Development of webquest using Google Site in teaching Circulatory System

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Abstract. This study aimed to develop a webquest in teaching circulatory system using Google site for Grade VI pupils. The developed webquest was an instructional material designed to enhance pupil’s performance in engaging learning activities especially in science lessons based from the K-12 Science Curriculum. The developed webquest was evaluated and rated Excellent by the ICT Experts, In-Service Teachers and Pre-Service Teachers. The comments and suggestions were used to improve the developed webquest. The researchers also made use of the Flesh-Kencaid Readability Test to determine the readability of the developed webquest and the results revealed that it is appropriate for Grade VI pupils.

1. Introduction
Social change has a great impact on education. The society is changing and advancing. Education as well is evolving. As teachers being the builders of the future, they must be competent and advanced in all aspects especially to create instructional activities based on the new concepts corresponding to characteristic development of learners in the 21st century, which enables the learners to have creativity and ability to generate new innovation [1]. With the rapid development of the technology, the passion of internet is boosting among learners. The World-Wide Web (WWW) is becoming the most important media for collecting, sharing and distributing information. Similarly, in the case of education, it can be a mean of collecting the relevant information about the concerned subject. This important media can serve both teachers and learners in teaching and learning activities. In fact, the number of internet users in the Philippines increased by 13 million or 27 percent from January 2016 to January 2017, according to a report by social media agency “We Are Social”. Both teachers and students have benefited from various educational technologies, teachers have learned how to integrate technology in their classrooms and students are getting more interested in learning with technology [2].

To make teaching more effective and innovative, teachers should select and make instructional materials that meet the needs of their pupils. With today’s generation, the researchers seek to develop webquest as an instructional tool in teaching sixth graders about Circulatory System. The researchers have chosen to use the webquest about Circulatory System because the researchers believed that it was the one of the least learned topic in science. When educational technology tools are used appropriately and effectively in science classrooms, students actively engage in their knowledge construction and improve their thinking and problem solving skills [3]. Research findings also support in bridging the
gap between technology and education. WebQuest encourages inquiry based learning which allows students to research a chosen topic while effectively using the internet and create a final product. It is designed to use learners' time well, to focus on using information rather than looking for it, and to support learners' thinking at the levels of analysis, synthesis and evaluation [4].

2. Objectives of the Study
This study hopes to achieve the following objectives:
1. To develop webquest that will help the learners understand better the topic about circulatory system and kindle their interest in science
2. To evaluate..
3. To help science teachers have an instructional material to further leverage the learners inquisitive minds

3. Method
This study used both quantitative and qualitative methods of research. In the quantitative research method, the data were obtained from the ratings of the evaluators on the developed webquest. In the qualitative research method, the data were obtained from the comments and suggestions of the evaluators. The researchers followed steps in developing WebQuest; a.) Selection of the topic on Circulatory System, b.) The identification of standards that was based on the K to 12 Science Learning Competencies 2016 for teaching circulatory system c.) Making of lesson plan d.) Developing Webquest e.) Testing the Readability f.) Validation and g.) Revision of the developed webquest. The WebQuest was rated by the ICT Experts, In-Service teachers, and Pre-Service Teachers through a rubric. The figure below shows the process for the development of webquest.

4. Results and Discussions
The development of the Webquest was organized based on the process of method.

4.1. Selection of Topic
The researchers preferred the topic on Circulatory System because the topic is one of the least learned topics in science for the elementary learners. The researchers want to create a new set of instructional material that will mold and enhance the students’ interest and love towards science and will give ease on the teacher’s side through the use of webquest.

4.2. Identification of Standards
The developed webquest was designed based on the standards and learning competencies provided by the K-12 Basic Education Curriculum. The learning objective of the learners is to be able to explain how the organs of circulatory system work together.

4.3. Making of Lesson Plan
The researchers made a lesson plan based from the K-12 Curriculum Guide of 2016. The learning objective formulated is given from the K-12 Curriculum Guide of 2016. The lesson plan was face validated by science teachers experts.

4.4. Developing Webquest
After selecting and assuring, the researchers conducted library research, interview and internet surfing about the subject and also studied the different designs of webquest. The researchers developed webquest in the Google Site. The content in the Google site was based on the outline as arranged in order as listed, to wit: (1) Home (2) Output Timeline (3) Webquest (4) Teacher Support (5) Sample Output (6) References
Under the developed Webquest are listed, to wit: (1) Introduction (2) Task (3) Process (4) Materials (5) Procedures (6) Resources (7) Evaluation

Figure 1. Home Page of the Entire Webquest

The developed webquest is entitled “A Ride through your Heart: A Webquest on the Circulatory System”. An awesome adventure on wheels is going to start! This Webquest will utilize the student's knowledge about the circulatory system. They will be grouped by seven and will be asked to make an alternative heart model (which will be their output in this Webquest) that will show the parts and functions of the circulatory system and the flow of blood throughout the body. The theme of the model will be like a road trip. The students will be using a toy car that will represent as the blood. This toy car will run throughout the alternative heart model. The students will use their understanding about the Circulatory System to be able to finish their output. After the production of the output, presentation will follow. The students will demonstrate the use of the alternative heart model. This means, the ride through the heart is going to start.

WebQuests are not just activities that utilize the Internet [5]. Students can experience both individual and team learning. This can be done by encouraging them to produce an authentic end product that is creative and applicable to real life. Webquests should be real, rich, and relevant. Students work in teams, learn to cooperate and collaborate because they not only access the Internet for information, but they also apply the information in a new way. This leads students to use their higher thinking skills for a deeper understanding and more independent learning. As a result, they become responsible for their own learning [5].

4.5. Readability
The researchers made use of the Flesh-Kencaid Readability Test to determine the readability of the developed webquest and the results revealed that it is appropriate for Grade VI pupils. The developed webquest has low percentage of passive sentences. The total number of words is 673. The total number of unique words is 307 which is 46% of the total text. Total number of repeat words is 366 which is 54% of the total text. Average number of words per sentence is 10. Total number of characters is 1,36 and average number of characters per words is 4.7. Average number of syllables per word is 1 and total number of syllables is 984. Readability formulas are used widely in education and has demonstrated moderate to strong predictive correlations with reading comprehension [6]. This means that the developed webquest is easy to read and understand. It has a result of 72.6 of Flesch Reading Ease which means that the developed WebQuest uses shorter sentences and easy to understand. It showed that the webquest has a Grade Level of 5.7 which indicates that it is expected to be understood by an average student in the 6th grade.
4.6. Validation of the Developed Webquest by the ICT Experts, In-Service Teachers and Pre-Service Teachers

After testing the readability of the developed webquest, the researchers met some experts regarding this matter. Three (3) ICT experts, five (5) In-Service teachers and ten (10) pre-service teachers have been given a copy of the WebQuest for them to check and give their comments and recommendations. The ICT experts evaluated the technical aspect of the WebQuest using rubric while the in-service teachers checked the content and the strategies using the rubric.

| Criteria             | Average Mean Rating | Description |
|----------------------|---------------------|-------------|
| Content              | 1.11                | Excellent   |
| Layout               | 1.44                | Excellent   |
| Content Accuracy     | 1.17                | Excellent   |
| Work Ethic           | 1.22                | Excellent   |
| Overall Quality      | 1.17                | Excellent   |

The table shows that the ICT Experts, In-service Teachers and Pre-service Teachers rated excellent developed Webquest. In content, 88.9% rated the site has a well-stated clear purpose and theme that is carried out throughout the site. It indicates that 16 out of 18 evaluators rated excellent. In layout, 55.6% rated the site has an attractive and usable layout. It indicates that 10 out of 18 evaluators rated excellent. It is easy to locate all important elements. In content accuracy 15 out of 18, 83.3% rated all information provided by the researchers on the site are accurate and all of the requirements of the assignment have been met. In work ethic 14 out of 18, 77.8% rated that researchers always use classroom project time well. And in over-all quality 15 out of 18, 83.3% rated that the site is of high quality. Teachers have access to more sophisticated tools that can break the monotony of everyday lectures and facilitate the learning experience in different ways. In the modern age, teaching is no longer limited to the physical classroom [7]. Any experienced teacher can tell you that no two people learn the same way. There are visual learners, auditory learners, read-write learners, and kinesthetic learners. And because all these types of learners are mixed in one classroom, teachers need to be able to find ways to accommodate these disparities. Thus, Webquest can be a tool in helping learners.

4.7. Revision

With the ratings, the researchers used the comments and suggestions of the ICT Experts, In-service teachers and pre-service teachers to improve and revise the presentation, layout, graphics, organization of themes and pages of the Webquest so that it will be an effective instructional tool in teaching circulatory system. Lecturers’ awareness of 21st century skills, especially the knowledge and skills in the integration of ICT, is a constraint in the training process and therefore, requires special attention especially to per-service teachers [8].

5. Conclusion

The developed webquest was rated Excellent from the ICT Experts, In-service Teachers, and Pre-service Teachers. It was evaluated based on its content, layout, content accuracy, work ethic and overall quality. It is readable and appropriate for the Grade VI Pupils. From the comments, the developed webquest was engaging and the site was exemplary. For science teachers, the webquest was helpful in teaching circulatory system.
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