

DEVELOPMENT OF WEB-BASED LEARNING MEDIUM ON THE HUMAN NERVOUS SYSTEM FOR JUNIOR HIGH SCHOOL STUDENTS



**This Final Project Compiled as a Condition to Complete Bachelor Degree Program at the Informatics
Department Faculty of Communication and Information**

Submitted by:

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**INFORMATICS DEPARTMENT
FACULTY OF COMMUNICATION AND INFORMATICS
UNIVERSITAS MUHAMMADIYAH SURAKARTA**

2018

APPROVAL PAGE

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SCIENTIFIC PUBLICATION

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NIK.882

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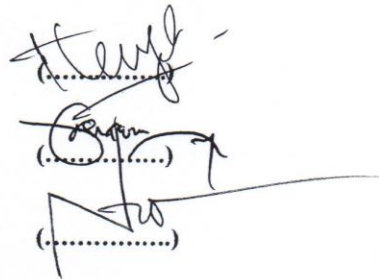
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DEVELOPMENT OF WEB-BASED LEARNING MEDIUM ON THE HUMAN NERVOUS SYSTEM FOR JUNIOR HIGH SCHOOL STUDENTS

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Keywords: Biology, Learning Media, Website

Abstrak

Biologi merupakan ilmu yang mempelajari segala hal yang berhubungan dengan makhluk hidup dan kehidupan. Salah satu dari sekian banyak materi pembelajaran biologi adalah materi yang

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Biologi merupakan ilmu yang mempelajari segala hal yang berhubungan dengan makhluk hidup dan kehidupan. Salah satu dari sekian banyak materi pembelajaran biologi adalah materi yang mempelajari sistem saraf pada manusia. Materi sistem saraf pada manusia adalah pelajaran yang abstrak dan sulit dalam melaksanakan pembelajaran karena berhubungan dengan mekanisme fisika dan kimiawi yang kompleks. Pada akhirnya siswa malas belajar karena kurang paham dengan materi ini. Untuk itu diperlukan pembaharuan dengan melakukan pengembangan media pembelajaran biologi yang berbasis *Website* yang berisi materi pembelajaran sesuai dengan Kurikulum KTSP, latihan-latihan soal yang sudah di sajikan oleh guru. Pengembangan perangkat lunak menggunakan model *Waterfall*, di rancang menggunakan sebuah program *PHP*, *HTML* dukungan database lokal dengan *MySQL XAMPP* dan software menggunakan Corel Draw, Sublime Text 3 dan Xampp. Pengujian website dilakukan pada siswa SMP Islam Sudirman Tingkir 2 Salatiga kelas IX. Hasil dari pengujian 83.22% website ini dapat meningkat motivasi belajar siswa, dan 87.2% isi materi mudah dipelajari dan dipahami.

Kata kunci : Biologi, Media pembelajaran, Website

1. INTRODUCTION

Biology is the study of all things related to living things and life. Biology is one of the oldest science has been known since prehistoric times. Biology not only learn about living beings but also the components of life support and is associated with living things. One of the many learning materials in biology is the study of material of the nervous system in humans.

The material of the nervous system in humans is abstract and difficult lessons in the implementation of learning because it is related to the physical and chemical mechanisms of the complex. The teaching system of biological subjects in schools currently still tends to be teacher-

centered learning and still do not use methods that are less varied. Finally, students feel bored because the material presented less attractive and not combined with media processing learning outcomes so that students to learn the material simply memorizing concept, it makes students less excited and less motivated to learn. The world of teacher education has a very important role in determining the quantity and the quality of the performance. Teachers can meet the above things, they need to be able to manage the process of teaching and learning that provides stimulus to the students so that students want to learn because as a main subject in the learning process.

Based on the above problems then needed renewal by performing learning media development with a good, effective, efficient that using more rapid technological advancement in the world because of the tools produced by the advances in technology is already in such rapid advancement, it is no longer in place if delivery of educational messages are still verbally or by mere words. Education should be in line with the progress of the human tool, use is all there is to the process of learning in school to be effective. Learning media development is designed to use a program that can be used by the user easily with an attractive display using *PHP*, *HTML* local database with *MySQL* support *XAMPP* and using *Corel Draw* to editing picture.

Based on the description of the background above, issues that will be discussed is how to develop biology-based learning media websites that contain material appropriate to the curriculum learning KTSP, exercises a matter that was already served by the teacher, usage instructions and information announcement in biology lessons.

Later research conducted by Asmara 2015 in the journal entitled "the development of Media Audio Visual-based Learning About Making Colloidal" aims to make it easier for students to understand the concept of Colloids and the colloid students that made him very close to everyday life. The study was successfully compiled an audio-visual media of practical creation of independent learning as colloids for the high school student/MA XI Classes Semester 2 and knowing the quality of the media that has been compiled.

According to the conveyed Nuzulia et al 2016 in the journal entitled "Interactive Learning Media Development Based On a scientific approach to Material working mechanism of the nervous system to enhance the interest and Learning Outcomes Grade XI SMAN 3 Yogyakarta" learning media development goal is to find out the feasibility of the media learning and knowing the effectiveness of learning media to increase interest and student learning outcomes. Generate interactive learning media-based scientific approach on the mechanism of action of the nervous system material worthy of being used as media of instruction. Student response mostly positive response states agree that this worthy learning media use.

According to Diah and Fadlillah by 2015 in the journal entitled "Draft woke up websites and E-Learning in TPQ Al-Fadhilillah" website can be expected to make it easier to communicate and seek and receive information. While e-learning as a solution to provide a different learning atmosphere and attractive as well as teaching and learning become easier to follow because there are learning the material. Website design and results e-learning in this AlFadhillah TPQ can provide the means or facilities to teachers in order to make it easier in conveying the subject matter. Can provide a fast learning method and practical and can be accessed from anywhere over the internet network in range. Can assist administrators in managing the activities of the AI-TPQ Fadhillah.

In the research Nugraini in 2013 in international research titled "Students ' Feedback of e-AV Biology Website and the Learning Impact towards Biology" Media teaching developed with features supporting learning biology such as interactive quizzes and discussion to support the learning of students in biology lessons. Some Video lessons that explain the energy in the field of the biotechnology industry, which is one of the common topics that are difficult to visualize and explain. There is a need help explanation of sources of Biodiesel, Biodiesel production and use of Biodiesel by using audio visual. This research resulted in platform media i.e. e AV Biology Website containing biology visually supported other features such as quizzes and videos.

2. METHOD

This research method using a Waterfall or waterfalls is a model developed for the development of software, make software. The model developed systematically from one stage to another stage in a fashion like a waterfall. (Ikbal, 2014). The Waterfall method is shown in Figure 1.

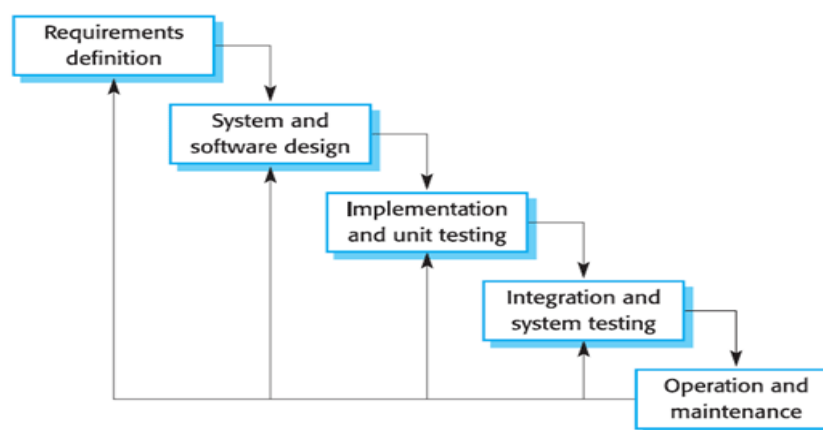


Figure1. The Waterfall Method

Description of the Stages of the Research:

2.1 Requirements Definition

This stage is the needs analysis system and collect data with the go to school in SMP ISLAM SUDIRMAN TINGKIR 2 SALATIGA by doing interviews and direct observation. Data obtained data on the biology lesson material the nervous system according to the curriculum, Rencana Pelaksanaan Pembelajaran (RPP), data problems, data students, and teacher's data. Interview with method directly to the speaker that is about teacher data is needed.

2.2 System and Software Design

This stage is done before doing the coding which aims to give an overview of what should be done and how it looks. This stage helps in specifying the overall system requirements.

2.2.1 Use Case Diagram

Use case diagrams are used to find out what functions that exist within a system and anyone who has the right to use these functions. Who emphasized at this chart is the "what" that made the system, and not the "how". Process Use Case Diagram is shown in Figure 2.

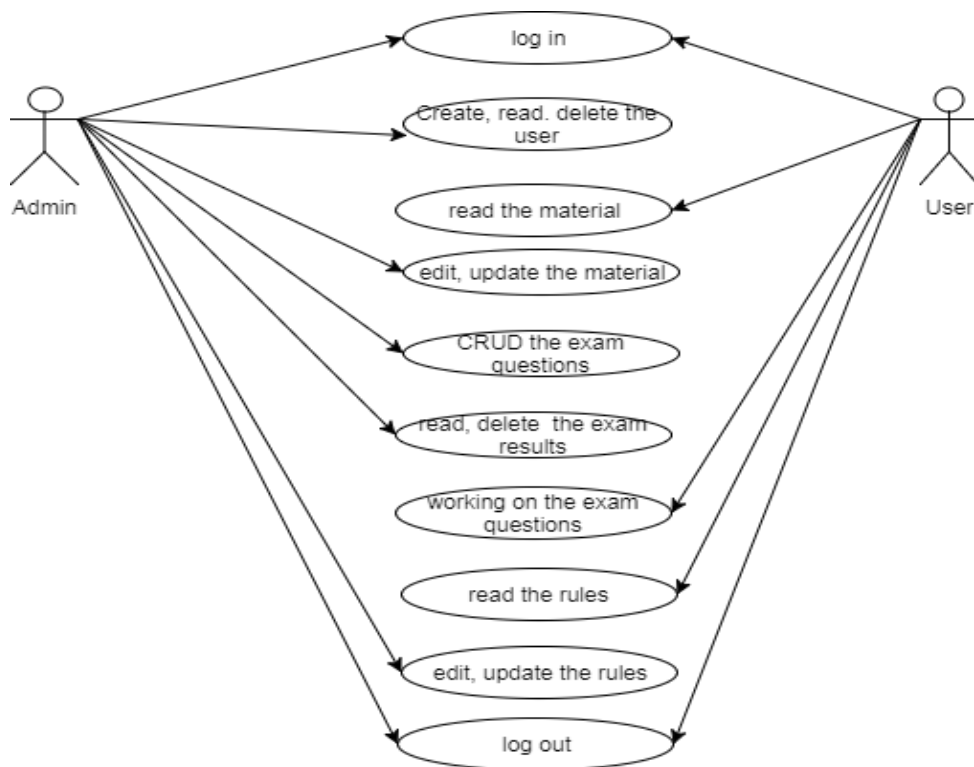


Figure 2. Use Case Diagram

2.2.2 Entity Relationship Diagram

On the design of a database consisting of 6 entities, namely the Admin Tables, the data table of a user, table questions, test settings table, table value, table module. The database is MySQL. Relationships relation between entities shown in Figure 3.

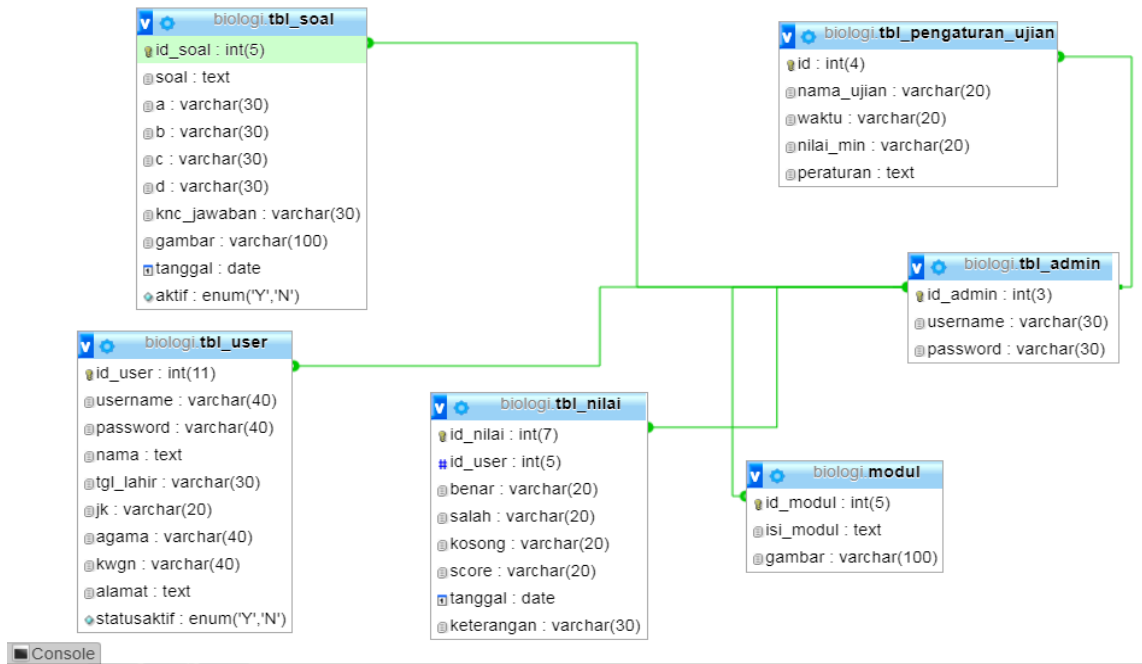


Figure 3. Entity Relationship Diagram (ERD)

2.2.3 Activity Diagram

In the activity diagram of the system all users starting with Login, if login fails back to the login page if successful will the system processes on the main page. Process activity the diagram is shown in Figure 4.

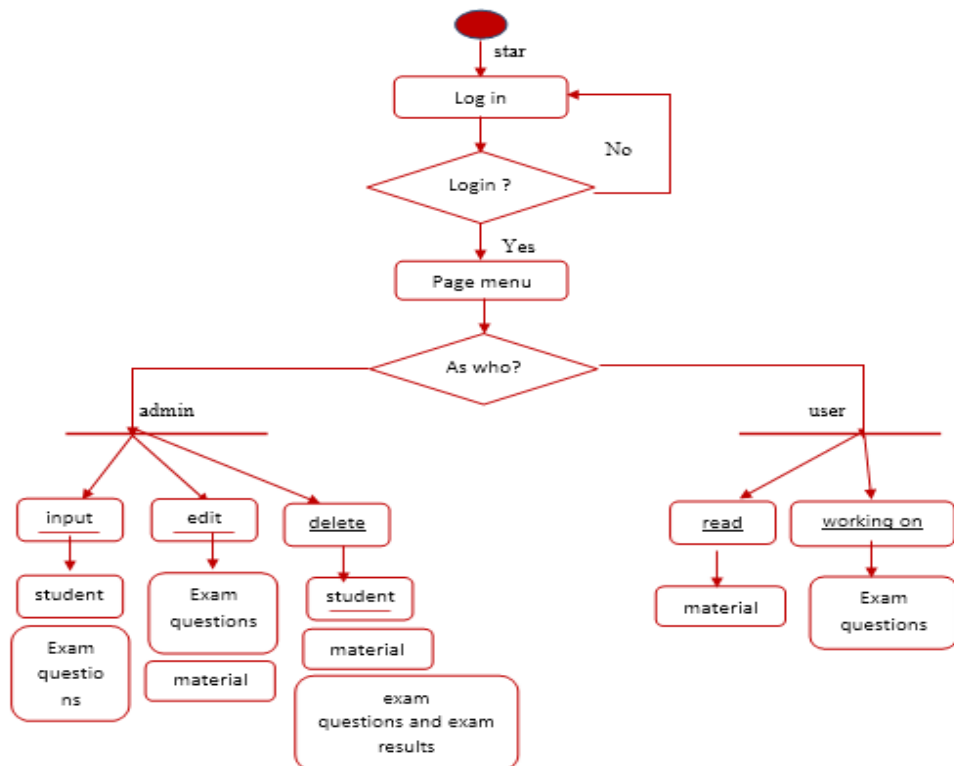


Figure 4. Activity Diagram

2.3 Implementation and Unit Testing

The application will be constructed using PHP to manage the web system and MySQL as the database management. Software technologies that are used to build the application including Sublime Text 3, XAMPP Control Panel v3.2.1, and Google Chrome web browser. After the building process is complete, the implementation of the application will be given to the school side.

2.4 Integration and System Testing

To find out the value of benefits from the application system testing is required. Testing system on this research was conducted at the SMP Islam Sudirman Tingkir 2 on one of the classes, namely class 9A totaling 24 students and 1 teacher.

2.5 Operation and Maintenance

The software must be given to the user, may be encountered the error when running user surroundings, or perhaps the user requesting the addition function. This maintenance can be done by way of periodic data backup and system development in accordance with their needs.

3. RESULT AND DISCUSSION

The results obtained by the researchers already passed the stage of program development application development media website based learning biology in the human nervous system material for class IX in the SMP Islam Sudirman Tingkir 2 Salatiga.

3.1 The Results of the Application Program

3.1.1 The Main Page of the Application

The application will display a home page where first display the user will open the application first. Then when the student login button click will appear the student login page can be seen in Figure 5 below.



(a)



(b)

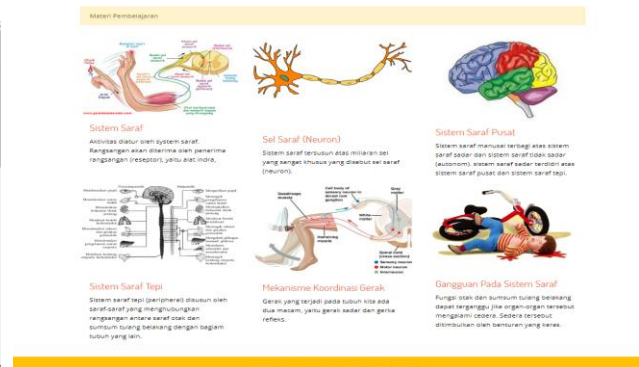
Figure 5. Start page (a) and students log in page (b)

3.1.2 The display of the menu page-home

Seamless access home menu displays page results option choice of material in the form of pictures. The main menu page can be seen in Figure 6 below.



(a)



(b)

Figure 6. The homepage of the top (a) and the home page of the bottom (b).

3.1.3 User identity page

User identity display page showing the data user/student has the username, name, date of birth, gender, religion, nationality, and address. User identity page can be seen in Figure 7 below.

Profil



admin

My Profil

Username	:admin
Nama	:admin
Tgl Lahir	:1 Januari 2018
Jenis Kelamin	:Perempuan
Agama	:Islam
Kewarganegaraan	:Indonesia
Alamat	:desa suruh

Figure 7. User identity page

3.1.4 Page Material

Material overview page has explanations of material chemistry SMP class IX and video material of the human nervous system. Can be seen in Figure 8 below.

SMP ISLAM SUDIRMAN TINGKIR 2 SALATIGA Beranda Video Profil Soal Log out

- Sistem Saraf
- Sel Saraf (Neuron)
- Sistem Saraf Pusat
- Sistem Saraf Tepi
- Mekanisme Koordinasi Gerak
- Gangguan Pada Sistem Saraf

SEL SARAF (NEURON)

Sistem saraf tersusun atas miliaran sel yang sangat khusus yang disebut sel saraf (neuron). Setiap neuron tersusun atas badan sel, dendrit, dan akson (neurit)

Materi

Sistem saraf tersusun atas miliaran sel yang sangat khusus yang disebut sel saraf (neuron). Setiap neuron tersusun atas badan sel, dendrit, dan akson (neurit)

Figure 8. Page Material

3.1.5 Regulatory page reserved and reserved

Rules page displays several regulations in the matter of the matter. And showing the number of reserved and time working on. Problem page display problems. Can be seen in Figure 9 below.



(a)



(b)

Figure 9. Regulatory page reserved and reserved

3.1.6 The Admin Home Page

The main page admin is the first menu after we successfully logged in. Where is the admin can control data will be in the post. Control the data of the user, material, exam questions, results of examinations, and regulation. Can be seen in Figure 10 below

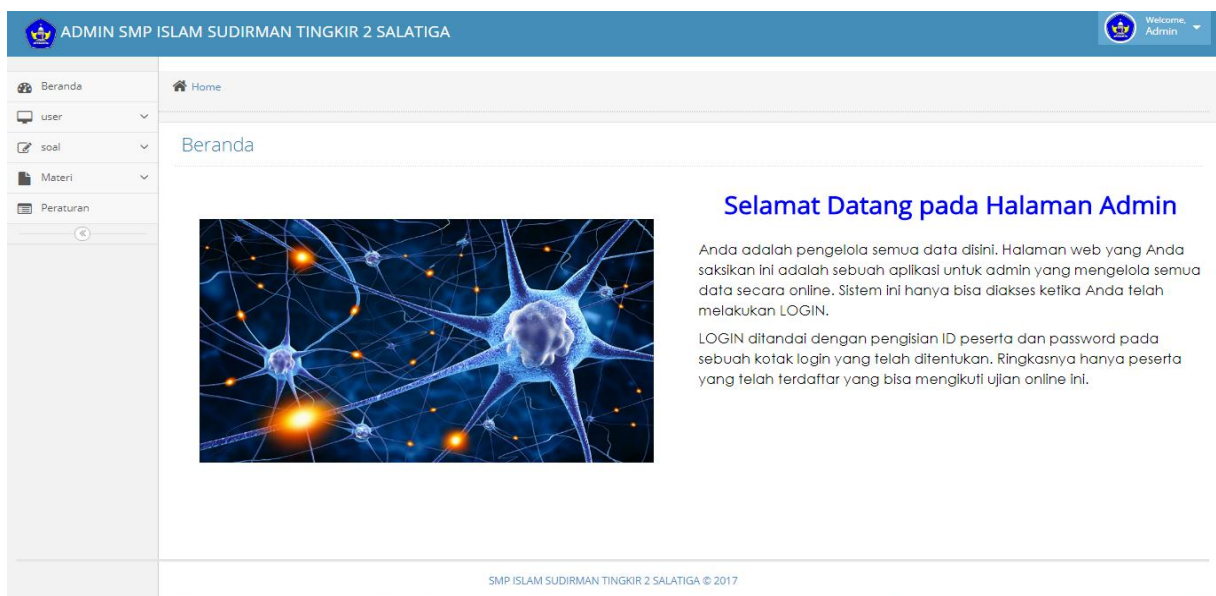


Figure 10. The Admin Home Page

3.2 The results of the analysis

3.2.2 Results Percentage of Observations

To see the response to the appropriateness of the application questionnaire is held. A questionnaire was given to 24 students and a teacher related subjects. Table 1 displays the questionnaire provided. On the questionnaire providing answers check option with very satisfied, satisfied, fairly satisfied, less satisfied, and not satisfied.

Table 1. Questionnaire

No	The criteria assessed	Answer				
		Very satisfied	Satisfied	Fairly Satisfied	Fairly Satisfied	Not satisfied
1	Website looks interesting					
2	The front page is easy to understand					
3	The content that is served very clearly					
4	Font is easy to read					
5	The website can be operated easily					
6	This website can increase your desire to learn					
7	The composition of the color application					
8	The content of the material is easily learned and understood					

The formula of finding the percentage of hail, according to the questionnaire (Sugiyono, 2008),

Description code table:

P1: First Question

SP: Sangat Puas (very satisfied)

P2: The Second Question

P : Puas (satisfied)

P3: The Third Question

CP: Cukup Puas (fairly satisfied)

P4: Fourth Question

KP: Kurang Puas (fairly satisfied)

P5: Fifth Question

TP: Tidak Puas (not satisfied)

P6: The Sixth Question

P7: The Seventh Question

P8: The Eighth Question

Based on the results of the above questionnaire recap obtained Equations 1.

The percentage of $= \frac{\sum \text{Skor} \times 100\%}{\text{Smax}}$ (1)

For Smax equations 2.

Smax = Σ Responden x 5 (2)

Description: the SP value (5), P (4), CP (3), KP (2), TP (1)

So the obtained values of Smax 25 x 5 = 125 test candidate questionnaire results users can be seen in Table 2.

Table 2. The results of a test questionnaire

No	P	SP (5)	P(4)	CP(3)	KP(2)	TP(1)	Total	Percentage
1	P1	4	21	0	0	0	104	83.22%
2	P2	11	14	0	0	0	111	88.8%
3	P3	11	11	3	0	0	108	86.4%
4	P4	10	10	5	0	0	105	84%
5	P5	9	10	6	0	0	103	82.4%
6	P6	7	15	3	0	0	104	83.22%
7	P7	13	7	5	0	0	108	86.4%
8	P8	14	6	5	0	0	109	87.2%

Description:

Smax 25 x 5 = 125 x 5 statement (SP,P,CP,KP,TP) = 25 x 5 = 125

Calculation:

P1 =(5x4)+(4x21)+(3x0)+(2x0)+(1x0)= 104. So come by PI = $\frac{104 \times 100\%}{125} = 83.22\%$

P2 =(5x11)+(4x14)+ (3x0)+(2x0)+(1x0)= 111. So come by PI = $\frac{111 \times 100\%}{125} = 88.8\%$

P3 =(5x11)+(4x11)+ (3x3)+(2x0)+(1x0)=108. So come by PI = $\frac{108 \times 100\%}{125} = 86.4\%$

P4 =(5x10)+(4x10)+ (3x5)+(2x0)+(1x0)=105. So come by PI = $\frac{105 \times 100\%}{125} = 84\%$

P5 =(5x9)+(4x10)+ (3x6)+(2x0)+(1x0)=103. So come by PI = $\frac{103 \times 100\%}{125} = 82.4\%$

P6 =(5x7)+(4x15)+(3x3)+(2x0)+(1x0)=104. So come by PI = $\frac{104 \times 100\%}{125} = 83.22\%$

$P7 = (5 \times 13) + (4 \times 7) + (3 \times 5) + (2 \times 0) + (1 \times 0) = 108$. So come by $PI = \frac{108 \times 100\%}{125} = 86.4\%$

$P8 = (5 \times 14) + (4 \times 6) + (3 \times 5) + (2 \times 0) + (1 \times 0) = 109$. So come by $PI = \frac{109 \times 100\%}{125} = 87.2\%$

The percentage of interpretation used to measure good or bad an application. Of the statement – statement contained in questionnaires students can assess whether this application is worthy or not and can assess whether this application can be used as a tool for learning or not. Figure 11 displays the percentage of interpretation obtained from table 2.

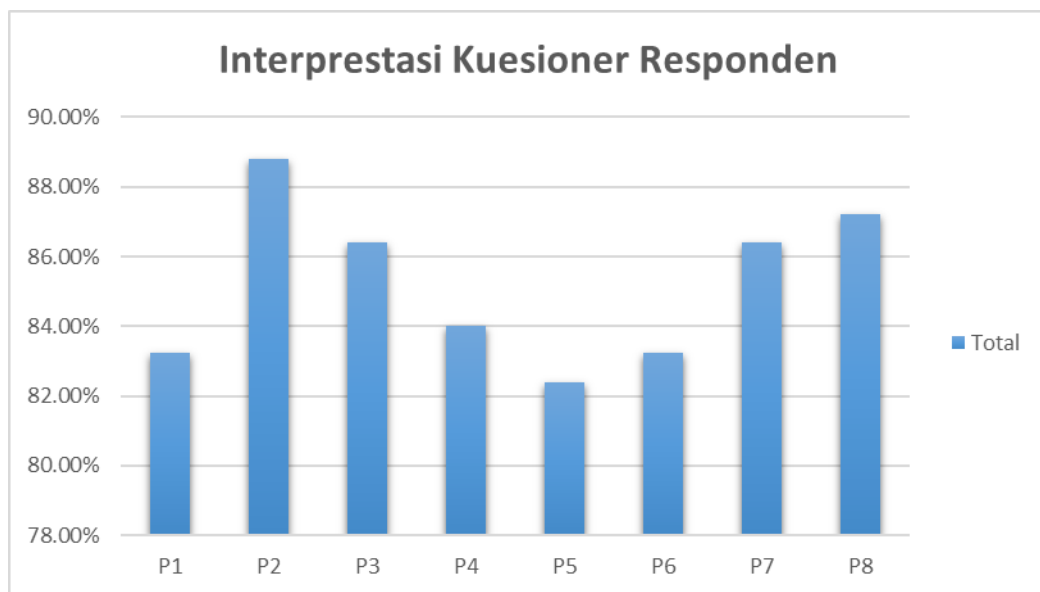


Figure 11. Interpretation the Questionnaire Respondents

4. CLOSING

Development of web-based learning medium on the human nervous system for junior high school students aims to make it easier for students to understand the material and improve learning motivation of students. Based on testing directly through questionnaires 83.22% respondents value students see that can enhance learning, 87.2% of the material on the website is very easy to understand because in complement with pictures and videos. For testing the questionnaires average percentage i.e. 85.21% can be taken from the conclusion that this application is worthy of being used and can grow students increased motivation to learn because of the easy understanding of the content of the material on the website.

The suggestion that the author can provide for development of web-based learning medium on the human nervous system for junior high school students further it is adding to the

discussion forum of students so that students and teachers can interact and are mutually make apps website even better.

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