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## **“RESENDS” Research-Based Teaching Material Supplement Development as a Form of Students’ Reproductive Health Care**

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### **Abstract**

This research was aimed to analyze the advisability and the effectiveness of “RESENDS” research-based teaching material supplement in improving the learning outcomes and fostering the students' reproductive health care against the dangers of e-cigarettes. This research was conducted by using research and developmental methods (R&D) which referred to the modified Sugiyono (2013) steps. The result of this research showed that the advisability of “RESENDS” research-based teaching material was very decent (material validity 91.5%, media validity 98.75%, students' responses 89%, teacher responses 96.7%). “RESENDS” research-based teaching material supplement was effective in improving the students' learning outcomes and their care attitudes. It was proved by the percentage of students' classical completeness that had achieved the  $KKM \geq 72$  was 87.9%. As many as 12% of the total students belonged to high criteria of caring attitude and 88% of the total students belonged to very high criteria. This research concludes that the product developed in this study is a research-based teaching material supplement “RESENDS”. “RESENDS” contains material on the reproductive system and research results related to the dangers of exposure to e-cigarettes to the reproductive system which contains basic competencies (KD), indicators, material diagrams, “did you know?” Columns, important concepts, discussion forums, summaries, practice questions, references and glossary that are printed in full color and complete with illustrations or pictures. The research-based teaching material supplement “RESENDS” is feasible and effective to use in improving learning outcomes and fostering a student's reproductive health care attitude towards the dangers of e-cigarettes.

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## INTRODUCTION

Teaching material is one of the crucial elements of learning activities. Teaching material can be used to facilitate the learning process and improve knowledge and also experience. According to Dick & Carey, as quoted by Gravoso (2008), teaching material is a set of material (*teaching material*) that is arranged systematically, displaying a complete figure of the competencies that will be mastered by students in learning activities. Teaching material plays an important role and meaning for both the teachers and the students in the learning activities. The teachers will find difficulties in improving the effectiveness of learning if they do not have a complete teaching material; meanwhile, the students will get trouble in the learning process (Sungkono, 2009).

Based on the result of the observation in Senior High School 1 Ambarawa, it was obtained that it used the 2013 curriculum for supporting the learning process in that school. The learning process in the class was good, the teachers had applied some teaching methods starting from a discussion, presentation, making a model, mind mapping, role play and also doing practicum activities. Nonetheless, the teachers did not use variation books as the learning sources, they only used BSE books and some books from the publishers. Those books are still dominated by writing and printed used blueprint paper.

The observation was done by giving a questionnaire to the students which were showed that 55.5% of the students more understand the material not by reading a book, it was caused by some factors such as only 38,9% of the students stated that the teaching material which was provided by the school was interesting and contain complete material. Therefore, it is necessary to develop teaching materials tailored to the needs of students as supplements to complement existing teaching materials, namely, an interesting teaching material, that can be easily understood, in line with the material, provides complete material, contains illustrations and pictures, not monotonous and writing only. The students expected a teaching material that is completed with the facts, summaries, and also some exercises.

The development of teaching material is highly recommended, following Peraturan Menteri Pendidikan Nasional Republik Indonesia Nomor 2 Tahun 2008 pasal 6 ayat 2 dan 3 which states that "Besides textbooks, the teachers can use the teachers' guidebook, enrichment book, and reference book in the learning process. Those books can be useful in giving students additional knowledge and perception, the teachers can suggest their students read the enrichment and reference book."

Researchers develop a teaching material supplement that is equipped with research facts in it. Research is considered as the right thing to be integrated into a teaching material because the result of the research is based on science so that the data which is gained by doing research is the actual reality, not an opinion which is made by a group of people. The students will be more understand the material when they also are given a fact. This is in line with Parmin & Peniati (2012) who stated that the results of the research which are integrated into teaching material are effective to be used in the learning process because it was more applicable and fulfill the contemporary element.

The research raised in this supplement is research related to the dangers of e-cigarette exposure to the reproductive system triggered by the trend of e-cigarette use among adolescents. The results of observations at school show that as many as 75% of students already know information related to e-cigarettes but do not yet know the dangers so that students' awareness of the dangers of exposure to e-cigarettes on reproductive health has not been well developed. The supplement developed is expected to increase students' reading interest so that it can help improve learning outcomes and play a role in fostering a student's reproductive health care attitude towards the dangers of e-cigarettes. Based on this background, it is necessary to conduct a study on "RESENDS" Research-Based Teaching Material Supplement Development as a Form of Students' Reproductive Health Care

## RESEARCH METHODS

The "RESENDS" research-based teaching material supplement was conducted by using research and developmental methods (R&D) which referred to the modified Sugiyono (2013) steps. Those steps consist of identifying the potency and the problem, doing research, collecting data, designing product, design validity, design revision, small-scale trial, large-scale trial, product revision, broad-scale trial, product revision, and final product. The small-scale trial was done in Senior High School 2 Semarang. The samples of the trial were 15 XI MIA IX students of 2018/2019 who were collected by using random sampling. The large-scale trial was done in Senior High School 1 Ambarawa. The samples of the trial were 108 XI MIPA 1, MIPA 2, and MIPA 4 students of 2018/ 2019 who were collected by doing the purposive sampling. The learning design was One Group Pretest and Posttest Design.

## RESULTS AND DISCUSSIONS

### "RESENDS" Feasibility

Feasibility data of "RESENDS" research-based teaching material supplement was the result of material and media validity which is based on textbook assessment instruments according to the BSNP 2014 which have been modified and adapted to the needs. In addition to the validation results from experts, student response data were also taken to test the readability and responses of the teacher as a consideration to determine whether the research-based teaching material supplement for reproductive system material was suitable for use. The "RESENDS" was feasible if it had the criterion such as (1) material validity achieved the mean percentage score  $\geq 51\%$ , (2) media validity achieved the mean percentage score  $\geq 51$ , (3) the students' responses towards the use of teaching material achieved the mean percentage score  $\geq 51\%$ , and (4) the teachers' responses achieved the mean percentage score  $\geq 51\%$ .

The validity of the "RESENDS" material was the result of material expert validity. The material components consist of content eligibility components, presentation components, and linguistic components. The details of the research results by a material expert can be seen in Table 1:

**Table 1** The validity of research-based teaching material in reproductive system material

No	Assessment Criterion	Validator 1	Validator 2
		Score (%)	
<b>CONTENT ELIGIBILITY COMPONENT</b>			
A	Material coverage	11	11
B	Material accuracy	6	8
C	Up-to-date and contextual	12	11
<b>PRESENTATION COMPONENT</b>			
A	Presentation technique	10	12
B	Supporting the presentation of the material	15	14
C	Completeness of the presentation	16	16
<b>LINGUISTIC COMPONENT</b>			
A	Discretion	6	7
B	Compliance with language rules	7	7
C	Use of terms and symbols	8	6
<b>Total score</b>		<b>91</b>	<b>92</b>
<b>The score average</b>		<b>91,5</b>	
<b>Maximum total score</b>		<b>100</b>	<b>100</b>
<b>Percentage score (%)</b>			

<b>Presentase skor (%)</b>	<b>91,5</b>
<b>Criteria</b>	<b>Very Valid</b>

Based on the results of the material expert's validation, it was obtained a score percentage of 91.5% with very valid criteria. It was caused by the arrangement of "RESENDS" based on the core competence (KI) and basic competence (KD) which was stated on the biology syllabus 2013 revised curriculum. The concepts, information, and examples that were provided on the "RESENDS" were considered to be applied so that it would be suitable for the students' needs and the development of the era. This is in line with Nur (2012) who stated that in choosing the learning textbooks we need to consider the content of the book which includes the accuracy of the concept, the accuracy of the information, the conformity of the examples, and the breadth and depth of the material.

As the name implies, "RESENDS" (Reproduction System and Electronic Nicotine Delivery System) contains reproductive system material that according to KD 3.12 and 3.13 and has wide coverage, as well as accurate material because it has clear sources from literature studies in books, articles, and journals. Besides, in the teaching material supplement, there is additional information about e-cigarettes, the dangers of e-cigarettes as well as research results that show the dangers of exposure to e-cigarettes to the reducing system. Facts related to e-cigarettes come from articles, journals, and research conducted by researchers. The supplement of this teaching material pays attention to current and contextual aspects where there is a relationship between the material and the real situation experienced by students, namely related to the dangers of e-cigarettes to the reproductive system. This can encourage students to make connections between the knowledge they have and its application in everyday life as members of the family and society.

The material in the teaching material supplement is arranged in a straightforward and communicative language so that it is not boring when to read. Even so, writing is still guided by the rules of good and correct Indonesian and pays attention to consistency in the use of symbols so that they are easily understood by students. "RESENDS" does not only contain learning material but is also equipped with basic competencies (KD), indicators, material diagrams, column "did you know?", important concepts, discussion forums, summaries, practice questions, bibliography and glossary that are printed in full color and equipped with illustrations or pictures that can make it easier for students to learn

In addition to validation from material experts, validation from media experts was also seen to see the feasibility of "RESENDS". The media components consist of graphics component which includes: the size of teaching material, the cover of teaching material, and the design of teaching material content. The details of the research result by media expert can be seen in Table 2:

**Table 2** The validity of research-based teaching material in reproductive system material

No	Assessment Criterion	Score (%)
<b>GRAPHICS COMPONENT</b>		
1.	The size of teaching material	8
2.	The cover of teaching material	28
3.	The design of teaching material content	43
<b>Total score</b>		79
<b>Maximum total score</b>		<b>80</b>
<b>Percentage score (%)</b>		<b>98,75</b>
<b>Criteria</b>		<b>Very Valid</b>

Based on the research result of media validity, it was obtained a score percentage of 98.75% with very valid criteria. The research-based teaching material supplement "RESENDS" can achieve very valid criteria from the assessment of media experts because an analysis of the teaching material needs that students want before drafting has been carried out. Drafting is done by making layout plots, determining explanatory information text, and organizing pictures, illustrations, charts, tables, and diagrams so that

their appearance looks attractive to students. The layout is made simple so that it doesn't interfere with the student's focus on the material presented. This is in line with the opinion of the Mukminan stated that in order to improve the learning media, we need to pay attention to the VISUALS principle, it stands for: (1) Visible: easy to be seen, (2) Interesting: attractive, (3) Simple: modest, (4) Useful: rewarding in content, (5) Accurate: correct (can be accounted for), (6) Legitimate: make sense or legal, and (7) Structured: well-arranged (Nurseto, 2011).

The graphic component is really taken into account in the preparation of the research-based teaching material supplement "RESENDS" by presenting an attractive appearance both in terms of the size of the teaching material, attractive cover design, and a harmonious layout. The choice of font types is not too much and too much so that it does not disturb students' concentration when reading. The content design contains an explanation of the material which is equipped with pictures or illustrations as the media which is printed in full color so that it does not seem monotonous. According to Putri (2017), the use of media in the learning process can affect student motivation to learn.

This makes students happier and motivated to use supplements to learn so that students' reading interest also increases. The name of the supplement is made with an interesting and easy to remember the abbreviation, namely "RESENDS" (Reproduction System and Electronic Nicotine Delivery System) so that it can stimulate students' curiosity to read.

The students' responses were conducted by giving them a questionnaire on small-scale trials. The small-scale trial was done in a different school where the large-scale trial was done. The small-scale trial was done into 15 XI MIA IX students in Senior High School 2 Semarang as the sample to complete the questionnaire of students' responses towards the research-based teaching material supplement in reproductive system material. Before answering the questionnaire, the students were allowed to read and observe the content of the teaching material as the guidance to answer the questionnaire. The result of the students' responses towards the teaching material can be seen in Table 3:

**Table 3** The result of the students' responses questionnaire

No	Statements	The Percentage of Students' Responses
1.	The design of teaching material cover is interesting.	83.3
2.	The appearance of teaching material layout is interesting.	90
3.	The font type is simple and easy to be read.	96.7
4.	The font size can be read clearly.	98.3
5.	The language used is simple and easy to be understood.	93.3
6.	The terminologies found in teaching material are easy to be understood	88.3
7.	The illustration/picture displayed clearly	98.3
8.	The illustration/picture displayed on the teaching material can give such a motivation to learn the material	93.3
9.	The materials presented in teaching material are easy to be understood	83.3
10.	The teaching materials are not boring	83.3
11.	The teaching material boosts the spirit to learn more about biology	83.3
12.	Loving biology after using the teaching material	76.7
	<b>The average of percentage</b>	<b>89</b>
	<b>Criteria</b>	<b>Very Good</b>

According to the result of the small-scale trial, the students gave their estimation in an average of 89% by means of very good criteria. Students were very interested in the teaching material supplements developed. The students looked enthusiastic when they first read the research-based teaching material supplement "RESENDS" that was developed. Positive responses from students to the development of teaching material supplements cannot be separated from the analysis of the teaching materials desired by students, namely: (1) easy to understand, (2) according to the material, (3) complete material, (4) lots of pictures or illustrations, (5) not only contains writing, (6) not boring, (7) attractive covers, (8) clear

writing, (9) printed on white paper and (10) in color. The development of this teaching material supplement tries to fulfill the needs of students in schools.

The teachers' responses on the small-scale trial were conducted by giving them a questionnaire consisted of 15 questions. The result of the teachers' responses towards the "RESENDS" showed that the total score was 58 with a percentage of 96.7 % and very good criteria. This is because in the preparation of teaching material supplements we also consult with teachers who already understand well the need for good teaching materials for students.

The "RESENDS" was not aimed to replace the existing teaching materials, yet it was used as the company or we can call it as the supplement of the previous teaching material because this kind of teaching material presents the research result that has not existed yet in the previous teaching material. Based on validation by material experts and media experts, and also based on the students' and teachers' responses; so it can be concluded that "RESENDS" are feasible to be used in the learning process.

### The Effectiveness of "RESENDS"

The effectiveness of the "RESENDS" was measured by analyzing the students' learning outcomes and also their reproductive health care attitude. The learning process by using "RESENDS" gave positive impacts on the students' learning outcomes and their affective value, it was the reproductive health care attitude of students towards the dangers of e-cigarettes. The "RESENDS" was effective if the students' learning outcomes achieved the minimal completeness criteria (KKM) with a value of  $\geq 72$  and the maximal completeness showed a value of  $\geq 70\%$  from the total students who achieved the KKM, and the reproductive health care attitude achieved the high criteria. The data of the students' learning outcomes was obtained from the pretest and posttest, after analyzing them it was obtained the number of students who complete and not a complete one. The percentage of the students' classical completeness presented in Table 4.

**Table 4** The recapitulation of percentage of the students' learning outcomes after using research-based teaching material supplement

Information	XI MIPA 1	XI MIPA 2	XI MIPA 4
The number of students	36	36	36
The complete students	31	31	33
The non complete students	5	5	3
The classical completeness of each class (%)	86.1	86.1	91.6
<b>Overall classical completeness (%)</b>		<b>87.9 %</b>	

The questions given to the students were 25 questions in the form of multiple choices that were taken from the analysis of test questions. The indicator used to find out the effectiveness of teaching material was by counting the percentage of the total students who achieved the KKM. After further analysis, the results of the percentage of classical completeness was 87.9% of students who achieved the KKM  $\geq 72$ . The percentage of classical completeness shows that the use of teaching material supplements can improve student learning outcomes because it fulfills the indicator of  $\geq 70\%$  of the total number of students reaching KKM. It is in line with Wahyudi (2014) who said that using teaching material in the learning process can improve the students' learning outcomes.

The role of "RESENDS" in improving learning outcomes is inseparable from the results of material and media validation that get high scores and show very valid criteria. The material in the research-based teaching material supplement "RESENDS" is according to the basic competencies (KD) and core competencies (KI) in the 2013 curriculum. The attractive "RESENDS" display makes students motivated and excited when learning.

This teaching material supplement is equipped with pictures or illustrations that support the material so that students can immediately observe and further explore the text and images related to the

material. Exploration of images and text can help connect the material presented with student experiences so that student knowledge can stay longer. Besides, positive responses from students and teachers also contributed to the development of this "RESENDS". This is in line with the research of Setiawan (2008) which states that the biology learning process carried out by teachers should allow the development of conceptual understanding, attitudes, and increase student interest in biology lessons. Students can explore their knowledge and experience because the teacher's role in learning is only as a guide and facilitator.

As for students who have not reached the KKM score at the time of the posttest it can be caused by several factors including there are students who are not present at the time of learning due to illness or dispensation so that they are left behind from other students. According to Sianipar (2010), success or students' achievement is influenced by some interconnected factors, both internal and external.

This research-based teaching material supplement can be used as the company of the existing teaching material because basically, developing research skills is one of the main goals in the world of education (Anggraeni *et al.*, 2015) in which most are studied and applied by integrating the cognitive skills and abilities to develop the science knowledge (Kuo *et al.*, 2015).

Research is considered as the essential component at the school level (Kapon, 2016) that is the core of science study and science (Hanauer *et al.*, 2009). The investigation-based learning process enables the students to develop basic competence and build a conceptual understanding of research skills (Yang & Liu, 2016). Many research skills are accepted as a method of teaching science (Leblecioglu *et al.*, 2017). Moreover, research can increase the learning interest and motivation because they are 'hands-on' and 'mind on' (Kasmurie *et al.*, 2010).

The research-based teaching material supplement "RESENDS" has several advantages including: (1) it has an easy to remember the name, namely "RESENDS" (Reproduction System and Electronic Nicotine Delivery System), (2) the cover design attracts students' attention, (3) is printed in full color in 100 gram HVS paper with glossy lamination, (4) the material presented does not only come from literature reviews from books, articles, and journals, but also comes from research results related to the dangers of exposure to e-cigarettes to the reproductive system, (5) presents images or illustrations relevant to the material and (6) equipped with basic competencies (KD), indicators, material diagrams, "did you know?" column, important concepts, discussion forums, summaries, practice questions, references, and glossary

Furthermore, in order to determine the level of students' awareness of reproductive health, it is analyzed by the attitude questionnaire in a large-scale test phase. The number of questions given was 15 statements. The result data of students attitudes can be seen in Table 5:

**Table 5** The result of student attitudes

Information	XI MIPA 1	XI MIPA 2	XI MIPA 4	Overall
High	16.7 %	13.9 %	5.6 %	12%
Very high	83.3 %	86.1 %	94.4 %	88 %

According to table 5, it can be seen that the students' reproductive health care attitudes after using research-based teaching material supplement showed that overall there were 12% of the students who had high reproductive health care attitude and 88% who had the very high on the reproductive health of students against the dangers of e-cigarettes.

In this study, learning outcomes can be interpreted as the level of students' knowledge about the various adverse effects that occur in the reproductive system due to exposure to e-cigarettes. Logically, if students get sufficient knowledge about the dangers of e-cigarettes, then the attitude to avoid or prevent e-cigarette abuse is high because students are aware of the dangers of e-cigarettes. Through education, students will understand better how health can be maintained. If students have adequate knowledge of reproductive health, they tend to pay attention to their reproductive health. Students will believe more because of the bad effects caused by the use of e-cigarettes come from the facts of the research results. When students have a good faith, students can also become cadres to invite families and communities to care more about reproductive health.



According to Azwar (2015), attitude formation is influenced by some factors such as personal experience, culture, and other people who are considered as important people, newspapers, institutions, and the individual's emotional factor. Caring is one of the character values that need to be developed, in the midst of the global flow of student interactions that are increasingly broad and free. Wardani (2012) stated that planting character values has a major influence on learning outcomes because the character itself includes integrity, good morals which are processed with intelligence.

After studying the teaching material supplements developed, students will have a good knowledge regarding the reproductive system material and the dangers of e-cigarettes to the health of the reproductive system. Students will be able to connect the material that has been studied with the facts that occur in the surrounding environment so that a good attitude will grow, namely a caring attitude towards reproductive health. This is in line with what was stated by Wijaya *et al.* (2014) that high school students who have good knowledge will be followed by positive attitudes, and high school students who have good attitudes will be followed by positive activities.

## CONCLUSION

Based on the results of research and discussion, it can be concluded that the product developed in this study is a research-based teaching material supplement "RESENDS". "RESENDS" contains material on the reproductive system and research results related to the dangers of exposure to e-cigarettes to the reproductive system which contains basic competencies (KD), indicators, material diagrams, "did you know?" Columns, important concepts, discussion forums, summaries, practice questions, references and glossary that are printed in full color and complete with illustrations or pictures. The research-based teaching material supplement "RESENDS" is feasible and effective to use in improving learning outcomes and fostering a student's reproductive health care attitude towards the dangers of e-cigarettes.



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