İDİL

DEVELOPMENT OF INTERACTIVE EDUCATIONAL SOFTWARE FOR BASIC KNOWLEDGE OF TURKISH MUSIC THEORY*

Elnara AHMETZADE
TÜBİTAK, elnara@ahmetzade@gmail.com, ORCID: 0000-0001-7774-3839

Tutku Dilem ALPASLAN
Doç. Dr., Ankara Hacı Bayram Veli Üniversitesi Sanat ve Tasarım Fakültesi, tutku.alpaslan@hbv.edu.tr, ORCID: 0000-0002-8516-1721

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ABSTRACT

In accordance with main purpose of the research, interactive educational software for basic knowledge of Turkish Music Theory was developed. Then, the five-point Likert type scale was prepared and applied to the Fine Arts High School students, graphic design experts and music experts. As a result, it was determined that developing of content was in accordance with targets, so as to ensure the integrity, in conformity with gradually increasing and small steps principles of programmed instruction. At the intro page, supporting the content with variable audio-visual elements ensured attractiveness and motivation, so created an incentive structure to learn basic knowledge of Turkish Music Theory. Content presentation was supported visually by color arrangements associated with the knowledge in a systematic way and auditorily by help of interactive elements, so retention was strengthened. Interface design elements are sufficient functionally; ensures the integrity formally and in terms of color; choice of font, text size and color of typographic elements is correct and text legibility is provided. At the evaluation section, diversity in assessment was achieved, evaluation process prepared in attractive way and compliance with the reinforcement and immediate feedback principles of programmed instruction is provided.

Keywords: Graphic design, interface design, programmed instruction, Turkish Music Theory, music education

**This article was produced from master's thesis of Elnara Ahmetzade (Supervisor: Associate Professor Ph. D. Tutku Dilem Alpaslan).*

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Introduction

One of the fields with which educational science has had close communication throughout its historical development to perform information transfer and learning more effectively is technology. There are different dimensions of education-technology relations. Benefiting from technological opportunities in the field of education is one of the dimensions of education-technology (Alkan, 1997: p. 12-13). Computers, which are the invention of technology that has become an indispensable part of our lives, provide benefits to the education in different ways. And one of these ways is to use computer as a programmed instruction tool (Çilenti, 1988: 121).

The programmed instruction is defined as "a process, figured by systematically applying the learning technics developed experimentally on the purpose of helping student reach the behavioral goals" (Alkan, 1997: p. 186). And the programmed instruction tools are experienced as the body of materials that find appropriate solutions for students' needs by perceiving the individual differences in education and enable students to learn individually. The programmed instruction tools that have been developed in parallel with the technology, has advanced to the level of the interactive educational software operated in computer as for today.

The elements like the content of the interactive programmed instruction materials, technological infrastructure and design should be built consciously and with the coordinated activities by the experts of the related field. When viewed from this aspect, it could be concluded that one of the significant support elements for the programmed instruction tools design is the graphic design. However, as a result of literature review, it was understood that there is not enough interactive educational software studied for different instruction disciplines in the researches of the graphic field. Examining different disciplines to study, especially a general lack of resource in the field of Turkish music education was noticed and it was understood that absence of interactive software a need for tools. While this case could pose a problem for Turkish music education in primary and secondary education institutions, it was also thought that it might cause malfunctions in Fine Arts High Schools, providing special training in music. By taking the needs determined into consideration, the topic of designing an interactive educational software themed with Turkish music theories was discussed in detail. In this study, an interactive educational software, which appeals to students, arouses interest and motivates by catching attention, provides effective learning, evaluation and consolidation, was tried to be developed.

Objective

The general objective of the study is to seek for the answer to the question of "How should the interactive educational software themed with 'basic knowledge of Turkish Music Theory' be?".

In order to reach this goal, questions below were tried to be answered:

1. How should the intro page activities of the interactive educational software themed with "basic knowledge of Turkish Music Theory" be?
    - 1.1. To attract attention
    - 1.2. To determine the motivation activities
    - 1.3. To arrange the intro page
    - 1.4. To present the goals
    - 1.5. To determine instructions for use
2. How should the content of the interactive educational software themed with "basic knowledge of Turkish Music Theory" be created?
3. How should the interface design of the interactive educational software themed with "basic knowledge of Turkish Music Theory" be?
    - 3.1. To design menus and guide buttons
    - 3.2. To design other interface elements
4. How should the evaluation part of the interactive educational software themed with "basic knowledge of Turkish Music Theory" be created?
    - 4.1. To determine the evaluation types
    - 4.2. To prepare evaluation questions

Method

The study model

This study is a survey model research. The survey models are studies that aim to depict a situation, which either happened in the past or still exists, as it is (Karasar, 2009: p. 77). In some resources, there is some information, saying survey model is a sub-unit of descriptive researches (Büyüköztürk, 2009: p. 21). As the opinions of the scale participants about the determined topic in related period were evaluated, sectioning approach was used.

Work group

The work group of the study consists of 40 ninth-grader students from Fine Arts High Schools in Ankara and Eskisehir, 40 music experts and 40 graphic design experts that were chosen by random sampling method.

Data collection

A literature review was made in order to create the conceptual framework of the study. Firstly, the interactive educational software themed with "basic knowledge of Turkish Music Theory" was developed in accordance with sub-objectives of the study. The content of software is based on Arel-Ezgi-Uzdilek's Turkish Music Theory system. Information from different sources is compiled and merged for content (Arel, 1993: p. 1-55; Özkan, 2000: p. 36-59, 93-185; Şenduran, 1977: p. 28-40; Deveci, 2010: p. 4-59; Kutluğ, 2000: p. 143-196.). During the preparation process of the software, guidance of an expert group, consisting of 2 graphic design instructors, an education program development expert, 2 educational technology expert and 2 computer experts, was used.

First of all, the subject to study, objectives and objective behaviors were determined. Objective can be defined as "Feature that can be expressed as behavior or change of behavior decided student to gain by planned and structured experiences." (Ertürk, 1972: p. 26). After this process, an information list was composed in order to make the objectives and the objective behaviors gained. Correspondingly, the content was decided and evaluation questions were prepared.

Interface of interactive educational software was designed in accordance with criteria and the application of software was made. For this, many sources related to the field were used (Akpınar, 1999; Alessi and Trollip, 2001; Blum, 1997; Cruthirds and Hanna, 1997; Galitz, 2007; Landa, 2001; Osin, 2003). Utmost care has been taken in preparing of interface. Because the system element that allows user to interact with the software is interface. The basic function of interface is to make the computer system more comfortable for user. In other words, the most important feature of the interface is its usefulness (Redmond-Pyle & Moore, 1995: p. 2). Also, the aesthetic qualities of the visual aspect of the interface design and the presence of interesting elements in interactive software are important too. If the multimedia product is used for the development of the educational process the interaction of the interface should not only to provide the objectives of the program but also attract the interest of the student (Morozov, Tanakov & Bistrov, 2001: p. 182-183). After finishing the software the sticker and cover for box for compact disc were designed compatible with the interface elements.

For evaluation of the developed instruction program the five-point Likert type scale prepared, was submitted to the supervision of the expert group and then corrected according to opinions expressed. The scale was applied by having students, music experts and graphic design experts watch the educational software and the data was collected. Necessary permission for the application of the scale at schools was obtained from the Ministry of National Education of Turkey.

Data analysis

The data was computerized after it was collected with the help of the scale prepared in accordance with the sub-objectives of the study. SPSS statistic software was used for data analysis.

The supervision of expert group was used in order to ensure the content validity of the scale that was used for the evaluation of the educational software. Internal consistency Cronbach Alpha index was calculated as $\alpha = 0.970$ in the scale reliability analysis. The arithmetic averages of the date and standard deviation values were calculated and tabulated. Interpretations were made according to the findings, basing on this information.

Results

The opinions of students and experts about the intro activities of interactive educational software themed with "basic knowledge of Turkish Music Theory"

The opinions of students, graphic design experts and music experts about the intro page activities of the designed interactive educational software themed with "basic knowledge of Turkish Music Theory" (to attract attention, to determine the motivation activities, to arrange the intro page, to present the goals, to determine instructions for use) are expressed as tables.

Table 1: The opinions about the intro page activities of interactive educational software

Questions	Groups	$\bar{x}$	S
1. Do you think the animations in the intro page attract the attention?	Students	4.82	.385
	Graphic Design Experts	4.88	.335
	Music Experts	4.90	.304
	TOTAL	4.87	.341
2. Do you think the verbal and written messages in the intro page ensure enough motivation?	Students	4.85	.362
	Graphic Design Experts	4.77	.323
	Music Experts	4.90	.304
	TOTAL	4.84	.367
3. Do you agree with the opinion that the intro page activities arouse curiosity about the content of the educational software?	Students	4.75	.343
	Graphic Design Experts	4.82	.385
	Music Experts	4.88	.335
	TOTAL	4.82	.330
4. Are the animations in the intro page coherent with the content of the educational software?	Students	4.90	.304
	Graphic Design Experts	4.92	.367
	Music Experts	4.95	.321
	TOTAL	4.93	.364
5. Do you think that the music choices in the intro page are coherent with the content of the educational software?	Students	5.00	.300
	Graphic Design Experts	5.00	.300
	Music Experts	00	.300
	TOTAL	00	.300
6. Do you agree with the opinion that the visual elements in the intro page are appropriate with the educational software?	Students	4.77	.323
	Graphic Design Experts	4.88	.335
	Music Experts	4.85	.362
	TOTAL	4.83	.374
7. Do you think that fonts used in the intro page are appropriate with the educational software?	Students	4.70	.364
	Graphic Design Experts	4.90	.304
	Music Experts	4.77	.380
	TOTAL	4.79	.366
	Students	4.90	.304

8. Do you have the opinion that the explanations in the home page clearly express the objectives?	Graphic Design Experts	4.88	.335
	Music Experts	4.85	.362
	TOTAL	4.87	.332
9. Do you think that the explanations in the home page give enough information about the content and the use of the educational software?	Students	4.92	.367
	Graphic Design Experts	4.92	.367
	Music Experts	4.90	.304
	TOTAL	4.92	.378

As seen on Table 1, agreeing level of students with the opinion (Question 1) that the animations in the intro page ensure attention is 4.82, that of graphic design experts is 4.88 and that of music experts is 4.90. According to these findings, music experts found the ability to attract attention of the animations stronger. And it is also understood that the majority of students have positive opinions about ensuring the attention. Besides, when the participants were asked about verbal expression after the scale applied, it was noticed they had opinions that animations with more modern lines could be operated. But, when the information that animation was designed by interpreting miniature, one of the traditional arts, in order to provide the coherence with the content, was explained, it was observed participants also reached a consensus about it.

According to the findings, it was noted that average of agreeing for students is 4.85, for graphic design experts is 4.77 and for music experts is 4.90 for the question about whether verbal and written messages in the intro page ensure motivation (Question 2). When the data is considered, it is thought that the written messages and verbal expressions used in the intro page of the software is successful at motivating due to having an encouraging manner to lean Turkish Music Theory.

It is observed that the agreeing level about the idea that the intro page activities arouse curiosity about the content (Question 3) is 4.75 for students, 4.82 for graphic design experts and 4.88 for music experts. Depending on the findings, it is understood field experts agree with the idea that the intro page activities arouse curiosity more than students do. As a result of evaluation, it could be concluded the educational software is successful at arousing curiosity about program and the content through the animations in the intro page, various written and verbal expressions.

As observed in the findings, the agreeing level for students is 4.90, for graphic design experts is 4.92 and for music experts is 4.95 about the opinion that animations in the intro page are coherent with the content (Question 4). Depending upon the data, it is possible to suggest that both students and field experts expressed positive opinions about animations being coherent with the content. It is thought that using elements which reflect traditional art of miniature motifs with the aim to support visually the deeply-rooted structure of Turkish music in animations increase the coherence between design and content. Besides, it is possible to say motifs being combined with contemporary forms by interpreting reflects the progressive structure of Turkish music that keeps progressing in every period, along with its traditional aspect.

According to the results in the Table, the level of agreeing with idea that music choices in the intro page are coherent with the educational software content (Question 5) is 5.00 for both students and field experts. It is thought using outstanding examples of extensive instrumental pieces of Turkish music in the intro page contributed to relevance of the educational software and affected participants' opinions positively. Therefore, it is argued music choices are coherent with the content.

When the data is examined, it is noticed that agreeing level for the opinion about whether visual elements of intro page are coherent with the educational software is 4.77 for students, 4.88 for graphic design experts and 4.85 for music experts (Question 6). Visual elements used in the intro page of interactive software include the basic elements that are needed for this part. Additionally, it is thought visual elements having features coherent with the content affected positively the opinions of the scale participants.

According to the findings, average agreeing point with the idea that the fonts used on the intro page are considered appropriate for educational software (Question 7) is 4.70 for students; 4.90 for graphic design experts and 4.77 for music experts. Looking at the related data, it is understood that experts in graphic design experts have a higher positive opinion on the fonts than music experts and students. It has been learned in interviews conducted after the exercise with the participants that they prefer more dynamic and decorative fonts throughout the educational software. However, it was determined they concluded a positive opinion about the topic when the participants were informed that sans serif fonts without decorative features were used to provide readability and to relieve eye sensation in the screen environment.

As seen in the table, the level of agreeing for students is 4.90, for graphic design experts is 4.88 and for music experts is 4.85 about the opinion that explanations in the home page clearly express the objectives (Question 8). When the findings are examined, it is seen students declare they are agreeing with the opinion

that the objectives are clearly presented in the home page at a higher level than field experts. As a result of the interviews after the exercise, it was found out that the field experts preferred a more comprehensive presentation of objectives. Yet, they were informed that it was aimed to prevent a complex structure by conveying the basics of topics to students and a consensus was reached.

In the table data, it is stated that students have 4.92, graphic design experts have 4.92 and music experts have 4.90 agreeing level for idea that the explanations in the home page provide sufficient information about the content and the use of educational software (Question 9). At the home page, detailed information about the scope and the content of educational software is given and it is indicated what topics are included in the parts of the program and what kind of applications can be used. Looking at the findings, it can be considered the information about the content and use of educational software provided by explanations in the home page are at a sufficient level.

The opinions of students and experts about the content formation of interactive educational software themed with "basic knowledge of Turkish Music Theory"

The opinions of students and experts about the content formation of interactive educational software themed with "basic knowledge of Turkish Music Theory" are presented as tables.

Table 2: Opinions about the content formation of interactive educational software

Questions	Groups	$\bar{x}$	S
1. Do you think the content creates coherence?	Students	4.85	.362
	Graphic Design Experts	4.88	.335
	Music Experts	5.00	.000
	TOTAL	4.91	.290
2. Do you think the feature of progressivity is provided in the process of content relay?	Students	4.88	.335
	Graphic Design Experts	4.90	.304
	Music Experts	5.00	.000
	TOTAL	4.93	.264
3. Do you think the educational software's compliance with spelling rules is at a sufficient level?	Students	5.00	.000
	Graphic Design Experts	5.00	.000
	Music Experts	5.00	.000
	TOTAL	5.00	.000
4. Do you think benefiting from colors to relay content intensifies memorability?	Students	5.00	.000
	Graphic Design Experts	5.00	.000
	Music Experts	5.00	.000
	TOTAL	5.00	.000
5. Do you think benefiting from voices to relay content intensifies memorability?	Students	5.00	.000
	Graphic Design Experts	5.00	.000
	Music Experts	5.00	.000
	TOTAL	5.00	.000

According to the findings on the Table 2, agreeing level is 4.85 for students, 4.88 for graphic design experts and 5.00 for music experts about idea that the content creates coherence (Question 1). When the findings expressing the opinions of students and field experts about the subject, it could be suggested the content is successful at creating coherence. It is understood the educational software content created in accordance with objective and objective behaviors was made in a way possible to create coherence, as a result of detailed analysis of various sources and collection of knowledge. Besides, it is thought that the information being revised in way to emphasize on significant points by simplifying contributes the coherence of the content.

As seen in the findings, the average to agree with the opinion that feature of progressivity of content relay (Question 2) is 4.88 for students, 4.90 for graphic design experts and 5.00 for music experts. It is possible to reach a judgement by the examined data that as a result of approaching to the educational software content systematically, a structure has been established in consonant with principles of gradual progress and small steps of the programmed instruction and the principle of progressivity has been provided.

It was determined in the findings all students and the field experts agreed with the opinion at the level

of 5.00 that compliance with spelling rules is at a sufficient level (Question 3). It could be argued that compliance with spelling rules was successfully made since a spelling book was used during the creation of the educational software content and the editing of texts was very much carefully made.

Looking at the findings on the table, it is seen that the average to agree with the opinion that benefiting from colors to relay content intensifies memorability (Question 4) is 5.00 for all students and graphic design experts and music experts. During the process of preparation of the educational software content, all the information aimed to be taught was systematically associated with colors and connections were tried to be made. Therefore, it was aimed to support the information with visual elements and to increase memorability. When the findings are examined, it could be thought a more efficient teaching process was be made by benefiting from coloring for the design of the educational software.

According to the table data, it is understood that all the scale participants had the average of 5.00 to agree with the subject that benefiting from voices to relay content intensifies memorability (Question 5). Considering the fact that the educational software a lot more appeals to the auditory field because of the content, it was aimed to offer the information projected to relay with the support of voices. Regulations, which will allow students to listen to musical notes and related musical pieces via interactive elements, were made in the software. Thus, it is possible to reach the argument that a more memorable process of teaching was developed by benefiting from voices for the educational software.

The opinions of students and experts about the interface design of interactive educational software themed with "basic knowledge of Turkish Music Theory"

The pinions of students and experts about the interface design (menu and guide buttons design, other interface elements design) of interactive educational software themed with "basic knowledge of Turkish Music Theory" are expressed as tables.

Table 3: Opinions about the interface design of the interactive educational software - Menus and guide buttons

Questions	**Groups**	$\bar{x}$	**S**
1. Do you think that the upper menu elements of the educational software are functional enough?	Students	4.90	.304
	Graphic Design Experts	4.88	.335
	Music Experts	4.85	.362
	TOTAL	4.87	.332
2. Do you think that the left menu elements of the educational software are functional enough?	Students	4.88	.335
	Graphic Design Experts	4.90	.304
	Music Experts	4.88	.335
	TOTAL	4.88	.322
3. Do you agree that the educational software's guide buttons are functionally sufficient?	Students	4.90	.304
	Graphic Design Experts	4.92	.267
	Music Experts	5.00	.000
	TOTAL	4.94	.235
4. Are the educational software menu and buttons coherent with the educational software content?	Students	5.00	.000
	Graphic Design Experts	5.00	.000
	Music Experts	5.00	.000
	TOPLAM	5.00	.000
5. Do you think that the educational software menu and buttons are coherent with the other interface elements?	Students	4.82	.385
	Graphic Design Experts	4.88	.335
	Music Experts	4.85	.362
	TOPLAM	4.85	.359

As seen in the table, the agreeing level about idea that upper menu elements are functional enough (Question 1) is 4.90 for students, 4.88 for graphic design experts and 4.85 for music experts. In the upper menu of the interactive software, there are return to the main page, printable information pieces and exit buttons. When opinions of students and the field experts are considered, it could be argued the sufficiency of upper menu elements design of the educational software in terms of functional aspect is significantly

provided.

According to the findings gathered, it has been determined that the average to agree with the opinion that the left menu elements of the educational software are functional enough (Question 2) is 4.88 for students, 4.90 for graphic design experts and 4.88 for music experts. There are guide buttons to the parts of the program in the left menu of the educational software. It has been aimed that the user accesses to the desired parts by moving easily in the program through those elements. When the opinions expressed by students, graphic design experts and music experts are examined, it could be considered that the functional sufficiency of left menu elements in terms of design is managed.

It is seen in the data on Table 3 that the average level to agree with the opinion that the educational software's guide buttons are functionally sufficient (Question 3) is 4.90 for students, 4.92 for graphic design experts and 4.50 for music experts. Guide buttons are used with the aim to make transition between pages possible in the educational software. As a result of evaluation of the results, it is possible to reach the idea that sufficiency of guide buttons is provided.

As observed in the findings, all of students and field experts have the level of 5.00 to agree with the opinion that the educational software menu and buttons are coherent with the educational software content (Question 4). Shapes created by abstraction of musical notes and accidentals are used in designing the menu and the buttons of the software to maintain coherence with the content. Looking at the scale data, it could be thought that the menu and the buttons have been successfully designed in coherence with the content.

According the data on the table, the average agreeing point with the opinion that the educational software menu and buttons are coherent with the other interface elements (Question 5) is 4.82 for students, 4.88 for graphic design experts and 4.85 for music experts. While the software menu and buttons were abstracted, it was paid strict attention that they had a formal structure coherent with other interface elements. According to the findings gathered, it is understood that scale participants have reached a consensus that the coherence of the menu and buttons with other interface elements is at a high level.

Table 4: Opinions about the interface design of the interactive educational software - Other interface elements

Questions	**Groups**	$\bar{x}$	**S**
1. Do you think that the educational software interface design is compatible with the content formally?	Students	4.88	.335
	Graphic Design Experts	4.92	.267
	Music Experts	4.95	.221
	TOTAL	4.92	.278
2. Are the instructional software interface elements coherent with the content in terms of color?	Students	4.85	.362
	Graphic Design Experts	4.95	.221
	Music Experts	4.90	.304
	TOTAL	4.90	.301
3. Do you agree that typographic elements of the educational software interface are coherent with the content?	Students	4.77	.480
	Graphic Design Experts	4.92	.267
	Music Experts	4.85	.427
	TOTAL	4.85	.403
4. Is the background compatible with the visuals?	Students	4.88	.335
	Graphic Design Experts	5.00	.000
	Music Experts	4.90	.304
	TOTAL	4.93	.264
5. Is the background coherent with typographic elements?	Students	4.90	.304
	Graphic Design Experts	5.00	.000
	Music Experts	4.92	.267
	TOTAL	4.94	.235
6. Is the color choice of the background appropriate?	Students	5.00	.000
	Graphic Design Experts	5.00	.000
	Music Experts	5.00	.000
	TOTAL	5.00	.000
	Students	4.90	.304

7. Are the formal features of the interface visual elements coherent?	Graphic Design Experts	4.92	.267
	Music Experts	4.92	.267
	TOTAL	4.92	.278
8. Are the layout features of the interface visual elements coherent?	Students	4.85	.362
	Graphic Design Experts	4.90	.304
	Music Experts	4.88	.335
	TOTAL	4.87	.332
9. Are the interface visual elements coherent with typographic elements?	Students	4.90	.304
	Graphic Design Experts	4.95	.221
	Music Experts	4.92	.267
	TOTAL	4.93	.264
10. Does the color selection of the interface visual elements fit?	Students	4.88	.335
	Graphic Design Experts	5.00	.000
	Music Experts	4.95	.221
	TOTAL	4.94	.235
11. Do font choices for typographic elements fit?	Students	4.88	.335
	Graphic Design Experts	4.95	.221
	Music Experts	4.92	.267
	TOTAL	4.92	.278
12. Are punto size choices for typographic elements appropriate?	Students	4.92	.267
	Graphic Design Experts	5.00	.000
	Music Experts	4.95	.221
	TOTAL	4.96	.201
13. Is the legibility for typographic elements provided?	Students	5.00	.000
	Graphic Design Experts	5.00	.000
	Music Experts	5.00	.000
	TOTAL	5.00	.000
14. Is white space sufficient for typographic elements?	Students	5.00	.000
	Graphic Design Experts	5.00	.000
	Music Experts	5.00	.000
	TOTAL	5.00	.000
15. Are the color choices of the typographic elements appropriate?	Students	5.00	.000
	Graphic Design Experts	5.00	.000
	Music Experts	5.00	.000
	TOTAL	5.00	.000

According to the findings gathered, level of agreeing is 4.88 for students, 4.92 for graphic design experts and 4.95 for music experts about idea that the educational software interface design is compatible with the content formally (Question 1). It is possible to reach the idea that positive opinions were gathered from the scale participants as the visual elements used for the interface design bear rhythmic and moving lines that are suitable for the nature of the concept of music, which is the main element of the software, and lines that show that the subject is seriously dealt.

As seen on Table 4, average agreeing point with the opinion that the interface elements are coherent with the content in terms of color is 4.85 for students, 4.95 for graphic design experts and 4.90 for music experts (Question 2). Both shades of color blue, which was aimed to make concentration happen much more easily, and different bright colors, which were to reflect the features of music, were used for the interface design of the educational software. When the data gathered is examined, it is understood that the opinions of the field experts are at a higher level than those of students about the opinion that the educational software interface elements are coherent with the content in terms of color. It was found out in the interviews after the practice that students prefer a more intense use of warm colors. However, when that the color blue was used to make concentration happen more easily was explained, it was observed that students also reached a consensus.

In the table data, it is seen that agreeing level is 4.77 for students, 4.92 for graphic design experts and 4.85 for music experts about idea that typographic elements of the educational software interface are coherent with the content (Question 3). As mentioned before, it was found in the interviews with the scale participants that they prefer a more decorative structure when it comes to the typographic elements. However, the participants were informed that the reason why the current fonts were chosen is to provide legibility and monitoring comfort. It could also be considered that graphic design experts have the same opinion, since they approach to the issue from a professional perspective and because of that they have a higher level of positive opinion.

As observed in the findings, the average to agree with the opinion that the background is compatible with the visuals (Question 4) is 4.88 for students, 5.00 for graphic design experts and 4.90 for music experts. The background of the educational software was preferred to have moving lines and color transitions, so that it could be coherent with the visuals. When the gathered findings are examined, it could be suggested that the coherence of the background with the visuals was successfully managed.

Looking at the findings on the table, it is seen that level of agreeing is 4.90 for students, 5.00 for graphic design experts and 4.92 for music experts about the opinion that the background is coherent with typographic elements (Question 5). When the background design was made, it was paid attention to do regulations that are coherent with the general structure of the typographic elements and make their perception easier. When the gathered results on the table are examined, it is possible to reach the opinion that the coherence between the background and the typographic elements is high.

As a result of the findings determined, the average to agree with the opinion that the color choice of the background is appropriate (Question 6) is 5.00 for all students and field experts. Different shades of color blue, which is generally used in the interface, were used for background design of the educational software. Fair shades were used with the aim of making other elements perceived easily and this structure was supported by white color transitions. When the data on the table is examined, it is possible to reach the judgement that the color choice of the background is appropriate.

According to the data on Table 4, level of agreeing is 4.90 for students, 4.92 for graphic design experts and 4.92 for music experts about idea that the formal features of the interface visual elements is coherent (Question 7). As explained before, it was paid strict attention to the fact that the interface elements have both rhythmic lines that are coherent with the content and the formal structure that represents the seriousness during the process of the design of the educational software. Looking through the table results, it is understood that students and the field experts find the formal features of the visual elements coherent.

It is visible in the findings gathered that the average agreeing point with the opinion about the coherence of layouts of the interface visual elements (Question 8) is 4.85 for students, 4.90 for graphic design experts and 4.88 for music experts. The layout of the visual elements of the educational software interface has been done in a structure that will support the basic features of the program, while functional features have been taken into consideration. Meanwhile, motion path of the eye and the possible follow-up direction of user are elements that were considered. Basing on the findings, it could be though that the coherence of layout of the interface visuals has been managed.

As observed in the data on the table, agreeing level about idea that the interface visual elements are coherent with typographic elements (Question 9) is 4.90 for students, 4.95 for graphic design experts and 4.92 for music experts. It was paid attention for the interface visual elements to have similar lines with typographic elements and to have features that will make perception easier during the process of design. According to the scale results, it could be argued that the coherence between the interface visuals and typographic elements has successfully been managed.

When the results on the Table 4 are examined, it is understood that average to agree with the opinion that font choices for typographic elements fit is 4.88 for students, 5.00 for graphic design experts and 5.00 for music experts (Question 10). The shades of color blue were preferred in order to make concentration easier, to hinder eyestrain, to underline the seriousness of the software and to provide trust for the interface design. Apart from that, bright colors were also used for various elements in coherence with the content. Basing on the opinions of students and the field experts, it is possible to reach the conclusion that the color choices of visual elements have properly been done.

According to the findings examined, agreeing level is 4.88 for students, 4.95 for graphic design experts and 4.95 for music experts about idea that font choices for typographic elements fit (Question 11). A readable font without serif has been used throughout the interface. Diversifications of the same font were used to prevent complications for underlying different parts. According to the data, the character choices of typographic elements are coherent at a high level.

When the data determined is examined, it is observed that level of agreeing with the opinion that punto size choices for typographic elements are appropriate is 4.92 for students, 5.00 for graphic design experts and 4.95 for music experts (Question 12). The puntos of the interface design change, depending upon the structure of the fonts that were used for texts, titles, menu and buttons. 11-12 punto sizes were used for these

elements. Basing on the findings gathered, it is possible to reach the idea that the level of coherence of the punto choices for typographic elements is enough.

It is visible on the findings collected that both of students and the field experts have the average of 5.00 to agree that the legibility for typographic elements is provided (Question 13). During the design process of the software interface a special attention was paid to the font, punto, and color choices of the typographic elements and space rules to provide legibility. Considering the information on the table, it is possible to say that the legibility of the educational software is provided at a high level.

According to the data on the table, the level to agree with the opinion that white space sufficient is for typographic elements (Question 14) is 5.00 for both students and the field experts. The letter and line spaces, spot values, the coherence with visuals and background of the interface typographic elements are the points that were taken into account during the process of design. Basing on the scale findings, it is possible to reach the idea that white space is sufficient for the typographic regulations.

As a results of the findings on Table 4, it is determined that average agreeing point is 5.00 for both students and field experts about the idea that the color choices of the typographic elements are appropriate (Question 15). As mentioned in the previous parts, the information in the content was systematically associated with colors during the process of preparation of the educational software. These associations were used for the color regulations of the typographic elements and a coherence with visuals were tried to be achieved. Another issue that was taken into consideration for the color choice is the relationship between the background colors and the typographic elements. Looking at the scale results, it could be considered that the color choices of typographic elements for the interface design of the interactive educational software were successfully managed.

The opinions of students and experts about the evaluation part of interactive educational software themed with "Basic knowledge of Turkish Music Theory"

The opinions of students and the field experts about the evaluation part (defining the types of evaluation, preparing the evaluation questions) of the interactive software themed with "Basic Theoretical Information of Turkish Music" are expressed as tables.

Table 5: Opinions about the evaluation part of the interactive educational software

Questions	**Groups**	$\bar{x}$	**S**
1. Do you think that having different types of questions in the evaluation provides the diversity in assessment?	Students	4,90	,304
	Graphic Design Experts	5,00	,000
	Music Experts	5,00	,000
	TOTAL	4,97	,180
2. Do you agree that different types of questions have made the evaluation process more interesting?	Students	5,00	,000
	Graphic Design Experts	5,00	,000
	Music Experts	5,00	,000
	TOTAL	5,00	,000
3. Do you think that evaluation questions are sufficient in terms of number?	Students	4,95	,221
	Graphic Design Experts	4,88	,335
	Music Experts	4,90	,304
	TOTAL	4,91	,290
4. Do you think that the level of coherence of evaluation questions with the content is sufficient?	Students	5,00	,000
	Graphic Design Experts	5,00	,000
	Music Experts	5,00	,000
	TOTAL	5,00	,000

It is visible in the findings that the average to agree with the opinion that having different types of questions in the evaluation provides the diversity in assessment (Question 1) is 4.90 for students, 5.00 for graphic design experts and 5.00 for music experts. As it is known, it is highly crucial the diversity be provided by benefiting from different types of questions in order for the act of assessment to be more comprehensive and more qualified. When opinions of students and the experts are considered, it is possible to assume that the diversity in assessment is provided by using different types of questions in the educational software.

According to the table data, level of agreeing is 5.00 for both students and the field experts with the

idea that different types of questions have made the evaluation process more interesting (Question 2). The evaluation, which is one of the significant aspects of the teaching process, helps to determine students' level of learning. In interactive educational softwares evaluation is realized by the user. Therefore, to increase the functionality level of the activities, they need to be prepared in a more interesting and enjoyable way. According to the findings gathered, it could be suggested a more interesting evaluation process has been developed by using various types of questions for the educational software.

When the findings determined are considered, it is observed that agreeing level is 4.95 for students, 4.88 for graphic design experts and 4.90 for music experts about the opinion that evaluation questions are sufficient in terms of number (Question 3). The evaluation questions of the educational software were prepared by paying attention to the objectives and the content and benefiting from the statement table. Examining the collected data, it is possible to argue that the questions are sufficient in terms of number.

When the data on the Table 5 is analyzed, it is observed that the average to agree with the idea that coherence of evaluation questions with the content is sufficient (Question 4) is 5.00 for both students and the field experts. Basing on the data on the table, it is possible to think that the coherence of the evaluation questions in the educational software with the content has been provided at a high level. Besides, it was determined with the opinions taken from the participants after the practice that evaluation questions have a motivating structure that will support students to be successful. It was also understood that the quality of the evaluation part to provide the user with feedback in an instant had positively affected the field experts.

Conclusion

It has been determined the intro page activities of the educational software, which was created through various visual and auditory elements, animations, verbal and written messages and supported with significant instrumental pieces of Turkish music, were successfully designed. Especially, thanks to motifs of the art of miniature being interpreted in the animations, the aim of combining the traditional arts with the contemporary graphic art was reached, its features that maintains their existence and development in every period with Turkish music's rooted-structure were reflected, and therefore the coherence of design-content of the software was intensified.

When the opinions of graphic design experts, music experts and students are taken into account, it is determined that attention catching and ensuring enough motivation with the intro page activities, arousing curiosity about the educational software, making a structure coherent with content in terms of auditory and visual aspects, use of proper font, expressing objectives and providing enough information about the content of the educational software were successfully managed. Thus, it could be concluded that the intro page activities that is motivating to learn theories of Turkish music.

As a result of the research, it is clear that the designed educational software has been developed in an integrated structure thanks to the fact that the content of it was prepared by paying attention to features such as coherence with objective and objective behaviors, emphasis on important points and simplifying; the progressivity feature has been provided by following the principles of gradual progress, and small steps of the programmed instruction and compliance with the spelling rules is high.

While a visual support was provided by benefiting from color regulations that were systematically associated with the information, an auditory support was also given thanks to elements that would allow users to listen to score and related pieces through interactive elements during the process of content relay in the interactive educational software. Therefore, it is understood that by using colors and voices memorability was intensified and the software was gained a more attractive and more functional structure.

As a conclusion of the interpretation of the findings about the educational software's interface, menu and guide buttons are determined to be functionally sufficient due to features like proper setting and possibility of fast movement. It is understood that the interface design is coherent in terms of stylistic aspect and colors, the elements reflect the structure of the concept of music thanks to rhythmic and moving lines and bright color supports, and bear a structure compatible with the content, the compliance with educational purpose and trust are represented with the color of blue mainly used throughout the design and lines reflecting the seriousness of the educational software. It has been determined after examining the findings that the choices of font, punto and colors are appropriate and readable.

It is understood that in the evaluation part of the designed interactive educational software variety of assessment is ensured with different question types developed by benefiting from the possibilities of interactive structure and the process of evaluation has been made much more interesting. Basing on the opinions of field experts and students, evaluations questions have been determined to be enough in terms of numbers and to be coherent with the content at a high level. Besides, it is stated the compliance with principles of reinforcement and immediate feedback of the programmed education has made significant contributions to the process of the evaluation.

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İDİL

TÜRK MÜZİĞİNDE TEMEL NAZARÎ BİLGİLER KONULU ETKİLEŞİMLİ ÖĞRETİM YAZILIMI

Elnara AHMETZADE, Tutku Dilem ALPASLAN

ÖZET

Araştırmanın temel amacına uygun olarak Türk Müziği Nazariyatı temel bilgilerine yönelik etkileşimli eğitim yazılımı geliştirilmiştir. Ardından beşli Likert tipi ölçek hazırlanarak Güzel Sanatlar Lisesi öğrencilerine, grafik tasarım uzmanlarına ve müzik uzmanlarına uygulanmıştır. Sonuç olarak, içerik geliştirmenin hedeflerle uyumlu biçimde, bütünlüğü sağlayacak nitelikte ve programlı öğretimin kademeli ilerleme ve küçük adımlar ilkelerine uygun olduğu belirlenmiştir. Giriş sayfasında içeriğin çeşitli görsel-işitsel unsurlarla desteklenmesi çekiciliği ve motivasyonu sağlamış, böylece Türk Müziği Nazariyatı'nın temel bilgilerini öğrenmeye teşvik edici bir yapı oluşturulmuştur. İçerik sunumu, bilgilerle sistematik bir şekilde ilişkilendirilen renk düzenlemeleri sayesinde görsel olarak ve etkileşimli unsurlar yardımıyla işitsel olarak desteklenerek akılda kalıcılık güçlendirilmiştir. Arayüz tasarım ögelerinin işlevsel açıdan yeterli olduğu; biçimsel ve renksel bütünlüğün sağlandığı; tipografik ögelerin yazı karakteri, punto ve renk seçiminin doğru ve metinlerde okunaklılığın sağlandığı tespit edilmiştir. Değerlendirme bölümünde, değerlendirmede çeşitliliğin sağlandığı, değerlendirme sürecinin ilgi çekici bir şekilde hazırlandığı ve programlı öğretimin pekiştirme ve anında geri bildirim ilkelerine uygunluğun gözetildiği anlaşılmıştır.

Anahtar kelimeler: Grafik tasarım, arayüz tasarımı, programlı öğretim, Türk Müziği Nazariyatı, müzik eğitimi