I Learn For My Hobby: How Much Are Aquarists Satisfied?
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Abstract

Since smart devices provide mobility convenience, in the field of information technology the need to popularize software applications for mobile/smart devices has emerged. Despite of these developments, web applications still maintain their importance. Therefore, IT (Information Technologies) studies are carried out by paying regard to the both situations for software developers.

Today, for individuals who work in big cities under excessive stress it is very important to spend their free times effectively and to turn free time activities into a relaxing process. The activities performed in this process are called hobby. For beginners, it is generally insufficient to have a desire for the field of hobby and they need additional information for the activity to be performed. It is important for them to know what to do when they encounter any problem. Individuals obtain these essential information through the experts in the enterprises selling hobby materials, websites on the internet, related forums or their friends. In order to maintain hobbies effectively and healthily, it is very important to obtain information only from those experienced in the field of hobby.

In this study, for those who want to take up the aquarium hobby; a basic training platform appropriate for the instructional design principles and that includes the important matters in the maintenance and placement of the aquarium as well as aquarium and fish selection was designed. The platform was developed in a way to be accessed from classical web browsers and mobile devices. The aim of the study is to increase the satisfaction among the learners using web and mobile environment. The content developed in this regard was offered to the study group consisting of users in mobile and web environments. The group was selected from the individuals using popular aquarium forums on the internet according to the principle of voluntariness. At the end of the training process, a satisfaction survey was applied to the learners and the obtained data were analyzed by using a web analysis tool.

THE STUDY

With the development of technology, the habits of people have also undergone a change. Calculations were used to be made manually or with machines in the past; however, it is today easier and faster to make calculations thanks to the reconnaissance and development of computers. Furthermore, with the emergence of internet, a new page has been opened in the era of information.

The most important characteristic of this era is the continuity of the development. People have started paying much attention to the mobile life with the emergence of smart devices having many brand-new features. Today, the use of smart devices is considerably high across
the globe. With the increase in the use of smart devices on mobile media, mobile needs have also increased in parallel. Thanks to this environment, there has been the opportunity to convey the contents of the training to the people who can perform banking transactions, manage social network accounts easily and carry out many daily activities by using mobile phones.

Learning is an important matter of fact for humanity. From the primitive man until today, people have always had to learn in order to survive. In an environment where information is continuously increasing, it is very important to learn learning. Scientists like Pavlov, Watson, Thorndike, Skinner and Guthrie adopted behavioral approach, defined learning as the change in the possibility of exhibiting a behavior and argued that learning consisted of action, reaction and behavior processes. Bruner, Koffka, Kohler and Lewin adopting cognitive approach explained learning as information storing and information interchange in the memory. Constructivists like Piaget, Vygotsky and Bloom defined learning as the change occurring in the meaning after the formation of new meanings by the individual (Newby, Stepich, Lehman and Russel, 1996: 24-43, cited by Tanrikulu, 2004, P.2).

People living and working in big cities can take up different hobbies with an aim to reduce stress in their lives and workplaces. Among hobbies related to animals, aquarium hobby is very attractive for those who love animals but are afraid of them or show allergic reactions to certain animals like cats and dogs. However, there are not sufficient number of platforms providing effective information for the beginners. Information found on the internet can be in contradiction with each other. In addition, people working in pet shops can give wrong information because of commercial concerns. Since the importance of technology cannot be underestimated in the information era, it can be useful to convey information from different technological environments as a training healthily with various technological approaches. At this point, according to the definition of Engin, Tösten, Kaya (2010) and Arslan (2003), the need of providing training by using computer aided training which is a process based on the principles of programmed instruction method and supported by software on individual or crowded training environments has emerged.

With an aim to make instructional activities more effective, instructional design models are used. The definitions of instructional design are as follows:
Merrill et al., (1966) argue that instruction is a science and that instructional design is a technology founded in this science.

Instructional design offers explicit guidance on how to help people learn and develop. The kinds of learning and development may include cognitive, emotional, social, physical and spiritual (Reigeluth, 1999).

According to another definition, instructional design is the process of solving instructional problems with the ordered analysis of learning conditions. An instructional design consists of planning information processing resources, instructional activities, instructional materials and assessment elements in an orderly manner (Fer, 2009).

According to Bilgin et al., (2004) instructional design is about developing functional instruction process in order to fulfill the needs of a certain population. In addition, instructional systems can become more complicated due to the developing technology but they are also indispensable.

ADDIE model is a cult model emerging in the period of the World War 2. Today, ADDIE model is taken as a reference by many instructional design models. Compared to the other models, processes are simpler, more generalized and clear. As seen in Figure 1, ADDIE consists of 5 steps in total. These are Analyze, Design, Development, Implementation and Evaluation respectively (Jones and Davis, 2011).

Learning activities have also changed time-dependently. Formal education which is performed in a certain time and place in schools is now different with the development of
technology. The developments observed in web 2.0 and instruction technologies have also changed instructional activities. Since smart phones and tablets get high-speed internet service through GMS network, the following question has emerged “Can instructional processes be managed through these platforms effectively?

The following definitions can be found in the literature regarding mobile learning:

Mobile learning is the combination of functionality and portability. There is a process on devices used for e-learning and m-learning in terms of functionality. This process can be simply defined as the provision of education and training on PDAs, palmtops, handhelds, smart phones and mobile phones. As a result, education and instruction are given through PDA, handheld or smart phone (Keegan, 2005).

Mobile learning enables an educational environment by using mobile phones or different mobile devices without depending on the place and time (P. Seppala & H. Alamaki, 2013). From this point of view, the most important part of mobility is that it removes the dependency on time and place. This is the most important difference between mobile learning and web-based learning.

Thanks to the mobility feature of mobile technologies, processes like learning and practice can also be performed outside of the class (Saran, Seferoğlu and Çağiltay, 2009). However, since the screens of mobile devices are smaller and it is more difficult to concentrate in different places, concerns arise with regard to the success of mobile learning.

In their study, Oran and Karadeniz (2007) analyzed the advantages and disadvantages of mobile learning. They argued that mobile learning environments offer time and place-independent learning opportunity to the learner and accordingly mobile contents specific to this field need to be developed.

The effects of individual choices in terms of instructional design on web based learning environments were discussed and the importance of offering different media to students was underline. It was concluded that every student learned in line with his own choices (Gülbahar, 2005).

In their study, Yabaş and Altun (2009) obtained positive and significant results within the scope of academic achievement test, knowledge, comprehension, practice, metacognition skills and self-sufficiency perception of differentiated instructional design.
In their study, Şimşek, Özdamar et al. (2008) analyzed doctoral theses written about “Educational Technologies in Turkey”. They came to the conclusion that the majority of studies focused on only formal education students.

In their study, Menzi et al. (2012) received the opinions of 21 academicians regarding the use of mobile technologies in education. Within the framework of the obtained findings, it was detected that the academicians had positive opinions about the use of mobile technologies in education. According to the obtained data, the use of mobile technologies in education will increase if technical support, infrastructure and cost problems are solved.

Yünkül and Er (2014) analyzed the effect of the multimedia software prepared according to the ADDIE instructional design model on the attitudes of students. It was detected that the attitudes of students learning with multimedia changed in a positive way. According to the researchers, the reason of this positive change was that the multimedia software was developed with an instructional design model and multimedia added richness to the process.

As mentioned by İşman (2002), today’s education system will fall behind if it cannot use or keep up with educational technologies. From this point of view, it can be stated that the role of technology in education is very important and e-learning should be improved in line with the new technological developments. Distance education is seen as an alternative to formal education which cannot be properly offered because of certain impossibilities and distance education can be successfully offered in Turkey conditions (Çallı, İşman & Torkul, 2001). In addition, the effects and differences of learning contents offered on immobile environments and e-learning contents offered through mobile are still issues of concern.

METHOD
Sample
The population of the study consists of all individuals who have started or are interested in aquarium hobby. As sample, 67 individuals, members of the aquarium websites popular on the internet or voluntary to take part in the learning process were included in the study.

Limitations
One of the popular aquarium forums on the internet was accepted as the population in this study. The mobile application was developed only for Android operating system. Aquarium learning process was divided into 5 categories: aquarium and fish selection, place selection, installation, fish placement and general maintenance. Learning content was offered for 2 weeks to the participants from Turkey.

**Tools**

As data collection tool, a satisfaction survey was used. The survey was applied to the participants within the sample on a digital media. In addition, Google Analytics and user experience tools Lucky Orange, MouseFlow and Appsee software were used. These software are applications that record and consolidate mouse-keyboard and scroll movements of users as heat map. 7 days trial version of Lucky Orange, 14 days trial version of Appsee software and MouseFlow’s plan recording 100 logins were used. Google Analytics is a free service. By benefiting from this service, data were collected regarding certain issues such as the time users spend on the contents, mouse or scroll movements.

**Instructional Design**

ADDIE was used as the instructional design model in this process which aims to teach the individuals interested in aquarium hobby how to create an ecological balance in the aquarium and maintain this balance as required. The fundamental reason for choosing ADDIE model was because it is generic and open to adaptation-development.

**Implementation of Instructional Design**

In addition to the general design pattern in ADDIE model, the process was divided into modules and every module was designed with a similar template in itself. The assessment was planned to be made for each module and in this way feedback was quickly received. As a result, it became easier and quicker to proceed to the next step. Furthermore, the learner was offered the opportunity to choose through different media as video / text instead of one media. Instructional design was performed by following the steps listed below:

a) Analysis: In this step, the basic knowledge the beginners should have and the mistakes they make were analyzed. As a result of the analysis, it was decided that the beginners should have the requirements given below. According to this, a person who completes the education and learning process can:
say the commonly fed fish species and aquarium volumes for these species
explain the most basic living conditions for the commonly fed fish species
explain that freshwater and saltwater aquariums have different requirements
know the appropriate temperature values for the commonly fed aquarium fish species
determine the appropriate feeding form for the fish species he wants to feed
express the effects of slope, sunlight and weight while choosing the place of the aquarium
solve the problems regarding the rough surfaces for the place of the aquarium
find the most appropriate place in the room for the aquarium
choose the necessary equipment for the aquarium correctly
place the necessary equipment and adornments in the aquarium correctly
explain what features the aquarium water should have
explain the terms like heater, filter and nitrogen cycle
place the aquarium water without damaging adornments
put the newly-bought fish in the aquarium healthily
make the general cleaning of the aquarium
identify water change frequency and amount correctly

As a result of all these acquirements, individuals will be able to start the aquarium hobby correctly, supply the fish species to be fed and maintain the hobby in a healthy way.

b) Design: For the delivery of the educational contents, computer aided instruction was used. It was planned that the learners were going to take the practice through mobile application and web browsers. In order to accomplish the objective, it was decided to provide the education under the modules given below:

- Aquarium and Fish Selection
- Place Selection
- Installation
- Fish Placement
- General Maintenance

There is an introduction section in each module and learners are informed about the objectives. First of all, the educational content is offered to the learners with a video. Video is preferred because learners should be first informed about the processes like aquarium installation or maintenance. Following the video, the content of the instruction is repeated as a text. In this step, the learners review the parts they have missed in the previous step. In the last step, questions asked to the learners whether they have acquired all the essential information
and if they do not have the necessary information, the steps are repeated until they learn everything adequately.

c) Development: At the development stage of education interface the WordPress, which is an open source content management system, was utilized. Namaste LMS and Watu add-ons, which are effective about publishing and managing the educational contents on the system, were also used. For the ones who are accessing via large-screened, desktop devices a menu with module titles being on the top was prepared. The learners accessing via mobile devices can browse around the modules thanks to a pop-up menu. Each module includes introduction section which informs about aims, video education section, textual explanation section and module assessment questions section in the form of tabs. The user interface can adapt itself to any kind of screen width and can be used hassle-free and without horizontal scrolling, zooming in-out on every device that can connect to the Internet. To enable access to education a Mobile Android application called “Akvarist” was developed and made available on Google Play. This mobile app and web app both provide the same contents to the learners.

d) Implementation: Implementation: The developed education was presented to the participants in the sample for two weeks via http://akvaryum.ogrenirim.com website and mobile app.

e) Evaluation: Five tests were prepared, which evaluate the attainments identified during analysis for each module individually, at the end of each module these tests were applied to learners as multiple-choice questions and each time with different question and option sequences. Instant feedback is given on the wrong answers. Depending on the success level of the test, the learner receives feedbacks whether to repeat the content or to proceed to the next level.

FINDINGS

Data obtained at the end of the study were reviewed under sub titles. The educational content was accessed by 545 individual users for 617 times, including the date June 10, 2015. The average sess-time of the users accessing the education on a web environment was 3.12 minutes while the average sess-time of the users on a mobile platform was 4.35 minutes. During the assessment phase, the answers of 67 users responding to the survey were taken into consideration. As for the survey fill-in rate, 10% of the users accessing the education via
a web-based platform answered the survey while this rate was 23% for the mobile platform users.

**The Demographic and Personal Data Obtained from Survey**

As shown in Figure 2, the gender distribution of the users responding to the survey is 74.6% (50 people) Male and 25.4% (17 people) Female.

![Figure 2: The gender distribution of the users responding to the survey](image)

As shown in Figure 3, the educational statuses of the respondents are respectively: Undergraduate 49.3% (33 people), Postgraduate 22.4% (15 people), High School 10.4% (7 people), Associate Degree 9% (6 people), Doctorate 6% (4 people), and Secondary School 3% (2 people). No primary school graduate took part in the survey.

![Figure 3: The educational status of respondents](image)

As shown in Figure 4, considering the aquarium hobby engagement time the answers were mainly: I am new to it 60.6% (40 people), 5 years + 18.2% (12 people), 4 years 7.6% (5 people).  

![Figure 4: Engagement time](image)
The Data Obtained In Mobile and Web Environments According to Survey Results

As shown in Figure 5, the rates and device types of access of users accessing the aquarium education platform are: 68.7% (46 people) via Computer (via Web Browser), 31.3% (21 people) via Mobile Devices (Tablets, Smart Phones).

As shown in Figure 6, 65% (30 people) of the users accessing the prepared platform via a computer based web browser stated that they were pleased with the platform, 26% (21 people) stated that they were partially pleased with the platform, 9% (4 people) stated that they were not pleased with the platform. As for the users accessing the prepared platform via a mobile device, 86% (18 people) of them stated to be pleased with the platform while 14% (3 people) stated to be partially pleased with the platform. None of the users accessing the education environment via a mobile platform stated to be unpleased with it.

As shown in Figure 7, 72% (33 people) of the users accessing the platform via a computer based web browser stated that the instructions on the platform were sufficient, 22% (10 people) of those users stated that the instructions were partially sufficient and 6% (3 people) of those users stated that the instructions were insufficient.

As shown in Figure 7, 81% (17 people) of the users accessing the platform via a mobile device stated that the instructions were sufficient while 19% (4 people) of those users stated that the instructions were partially sufficient. None of the users stated that the instructions were insufficient.
As shown in Figure 8, 87% (40 people) of the users accessing the prepared platform via a computer-based web browser stated that they could follow the courses on the platform easily, 9% (4 people) of those users stated that they could partially follow the courses with ease and 4% (2 people) of those users stated that they couldn’t follow the courses easily.

As shown in Figure 8, 95% (20 people) of the users accessing the prepared platform via mobile devices stated that they could follow the courses easily, 5% (1 person) of those users stated that they could partially follow the courses with ease.

As shown in Figure 9, 65% (30 people) of the users accessing the courses via a computer-based web platform stated that they would like to attend different courses through the platform, 26% (12 people) of those users stated that they would partially like to attend different courses through the platform and 9% (4 people) of those users stated that they wouldn’t like to attend different courses through the platform.

As shown in Figure 9, 86% (18 people) of the users accessing the courses via a mobile platform stated that they would like to attend different courses through the platform while 14% (3 people) of those users stated that they would partially like to attend different courses through the platform.
As shown in Figure 10, the scoring according to the evaluations of the users accessing courses via computer based web platform is respectively: 24% (11 people) 8 points, 22% (10 people) 9 points and 7 points, 17% (8 people) 10 points, 7% (3 people) 6 points, 4% (2 people) 4 points, 4% (2 people) 4 points. In parallel with those results, the point average of the web-based environment is 7.82.

As shown in Figure 10, the scoring according to the evaluations of the users accessing courses via mobile platform is respectively: 38% (8 people) 8 points, 28% (6 people) 10 points, 19% (4 people) 9 points, 5% (1 person) 7 points, 5% (1 person) 6 points, 5% (1 person) 5 points. In parallel with those results, the point average of the mobile environment is 8.47.

As shown in Figure 11, 70% (32 people) of the users attending the education service via a web based platform would recommend the platform to others, 24% (11 people) of those users would partially recommend the platform to others and 6% (3 people) wouldn’t recommend the platform to others.
As shown in Figure 11, 95% (20 people) of the users attending the education service via a mobile based platform would recommend the platform to others, 5% (1 person) of those users would partially recommend the platform to others.

![Figure 11: Answers given to the question ‘Would you recommend the Web Based Platform and Mobile Based Platform to others?’](image1)

**Data on Education and Contents According to Survey Results**

As shown in Figure 12, 64.2% (43 people) of the users stated that course contents are sufficient, 25.4% (17 people) stated that course contents are partially sufficient and 10.4% (7 people) of the users stated that course contents are insufficient.

![Figure 12: Answers given to the question ‘Are the course contents sufficient?’](image2)

As shown in Figure 13, 44.8% (30 people) of the users think the exams in the education service are sufficient, 34.3% (23 people) of the users think exams in the education service are partially sufficient and 20.9% (14 people) think the exams in the education service are insufficient.

![Figure 13: Answers given to the question ‘Do you think the exams in the education service are sufficient?’](image3)
As shown in the figure 14, 65.7% (44 people) of the users think the feedbacks given in the education service are sufficient, 28.4% (19 people) think they are partially sufficient and 6% (4 people) think they are not sufficient.

![Figure 14: Answers given to the question ‘Do you think the feedbacks are sufficient?’](image)

As shown in Figure 15, 76.1% (51 people) of the users stated that the education given helped them learn the subject, 20.9% (14 people) stated that the education given partially helped them learn the subject and 3% (2 people) stated that the education given didn’t help them learn the subject.

![Figure 15: Answers given to the question ‘Did the platforms help you to learn the subject?’](image)
### ANOVA Analysis Results

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<th>Std. Deviation</th>
<th>Std. Error</th>
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Table 1: Descriptive statistics results according to the accessed platform
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</table>

Table 2: ANOVA test results according to the accessed platform
When Table 1 and Table 2 are analyzed, it is statistically proved that there is a significant difference between the answers given by users to the questions “Did you find the content sufficient?” (F(1, 65)=7.388, p<.05), “Did you find the exam sufficient?” (F(1, 65)=4.284, p<.05), “Did you find the feedbacks sufficient?” (F(1, 65)=6.101, p<.05), “Did they help you to learn the subject?” (F(1, 65)=6.199, p<.05) and “Do you recommend this course to others?” (F(1, 65)=5.497, p<.05).

Heat Maps and User Experience

By analyzing the results of the heat map, the areas where users mainly interact on the screen were detected. As seen in Figure 16, the areas users clicked on the screen were detected and the areas they clicked wrong were identified.

![Web Based Heat Map](image)

User Videos, Video Analysis and User Experience

The learners’ screen activities when they received the education were recorded as videos via MouseFlow, LuckyOrange and Appsee tools. By randomly choosing these video records the users’ behaviours on the web based and mobile platforms were analysed, errors were identified and necessary arrangements were done.

DISCUSSION AND CONCLUSION

Considering the findings obtained through the study it is seen that satisfaction level of the users attending the education services via mobile devices is higher. The average session times (mobile 4.35mins, web 3.12mins) and survey fill-in rates (mobile 23%, web 10%) of the users accessing the content via mobile devices is higher compared to the users accessing the content via using a web browser on computer. However, it is seen that although the content is viewed
by 545 individuals in total 26% of them leave the education instantly and the survey fill-in rate for the users of both environments is 12.3%.

When the ANOVA test results on content, exam, feedback, subject learning and recommendation to others are reviewed, it is seen that there is a significant difference between the mobile platform users and web platform users. The mobile platform users have higher satisfaction levels regarding the sufficiency of the content, exams and feedbacks. Moreover, mobile platform users’ opinions on the effectiveness of the content in terms of learning the subject and recommending it to others have higher rates. These outcomes are considered as sympathy created by the fact that people see mobile platforms more popular and lovely and do not encounter these kind of works on mobile environments so often. Moreover, it is estimated that the ability to reach the content via mobile devices at any place and time effects the outcomes.

For the online education services, when institutions restrict the access to the internet contents to only one general application this creates a transmission problem. Having analysed the complaints gathered in this study, it is seen that individuals using the Internet access provided by the Turkish Ministry of Education cannot open the educational videos.

The educational content provided does not contain any activity which would require superb physical keyboard and mouse usage capabilities. The user satisfaction was measured mostly in terms of focusing and availability. Success of other educations, such as programming trainings which would require physical keyboard and mouse usage, can be analysed by other studies.

The comparison of learners’ satisfaction in terms of accessing the contents in mobile and web environment can be carried out with bigger study groups and different curse contents.

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