keywords:** evolution; motivation; novel.

## **INTRODUCTION**

Learning is an effort planned by the teacher to make students learn according to their needs and interests (Kustandi, 2013). Another opinion states that learning is an effort made deliberately by educators that cause students to carry out learning activities (Sudjana, 2012). Learning should be a process that directs students to achieve an expected goal to have a good effect on the effectiveness of student learning in understanding what they are learning (Mulyono, 2018).

The purpose of learning is to help students understand concepts instead of memorizing separate facts (Izza et al., 2020). If students understand the concept well, it will result in their behavior in a better direction. However, if the learning process only emphasizes memorizing facts, then the learning process is still not optimal, especially in lessons emphasizing understanding concepts (Ernata, 2017). The understanding of concepts lies in the variety of subjects in the school. One of the subjects that emphasizes understanding concepts of which is biology. Biology is a science that studies the concept of living things and their environment (Khoirudin, 2019). Biology learning in schools requires learners to understand, analyze conceptually and procedurally, and apply them to solve problems (Aqil, 2017).

Regarding the material studied, biology is related to concepts from actual scientific facts and abstract objects, so it requires a deep understanding (Suryanti et al., 2019). Evolution is one of the materials in biology that explores abstract concepts that require a deep understanding (Noviati, 2020). Evolution has been studied since ancient Greece, but the concepts of descent with modification and natural selection were first proposed by Charles Darwin (Campbell, N.A., J.B. Reece, 2010). In the field of biological studies, evolution explains changes in a population. The change in question is if it can be inherited genetically and gradually passed down between generation (Futuyma, 2005).

The exciting thing is that until now, the theory of biological evolution proposed by Darwin has become a debate. The theory is the substance of the concept that contradicts many religious teachings, especially in the part of human origins (Asghar, 2013). One of the famous refutations to the theory of evolution is the opinion of a creationist religious named Harun Yahya. Harun Yahya expressed aloud that Darwin's theory of evolution is just a theory, not a fact. On the other hand, one scientist, Richard Dawkins, argues that evolution is a fact. That opinion is based on the discovery of evidence of evolution in the form of similarities in body structure, behavior, DNA, and fossil records (Khusnuryani, 2005).

In its contentious status, the concept of evolution is also one of the materials in the 2013 curriculum of high school biology subjects' class XII core competency three and core competency four, as well as basic competence 3.9 and basic competence 4.9. In Indonesia, evolutionary material is a challenge to learn and teach. Some teachers need help explaining several things in evolutionary material, one of which is about the origin of life (Endrawati et al., 2012). Another challenge of studying evolutionary material is that students tend to be less motivated when learning. The lack of student learning motivation in learning evolution material will impact learning outcomes. Evolution material that is not studied with entire motivation can cause students to get low learning outcomes, misconceptions about the theory of evolution, and an incomplete understanding of the theory of evolution (Ardianto, 2016).

Learning motivation encourages and makes a person eager to learn (Uno, 2012). Another opinion states that learning motivation is the tendency of students to carry out learning activities driven by the desire to achieve the best possible

learning outcomes (Ormrod, 2008). Learning motivation is indispensable in the learning process because it gives a passion for serious learning. Thus, learning motivation increases student understanding of a learning material (Muasaroh, 2016). There are several indicators to observe the learning motivation for students in studying evolution. Indicators of learning motivation can be observed from four characteristics: (1) Attention namely, students' high and low interest in learning. (2) Relevance is the student's response about its suitability between learning and daily life. (3) Confidence is the level of confidence of students during the learning process. (4) Satisfaction is a sense of joy that arises from students during the learning process (Keller, 1987). The benefits of learning motivation for students are undoubtedly important to improve and then judge from the existing indicators. One of the steps to increase learning motivation is to use exciting learning resources (Umniah, 2018).

Related to the motivation to learn evolution, at SMA N 1 Bandar, the difficulty of studying evolutionary material causes students' low motivation to study the theory of evolution. From interviews with class XII students of SMA 1 Bandar Kabupaten Batang, it is known that they feel less excited when studying evolution. According to them, they have low motivation to learn evolutionary material since it tends to be challenging to learn. In addition, the learning resources used also tend to be less attractive. Interviews with SMA 1 Bandar Batang Regency biology subject teachers also supported the findings. According to the biology subject teacher of SMA 1 Bandar Batang Regency, at SMA N 1 Bandar Batang Regency, evolution learning uses learning resources that are limited to biology printed books class XII, causing students to be less excited when learning evolution materials. Thus, one solution to overcome the lack of motivation of class XII students of SMA N 1 Bandar Batang Regency is to present alternative learning resources that are attractive to students.

Learning resources are material tools to provide learning opportunities for students (Sudjana, 2012). Learning resources are something that learners can use to obtain subject matter (Przybylski et al., 2009). Another opinion states that learning resources make it easier for students to obtain information, knowledge, and experience in teaching and learning (Kemendikbud, 2002). Learning resources are all kinds of media, objects and ideas, people, and others that can facilitate the learning process (Yusuf, 2017). Learning resources have a very important role in the delivery of learning materials. Learning resources will make learning take place effectively if chosen appropriately and relevantly (Samsinar, 2019).

A learning novel is one of the relevant learning resources for students of SMA N 1 Bandar Batang Regency to learn evolutionary material. Based on the response of class XII students of SMA N 1 Bandar Batang Regency to the questionnaire regarding reading interest. It is known that 53.10% of students choose novels, and the remaining 46.90% choose other readings. According to the answers that appear most often, novels bring out more imagination and trigger curiosity, giving rise to motivation to read them, while ordinary textbooks that contain only material and tend to be boring.

A novel is a form of literary work that is (not too long but also not too short) in the form of prose, containing a series of stories of a character's life and the environment by highlighting the character and nature of each perpetrator. As a form of middle literary work (not short stories or romances), novels are often considered worthy of elevating an event in human life and reflecting on a problem to be solved (Nursisto, 2000). Thus, connecting abstract evolutionary materials and student characteristics, novels, and materials, learning novels as alternative learning resources on evolutionary materials needs to be developed.

## METHOD

### Research Design

This research uses a Research and Development (R&D) design, a research method used to produce specific products and test the effectiveness of these products (Sugiyono, 2013). This research and development develop alternative learning resources like novels for evolution learning in high school. The type of research and development used in this study is the ADDIE model developed by Dick and Carry (1996), with the development procedure carried out through five stages.

The first stage is analysis, which consists of establishing basic problems related to learning motivation faced by students of SMA N 1 Bandar Batang Regency in high school biology learning on evolutionary materials related to learning resources. Analysis of student characteristics that aims to analyze students' interest in reading activities and types of readings for class XII students of SMA N 1 Bandar Batang Regency. The analysis of material characteristics in this study aims to determine the characteristics of evolutionary material in biology subjects in class XII SMA. The second stage is designing. At this stage, alternative learning resources in the form of evolution learning novels are designed by adjusting the results of the analysis that has been carried out. Then various references are also collected related to alternative learning resources in the form of evolution learning novels so that the resulting product is suitable for implemented.

Table 1. Feasibility Interpretation Criteria

No	Criterion	Validity Level
1.	81,00% - 100,00%	Highly Valid (can be used without revision)
2.	61,00% - 80,00%	Valid (can be used with minor revisions)
3.	41,00% - 60,00%	Less Valid (recommended not to use because it needs revision)
4.	21,00% - 40,00%	Invalid (not allowed to use)
5.	00,00% - 20,00%	Highly Invalid (should not be used)

Source: (Riduwan, 2009).

The third step is development, which is achieved by realizing the product. The products developed are adapted to the previous design. Product realization

will be realized by hard file and soft file. The product will be validated by material experts and learning novel development experts after completion. The feasibility interpretation criteria can be seen in Table 1.

The fourth stage is implementation, carried out by testing the increase in student learning motivation in learning evolution material based on ARCS indicators (Attention, Relevance, Confidence, and Satisfaction) (Keller, 1987). By conducting research using a pre-experimental research type one-group pretest and post-design (Sulaeman, 2022). The criteria for the level of student learning motivation can be seen in Table 2.

Table 2. Learning Motivation Level Criteria

No	Criterion	Motivation Level
1.	81,00% - 100,00%	Very High
2.	61,00% - 80,00%	Tall
3.	41,00% - 60,00%	Enough
4.	21,00% - 40,00%	Low
5.	00,00% - 20,00%	Very Low

Source: (Emzir, 2008).

After going through the pre-experimental design type of one-group pretest and post-design, the results obtained will be tested by an N Gain test which aims to determine the effectiveness of using the developed product. The N Gain test is carried out with a formula namely:

$$N\ Gain = \frac{Posttest\ score - Pretest\ score}{Ideal\ score - Pretest\ score}$$

Table 3. N Gain value criteria

Value N Gain	Criterion
$g > 0.7$	Tall
$0.3 \leq g \leq 0.7$	Keep
$g < 0.3$	Low

Source: (Sugiyono, 2015).

The interpretation of the effectiveness of N-Gain, namely:

Table 4. Interpretation of N Gain evectivity

Percentage	Criterion
< 40%	Ineffective
40 % - 50 %	Less effective
56 % - 75%	Quite Effective
>76 %	Effective

Source: (Sugiyono, 2015).

The fifth stage is the evaluation carried out at each research stage, namely at the stage of analysis, design, development, and implementation. Evaluation is aimed at gaining a better understanding of what has been done. That is suitable to the statement that evaluation determines decisions to achieve a need.

### **Population and Sample**

In this study, the population and samples were also determined. The population is a generalized area consisting of objects/subjects with specific qualities and characteristics determined by researchers to be studied and then conclude (Sugiyono, 2015). Meanwhile, the sample is part of the population with specific characteristics or circumstances to be studied. The sample can be defined as a portion of the selected population and is expected to be representative of the population (Puspitaningtyas, 2016). The population in this study was class XII mipa students of SMA N 1 Bandar Batang Regency, which consist 175 students. The sample in this study was one class XII SMA 1 Bandar Kabupaten Batang, consisting of 18 students. The technique used to take samples using purposive sampling techniques, namely a sample determination technique with specific considerations (Sugiyono, 2015).

### **Research Instrument**

The data collection techniques used in this study used interviews and questionnaires. Interviews in this study were conducted with teachers of biology subjects at SMA N 1 Bandar, Batang Regency. Interviews were conducted to determine students' learning process on evolutionary material and its constraints related to student learning motivation in evolutionary material. In this study, two types of questionnaires were used. The first is a questionnaire to find out the characteristics of class XII SMA 1 Bandar Batang Regency students related to students' interest in alternative learning resources in the form of learning novels in evolutionary materials. While the second questionnaire is used as an instrument to obtain data related to the learning motivation of class XII SMA 1 Bandar Batang Regency students on learning evolution material based on ARCS (Attention, Relevance, Confidence, and Satisfaction) indicators (Keller, 1987). Data analysis techniques are used in analyzing quantitative data in the form of questionnaire scores by calculating the percentage of answers. Then the qualitative data obtained from interviews with biology subject teachers of SMA N 1 Bandar Batang Regency were analyzed using qualitative descriptive analysis.

## **RESULT AND DISCUSSION**

### **Result of Research Procedure**

Product development in the form of learning novels in this research gets results at every stage. The study's results can be seen in the analysis stage in table 4.

Table 4. Summary of analysis results

No.	Types of Analysis	Result
1.	Front End Analysis	The lack of variety of learning resources in the evolution material at SMA N 1 Bandar Batang Regency, so alternative learning resources are needed that are in accordance with the characteristics of students in the evolution material.
2.	Analysis of Student Characteristics	The average age of class XII students of SMA N 1 Bandar Batang Regency is 17 to 19 years old who enter the formal operational stage. - 84% of students of class XII SMA N 1 Bandar Kabupaten Batang are interested in reading. - 53.1% of class XII students of SMA N 1 Bandar Kabupaten Batang are interested in reading novels.
3.	Analysis of Material Characteristics	The evolution material is contained in KD 3.9 Class XII SMA biology subjects, namely explaining the theories, principles and mechanisms of evolution as well as the current views of experts related to speciation. -Evolutionary material tends to be difficult to teach students. This is because the concept of evolution is abstract and often causes conflicts, for example when explaining the origins of life. - Evolution is a complex theory that carries narratives from the past to the present and predictions of the future so that, with such characteristics, it will be interesting if it is included in a storyline.

Based on the table, the learning novel is appropriate for students' characteristics and brings evolutionary material to class XII SMA. Thus, developing alternative learning resources of evolutionary materials in the form of learning novels is necessary.

Then at the design stage, the novel developed will tell the story of a character named Evo Dawkins (Evo), a language faculty student and functionary of a student organization in the field of the environment from Durnois State University (UNDUR) at Durnois City, the Equatorial Land of Southeast Island (EXOTIC Country) a fictional region, who is obsessed with the search for his "human" identity. A clue that became the basis for this way of thinking came from his accidental appearance of a gibbon-type primate who was primate with a

human like physical form at the zoo when he was in high school. From then on, He began to feel that humans are not only of one kind currently. It could be gibbons are relatives' of human or, in other words, gibbons are humans with different appearances and abilities, like humans with special needs. The assumption that gibbons are close to humans makes Evo have a high sense of pity for gibbons. It is because it turns out that there are still many gibbons that are hunted, tortured, and even killed until their population status is almost extinct. The products developed present a very thick evolutionary atmosphere, ranging from carrying evolution-themed stories, names of characters connected to evolutionists, and fictional place settings related to evolution. It is needed because fit the material will be applied.

Regarding the software for developing drafts of novels, the software used is Microsoft Word 2010 because in making it, various writing features are needed, and the existing features of Microsoft Word 2010 are good enough to make a draft novel to be developed. It is supported by Ngibad's statement (2018) that by using Microsoft Office software, one can type various types of proposals, scientific works, letters, invoices, employee performance reports, financial reports, employee databases, presentations, make images in the form of JPEG, drafts, and others. It is related to the software used to design the cover of the novel developed, namely using Canva Premium. It is related to the opinion of Supono (2015) that the Canva application is perfect for designing book covers, novels, and others.

In the novel developed, evolutionary material is also included according to Basic Competence 3.9, which explains the theories, principles, and mechanisms of evolution and experts' current views on speciation by making it a character conversation. It is intended to make the reader learn evolutionary material by imagining himself as a character. In terms of the extrinsic elements of the novel, the author of the novel bases himself on rational and empirical data of science and is neutral without involving dogma so that the product developed does not involve the subjective point of view of the author of the novel. It is supported by Nursisto's opinion (2000) namely, to enjoy the novel, one way is to follow the conversations of the characters contained in the novel.

At the development stage, based on the results obtained, this product realizes that it is available in a soft file and physically by adjusting the design that has been made. The resulting product was made as attractive as possible for high school students. In addition to the cover that interprets evolution, the BLURB section is made interesting by providing excerpts of the character's conversational narrative about the origin of life, the main character's characteristics, and an invitation for the reader when experiencing a position as a character in the novel. BLURB is a sentence structure on the back cover of a novel that attracts potential readers (Supono, 2015). Successfully developed products can be seen in Figure 1.

At the development stage, expert validation is also carried out. Validation is carried out by two validators they are material expert validators and learning novel development validators. From the results obtained, the product developed



is worth testing but with various revisions. Most product revisions lie in typos caused by the many words written. Typing errors occur because the human brain cannot always capture writing details well enough (Fahma et al., 2018). According to the validation results that have been carried out, the product developed has an average validation percentage of 82.5%, which is very valid.

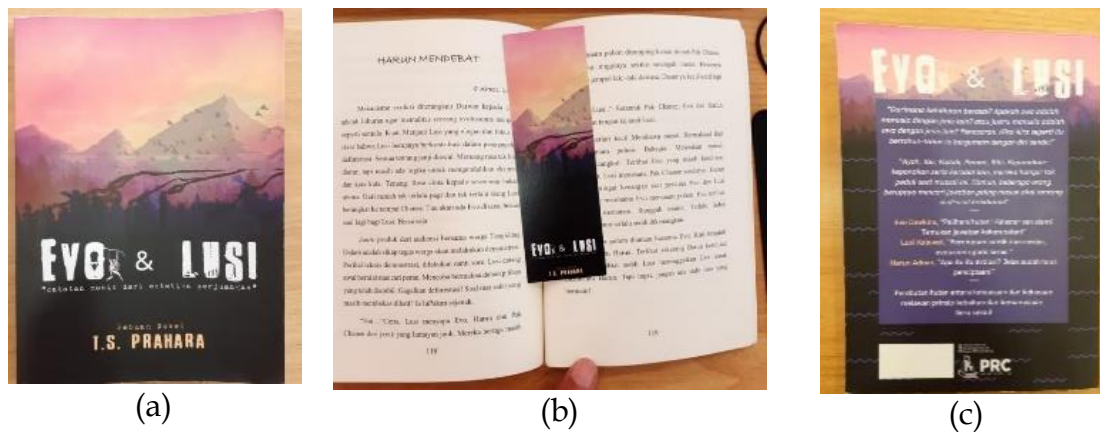


Figure 1. (a) Front view of the novel (b) Display of the content of the novel (c) Display of the back cover of the novel.

The next result is obtained when the implementation stage. At this stage was carried out, SMA 1 Bandar Batang Regency students enthusiastically welcomed this research. The product developed attracted students' attention because there was no such learning resource as a novel available at SMA N 1 Bandar Batang Regency on evolutionary material. The implementation is carried out by providing pretests to class XII students of SMA N 1 Bandar Batang Regency with a motivational questionnaire that has been prepared. Then a novel has been given that has been developed to be read to increase the motivation of class XII students in learning the theory of evolution. The students' enthusiasm made them feel at home, and they completed the novel within six days. After the student finishes reading, they are given another posttest with the same motivational questionnaire. It follows Sayuti (2000) opinion that the narrative presented in a literary work will make the reader enthusiastic about reading it.

Based on the implementation that has been carried out, it is known that the level of motivation of class XII students of SMA N 1 Bandar was initially included in the sufficient criteria with a percentage of 59.17%. And After being given a novel to read, the student's motivation level rises to 79.86% or in high criteria. Thus, the implementation carried out at SMA N 1 Bandar Batang Regency shows that the products developed follow the characteristics of students and the needs of schools in realizing alternative learning resources to increase student motivation in evolution learning.

## Discussion

In product feasibility, the product developed is included in the feasible category because of the development process related to the novel development

procedure. The novel development procedure consists of determining the target reader, determining the idea of the story, creating a novel outline, determining the intrinsic elements of the novel, writing each part of the novel, and revising and creating an attractive cover (Nurgiyantoro, 2012). Following the existing procedure, the process of finding inspiration for ideas is carried out by reading various types of fiction and non-fiction. The ideas obtained are then developed into outlines and intrinsic elements of the novel and written into each chapter.

In addition, in the development process, the development of the novel is assisted using software that is in accordance with its function. In the novel's content, the software used is Microsoft word. Using this software, the novel's content can be written well. Microsoft Word is software for creating documents, including papers and novels. The software provides various features to facilitate typing a document (Ngibad, 2018).

Based on the aspect of product effectiveness, referring to the results obtained at the implementation stage, the product developed can make students increase attention in learning evolution, adapt learning materials to daily life, increase self-confidence levels when learning evolution and increase student happiness when learning evolution materials. From the initial motivational level of SMA N 1 Bandar, students are included in the good category with a percentage of 59.17%. And After being given a novel to read, the student's motivation level rises to 79.86% or in high criteria, according to Emzir (2008) It means the motivation to learn evolution with indicators, according to Keller (1987), is attention which is related to the attention of students, relevance related to student life, confidence which is related to confidence and expectations of student success in learning something, and satisfaction which is related to a sense of pride in the results achieved, successfully increases.

In the attention indicator, learners' attention increases due to the appearance of novels that are considered attractive. Novels can attract students because they can bring out the imagination of their readers. The imagination that appears in the reader's mind will make the reader feel an emotional sensation as a result of the condition of the characters told in the novel (Nurgiyantoro, 2012). In the relevance indicator, students can connect it with daily life because in the story in the novel, the concept of evolution is presented which is related to daily activities, for example in tree planting activities that associate it with the concept of a phylogeny tree. Then, the character's life as an ordinary teenager with disadvantages and advantages relates and makes friends like a teenager relationship. The relevance of the novel to the reader's life will cause learning to be optimal because good learning means striving to increase student motivation in understanding something, and this will happen if the education is carried out related to daily life (Kawuryan, 2019).

In the indicator of confidence, students increase their self-confidence, products in the form of novel learning evolution material developed to give rise to a sense of students interest. Student confidence will appear if students have a fondness for what is learned so that students can study more seriously. In the developed novel, evolutionary materials are also presented so that with the

seriousness of learning using the developed novel, students will be confident because they know the evolutionary material that has been presented (Andriyani, 2012).

The last indicator is related to satisfaction. Product results increase the sense of happiness of students because the product developed has entertainment value with the storyline presented. In addition, the climax presented in the developed novel also causes a sense of satisfaction for students because students can draw conclusions with the understanding gained from all the novels read. With such a storyline and climax, the novel developed can provide satisfaction and happiness for students because the happiness and satisfaction of students are related to the curiosity caused by the entertainment a person gets (Lu & Shih, 1997).

Therefore, the N Gain test was carried out to strengthen the results that the products developed are effective in increasing the learning motivation of students of SMA N 1 Bandar Batang Regency. The N Gain test of the developed product also produced a value that was included in the moderate category of 0.507, so it was included in the category of being effective enough to increase student learning motivation in evolution learning (Sugiyono, 2015). The products developed are quite effective in increasing student learning motivation in learning evolution material because they are developed by the characteristics of students of SMA N 1 Bandar Batang Regency, the majority of whom like reading activities, with a choice of reading materials, namely novels. So when an alternative learning resource is developed as an evolution learning novel, it is appropriate to increase student learning motivation. It is supported by the opinion of Sudjana (2012), namely that learning resources also provide opportunities for students to develop themselves according to their abilities and provide more scientific teaching because educational programs run more systematically and present information more flexibly.

## CONCLUSION

Based on the validation results that have been carried out, the products developed have an average percentage of validation results, which is 82.5% very valid. The validation percentage is obtained from the validation results by learning novel development experts and evolutionary material experts. But with the various revisions that need to be made, the majority of which lie in writing errors and laying down the concept of evolution. And when tested on a limited basis at SMA N 1 Bandar Batang Regency, the products produced were proven to increase student learning motivation. The initial motivational level of SMA N 1 Bandar Batang Regency students is included in the good category with a percentage of 59.17%. After being given a novel to read, the student's motivation level increases to 79.86% or in high criteria.

Based on the results of research and development that has been carried out, it can be recommended to:

Considering that the results of research and development products can increase learning motivation for class XII students on evolutionary materials, it is recommended that teachers add variations in learning resources for evolution

materials at SMA N 1 Bandar Batang Regency. The necessity to add a more profound emotional impression to the storyline of the developed product. The necessity for proofreading in more depth to get better grammar.

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