



The Development of Ectofishpedia as a Learning Supplement on Aquaculture Activity

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Abstract

The observation's result at SMK Negeri 4 Kendal on students of the Freshwater Fisheries Agribusiness department and Water Quality and Pest Disease teachers has revealed that 89.1% of students found it challenging to find ectoparasites during lab-work because of limited material samples, time, and also limited images of ectoparasites on commonly used teaching materials. The 2013 curriculum requires students to be able to learn from various learning sources, and teachers are needed to be more creative in developing learning media. The observations are also made on fish breeders in the Muncul area of Semarang Regency. It is known that fish farmers do not understand fish ectoparasites, their symptoms and proper handling. Based on the results of these observations, the need for a media that can help students learn ectoparasites and a medium that can help fish farmers in overcoming ectoparasites in fish, so the Ectofishpedia is developed. Ectofishpedia is made based on ectoparasitic observations at BKIPM Semarang and literature studies. This study aimed to determine the validity of Ectofishpedia, the feasibility of Ectofishpedia as a supplement for teaching materials, and the feasibility of Ectofishpedia for use by fish farmers. This study followed the R&D method by Sugiyono (2013). The validity assessment by material experts obtained a percentage score of 88.74%, and by media experts 98.75% with very valid criteria. The feasibility assessment by the teacher got a score of 86.45% and 85.05% by students with very appropriate criteria. The feasibility assessment by fish farmers obtained a score of 83% with very appropriate criteria. The results of this study indicate that Ectofishpedia is valid and applicable to use as a supplement for teaching materials for pest and disease materials and is suitable for use by fish farmers.

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INTRODUCTION

The 2013 curriculum invites students to do interactive and networking learning, that is learning from various learning sources and studying from anywhere, this is in accordance with Minister of Education and Culture Regulation number 70 of 2013 (Ministry of Education and Culture, 2013). One of the factors that play a role in the process of ongoing learning activities is learning media. The process of learning activities is very influential on student learning achievement. The effective learning media will make information processing by students work well so that student achievement can be promoted. Teaching material is one of the media that is used in learning.

The observations at SMK N 4 Kendal on students of the Freshwater Fisheries Agribusiness Department and Water Quality and Pest Disease teacher revealed that 89.1% of students found it challenging to find ectoparasites during lab-work because of limited material samples, time, and also limited images of ectoparasites on commonly used teaching materials. The observations are also made on fish farmers in the Muncul area, Rowoboni Village, Banyubiru District, Semarang Regency. It is found that fish farmers do not understand fish ectoparasites, their symptoms, and appropriate treatment.

Based on the results of these observations, we need a media that can help students learn ectoparasites and a medium that can help fish farmers to overcome ectoparasites in fish, so that the Ectofishpedia (Ectoparasite Fish Encyclopedia) is developed. Encyclopedia according to the Big Indonesian Dictionary (2017) is books or a series of books that collect information or descriptions of various things in the field of art and science, which are arranged alphabetically or according to the scientific environment. Ectofishpedia was made based on ectoparasitic observations at the Semarang Fisheries Product Quality and Safety Control Quarantine Center (BKIPM) and literature studies.

RESEARCH METHOD

The development of Ectofishpedia was done by research and development method which refers to Sugiyono's (2013) modified steps. These steps consist of identifying potential and problems, data collection, product design, design validation, design revision, product testing and review, product revision, and final product.

The method of data collection is done through ectoparasite observation data, questionnaires, interviews, and documentation. The instruments were interview sheets and questionnaires. The design validation consists of material validation and media validation. Material validation is carried out by four material expert validators from Biology Department of Universitas Negeri Semarang, Fisheries Department of Diponegoro University, Quarantine Quality and Safety Control Quarantine Center (BKIPM), and SMK N 4 Kendal Teachers. Media validation is carried out by a media expert validator from Biology Department of Universitas Negeri Semarang. The trial was carried out at N 4 Kendal Vocational School for two teachers of Water Quality and Disease Pest, and 35 students in class XI of the Freshwater Fisheries Agribusiness Department that had received ectoparasite material during class X. Product assessments were carried out to five fish farmers in Muncul area, Desa Rowoboni, Banyubiru District, Semarang Regency.

RESULTS AND DISCUSSION

Ectofishpedia (Ectoparasite Fish Encyclopedia) is a supplementary teaching material of various ectoparasites which infect freshwater fish. Ectofishpedia is designed based on the results of observations at BKIPM and literature studies. Ectofishpedia contains preface, table of contents, infectious diseases in fish, ectoparasites, freshwater fish, operational standards for examining ectoparasites, ectoparasites in freshwater fish, studies related to ectoparasites in fish, bibliography, glossaries, author profiles, basic competency sheets, indicators, and exercises.

The literature sources used in compiling the contents of Ectofishpedia were obtained from various books and journals, including BKIPM (2017), Dwi (2014), Febrianti (2013), Herlina (2017), Kabata (1985), Kemendikbud (2013), Kordi (2004, 2010, 2011, 2015), Kurniawan (2012), Lestari (2011), Sarjito *et al.* (2013), Solichin *et al.* (2013), Tarmizi *et al.* (2016), Tri *et al.* (2015), Wakita *et al.* (2005), and Yuasa *et al.* (2013). The reference images used in the preparation of Ectofishpedia are obtained from Abdullah *et al.* (2010), Asnita (2011), BKIPM (2017), Bullard *et al.* (2015), Christy *et al.* (2015), Dezfuli *et al.* (2011), Farika *et al.* (2014), Farras *et al.* (2017), Fernandez *et al.* (2009), Horiguchi *et al.* (2001), Kabata (1985), Klinger & Floyd (2013), Kurniawan (2012), Idrus (2014), Tanjung *et al.* (2013), and Wakita *et al.* (2005).

The Ectofishpedia draft is validated by four material validators and one media validator. The validity assessment of Ectofishpedia used a modified assessment instrument for textbooks from the 2013 BSNP covering material and media components. The validity of the material was assessed based on three aspects involves content eligibility, the feasibility of the presentation, and aspects of language feasibility. Before the validator gave an assessment, the revised suggestion was made first. The validators provided several suggestions for improving the Ectofishpedia design, that is (1) The depth of the material needs to be improved, complemented by morphological images of each species along with information on their parts, (2) each reference includes the reference source, (3) Add a graph that illustrates the relationship between 3 disease-causing factors in fish, (4) Pictures are more clear and exciting (5) More enhanced presentation. After Ectofishpedia was revised, the validators were an assessment score. The scores given by the validators are presented in table 1.

Table 1 Validation Result of Ectofishpedia

No.	Validator	Institute	Percentage (%)	Average of Score Percentage (%)	Criteria
1.	Material Validators	•Biology Dept. of Unnes	93.33	88.74	Very valid
		•Fisheries Dept. of Undip	83.33		
		•BKIPM	90		
		•SMK N 4 Kendal	88.33		
2.	Media Validator	Biology Dept. of Unnes	98.75	98.75	Very valid

Based on the results of the validation of material expert, the evaluation of validity by material experts got a percentage score of 88.74%, and by media expert of 98.75% with very valid criteria. After Ectofishpedia is declared valid, a trial and review of the product can be carried out.

The validity of the material was assessed based on three aspects involves content eligibility, the feasibility of the presentation, and aspects of language feasibility. According to the Ministry of National Education (2008), excellent teaching materials must have a high level of readability, have language substance that matches the abilities of students, and the systematic preparation of teaching materials is clear, coherent, complete, and easily understood. The indicators of Ectofishpedia validity assessment have included the provision of suitable teaching materials according to the Ministry of National Education (2008).

The aspects are assessed from the validity assessment of the media include book size, cover design, and content design. Validity assessment from media expert obtained a percentage score of 98.75% with very appropriate criteria. Imtihana *et al.* (2014), state that attractive design components with communicative, creative displays in the presentation of illustrations, tables, and photos make it easier for students to learn the material. Ectofishpedia has a cover layout element and the contents section which has a color arrangement, image size, and harmonious contrast. It aims to attract reading interest. This is in line with Hasibuan & Kartono (2013) that the use of color is the essential thing in

making visual design products. The purpose of the right color will create a beautiful image, increase readability, and increase the passion of readers when viewing visual design products.

On the cover, Ectofishpedia uses more dominant and thick letters, using letters that are easy to read and not decorative letters, the title color is more contrasted than the base color of the cover. This is in accordance with the opinion of Hasibuan & Kartono (2013), that letters chosen must consider more readability than beauty. Decorative letters have a beautiful structure but difficult to read. In addition to readability, the letters chosen must provide comfort to the audience. Illustrations or drawings on the cover describe the characters from the contents of the Ectofishpedia material, and have revealed the character of the object to be studied. This is in line with the statement of Sinaga & Erdansyah (2013), that illustration on visual media must be accompanied by images related to the contents of the media made. Suprayitno (2014) also states that an illustration must have knowledge, understanding, and insight that is contextual about what is to be conveyed. This functions as a message so that the display of the illustration image can work correctly and adequately.

The field testing aims to find out the feasibility of Ectofishpedia as a supplement for teaching materials. The trial is carried out with the teacher and student response questionnaires instruments. The testing was conducted on two teachers of Water Quality and Disease Pest subject of SMK N 4 Kendal and 35 students of Grade XI Freshwater Agribusiness. The average percentage score from teacher responses is 86.45% with very appropriate criteria. The score of the results of the teacher's responses is presented in Table 2.

Table 2 The Result of Teachers' Response to Ectofishpedia

No.	Teachers	Institute	Score Percentage (%)	Average of Score Percentage (%)	Criteria
1	Teacher 1	SMK N 4 Kendal	87.5	86.45	Very appropriate
2	Teacher 2	SMK N 4 Kendal	85.4		

The teachers responded that there are many pictures on Ectofishpedia which make it easier for students to understand the material. This is supported by Julianto's statement in Ayu *et al.* (2013) that photos can avoid misconceptions, led to the same perceptions, and equate experiences. Muchtar & Siregar in Ayu *et al.* (2013) also argue that photographs can overcome the limitations of observation.

The results of the questionnaire analysis of student responses to Ectofishpedia obtained an average percentage score of 85.05% with very appropriate criteria. The score of the results of student responses is presented in Table 3.

Table 3 The Results of Students' Response to each Aspect of Ectofishpedia

No.	Statement	Percentage of Students' Response (%)
1	The learning material supplement layout is interesting	87.8
2	Making students more enthusiastic in learning	83.5
3	Fascinating	83.5
4	Supporting material mastery	82.8
5	The illustration can motivate learning process	88.5
6	Understandable material	79.2
7	Containing parts for students to find the concept by themselves	79.2
8	Arousing the discussion desire	78.5
9	Containing problems that testing students' understanding about ectoparasites material	91.4
10	The sentences and paragraphs are understandable	86.4
11	The language used is simple and understandable	89.2
12	The language based on EYD (enhanced language spelling)	88.5
13	No ambiguous sentences	80.7
14	Terms in learning material supplement are understandable	90.7
	Average	85.05
	Criteria	Very appropriate

Beside from each aspect, students' response can be seen from criteria level also. Students' response that is seen from the criteria level is presented in Table 4.

Table 4 The Results of Students' Response based on Criteria Level

Score Interval	Criteria	Students Number
81.26% - 100%	Very Appropriate	25
62.52% - 81.25%	Appropriate	10
43.76% - 62.51%	Less Appropriate	0
25% - 43.75%	Inappropriate	0

When the trial took place, students show a good response and high enthusiasm, seen from the excitement of students to read the Ectofishpedia. Students are interested in the pictures on the Ectofishpedia, as well as well-packed and detailed material, students also ask about the process of making Ectofishpedia, and discuss with friends in groups. According to Komalasari in Lestari (2017), an image or photo can provide a real picture that shows the real object, giving meaning to learning that is alive and precise compared to words to stimulate students' thinking skills.

In Ectofishpedia there are microscopic images of ectoparasites accompanied by morphological images. This can help students learn ectoparasites, so Ectofishpedia is right if it is used as a learning media to complete the main textbook. Learning media can display something abstract to be real, besides it also makes a concept more interesting so that it can motivate students in learning activities (Purwanti, 2014).

The study of Ectofishpedia products is seen from the evaluation of the feasibility of Ectofishpedia by five fish farmers. The results of fish farmers' responses to Ectofishpedia are presented in Table 5.

Table 5 The Result of Fish Farmers' Response toward Ectofishpedia

No.	Fish Farmers	Score Percentage (%)	Average of Score Percentage (%)	Criteria
1	Muncul Mina	87.5		
2	Nafa Mina	82.5		
3	Jaya Mina	85	83	Very Appropriate
4	Truno Mina	77.5		
5	Koko Mina	82.5		

The fish farmers' responses on Ectofishpedia obtain an average score of 83% included in the criteria of very appropriate. Fish farmers approve that Ectofishpedia can help farmers to identify ectoparasites, symptoms of ectoparasites in fish and how to treat them, because they do not know about ectoparasites, which they only know simple symptoms such as white spots on the surface of the fish, and usually treat it by sowing salt and giving some medicines. Images give its best on: (a) the characteristic is concrete, (b) images can overcome problems of space and time constraints, (c) can overcome the limitations of our observations, (d) can clarify a problem, and (5) easy to use, without the need for special equipment (Kemp & Dayton in Afriyanti, 2012).

CONCLUSION

Based on the research results and discussion, it is assumed that Ectofishpedia is valid and appropriate to be used as a material supplement for pests and disease material in aquaculture activity in SMK N 4 Kendal and also appropriate to be used for fish farmers.

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