

Students' Ideas about Anatomy 4D Program in Inquiry Based Learning Classroom¹

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Presentation/Paper Type: Oral / Full Paper

Abstract –Inquiry-based learning is important for students to understand scientific knowledge and the working systems of scientists to develop their knowledge. For this, students should have some skills, and if they do not have, these skills need to be gained. Some of these skills can be expressed as being responsible for their own learning, being able to make scientific inquiries, and to establish healthy communication. The role of the student in the Turkish Science Education Curriculum is to investigate, to be in charge of their own learning, to be a scientific literate by making scientific explanations and discussions. In fact, this role is parallel with the student role in the inquiry based learning environment. The aim of this study, which was carried out with a unit planned to be processed with an inquiry based learning approach that the students have structured their own learning, was to determine the students' opinions about the Anatomy 4D program application. For this purpose, semi-structured interview was conducted with 11 volunteer seventh graders, 6 of whom were girls and 5 of them were boys. The data obtained from the interview were subjected to content analysis. As a result of these analyses, it was determined that the students opinions about Anatomy 4D program applications were instructive, entertaining and permanent.

Keywords – Anatomy 4D, science education, inquiry based learning, qualitative method, students' ideas

I. INTRODUCTION

Inquiry based learning is based on the ideas of Homer Lane (1875-1925), John Dewey (1900-1952) and Montessori (1870-1952) [1]. Inquiry based learning is a state of curiosity, and if the students questions (why and how questions are more asked) are ignored because they are silly or unnecessary, the curiosity disappears [2]. Therefore, it can be said that students learn by asking questions in inquiry based learning environment. Besides students learns in inquiry based learning environment by actively participating the learning process, by social interaction, by establishing a relationship between the preliminary information and new information, by being strategic, by trying to be self-organizing and reflective, by constructing preliminary information, by trying to understand instead of trying to remember and by spending time to practice [3], [4]. It is stand out that individual efforts of students are important. This is important because individuals learn only when they themselves construct the information [5]. Therefore, students should be held responsible for their own learning, to learn how and what to learn [3] because learning is an active constructivist process [6]. Of course, students need to be curious about the topic that they will learn. So in order to make students active, it is necessary to consider the things they are curious about and their interests.

Inquiry based learning is the process of developing the understanding that students learn best with their physical and mental activities [1]. That is why inquiry based learning is one of the instructional practices of the constructivist approach [7]. Besides, it is also important to use activities in learning the subject or concept. Because the theory and practice comes

together in the mind with the activities [8]. And collaborative group work can be done during the activities [9]. While using the program, students work in groups while using Anatomy 4D program. Because scientific inquiry is rarely an individual activity, just like scientists do [10]. Groups used Anatomy 4D program to practice concepts, which they learned. In the human body systems unit, the systems where Anatomy 4D program is used: digestion system, excretory system and nervous system.

In this study, it was aimed to determine the opinions of students about the Anatomy 4D program application which is used in an inquiry based learning environment.

II. MATERIALS AND METHOD

A. Research Model

The qualitative method was employed in the current study. The data was collected through semi-structured interviews [11] which was conducted with the students who was in the inquiry based science classroom environment. Semi-structured interview is a qualitative data collection strategy. In this strategy researcher asks predetermined questions but additional questions can be asked [12].

B. Sample

The data were collected from seventh graders in 2017-2018. A semi-structured interview was conducted with 11 volunteer seventh graders, 6 of whom were girls and 5 of them were boys.

¹ This study is a part of first writers' PhD thesis.

C. Analysis of the Data

The interviews was voice recorded. The data obtained from the interview were subjected to content analysis [13]. While content analysis was made, first the voice recording poured into textual material on Microsoft Word program. Then coding textual material was made. While texting the interview, the students who were interviewed were given the codes as S1, S2.... In addition, after that codes turned into themes. In order to reflect the students' ideas, some students' quotations were directly quoted. Finally, the frequencies and percentages of all expressions under the themes are determined and given as a table. Although there are 11 students interviewed, the total number of students in the table is 27. This is because a student has an expression of several themes.

D. Anatomy 4D Program Application Process

Inquiry based learning classroom environment was carried out with 23 seventh grade students during 30 lesson hours in 2017-2018. The lessons steps were designed as in Learning Designer [14]. Teacher created the groups and they firstly talked interesting facts about the concepts that they will learn in "read watch listen" step. After that step, the groups were made scientific conversations and researches about the concept in "collaborate" and "discuss" steps. After these they done the "investigate", "practice" and "produce" steps. In "practice" step Anatomy 4D program was used by groups. Teacher gave "The Human Body [15]" worksheet to the students to work on it. The students applies the systems and system organs in assistance Anatomy 4D program.

III. RESULTS

Student Ideas about Anatomy 4D findings is given in the table below.

Table 1. Student Ideas about Anatomy 4D

Theme	Students	Frequency	Percent
Instructive	Ö1, Ö2, Ö5, Ö6, Ö8, Ö9, Ö10, Ö11	9	%33
Entertaining	Ö1, Ö2, Ö3, Ö4, Ö7, Ö8, Ö9, Ö10, Ö11	9	%33
Permanent	Ö1, Ö2, Ö3, Ö4, Ö5, Ö7, Ö9, Ö10, Ö11	9	%33
Total		27	%100

The ideas of the students that they found the Anatomy 4D as "Instructive" are:

- S1: "Very informative application."
- S2: "(...) It is showing the organs. Good."
- S5: "It is showing the organs (...) informative."
- S6: "Simple application that can be used especially in lessons."
- S8: "Except for learning, for example, drawing something, something that could be very useful."
- S9: "(...) it is better in terms of learning. We were just pointing it out on our friend. It was both fun and we learned a lot of information."

S10: "The system shows all the organs in a 3D way."

S11: "We were holding the paper. Yes I remembered. We were holding a skeleton, and organs showed up. We've been better learning where they're in our bodies."

The ideas of the students that they found the Anatomy 4D as "Funny" are:

S1: "I even got his home printout. I looked at the heart. Very nice application."

- S2: "I think it's a very nice [app]."
 - S3: "We had so much fun. We tried to take it with the papers. We tried it on ourselves. It was a fun event."
 - S4: "Seriously it is an unusual app. I like it. Do you even have those papers? It's so beautiful, I never thought it would be like this."
 - S7: "I think it's a good app because it shows the human body."
 - S8: "I think it is a very nice program."
 - S9: "I think it is a good app. In addition, it is better in terms of learning. (...) It was both fun and we learned a lot of information. It was nice"
 - S10: "It is a very nice [app]."
 - S11: "The guy who did the program did very well. App is very nice. The children of our age have learned well."
- The ideas of the students that they found the Anatomy 4D as "Permanent" are:
- S1: "[At home] I used, yes."
 - S2: "I do as I get bored."
 - S3: "I will use."
 - S4: "If I have [Anatomy 4d work] paper, I can use it."
 - S5: "So. If I do my homework, sometimes I look in my spare time."
 - S7: "I will use it if I have [Anatomy 4d work paper] at home. Why not?"
 - S9: "Yes, [I will use it]."
 - S10: "Of course, if I had a spare time."
 - S11: "If I had the opportunity, I would use it in my spare time."

IV. DISCUSSION

The students found Anatomy 4D, which was used in inquiry based learning environment, to be "Permanent", "Instructive" and "Entertaining". These findings are in parallel with the studies in the literature [16]. It can be said that the students have a positive opinion about the use of the Anatomy 4D program. Considering that the motivation of the student in the inquiry based approach comes from the pleasure of learning and understanding something [10], it can be said that seeing the Anatomy 4D program as "Entertaining" by the students has a positive effect on the motivation of the students.

V. CONCLUSION

This study shows the students' opinions about Anatomy 4D program application which is used in an inquiry based learning environment. The students found Anatomy 4D to be "Permanent", "Instructive" and "Entertaining". In addition, this program is easily applicable on group activities.

This study is not examines if it is really effects these areas. So, further studies can be examine if Anatomy 4D program is effective on permanence and instruction.

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