Feasibility of Human Excretory System Module in Biology Learning

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Abstract

This study aimed to determine the feasibility of the human excretory system module. The method of this research used was a quantitative descriptive through the instrument of a validation sheet modules which validated by two expert validators. The aspects assessed include the feasibility of the content, language, presentation, and graphics. The results of this research showed the average aspects of feasibility of the content reached the value of 1.00 within the 'very feasible' category. The conclusion is the human excretory system module can be useful in teaching biology, especially in human excretory system materials.

Keywords: Teaching Material, Module, Human Excretory System

INTRODUCTION

The human excretory system is one of the parts in biology material which is the basis of curriculum competencies for the grade 11 and the scope of this material consist of the structure and function of excretory organs, excretory processes, disorders and diseases, and technologies related to the health of the human excretory system. According to Prehtiningsih *et al*., (2015); Qumillaila *et al.,* (2017), the excretory system is the one of difficult material in teaching biology. Because of many concepts is abstract that students must understand carefully and the teachers also have to explain through the instructional media in the material of the structure of excretory organs and the process of human excretion.

Understanding the concept is related to students learning outcomes influenced by two factors; internal factors and external factors (Prehtiningsih *et al*., 2015). Internal factors include the physical and spiritual health of students, study habits, interests, and students' self-motivation and the external factors include family conditions, social environment, teacher's technique in teaching, and the tools the teacher applies in the classroom (Jirana *et al.*, 2015; Syarifuddin, 2011; Kristiana *et al.*, 2017; Mujakir, 2015).

While the various efforts have been made to improve the students' understanding related to the material of human excretory system, including to use learning strategies by mood, understanding, recalling, digesting, expanding, reviewing based on the interactive flash media (Mayangsari *et al.,* 2015). Besides that, several learning models have been used, such as guided inquiry (Prehtiningsih *et al.*, 2015), discovery (Masrida *et al.,* 2016) and snowball throwing (Hanum *et al.,* 2015). Other efforts have also been done through the use of instructional media, including puzzles (Kristiana *et al.*, 2017), e-learning-based media (Daud & Rahmadana, 2015). In addition to using strategies, models and learning media, other efforts have also been made through the teaching materials. Module is one of the solutions to help the students' understand teaching materials that also have been compiled to the inquiry-based human excretory system concepts (Suprapti & Susanti, 2015).

Teaching materials are key to learning resource that can affect students learning success (Nisa, 2015) and increasing the students learning outcomes (Asfiah *et al.*, 2013; Suprapti & Susanti, 2015) and the best teaching materials are those that can be used for the students to learn by the independent

(Padmapriya, 2015; Pramana & Dewi, 2014).

The module is one of the teaching materials that can be used as a learning resource for students. According to Asfiah *et al.*, (2013), a module contains a description of the material in relation to the core competencies and basic competencies as well as examples related to real life. The language used in the module should be understandable, interesting and avoiding the interpretation of the double meaning. The presentation should be arranged from the basic concepts to the more complicated ones. The module also presents systematic material, starting with an introduction, content, conclusion, and evaluation. The materials can also be supported by attractive pictures that are suitable with presented topics. Some of the research results show that the module has a positive impact on learning. Based on the research Sujiono & Widiyatmoko (2014), which integrates the science module based on problem-based learning on themes and the result is the students' motion will reach 100% completeness. Furthermore, Asfiah *et al.*, (2013) reported that using the science module based on the contextually integrated on the theme about sound - the result of the average score in the grade 8 (Class A and B) were 84.09 and 83.69 respectively. Related to the research of Suprapti & Susanti (2015), after the implementation of the inquiry-based excretion system module - the students in the learning Math and Science on grade 11 obtained the average score of 81.55 and 82.22. It is the result showed that the module could be used as one of the teaching materials in the learning process. However, the authors are interested in compiling modules as companion teaching materials to the textbooks and the student's activities worksheets. The purpose of this study is to design the human excretory system module on biology learning that feasible to use as a learning module in grade 11.

METHOD

This research uses the quantitative descriptive method, which is consists of three stages; the creation of human excretory system modules, module validation, and analysis of module validation results. In the process for making the module, the authors took the steps as follows the preparation of material references from books and journals, preparation of pictures that support the clarity of the material, and the preparation of the module content which consists of the introduction, contents, and concluding sections. On the validation steps, the module has been validation by two expert validators. The aspects of module evaluation are contained on the content, linguistics, presentation, and

graphics aspects. The assessment instrument is used in the form of validation sheets and the data of validation this module analyzed by using the formula below (Gregory, 2000).

The Content of Validation:

$$\frac{D}{A+B+C+D} \qquad (1)$$

Information:

A: Both judges disagree

B: Judge I agrees, Judge II disagrees

C: Judge I does not agree, judge II agrees

D: Both judges agree

Validity criteria:

0.80 - 1,00: High validity

0.60 - 0.79: High content validity

0.40 - 0.59: Medium content validity

0.20 - 0.39: Low validity

0.00 - 0.19: Very low content validity

Table 1. The Cross Tabulation (2x2)

Scoring Tabulation from Experts		*Judge* I	
		Not Relevant (score 1-2)	Relevant (score 3-4)
Judge II	Not Relevant (score 1-2)	(A)	(B)
	Relevant (score 3-4)	(C)	(D)

The module considered valid if it gets a value of 3 or 4 from the experts and their level of understanding is in the high content validity level

RESULTS AND DISCUSSION

Teaching materials are all forms of materials used in the implementation of learning activities. One of most teaching materials is on modules. The modules used in the learning process should have gone through the feasibility testing stage carried out by experts.

As stated by Daryanto (2013), validation is a process to test the suitability of the module through the target of the competencies in learning. In this case, the validation results of the human excretory system module are presented in the Table 2. Based on the acquisition of the total average of validation, it is stated the module of the human excretory system is relevant to use as teaching material in the learning.

Table 2. Results of Human Excretory System Module Validation

No.	Aspect	Indicator	Validator Score 1	Validator Score 2	Validity Value	Criteria
1.	Feasibility Content	Conformity with the basic competence	4	4	1.00	Very High
		Accuracy of learning material concept	4	4		
		Understandable material	4	4		
2.	Linguistics	The use of language can help students to understand the material	3	4	1.00	Very High
3.	Presentation	Reading readability	4	4	1.00	Very High
		Material presentation with images	4	4		
		Communicative material presentation	4	4		
		Summary of material presentation	4	4		
		Glossary presentation	4	4		
		Bibliography presentation	4	4		
4.	Graphics	The use of graphics or attractive images	4	3	1.00	Very High
		Module Cover	4	3		
		Average			1.00	Very High

1. Feasibility of the Content Aspects

The content feasibility aspect consists of three indicators. The first indicator: conformity through the basic competencies, where each validator gives the score 4 that is showing the overall indicators of learning in line with the basic competencies. According to Hidayah *et al.*, (2016), the formulation of basic competencies and indicators must be appropriate, so it is not the impact on the implementation and assessment of learning outcomes. The basic competencies and indicators presented in the module can be seen in Figure 1.

Kompetensi Dasar	Indikator Pembelajaran
3.9 Menganalisis hubungan antara struktur jaringan penyusun organ pada sistem ekskresi dan mengaitkannya dengan bioprosesnya sehingga dapat menjelaskan mekanisme serta gangguan fungsi yang mungkin terjadi pada sistem ekskresi manusia melalui studi literatur, pengamatan, percobaan, dan simulasi.	1. Membedakan pengertian ekskresi, sekresi, dan defekasi 2. Mendeskripsikan struktur dan fungsi ginjal sebagai organ ekskresi 3. Menjelaskan proses pembentukan urine. 4. Mendeskripsikan struktur dan fungsi paru-paru sebagai organ ekskresi 5. Mendeskripsikan struktur dan fungsi kulit sebagai organ ekskresi 6. Mendeskripsikan struktur dan fungsi hati sebagai organ ekskresi 7. Mengidentifikasi kelainan dan penyakit pada sistem ekskresi manusia 8. Mengidentifikasi teknologi yang berkaitan dengan kesehatan sistem ekskresi

Figure 1. Basic Competencies and Indicators

The second indicator: the accuracy of learning material concepts, which is each validator gives a score of 4 that is mean showed the concept of this material can be explained correctly in this module.

Based on the information of Prastowo (2013), in the teaching materials must be reliable. It is related to Daryanto (2013) states that the concept is an important indicator for the students to achieve the understanding of materials. In this case, is the basic competencies. The contents of the material in this module can be seen in Figure 2.

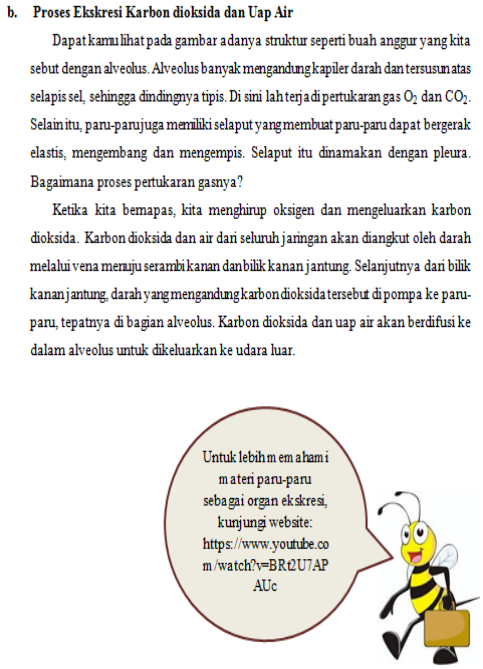

Figure 2. Content of Material in the Module

The third indicator: the materials should be easy to understand by the students. According to the validators' assessment, the material presented on the module of the human excretory system is softly understood. Corresponding to Daryanto (2013) states that learning materials are arranged in regular manners and images in such a way as to provide information that is more easily understood by the students.

2. Linguistics Aspect

Linguistics aspects consist of the one indicator; the language can use as the facilitate students to understand the materials. While for this case, the validator 1 gives the score 3 and the validator 2 gives the score 4. Furthermore, the validators notes to authors for this research must be taken care of the language for these instructions on the student's worksheet. Related to Asfiah *et al.,* (2013) that using the language for the research must be clear and try to avoid double meaning to interpretation so that the students can easily understand through the information conveyed.

3. Presentation Aspect

The presentation aspect consists of six indicators. The first indicator is the readability of the writing. Each validator gives the score 4 and the feedback for the presentation material as the font size, type of font, and the paragraph used to suitable for reading. According to Fadli *et al.,* (2017) that the writing is readable, the writing is not too small and the text description is structured. Furthermore, Daryanto (2013) also states that if the module has a high level of readability and suitable for students' abilities, it will be able to help students achieve learning goals.

The second indicator is the presentation of material and the image. The validators give the score 4 for the indicator. It means that the material presented in this module is also accompanied by appropriate images. In connection related to this assessment, Daryanto (2013) tried to use images as increasing the students' interest in reading abilities. It also facilitates the students to easily understand the concepts (Setiyadi *et al.*, 2017). The presentation of an image in the module can be seen in Figure 3.

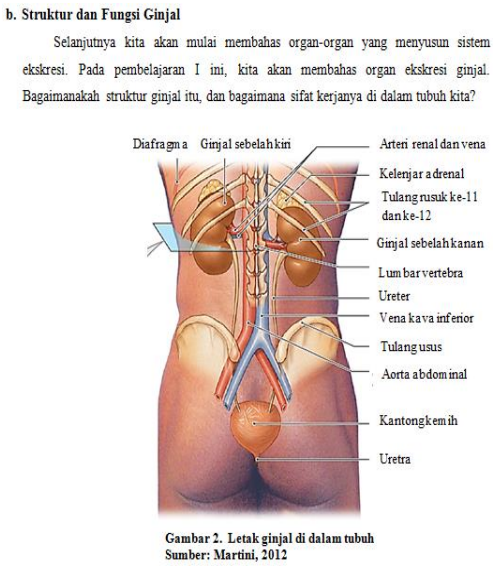

Figure 3. Image Presentation in the Module

The third indicator is the presentation of communicative material. The material in this module is considered communicative as well as which is each validator gives the score 4. According to Daryanto (2013), the presentation of communicative material makes the reader seem to communicate in both of directions.

The fourth indicator is the presentation of a summary. The summary presented in this module is considered to clear and concise, and each validator gives the score 4. According to Daryanto (2013), the summary must be able to summarize the material in one chapter. This can make the students easily recall their ability to the material that has been learned. The summary in the module can be seen in Figure 4.

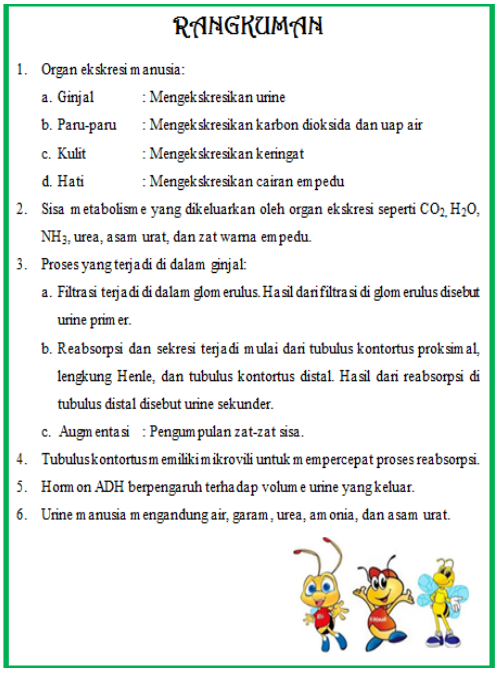

Figure 4. Summary in the Module

The fifth indicator that the presentation is the glossary and each validator gives the score 4 for this module. Related to Daryanto (2013), glossary in the module contains the operational definition that has been used in the module and is often required by the readers. According to Setiyadi *et al.*,

(2017), the glossary is expected to increase the students' knowledge. The glossary in the module can be seen in Figure 5.

Istilah Biologi >>>>>

Absorpsi	Proses pengambilan suatu substansi dan menjadi bagian substansi lain
Alveolus	Gelembung berisi udara, berdinding tipis yang terdapat pada paru-paru
Arteri	Pembuluh nadi
Augmentasi	Proses penambahan zat-zat dan urea di tubulus distal
Bronkiolus	Cabang dari bronkus
Bronkus	Cabang dari trakea
Bilirubin	Zat warna empedu
Defekasi	Proses buang air secara sadar
Dialisis	Pemisahan zat-zat terlarut

Figure 5. Glossary in the Module

The sixth indicator in this presentation is a bibliography, and each validator gives the score 4. Based on Daryanto (2013) states bibliography can help the students' learn more about the information which is provided of the particular reference source.

4. Graphics Aspect

The graphics aspect consists of two indicators. The first indicator is about the use of attractive graphics or images. Overall, the assessment results indicate that using graphics or images on the module are a good idea. As stated by Daryanto (2013), the use of attractive graphics or images can increase the students' interest feel in reading. The second indicator is the cover of the module. Based on the validators' assessment, the cover's design is valid and can receive for all user. According to Daryanto (2013), the module cover design must be adjusted to the images that can support the material to be delivered. The module cover can be seen in Figure 6.

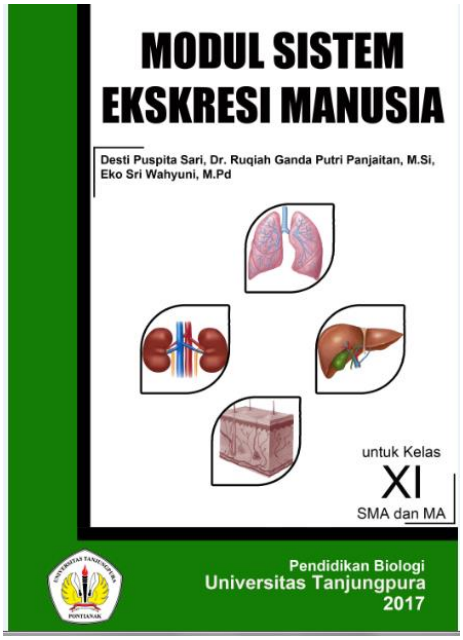

Figure 6. Module Cover

CONCLUSION

The human excretory system module is valid to be used as teaching material in the material of the human excretory system for the XI grade of senior high school.

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