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Research Article

Development of monopoly mite game as a health promotion media to increase knowledge and understanding about house dust mites in student boarding house

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Abstract: Student's knowledge of house dust mite (TDR) is still limited as well as the learning media used are uncomplicated. However, aside from learning outcome, knowledge of environmental health and hygiene are ignored. This study aims to produce health promotion media and analyze the effectiveness. This type of study was conducted by Research and Development (R&D) modified model by Borg & Gall. Data were collected from material expert, media expert, and extensive trial (experiments) that involving 30 students of Biology education department who have taken parasitology courses. As data analysis uses paired t-test (paired sample t-test). The result of the Mite Game Monopoly health media promotion products shows the validation of media experts and material experts are categorized very well with percentages of 97% and 89%. The result of data analysis obtained a value $P < 0.05$ which means there is a significant difference in the average value of pretest and posttest, it shows an increase of knowledge and understanding of TDR between before and after using the Mite Game Monopoly media

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1. Introduction

House dust is a very small particle with a diameter of about 6 x 10-7 mm or 0.0000006 mm to 1 mm for one house dust particle (Rofieq et al., 2016). In the dust there are very small house dust mites (TDR) ranging from 0.2-0.3 mm (Indriyanti, 2018). According to Rofieq (2018) dust contains organic and inorganic materials which are a food source for mites. The digestive activity of these mites will produce feces that contain inhalant allergens. The dirt can mix with house dust, causing an allergic reaction. In addition to mite droppings, other causes of allergic reactions are derived from the mite's own body which includes sexual organs, gastrointestinal tract, and cuticles. Each gram of dust contains 1000 mites and 250,000 allergens from the mite droppings; therefore, the more dust accumulates, the more likely the mites will live and produce inhalant allergens as the cause of allergic reactions (Natalia, 2015).

According to Indriyanti (2018), boarding rooms that are not cleaned will create more dust so that the cause of allergic reactions will increase. This problem can be overcome by promoting knowledge and understanding of health due to house dust mites. Health promotion is an effort to convey health messages to individuals, groups or communities who can provide knowledge about health and change behavior to improve health. In conducting health promotion, a media is needed to convey the expected content or material. The

media is used to facilitate the delivery of information to the audience or recipients of information (Afandi, 2015; Batubara, 2017; Notoatmodjo., 2010; Nugroho, 2014).

There is no research conducted on the development of monopoly myth games to increase public knowledge and understanding of mites. The purpose of this study was to develop a monopoly game in carrying out health promotions to provide education to the public about mites and the diseases they can cause. In the future, this research will be used as a reference basis for the development of mite-specific games in future research.

2. Materials and Methods

The research conducted was development research using the Research and Development (R&D) model from Borg and Gall which was modified by Sukmadinata (2005). The Borg and Gall development research model consists of ten steps, among others, research and data collection (research and information collecting), planning (planning), product draft development (develop preliminary form of product), preliminary field tasting), revise the results of the test (main product revision), field test (main field tasting), refine the product of the results of the field test (operational product revision), test the implementation of the field (operational field testing), refine the final product (final product revision), dissemination and implementation (dissemination and implementation). The Research and Development (R&D) model from Borg and Gall which was modified by Sukmadinata (2015) into three stages consisting of: 1) Preliminary study, 2) Development, and 3) Validation.

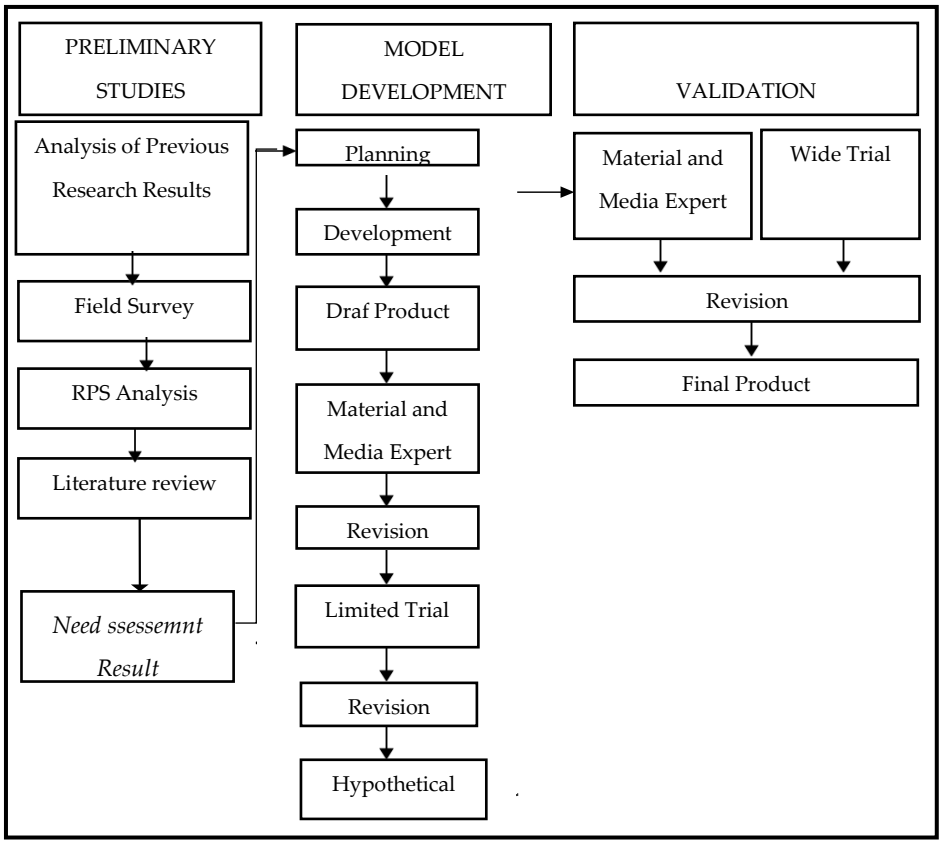

Figure 1. Sukmadinata modified Borg & Gall research and development procedures (Source: Sukmadinata, 2015)

2.1 Model Development

The preliminary study that has been carried out will obtain data from the analysis of previous research results, field surveys, RPS and syllabus analysis as well as literature studies in the form of essential concepts about house dust mites that will be displayed on the monopoly game media. At the development stage, the activities carried out are: (1)

Planning, (2) Product Draft Development, (3) Consulting Media Experts and Material Experts, (4) Product Revision, (5) Limited Trial, (6) Revision.

2.2 Validation

Validation is the final stage of development research. Validation is carried out to assess the products developed and produced. At the validation stage, the activities carried out are as follows: (1) Validation of Expert Tests and Extensive Trials (Experiments), (2) Dissemination and Implementation.

2.3 Product Trial

Product trials are carried out to collect data used to determine the effectiveness and feasibility of the products developed. Product trials are also used to see which products can achieve their goals and objectives. The product testing stages include: 1) media expert trials, 2) material expert trials, and 3) extensive trials (experimental research).

Table 1. Material expert instrument grid

Aspect validated	Descriptor
Material Equipment	Presentation of material in the media
Material breadth	Presentation of concepts, definitions, principles, examples and pictures according to material needs
Material Depth	The depth of the material according to the subject
Material Accuracy and Truth	The accuracy and truth of the material in accordance with the subject
Language Usage	Text legibility Information Clarity Effective and efficient use of language

(Source: Akbar, 2013)

Table 2. Grid of media expert instruments

Aspect validated	Descriptor
Presentation Equipment	Completeness of media components
Presentation breadth	Easy to use media Media can be reused
Media Shapes and Sizes	The suitability and accuracy of the shape and size of the media
Serving Layout	Media presentation accuracy
Graphic Eligibility	Media coloring Color compatibility of text with background color on media The accuracy of the selection of fonts and font sizes on the media

The field survey was conducted on Biology Education of UMM education students who had taken the parasitology course by filling out a questionnaire about the material of parasitic arthropods that cause allergic reactions and toxic reactions that had been studied totaling 30 respondents. The data collection instruments used were questionnaires and test sheets to increase knowledge and understanding. The use of questionnaires in this study was carried out for data collection for preliminary studies (need assessment) and questionnaires for validation of material experts and media experts. The material expert's instrument grid for assessing the material and linguistic aspects of the monopoly game media is shown in Table 1, while the media expert's instrument grid for assessing the presentation and display aspects of the monopoly game media is shown in Table 2 (Akbar, 2013).

The trial was carried out by giving pretest questions totaling 20 multiple choice questions about house dust mites. Respondents were given 45 minutes to answer the pretest questions. Furthermore, respondents were asked to group into five groups with a total of

six people in each group, then each group was given the Mite Game Monopoly media and played the game for 60 minutes.

3. Results

The results of the need assessment analysis were then continued at the development stage of the Mite Game Monopoly health promotion media draft as follows (Figure 2).

Figure 2. Board Monopoly Mite Game Appearance

The total student who fills out the questionnaire there are 30 students. The results of the extensive test data (experiments) are shown in Table 3.

Table 3. Data from the results of the extensive test with one group pretest-posttest

No	Name of Student	Result Assesment	
		Before	After
1	D. K.	65	95
2	S. A.	60	80
3	H. P.	75	80
4	J. M. E. S.	65	85
5	N. R. N. R.	35	80
6	L. Z. A.	65	80
7	A. A. I.	50	75
8	V. D. S.	40	95
9	K. A.	50	95
10	L.	65	75
11	A. M. P.	65	75
12	D. A.	60	75
13	S. H.	60	75

No	Name of Student	Result Assesment	
		Before	After
14	S. A. P.	55	85
15	A. I. R.	50	75
16	Y. N. A.	55	80
17	M. H.	65	90
18	M. A.	50	70
19	S. H.	70	90
20	S. M.	65	90
21	F. R.	40	80
22	D. F.	65	75
23	B. K. H.	70	90
24	F. P.	60	80
25	R. S.	70	80
26	A. A. P. R.	65	75
27	S. S.	45	70
28	A. R.	50	80
29	H. N. W.	65	75
30	M. J.	50	80

The results of the material expert test are the results of an assessment by a material expert on the Mite Game Monopoly media conducted by Dr. AR, M.Kes. The questionnaire was filled out on July 15, 2019. The validation of the material expert data consisted of 5 aspects, namely the completeness of the material, the breadth of the material, the depth of the material, the accuracy and truth of the material, and the use of language. The results of the assessment by material experts are shown in Table 4.

Table 4. Data on the results of the assessment by material experts

No	Rated Components	Percentage (%)	Qualification
1	Material Equipment	100	Very Qualified
2	Material breadth	100	Very Qualified
3	Material Depth	100	Very Qualified
4	Material Accuracy and Truth	94	Very Qualified
5	Language Usage	95	Very Qualified

Based on the results of the assessment by material experts in Table 4, not all of the components assessed have a 100% percentage level, but overall, the media qualifications are very feasible to use. Filling out the questionnaire by material experts was also carried out by providing comments and suggestions for improvement. Suggestions and improvements comments by material experts are shown in Table 5.

Table 5. Comments and suggestions for improvement by material experts

Validator	Feedback, Comments and Suggestions
Dr. AR, M.Kes	• Overall the content of the material and the illustrations are appropriate and in accordance with the questionnaire.

The results of the media expert test are the results of an assessment by media experts on the Mite Game Monopoly media conducted by Dr. M. S, M.M. The questionnaire was filled out on July 16, 2019. The validation of the media expert data consisted of 5 aspects,

namely the completeness of the presentation, the use of media, the shape and size of the media, the layout of the presentation, and the feasibility of the graphics. The results of the assessment by media experts are shown in Table 6.

Table 6. Data on the results of the assessment by media experts

No	Rated Components	Percentage (%)	Qualification
1	Presentation Equipment	100	Very Qualified
2	Presentation breadth	100	Very Qualified
3	Media Shapes and Sizes	100	Very Qualified
4	Serving Layout	100	Very Qualified
5	Graphic Eligibility	93	Very Qualified

Based on the results of the assessment by material experts in Table 6, not all of the components assessed have a 100% percentage level, but overall, the media qualifications are very feasible to use. Filling out the questionnaire by media experts was also carried out by providing comments and suggestions for improvement. Suggestions and improvements comments by media experts are shown in Table 7.

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Table 7. Comments and suggestions for improvement by media experts

Validator	Feedback, Comments and Suggestions
Dr. M. Syaifuddin, M.M	• The edge of the board should be covered with the same paper as the top of the board so that it is not easily damaged.

4. Discussion

The analysis of the results of previous studies used in the preliminary study, namely research from Indriyanti (2018) with the title of research on the relationship of internal and external factors to the number of house dust mites (TDR) in student boarding rooms in the village of Landungsari Dau Malang. Analysis of the results of previous related research was carried out to find out the material about house dust mites (Rofieq, 2018; Rofieq et al., 2016). The results of the study identified materials about house dust mites. The results of the analysis will be used as the basis of the material in the manufacture of media. Based on the results of the analysis of the results of previous studies, the substance of the material was obtained, namely (1) house dust components, (2) understanding house dust, (3) TDR classification, (4) TDR habitat, (5) TDR food, (6) allergens in TDR, (7) factors that affect the amount of TDR, (8) how to deal with TDR.

The results of filling out the questionnaire from the field survey were obtained as many as 76% of students did not know the type of mites in the house and 80% of students did not know the dangers posed by house dust mites. In addition, the discussion about house dust mites during the lecture process is very limited and some materials are not even explained in full, while students really need a fairly complete material for house dust mites. Another obstacle for students to obtain this material is having to look for it from the internet, journals and other sources, but the reason is that there is no time and reasons for being lazy to look for making knowledge and understanding about house dust mites are limited, even though this information is very important to know and understand first.

The results of filling out the questionnaire will be used as a basis for material in the manufacture of media that will be presented in the Mite Game Monopoly health promotion media. Based on the results of filling out the questionnaire, the substance of the material was obtained, namely (1) understanding of house dust, (2) components of house dust, (3) classification of TDR, (4) habitat and food of TDR, (5) life cycle of TDR, (6) prevalence TDR, (7) factors that affect the amount of TDR, (8) TDR allergens, (9) how to cope with TDR.

Determination of concepts from the results of the need assessment in the form of analysis of previous research results, field surveys, and analysis of RPS and syllabus obtained for each concept and material that will be presented in the Mite Game Monopoly

health promotion media. The next researcher did a material explanation through a literature study. The development of each material discussed through a literature study using literature from 1) Rofieq et al. (2016) about The content of various domestic microbes and their correlation to inhalant allergens in house dust between urban and rural residents in Malang Raya Indonesia, 2) regarding the Relationship of Internal and External Factors to the Number of House Dust Mites (TDR) in Student Boarding Rooms in Landungsari Dau Village, Malang, 3) a book on Environmental Biology-Based House Dust Management by Rofieq (2018) 4) a textbook of medical parasitology compiled by the department of parasitology FK UI, 5) several related journals.

Based on the results of the assessment by material experts in Table 4, not all of the components assessed have a 100% percentage level, but overall the media qualifications are very feasible to use (Arikunto, 2010; Arikunto & Suharsimi, 2013). Filling out the questionnaire by material experts was also carried out by providing comments and suggestions for improvement. Suggestions and improvements comments by material experts are shown in Table 5.

The revisions made at this stage are based on the results of data analysis from material experts, media experts, and respondents. Revisions that still need to be done are comments and suggestions by media experts. The repairs made are that on the game board the edge of the board should need to be covered with the same paper as the top of the board so that it is not easily damaged.

5. Conclusions

The results of product development are the Mite Game Monopoly health promotion media which is made based on the results of the need assessment through analysis of previous research results, analysis of RPS (Learning Implementation Plans) and syllabus, and field surveys that produce essential concepts including understanding house dust, house dust components, TDR classification, Habitat and food TDR, allergens in TDR, factors that affect the amount of TDR, and how to cope with TDR.

The research results of the Mite Game Monopoly health promotion media product show that the results of the validation of media experts and material experts are categorized as very good with percentages of 97% and 89%, respectively, while the results of data analysis get P value 0.05, which means there is an average difference between the pretest and posttest scores which is significant and shows an increase in knowledge and understanding of TDR between before and after using the Mite Game Monopoly media.

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