Turkish Journal of Education

TURJE 2012

www.turje.org | January, 2023 | Volume 12, Issue 1 | ISSN: 2147-2858



Mustafa Sümen, 2022, Çağlayancerit - Kahramanmaraş / TÜRKİYE

In this issue our readers will find;

A study on educational software development through gamification in guitar education
by Tuncay Aras & Ajda Aylin Can

Academics' perspective on out-of-school learning environments
by Ayşegül Aslan, Demet Batman, & Ümmü Gülsüm Durukan

Components of collective argumentation in geometric construction tasks
by Esra Demiray, Mine Işıksal-Bostan, & Elif Saygı

TURJE Azerbaycan Avenue 64 / 22 46040 Onikişubat - Kahramanmaraş TURKİYE

Journal Name: Turkish Journal of Education Türk Eğitim Dergisi
Acronym: TURJE
Turkish and English Quarterly Publishing Scientific Peer Reviewed Online Journal
Türkçe ve İngilizce olarak üç ayda bir yayımlanan Bilimsel Hakemli Elektronik Dergi
eISSN: 2147-2858
Year: 2023
Volume: 12 Issue: 1
URL: www.turje.org, Email: turjeorg@gmail.com, Telephone: +90344-300-1310
Address: Azerbaycan Bulvarı 64/22 46040 Onikişubat Kahramanmaraş TÜRKİYE

Turkish Journal of Education (TURJE) seeks to bridge and integrate the intellectual, methodological, and substantive diversity of educational scholarship, and to encourage a vigorous dialogue between educational scholars and practitioners.
TURJE publishes researches, theoretical statements, philosophical arguments, and critical syntheses.
First published in 2012

Table of Contents İçindekiler

Research Articles	
A study on educational software development through gamification in guitar education Tuncay Aras, Ajda Aylin Can	1-27
Academics' perspective on out-of-school learning environments Ayşegül Aslan, Demet Batman, Ümmü Gülsüm Durukan	28-49
Components of collective argumentation in geometric construction tasks Esra Demiray, Mine Işıksal-Bostan, Elif Saygı	50-71

Editorial Board Editörler Kurulu

Editor(s) in Chief
Prof.Dr. Bayram Coştu (Yıldız Technical University, Türkiye)
Assoc.Prof.Dr. Ümran Betül Cebesoy (Uşak University, Türkiye)

Field Editors of Volume (12) Issue (1)
Prof.Dr. Bayram Coştu (Yıldız Technical University, Türkiye)
Prof.Dr. Kadir Bilen (Alanya Alaaddin Keykubat University, Türkiye)
Assoc.Prof.Dr. Fadime Ulusoy (Kastamonu University, Türkiye)
Assoc.Prof.Dr. Ramazan Yirci (Kahramanmaraş Sütçüimam University, Türkiye)
Assoc.Prof.Dr. Reyhan Ağçam (Kahramanmaraş Sütçüimam University, Türkiye)
Assoc.Prof.Dr. Salim Sever (Ankara University, Türkiye)
Dr. Betül Tekerek (Kahramanmaraş Sütçüimam University, Türkiye)

Editorial Board Editörler Kurulu

Field Editors

Computer Education and Instructional Technology
Prof.Dr. Hakan Tüzün
(Hacettepe University, Türkiye)
Curriculum Development in Education
Assoc.Prof.Dr. Mustafa Cem Babadoğan
(Ankara University, Türkiye)
Educational Informatics
Dr. Adem Tekerek
(Gazi University, Türkiye)
Education Management
Assoc.Prof.Dr. Ramazan Yirci
(Kahramanmaraş Sütçüimam University, Türkiye)
Assoc.Prof.Dr. Olcay Yavuz
(Southern Connecticut State University, USA)
Educational Psychology
Prof.Dr. Selahiddin Öğülmüş
(Ankara University, Türkiye)
Foreign Languages Education
Assoc.Prof.Dr. Reyhan Ağçam
(Kahramanmaraş Sütçüimam University, Türkiye)
Dr. Amal BouZeineddine
(American University of Beirut, Lebanon)
Mathematics Education
Assoc.Prof.Dr. Fadime Ulusoy
(Kastamonu University, Türkiye)
Dr. Betül Tekerek
(Kahramanmaraş Sütçüimam University, Türkiye)
Measurement and Evaluation in Education
Assoc.Prof.Dr. Erkan Hasan Atalmış
(Kahramanmaraş Sütçüimam University, Türkiye)
Music Education
Assoc.Prof.Dr. Salim Sever
(Ankara University, Türkiye)
Physical Education and Sport
Prof.Dr. Ökkeş Alpaslan Gençay
(Kahramanmaraş Sütçüimam University, Türkiye)
Psychological Counseling and Guidance
Assoc.Prof.Dr. Lea Ferrari
(University of Padova, Italy)
Assoc.Prof.Dr. Ramin Aliyev
(Hasan Kalyoncu University, Türkiye)
Science Education
Prof.Dr. Bayram Coştu
(Yıldız Technical University, Türkiye)
Prof.Dr. Kadir Bilen
(Alanya Alaaddin Keykubat University, Türkiye)
Assoc.Prof.Dr. Ümran Betül Cebesoy
(Uşak University, Türkiye)
Social Sciences Education
Prof.Dr. Ahmet Nalçacı
(Kahramanmaraş Sütçüimam University, Türkiye)
Assoc.Prof.Dr. Mustafa Sever
(Ankara University, Türkiye)
Special Education
Dr. Şule Güçyeter
(Uşak University, Türkiye)
STEM Education
Prof.Dr. M.Sencer Çorlu
(Bahçeşehir University, Türkiye)
Dr. Defne Yabaş
(Bahçeşehir University, Türkiye)
Technology & Engineering Education
Prof.Dr. Abdullah Togay
(Gazi University, Türkiye)
Prof.Dr. Mehmet Tekerek
(Kahramanmaraş Sütçüimam University, Türkiye)
Turkish Language Education
Prof.Dr. Kasım Yıldırım
(Muğla Sıtkı Koçman University, Türkiye)

International Advisory Board

Prof.Dr. Edward Reeve, Utah State University, USA
Prof.Dr. Kurt Henry Becker, Utah State University, USA
Prof.Dr. Safure Bulut, Middle East Technical University, Türkiye
Prof.Dr. Süleyman Sadi Seferoğlu, Hacettepe Unıversıty, Türkiye
Assoc. Prof.Dr. Sun Young Han, Sungkyunkwan Unıversıty, South Korea

Language Editors

Dr. Gözde Balıkçı (Kahramanmaraş Sütçüimam University, Türkiye)
Dr. Stefan Rathert (Kahramanmaraş Sütçüimam University, Türkiye)
Dr. Yunus Emre Akbana (Kahramanmaraş Sütçüimam University, Türkiye)
Mohammed Mubarique (Çankaya University, Arı College, Türkiye)
Şerife Durna (Kahramanmaraş Sütçüimam University, Türkiye)

Statistics Editors

Dr. Arif Selim Eren (Kahramanmaraş Sütçüimam University, Türkiye)
Dr. Kübra Coşar (Ankara Haci Bayram Veli University, Türkiye)

Pre-review Editor

Dr. Ferhat Karakaya (Yozgat Bozok University, Türkiye)

Technical Editor

Recep Başarıcı (Hacettepe University, Türkiye)

Secretaries

Elif Nihan Yılmaz (Middle East Technical University, Türkiye)
Semanur Aras (Kahramanmaraş Sütçüimam University, Türkiye)
Özge Nur Özsunkar (Kahramanmaraş Sütçüimam University, Türkiye)

Graphical Design

Arif Gürler (Kahramanmaraş Sütçüimam University, Türkiye)

Reviewers of the Issue Sayı Hakemleri

Reviewers of the Volume (12) Issue (1)

Dr. Aykut Emre Bozdoğan (Gaziosmanpaşa University)
Dr. Ayşe Savran Gencer (Pamukkale University)
Dr. Betül Karagöz Dursun (İnönü University)
Dr. Mehmet Fatih Özmantar (Gaziantep University)
Dr. Melihan Ünlü (Aksaray University)
Dr. Mustafa Doğan (Selçuk University)
Dr. Mustafa Ürey (Trabzon University)
Dr. Serkan Özay (Niğde Ömer Halisdemir University)
Dr. Sevgi Aydın Günbatar (Yüzüncü Yıl University)
Dr. Stefan Rathert (Kahramanmaş Sütçüimam University)
Dr. Tuğba Uygun (Alanya Alaaddin Keykubat University)
Dr. Ümran Betül Cebesoy (Usak University)
Dr. Yunus Emre Akbana (Kahramanmaş Sütçüimam University)

To join our Editorial or Reviewer Team
Please send your CV to: turjeorg@gmail.com

Indexing Dizinler

Emerging Sources Citation Index (ESCI), Web of Science™ Core Collection
(Since January, 2015)

ERIC: Education Resources Information Center
(Since January, 2018)

APA PsycInfo
(Since January, 2020)

EBSCO Education Source
(Since January, 2013)

TR Index
(Since January, 2019)

ERIH PLUS European Reference Index for the Humanities (ERIH) to NSD
(Since January, 2017)

Turkish Journal of Education is a DOAJ Indexing Open Access Journal

Turkish Journal of Education is licensed to the public under a Creative Commons Attribution 4.0 license.

TURJE
www.turje.org
2023
Volume: 12 Issue: 1
Turkish Journal of Education

https://doi.org/10.19128/turje.1162940
Research Article
Received 16.08.2022
Accepted 21.11.2022

A study on educational software development through gamification in guitar education

Tuncay Aras
Ataturk University, Faculty of Fine Arts, Erzurum, Türkiye, tuncay.aras@atauni.edu.tr
Ajda Aylin Can
Marmara University, Faculty of Education, Istanbul, Türkiye, acan@marmara.edu.tr

Check for updates

ABSTRACT This study aims to develop educational software for the instrument (guitar) training course through gamification. The study was carried out by basing on the design and development research method and the processes included in the analysis, design, development, implementation, and evaluation phases of the method are considered as the sub-problems of the study. In each phase, interview techniques were used and the participants were determined according to the requirements of the phases. The results reveal that students find the education with traditional methods in instrument education boring and therefore their motivation is low. As a result of the studies carried out to offer solutions to the existing problems related to motivation in instrument (guitar) education, a mobile application called *Gitarist* was developed and the application was revealed as a product. In the implementation phase, it was concluded that the application developed through gamification techniques had motivation-enhancing effects on students. In line with the results, some suggestions were made for technology-supported studies to be carried out in the future.

Keywords: *Gamification in guitar education, Gamification in music education, Instrument education, Software, Technology*

Gitar eğitiminde oyunlaştırma yöntemine yönelik eğitsel yazılım geliştirme çalışması

ÖZ Bu çalışma, çalgı (gitar) eğitimi dersi için oyunlaştırma yöntemi doğrultusunda eğitsel bir yazılım geliştirmeyi amaçlamaktadır. Çalışma, tasarım ve geliştirme araştırması yöntemi temel alınarak gerçekleştirilmiş ve yöntemin aşamaları olan analiz, tasarım, geliştirme, uygulama ve değerlendirme aşamaları içerisinde yer alan süreçler, çalışmanın alt problemleri olarak ele alınmıştır. Her aşamada, nitel araştırma yöntemi içerisindeki görüşme tekniklerinden yararlanılmış ve katılımcılar aşamaların ihtiyaçları doğrultusunda belirlenmiştir. Çalışmanın sonuçları günümüz öğrencilerinin, çalgı eğitiminde geleneksel yöntemler ile verilen eğitimi sıkıcı bulduklarını ve bu nedenle motivasyonlarının düşük olduğunu ortaya koymaktadır. Çalgı (gitar) eğitiminde motivasyona yönelik karşılaşılan mevcut sorunlara çözüm yolları sunabilmek için analiz, tasarım, geliştirme, uygulama ve değerlendirme aşamalarının gerekleri doğrultusunda yapılan çalışmalar neticesinde *Gitarist* adlı mobil uygulama geliştirilmiş ve uygulama bir ürün olarak ortaya çıkarılmıştır. Çalışmanın uygulama aşamasında, oyunlaştırma teknikleri kapsamında geliştirilen mobil uygulamanın, öğrenciler üzerinde motivasyonu artırıcı etkileri olduğu sonuçlarına ulaşılmıştır. Çalışmadan elde edilen sonuçlar doğrultusunda alan ve ileride yapılacak olan teknoloji destekli bu tarz çalışmalar için bazı önerilerde bulunulmuştur.

Anahtar Sözcükler: *Çalgı eğitimi, Gitar eğitiminde oyunlaştırma, Müzik eğitiminde oyunlaştırma, Teknoloji, Yazılım*

Citation: Aras, T., & Can, A. A., (2023). A study on educational software development through gamification in guitar education. *Turkish Journal of Education, 12*(1), 1-27. https://doi.org/10.19128/turje.1162940

INTRODUCTION

With the increase in mobile devices and the rise of the concept of digital games since 2000, the idea of integrating the gameplay of business sectors such as marketing and economy into their systems has sprung the emergence of different concepts. Undoubtedly, the most comprehensive of these concepts is gamification. According to Deterding et al. (2011) "gamification is the use of game design elements in non-game contexts". The definition of Zichermann and Cunningham (2011) in *Gamification by Design: Implementing Game Mechanics in Web and Mobile Apps* as "gamification is the process of game-thinking and game mechanics to engage users and solve problems" complete the definition of Deterding et al. (2011). The use of gamification, game elements, and game design techniques focusing on solving motivational problems in real life is important to make the distinction between game and gamification. "Games are the structures designed to entertain those who play games. Gamification, on the other hand, aims to transform real-life experiences into playful structures and make them more fun, to increase motivation in people and to create behavior change in people" (Berber, 2018). Although studies have been carried out in different fields such as business regarding the concept of gamification brought out by Nick Pelling in 2002 (Pelling, 2011), the number of studies, especially academically, has started to increase rapidly after 2010 depending on technological developments.

Many educators experience difficulty in their classes because their students are not motivated and do not actively participate in class activities (Kim et al., 2018). When the aim of establishing the necessary connection between education and technology in today's society is achieved, it is possible to observe the students' increasing motivation and their adherence to the environment. Adding gamification to education is considered an important step in achieving this aim. "By applying gamification to the classroom, students could be motivated to learn in new ways or enjoy otherwise tedious tasks" (Hanus & Fox, 2015). In education, gamification is a technique that proposes dynamics associated with game design in the educational environment, to stimulate and have direct interaction with students, allowing them to significantly develop their curricular, cognitive, and social competencies (Manzano et al., 2021). According to Putz et al. (2020), "the positive effects of gamification in education are not only limited to its ability to improve knowledge memorization, but also to enhance social and practical skills such as problem-solving, collaboration, and communication". It is possible to say that the lack of interest and motivation among students in every field of education is one of the major problems in instrument education. "Considering the importance of practicing technical exercises, it is problematic when students avoid practicing them regularly; students find them boring, repetitive, useless, or difficult" (Birch, 2013). In this context, the lack of technological developments in instrument education and how a design can be created for guitar education through gamification constitutes the problem of the research.

Purpose

The research aims to develop educational software through gamification for instrument training education. Following the aim of the study, answers to the following sub-problems will be sought.

Since the analysis, design, development, implementation, and evaluation phases of the design and development research method will be carried out as a guide in the problem-solving process, the processes within these phases are considered sub-problem situations. The following questions constitute the sub-problems of the study;

1. How was the analysis phase of the educational software to be developed through gamification for the instrument (guitar) training class carried out?
2. How was the design phase of the educational software to be developed through gamification for the instrument (guitar) training class carried out?
3. How was the development phase of the mobile application, the prototype of which was developed through gamification for the instrument (guitar) training class carried out?
4. How was the implementation phase of the mobile application, the prototype of which was developed through gamification for the instrument (guitar) training class carried out?

5. How was the evaluation phase of the mobile application of which the prototype was developed through gamification for the instrument (guitar) training class carried out?

METHOD

Research Design

In the research, the design and development research method was used and the aim was to develop educational software through gamification for instrument (guitar) training.

Richey and Klein (2007) have defined design and development research as "the systematic study of design, development and evaluation processes to establish an empirical basis for the creation of instructional and non-instructional products and tools and new or enhanced models that govern their development".

Richey and Klein (2014), emphasize that many recent studies focus on the design and development of technology-based products and tools, and generally, these studies are based on the analysis, design, development, implementation, and evaluation phases of the design and development processes. These phases are the phases of the ADDIE instructional design model. According to Bell and Shank (2007), "It is an acronym for
Analysis—the process of defining what is to be learned
Design—the process of specifying how it is to be learned
Development—the process of authoring and producing learning materials
Implementation—the process of installing the instruction product in a realworld context
Evaluation—the process of determining the impact of the instruction"

Considering that the method of the research is design and development research, the ADDIE model, one of the instructional design models, was used for the software design process in the study. "The ADDIE model of instructional design is a generic instructional model that provides an organized process for developing instructional materials" (Shelton & Saltsman, 2007).

In the study, during the analysis phase of the software planned to be developed through the gamification, interview techniques in the qualitative research method were used to get expert opinions to reveal the problems encountered in the motivation of students in the instrument (guitar) training and technological approaches in the course, to receive expert opinions regarding the design phase, to submit to the expert opinion again to evaluate the suitability of the software whose prototype will be developed as a mobile application in line with expert opinions, for analysis and design, as a result of the pilot application, to get the student opinions about the mobile application and to evaluate the mobile application in terms of content and functionality during the evaluation phase to get the opinions of guitar educators.

Procedure

Legal permissions (Institution: Kars Provincial Directorate of National Education, No: 91782061-605.01-E.5953353 Date: 03/25/2019) and ethical (Institution: Atatürk University Social Sciences and Humanities Ethics Committee, Number: E-91464383-050.02.02-2200142177, Date: 05/12/2022) were obtained from the necessary institutions to pilot scheme of the mobile application to be developed for the instrument (guitar) training course of fine arts high schools. The pilot scheme process with the 9th graders lasted for 8 weeks, provided that the lesson was not disrupted, and after that, the students' opinions about the mobile application were taken.

Participants

Since the study included the phases of analysis, design, development, implementation, and evaluation, the participants were determined in line with the needs of the phases.

Table 1.
Participants by Work Phases

Participants	Analysis	Design	Development	Implementation	Evaluation
Guitar Educator	x	x	x		x
Software Specialist		x	x		
Game Designer		x	x		
Instructional Tech. Specialist		x	x		
Psychological Counseling and Guidance (PCG) Specialist			x		
Language Expert			x		
Graphic Design Specialist			x		
Students				x	

In the analysis phase of the study, the opinions of 12 guitar educators, in the design phase, the opinions of a guitar educator, a game design specialist, a software specialist and a teaching technologist; in order to evaluate the suitability of the educational software named *Gitarist*, of which prototype was developed as a mobile application, in line with the opinions received during the design phase, in the development phase, the opinions of 3 guitar educators, 2 software development specialists, 2 game design specialists, 3 instructors technology specialists, 3 psychological counseling and guidance specialists, 2 graphic design specialists and 2 language experts; after the pilot application in the application phase, the opinions of 6 guitar students about mobile application in the 9th grade of Kars Gülahmet Aytemiz Fine Arts High School music department; and in the evaluation phase, the opinions of 10 guitar educators working in the music departments of fine arts high schools in different provinces were received in order to evaluate the mobile application in terms of content and functionality.

Data Collection Tools

The study includes the phases of analysis, design, development, implementation, and evaluation. To ensure the credibility of the study (internal validity), qualitative research and expert review examinations were made by ensuring that the subject-matter expert examines the research in various dimensions. The researcher has taken part in each phase of the study as a participant. The data obtained during the phases were presented to the experts and the validity of the data was evaluated together. While the data obtained in the study were transferred to the findings section, direct expressions from the participants were included, apart from the themes and codes, and the transferability (external validity) was increased through the detailed description.

In the study, a consistency (internal reliability) review was carried out by a colleague and subject-matter expert in the development of data collection tools, data collection, and analysis of the data obtained. To ensure the confirmation of the study (external reliability), explanatory information about the basic phases of the study was included and the raw data obtained from the study were archived for comparison in another research in the future.

Data Collection

In the study, data were collected through semi-structured interview forms prepared according to the needs of analysis, design, development, implementation, and evaluation phases. At all phases, one-on-one interviews were made with some of the participants, voice recordings were taken, and some of them were recorded by making phone calls, and these interviews were transferred to the prepared interview forms.

Data Analysis

Since the semi-structured interview form from the qualitative data collection tools was used in the study, content analysis, one of the qualitative data analysis methods, was used to analyze the data obtained from the interview evaluations. The data obtained as a result of the interviews in the analysis, design, development, implementation, and evaluation phases of the study were coded on the MAXQDA 2020 program, the themes were revealed, the codes and themes were identified, and the findings were defined and interpreted.

FINDINGS

Findings and Interpretation of the First Sub-Problem

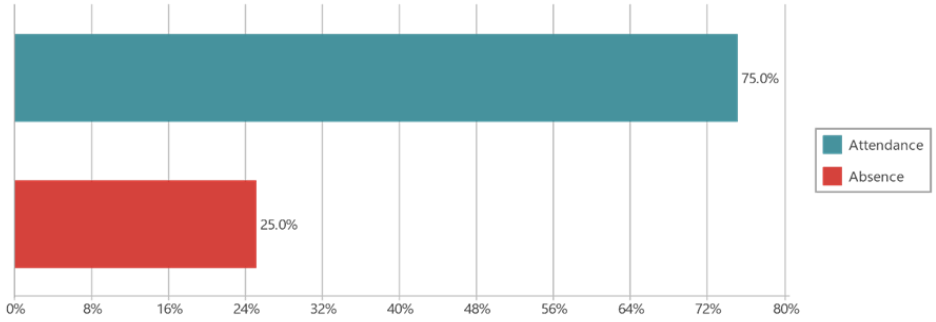
During the analysis phase, interviews were held with 12 guitar educators who taught instrument (guitar) training in the departments of fine arts high schools in different provinces. 3 categories were reached by analyzing the interview forms of guitar educators who shared their experiences in individual instrument training courses. Categories show the participants' opinions about instrument training lessons, technology, and the gamification method.

Individual instrument (guitar) training course

The participants stated that etudes, scales, exercises, and similar studies bored the students and they wanted to start playing immediately, and only the students who are aware of the necessity of these studies give importance to such studies. In this sense, the discipline of instrument training emerges as a situation that varies from student to student.

The participants gave their opinions about the attendance status of the students. The Figure 1 shows the attendance status of the students in line with the opinions of the participants.

Figure 1.
Ensuring Attendance in the Class



According to Figure 1, the vast majority of the participants do not have problems with attendance in class. Those who had attendance problems stated that the reason for absence was their failure in the given studies.

> *Proportional to talent and success. If the student can make the given studies, s/he can continue the lesson. If s/he fails, s/he wants to leave the class (P10)*

It can be said that the application will be effective in eliminating the causes of such problems, as the application aims to create a fun learning environment and increase the students' commitments to the

learning environment and motivate students thanks to the gamification.

Technology

From the statements of the participants, categories were formed that characterize the students' relations with technology, the technological methods used in the lessons, and the opinions of the participants about the influence of technology on education.

The relations of students with technology are discussed as educational and non-educational. Although it is understood from the statements of the participants that the students do not have any problem with the use of technology, it is clear that this usage does not have an impact on education. An example can be given to this majority opinion:

> *Our students use technology mostly on social media. The negative reflections of this situation in the world affect the whole education situation. Research and learning status is decreasing day by day. (P1)*

Considering the analysis of the opinions of the participants about the influence of technology on education, most of them stated that technology will contribute to education, increase the motivation of the students, and enable students to become individuals who catch the age.

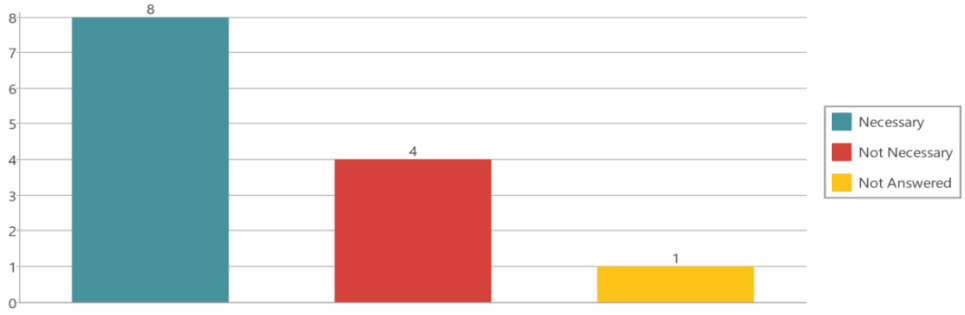
Participants who stated that they used technological materials during the class were evaluated in three types; some participants stated that they use them only for playing the etudes, getting notes and documents, and tuning.

> *Yes I'm using technology. We download guitar apps from the Google play store. It is efficient in recognizing chords. We are studying topics related to chord setups there. Sometimes we show videos of classical works. (P3)*

Gamification

The participants were asked questions about how the training modules designed by using gamification in line with the technological approaches can have an impact on the students. The Figure 2 shows the answers received.

Figure 2.
Opinions on Gamification



According to Figure 2, one of the participants did not answer this question. However, the participants stated that it was necessary for 8 and not necessary for 4 participants. Expressions of participants who think it is necessary can be given as follow:

> *Transferring this concept to the educational process will increase **the attention and motivation** of the students as it will make the lesson **fun**. This can have a positive influence on **permanent learning**. Attitudes towards the class may change positively. (P9)*

Participants stated in general terms that the lesson could become interesting and entertaining, the reluctance of the students to the class could disappear, their attendance could increase and all these influences could bring along permanent learning.

Findings and Interpretation of the Second Sub-Problem

The software, which is planned to be developed for the problems and needs determined during the analysis phase, has passed to the design phase. At this phase, the opinions received from a guitar educator, a game design specialist, a software specialist, and an instructional technology specialist were analyzed on how the educational, visual design, multimedia, content, orientation and help, installation, and features of using software should be.

The educational features

The participants made statements about the educational features of the software, the level of education, and the output of the education. The level of education includes opinions about the planning of education. The Table 2 shows some expressions on this topic.

Table 2.
Opinions about the Level of Education

Educational features should start from the most basic level and go through the next levels.
The software should be compatible with the expectations and pedagogical features of the target audience.
The subject area should be handled in the software with its basic points.
Since the software will be created according to the course content, attention should be paid to the difficulty levels and the relevance of the selected etudes or studies.
In such software, the target audience's expectations should be considered and well thought out. As the gamification concept is involved, the course content should be integrated very well with the game elements.

As can be seen in Table 2, the level of education to be included in the software is determined by the characteristics of the users. It is also stated that it is necessary to establish a clear level of progress that develops from basic to the highest level by integrating gamification well.

The participants gave importance to the outputs during the training process. They stated that this process should be supported with feedback, points, and a reward system.

Visual design features

Opinions on visual design are determined by the general appearance and user-specific features code. Some expressions regarding the general appearance are shown in the Table 3.

Table 3.
Opinions about the General View

It would be preferable to have a more playful mood than a serious stance. In this sense, the game elements must be carefully selected and integrated into a simple visual design.
A simple game interface should be used.
Visualization and game characters should be used instead of using too much text since gamification will be integrated.
I think it will be sufficient for the visual features to be simple and understandable depending on the fiction.
I think that if solid fiction is created, visual elements will not be very important. I also think that using too much text can tire the student. Therefore, visuals may be more intense than texts.

As can be seen in Table 3, the participants recommended that the software should not be serious, has a simple gameplay design with a solid gamification setup, and that the visuals are intense instead of the text, and that complies with the visual design principles.

The participants stated that the design should address the age of the users, the expectations and learning styles should be taken into consideration and the visualizations should be made according to the purpose of the software.

Multimedia features

The answers given by the participants to the questions related to multimedia features are shown in the Table 4.

Table 2.
Opinions about Multimedia

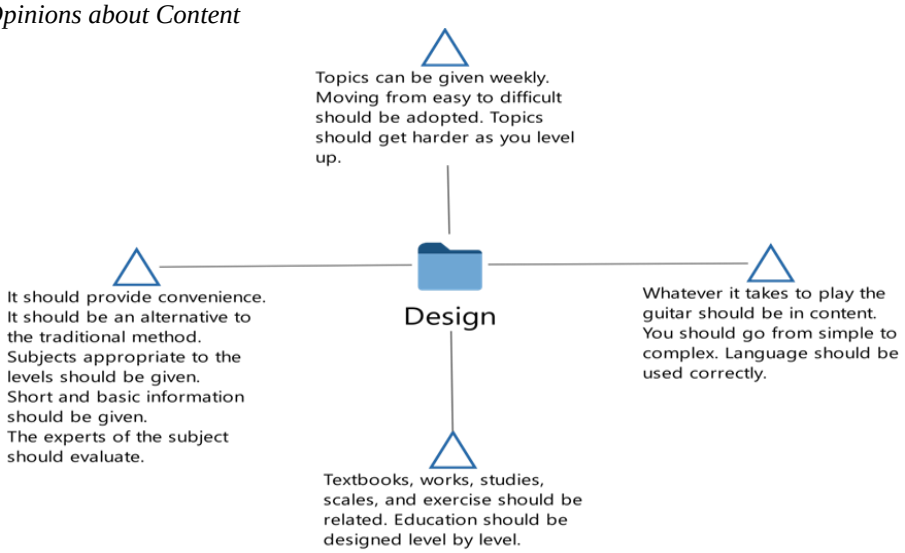
Multimedia tools (sound, graphics, animation) that may be of interest to students should be preferred, but care should be taken not to use them all at the same time for the same action.
Excessive use of multimedia, which may create a cognitive load, should be avoided in the software.
Rather than too much clear information that will not bore the student, there may be sounds, images, graphics, and similar multimedia elements that will make the information more fun and make the student aware.
Multimedia appeals to the ear and the eye.

As can be seen in Table 4, the participants stated that the use of multimedia without creating an overloaded space would be interesting and it would be a way for the student to learn with fun, and also it should appeal to the ear and eye.

Content features

Participants provided three different groups of views on the content. These three groups are described as general opinions, information, and opinions about the level. Accordingly, they generally stated that only the language should be used correctly. Opinions about the content and level are presented with the help of the Figure 3.

Figure 3.
Summary of Opinions about Content

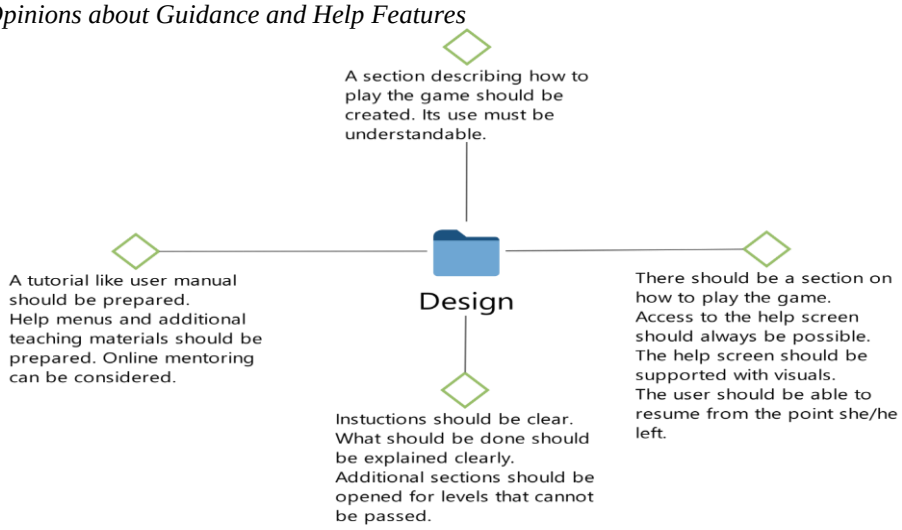


According to Figure 3, the statements focused on the fact that the information should be constructed from easy to hard, in this sense, the importance of level-by-level progress, being easy and understandable, and that the textbook and exercises should be in harmony.

Guidance and help features

A good level of guidance and help features is one of the issues that the participants take into consideration. In this sense, the opinions they offer are excessive (Figure 4).

Figure 4.
Summary of Opinions about Guidance and Help Features

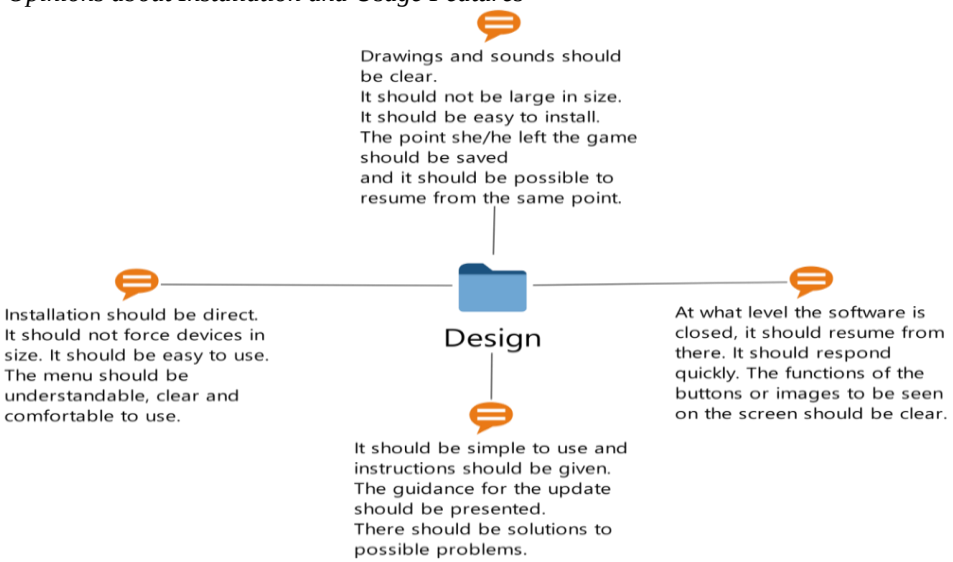


According to Figure 4, statements about guidance and help are that they should be a tutorial on how to play the game, include clear directions, visual aid menus, and additional support should be offered to levels that cannot be passed.

Installation and usage features

The opinions of the participants on the subject are presented in Figure 5.

Figure 5.
Summary of Opinions about Installation and Usage Features



According to Figure 5, the installation should be non-directed and easy, the size of the software should be small and the updates should be clear. Usage should include simple, easy-to-understand, clear, and synchronized suggestions.

Findings and Interpretation of the Third Sub-Problem

In the development phase, it is aimed to obtain opinions about the evaluation of the *Gitarist* application, the prototype of which was developed through the opinions of the participants during the design phase, based on the situation and needs that were determined during the analysis phase.

Categories are determined as educational features, design features, gamification features, guidance, and help features, installation and usage features, and general evaluation considering the opinions. Findings will be shared by giving each category under the related titles.

Educational features

Participants analyzed the software, whose prototype was developed as a mobile application through the suggestions given during the design phase, in terms of the education level and the output of the training and the statements of the participants were concentrated under these codes. The level of education was expressed as adequate, clear, and explicit by the participants, and it was found successful to be constructed with the levels.

The participants express their opinions on the outcome of the training:

> *The award of playing a piece along with a famous guitarist at the end of the application is the most appropriate "operational reinforcer" that can be given according to the age of the students. Also, images and information about famous guitarists can help students to get to know them and even identify themselves with them. (PGC2)*

The mobile application called Gitarist was evaluated in terms of educational level and outcomes through an educational lens and was found successful by the participants.

Design features

The design features were evaluated separately in the categories of visual design and multimedia features at the design phase. During the development phase, the participants expressed their opinions, including the design features in both dimensions. In this sense, the sub-codes of the design features category have emerged as texts, multimedia, and user compatibility. Some opinions about the texts in the design are as follows:

> *Keeping the text information of the composers short is a good practice. It is also important that it is readable while it is short. Make sure that the font of the related texts is reviewed and read easily by the player. (Game designer 1)*

> *The information provided is sufficiently descriptive. The fact that the sentences are not too long prevents the possibility of the application from being boring, while the information and notifications given as clear, understandable, clear, and short are frequent enough to ensure the continuity of the game. (Language Expert 1)*

The participants also made critical and guiding statements about the texts:

> *Text sizes can be slightly enlarged (Software specialist 1)*

> *(...) In the level transitions, the duration of warning-suggestion statements on the screen is short and the texts do not attract attention. (Instructional technology specialist 4)*

> *The expressions in the loading sections pass a little faster and it becomes difficult to read. (Game designer 2)*

As can be seen from the expressions, keeping the texts short and clear and texts' being explanatory and interesting are the characteristics that are evaluated as successful by the participants. It was not found sufficient in subjects such as text size and fast transitions.

In line with these statements, information texts about avatars and famous guitarists at the end of the level were tried to be enlarged so as not to pass to the second screen. Besides, the expressions given on the "loading" screens were enlarged and the duration of the expressions was extended.

Participants made the following statements for multimedia features as one of the design features:

> *The design is good. In general terms, it was tried to use the same lines graphically. This will not make the student tired. I think the drawings of guitarists chosen as avatars are also good. It did not break the line. In general, I think it is suitable for today's mobile application designs. (Instructional technology specialist 1)*

> *At first glance, the titles on the levels are perceived as if they are not related to the levels. It can be closer or the same color. But when you enter it, the level titles are given. In this respect, it is suitable for multimedia principles. (Software expert 1)*

Considering opinions, the feedback such as good, great, and perfect which are included in the exercises, are supported with different colors. At the same time, the titles of the levels are made the same as the colors of the levels and the integrity of the titles with the levels is tried to be provided.

It is understood from the expressions that the design is generally liked in terms of multimedia. Contributions related to some color transitions and active-passive level representations are presented. One of the important issues contributing experts emphasized during the design phase is that the application has features that are suitable for the target audience. In this sense, the experts whose opinions were consulted during the development phase evaluated the application in this regard. Some views are as follows:

> *It is prepared visually attractive for the attention of that age group. In this sense, I liked it very much. Today's individuals cannot come to the crowd in the technological system and can give up very quickly. In this respect, the simplicity of the design attracted the attention of the student. (PGC 1)*

> *I think it is suitable for this age group. Interaction is important in applications with this type of game content. You have maximized the interaction. (Instructional technology specialist 2)*

Gamification features

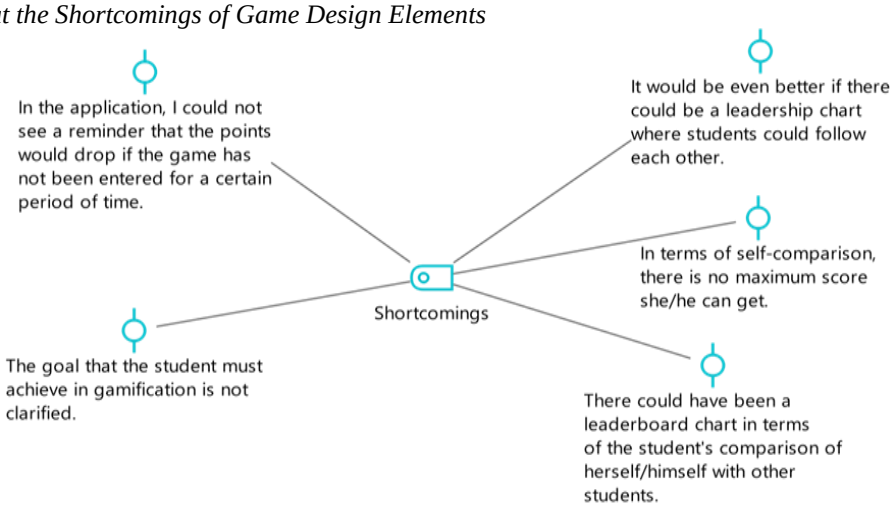
The gamified features are one of the most important parts of the mobile application. In this sense, the participants need to see the game design elements in the application while evaluating the application. The opinions of the participants about gamification and gamified features are generally as follows:

> *I can say that it has the features of gamification. Feedbacks are important in gamification. It is nice to see there is too much in this application. Points, trophies, awards, levels, collections, etc. game elements are well placed in the application. (Instructional technology specialist 1)*

> *When you enter the application, you feel like you are in a game. In this sense, it is very successful as a design. Opening periodic guitars at the end of the level is nice as unlocking content. This is also one of the features of gamification. (Game designer 2)*

Participants stated especially the points that they found deficient about the features of gamification in their evaluations. Statements about the deficiencies are shown in the Figure 6:

Figure 6.
Opinions about the Shortcomings of Game Design Elements



As seen in Figure 6, all the opinions on the right side are on the absence of a leaderboard in practice and as a result of this absence, the lack of racing motivation with other users. On the left side, the lack of the target in the game and the lack of features such as notification and loss of points when the game is not entered for a long time are mentioned.

Depending on these statements, the maximum score that the student can get from the application for self-comparison has been added to the application. Also, to clarify the goal, the number of feedbacks such as "you will be very surprised by the bonus part you will encounter when you complete all the levels" has been increased in a way that the student can see constantly in the application, and in this way, it has been aimed to arouse curiosity in the student.

Guidance and help features

The participants evaluated the application in terms of its guidance and help features. Sample opinions are given below:

> *The guidance and help features are well designed, I couldn't see a problem. Easy and understandable for the student. (Instructional technology specialist 3)*

> *(...) We can say that the tutorial part directs the student in the educational sense. Therefore, it encourages use. There are opportunities to understand the application easily. At the same time, showing the finger numbers and notes on the string is a positive feature of the application regarding not being similar to other applications. There are buttons in the process where you can return to the previous page or the menu. (Game Designer 2)*

It is understood from the expressions that the tutorial part is appreciated, and the information in the guidance and help is easy and understandable.

Installation and usage features

The participants evaluated the application in terms of installation and usage and they did not state any problem with the installation and reported positive opinions regarding the usage. An example of these views is the following:

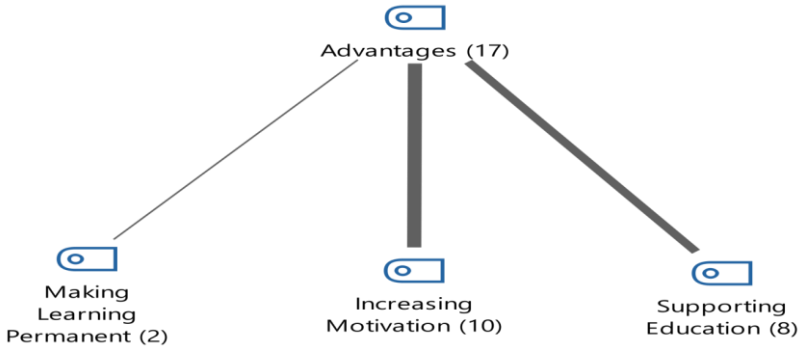
> *I did not see any problems in terms of installation and usage. I can say that it has been a very successful application in general. (Software specialist 1)*

General evaluation

General statements were taken from the statements of the participants, especially from the dimensions to which opinions were requested. General expressions are formed from subcodes such as the advantages, disadvantages, and suggestions for the development of the mobile application.

The participants expressed 3 basic opinions regarding the advantages of the application. The Figure 7 shows the intensity of these views:

Figure 7.
The Advantages of Mobile Application



The thickness of the lines in Figure 7 expresses the density. Accordingly, the participants made explanations about the advantages of the application and the explanations support that these advantages can increase motivation most. Secondly, they stated that the mobile application has aspects that support education and can provide permanent learning. These concepts coincide with the statements of the participants who gave their opinions about the effect of gamification on education even during the analysis phase.

The disadvantages of the application are based on 3 different basics. Content issues, technical issues, and social issues constitute the codes of the disadvantages. Participants did not mention an existing problem related to technical problems, just the possibility of future technical problems was described as a disadvantage.

The disadvantages mentioned regarding social problems are as follows:

> *I think that if students focus only on such an application, I am not sure whether it will affect their overall academic success or not. In this period, children can make some behaviors a habit. (PGC 1)*

It is evaluated as a difficult situation to meet the expectations of today's generation in such a period in which technology is rapidly developing and almost every individual is affected by this. The mobile application, developed to meet expectations, has been created as an alternative to traditional methods. In this sense, it can be said that such studies, which are thought to have positive effects on education today, are necessary.

To evaluate the conformity and compatibility of the mobile application whose prototype was developed under the name of *Gitarist* for analysis and design, necessary corrections were made in line with the analysis of the interviews with experts, then the first version of the application was revealed.

Figure 8.
Gitarist Main Screen



Findings and Interpretation of the Fourth Sub-Problem

The implementation phase consists of the views of 9th grade 6 guitar students of the music department of Kars Gülahmet Aytemiz fine arts high school, who experienced the mobile application called *Gitarist* after the 8-week pilot application process. Categories emerging as a result of opinions are the general features of the application, gamification features, influence on development, and use of the application. Findings will be presented by titling each category.

General features of the mobile application

Students were asked to evaluate the application first. Three codes have emerged in line with their answers. Thus, according to students, the mobile application has difficult, encouraging, and fun features. Sample views are as follows:

> *It encourages practice. When you can't, you get ambitious and practice harder. (S5)*
>
> *It forced me a bit for the beginner level. (S3)*
>
> *I think it's very fun to play. (S4)*

The Table 5 shows which statement is used by the students the most for the mobile application.

Table 5.
Distribution of Students' Opinions about the Features of Mobile Application

	Frequency	Percentage
Fun	5	83.33
Leading to Practice	4	66.67
Hard	3	50
Coded Documents	6	100
Uncoded Documents	0	0
Analyzed Documents	6	100

According to Table 5, there are 5 opinions related to the fun of the mobile application, 4 opinions on motivation, and 3 opinions about the difficulty of the mobile application. The students, who say that the practice is difficult for some exercises, said that they changed their minds about the difficulty of exercises when they tried and succeeded. In this sense, it can be said that the application has an important output to break down prejudices or failure.

Gamification features

While the students mostly provided opinions on levels and awards, one of them expresses an opinion

about the scoring system:

> *I think the sequence of levels is well designed, teacher. An application that moves from easy to hard and has lots of exercises. (S1)*
>
> *It was very nice for the application to progress slowly, level by level. (S2)*
>
> *It was easy at first. Then I had some difficulties as I progressed. (…) even if I couldn't pass at the first moment, I succeeded as I turned back and played constantly. (S6)*

It is understood from the expressions that the students adopt learning through levels, the levels progress from easy to hard and achieve success when they play by repeatedly trying the parts they have difficulty with.

Table 6.
Students' Opinions about Awards

Student	Opinion
S1	Thanks to the guitars added to the collection, I learned the guitars I didn't know.
S2	We like it more when the guitarists come out and congratulate us at the end and I wanted to play more. I loved getting compliments.
S3	At the end of the level, different guitarists appeared. They were saying good things. I think it can be motivating. The rewards are already related to the guitar. I think it's good.
S4	At the end of the levels, I was very impressed by seeing guitarists and hearing good words from them. The guitar award is also important. …. Other than that, I was wondering what the bonus reward was, so I guess I finished before everyone else.
S5	I think it's well designed. It created a competitive environment. You study harder to be the first.
S6	… The rewards made me play more. The guitarists at the end of the levels impressed me. I like it so much. The guitar award was also very good.

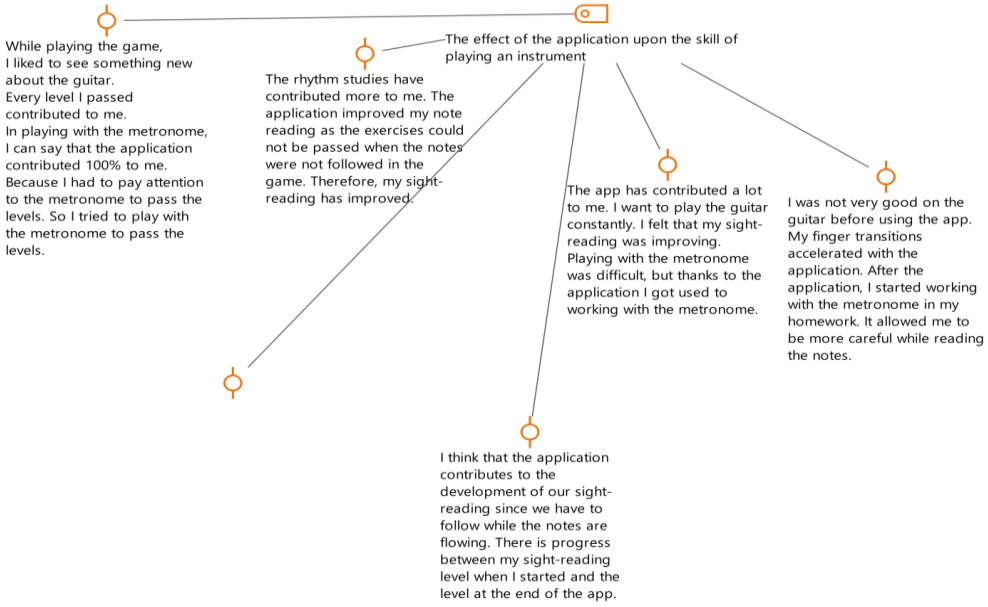
According to Table 6, students enjoyed the awards very much. The awards increased their motivation and enabled them to play more and practice more because of the competitive environment it created. The fact that they are impressed by the guitarists, who come out at the end of the levels, shows that the mobile application has more to teach playing the guitar.

Influence on development

From the expressions of the students, it has been determined that there are some areas in which they develop their skills thanks to the application. According to this, the students stated that they had improved in terms of progress in their instruments and their personal development.

The views expressing the development of the students' instruments represent each successful outcome of the mobile application. In this sense, each student's opinion on the subject is presented in the Figure 9:

Figure 9.
Developmental Expressions regarding Students' Instrument Playing Skills



According to Figure 9, students generally made statements that the mobile application contributed to their development, such as encouraging them to practice, achieving success by playing with the metronome, and positively affecting their sight-reading. While the students made statements about development, they included statements that showed that they had developed personally. Students were very impressed by the greetings and the motivational speech of Türkiye's leading guitarist coming at the end of each level and by adding periodic guitars which would be open when they showed outstanding achievements to their collections in the application.

> *I did not know Celil Refik Kaya, then I searched for him. (S4)*

> *The guitar awards are informative. I learned some things. My practicing hours have increased, teacher. The way I practice has changed. (S5)*

> *The guitar players at the end of the levels impressed me. I like it so much. The guitar award was also very good. I didn't know there were such guitars in the past. (S6)*

Using the mobile application

Students were asked various questions regarding the use of the mobile application. In this regard, the categories related to the use of the application are the use of the mobile application in the course, the use of such applications in other lessons, and the use of other similar applications.

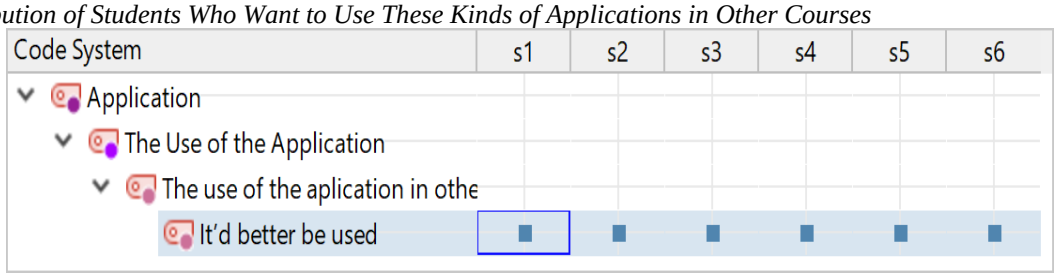
The students made comments about the use of the mobile application in their lessons. Examples of these views are as the followings:

> *As it was fun, it gave a whole new mood to the lesson. (S5)*

> *I think the lesson has become more fun. There were a lot of times when it was boring. Now I am more eager for this lesson. I think it was very good to use this lesson. (…) (S6)*

As can be understood from the expressions, the students stated that they enjoyed the use of the application in the lesson more. In this sense, they want to use such applications in other courses. The Figure 10 shows the students who want to use these kinds of applications in other courses.

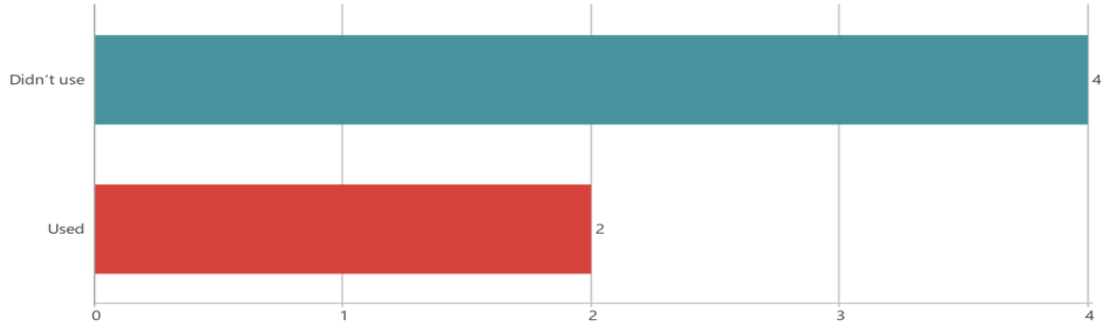
Figure 10.
Distribution of Students Who Want to Use These Kinds of Applications in Other Courses



As can be seen in Figure 10, all students made statements requesting that such applications be used in other courses. The absence of students who want not to be used indicates that the application is liked by students.

The Figure 11 shows the students' answers regarding whether they have used such mobile applications before.

Figure 11.
Students' Previous Use of These Kinds of Mobile Applications



As seen in Figure 11, the number of students who used some other applications before was 2, while those who did not use any application were 4 people. Those who did not use them did not comment on why they did not use them. However, the statement of one of the users is interesting:

> *I tried once for the piano. But because they are usually paid, you can play apps to some extent. That's why I couldn't look at the piano practice. (S2)*

The student tried the piano application before, but it was not possible to use it continuously because it was paid. In this context, it is possible to say that the mobile application called *Gitarist* will be more accessible and useful in terms of contribution to education.

Findings and Interpretation of the Fifth Sub-Problem

In the evaluation phase, which is the last phase of the study, guitar teachers working at fine arts high schools in different provinces were reached and teachers were asked questions for the evaluation of the application in terms of content and functionality. The categories from the answers received were determined as the evaluation of the design, the evaluation of the content, the evaluation of gamification, and the evaluation of usability.

General evaluation

Teachers were asked what they thought about the mobile application. According to teachers, the application is a very successful, engaging, motivating, and contemporary mobile application. Some statements of teachers about the success of the mobile application are as follows:

> *It has been an interesting and successful application. It's an application that has been studied and worked on. (Fine Arts High School Teacher 4)*

Some of the teachers' statements about the application being motivating are as follows:

> *(...) It was an application that attracted attention and aroused curiosity apart from classical education methods. The teaching and learning process has become more enjoyable. (Fine Arts High School Teacher 9)*

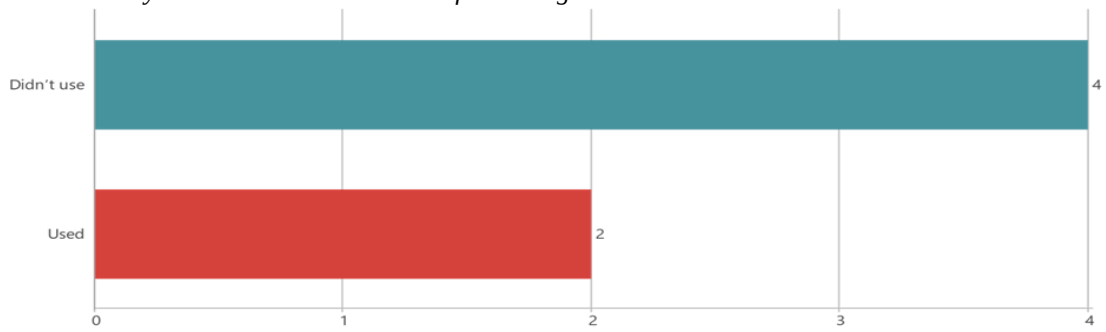
Some of the teachers' statements about the application being appropriate today are as follows:

> *We live in the age of technology, every year I feel the difficulty of teaching with the classical method a little more, the students do not want to get out of the technological world they are accustomed to. I think it is an application that will be a solution to this problem. It has been a study that touches the bleeding wound. (Fine Arts High School Teacher 1)*

Evaluation of the design

Teachers made general statements about the design of the mobile application. Expressions were formed within the framework of the suggestions with the views such as plain, simple and easy, interesting, and critical about the application. The Figure 12 shows the intensity of the expressions.

Figure 12.
Expression Density Related to the Evaluation of the Design



According to Figure 11, the most intense expressions used by teachers when describing the design were determined as plain, simple, and easy. While the second density is in the expressions about the interesting feature of the application, the least density is in statements containing criticism.

Evaluation of content

The teachers evaluated the content as adequate and inadequate. In the generally reported views, it was reported that the levels were successfully constructed. The following examples can be given for the opinions including that the content is adequate:

> *The content of the levels is very convenient. (Fine Arts High School Teacher 1)*

> *(...) It is suitable and sufficient because it is prepared according to the content and approaches of the course. Content has been created considering the objectives in the content. (Fine Arts High School Teacher 6)*

Evaluation of gamification

Exemplary views of teachers' thoughts about gamification are shown in the Table 7:

Table 7.
Expressions about Gamification

Teacher	Opinion
Fine Arts High School Teacher 1	There are good motivational factors as reinforcers.
Fine Arts High School Teacher 4	It was encouraging because it was made with game logic. It will be effective for students.
Fine Arts High School Teacher 5	I think it reflects all game elements. I think that the game elements are encouraging and motivating the student. I believe that even if the students get low scores and pass the level, they will play again and increase their points and rewards. Thus, I believe that discipline and willingness of students to study will increase.
Fine Arts High School Teacher 10	The fact that the main elements of the current game understanding of young people are integrated into this educational application and elements such as points, rewards, etc. has become more fun and motivating.

As can be seen in Table 7, the teachers who expressed statements about gamification drew attention to the features of gamification that are generally motivating, encouraging to study, and hosting entertainment. In this sense, it is possible to say that the mobile application developed based on gamification has reached its purpose.

Evaluation of usability

Teachers were asked questions about the usability of the mobile application. In this sense, the sub-codes related to the use of the application in instrument (guitar) education, its effect on the teaching-learning process, and its use outside the classroom were obtained from their answers.

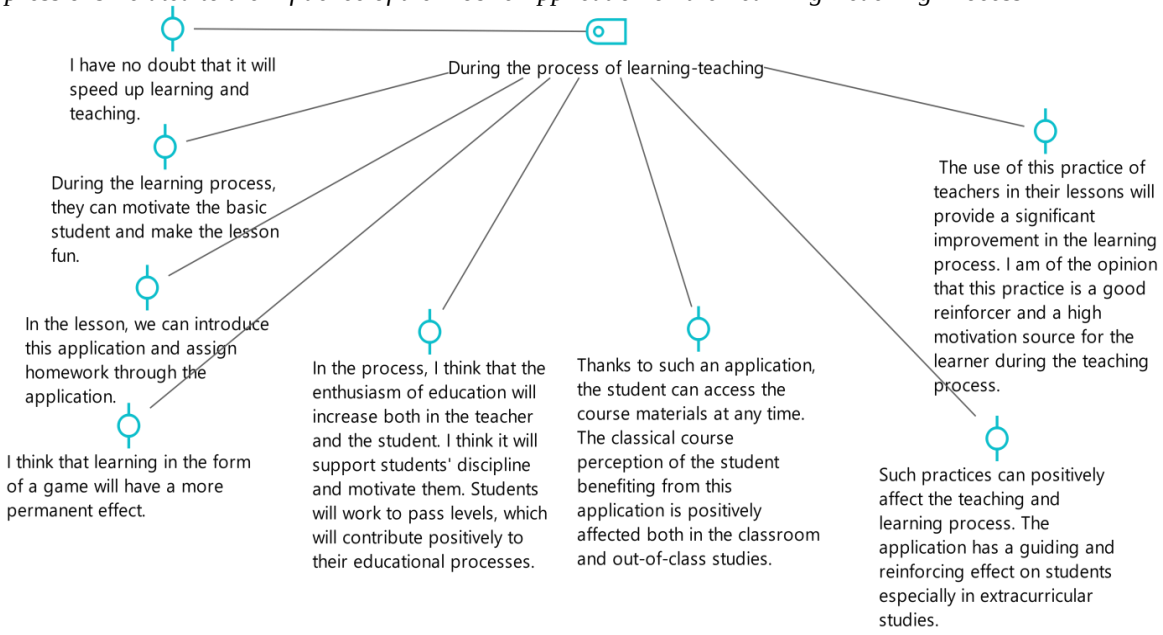
Considering teachers' opinions about the use of the mobile application in the instrument (guitar), they believed that education can be very effective in institutions aiming to provide education at the beginner level such as fine arts high schools, the application can encourage students to play guitar and by this way, the students can be more motivated and successful because they will work with fun and thus, the use of such an application can make teaching easier. Sample opinions on the subject are as follows:

> *The Gitarist application was definitely an application that can be used in instrument training. It can also be designed for advanced levels and turned into a more effective application. (Fine Arts High School Teacher 6)*

> *Integrating such an application using gamification to instrument education will definitely facilitate the work of teachers. I think this application will meet the needs of instrument teachers who are in search of various methods and techniques to a certain extent. (Fine Arts High School Teacher 7)*

Teachers were asked questions about the influence of the application on the learning-teaching process. Examples of their answers are shown in the Figure 13:

Figure 13.
Expressions Related to the Influence of the Mobile Application on the Learning-Teaching Process



As seen in Figure 12, expressions focus on the use of the application within the context of the process, which will accelerate learning and teaching, make learning permanent, motivate the student and provide students with self-discipline.

Teachers were asked questions about evaluating the use of the application outside the classroom. The answers are given in the Table 8.

Table 8.
Expressions regarding Extracurricular Use of the Mobile Application

Teacher	Opinion
Fine Arts High School Teacher 1	Since the program has a motivating effect on studying, it will be especially useful for daily regular guitar practice.
Fine Arts High School Teacher 2	I think it should be used out of the classroom but in the form of support to the class. The student should play with the metronome by looking at the note at her/his home.
Fine Arts High School Teacher 5	For students, I think it is an excellent motivating resource both inside and outside the classroom.
Fine Arts High School Teacher 7	It will be easy to focus on extracurricular studies. I think it is important that the student is warned by the application when s/he does wrong in his extracurricular studies and provided her/him with the opportunity to play it in the best way.
Fine Arts High School Teacher 9	Since the application is simple and understandable, anyone who deals with guitar playing can benefit from it. This application is also very useful in private music houses and art schools. Also, it should be available in digital stores like Google Play ensuring that everyone can benefit.

As can be seen in Table 8, teachers reported positive statements regarding the use of the mobile application outside the classroom. The situations in which the statements are concentrated are that the practice is an encouraging, motivating, and useful course material for studying outside the class. It is recommended that not only students but anyone who deals with guitar playing can use this application, so it is recommended to consider expanding the target audience of the application.

DISCUSSION, CONCLUSION, AND SUGGESTIONS

In the study titled "A study on educational software development through gamification in guitar education", a research process consisting of five phases has been adopted.

During the analysis phase, guitar educators stated that in instrument training courses, students perceive playing an instrument mostly as a task, they often get bored with pre-work etudes, scales, and exercises, there is no attendance problem, but there may be a low attendance problem due to failure, and students' motivation is low. Kurtuldu (2010) examined student views on the causes of failure in piano education, and in one aspect of the study, students stated that etudes or exercises for the works were inadequate and to a certain extent compelling, and students expressed equally positive and negative opinions about the piano lessons being boring. Considering the results of the study in general terms, it is stated that the reasons for failure are generally in line with the opinions of the students, with some individual factors and concerns about the course. Also, during his interviews with 6 teachers who gave instrument training lessons in different branches for instrument motivation, and performance, Özmenteş (2013) has concluded that the goals set by students, their difficulties in playing their instruments, and their unwillingness to their instruments affect the motivation of students in general. In this context, it can be said that the main issue is the methods and techniques applied in the classroom, which can be said to be embedded in teaching. "At present, many domestic college music classroom is still teacher centered, with books as the center, follow the prescribed order. Most appreciate echo what the books say, teaching materials according to the chapter order is the first theoretical knowledge works, calculation by memory, from music situation, understand the way to learn the basic knowledge of music, the music will lose their learning experience, pleasure, aesthetic principles in teaching image, not to have the respect in the learning process of students independence and distinctive personality" (Peng, 2021).

In the analysis phase, guitar educators reported that students mainly use technology for non-educational purposes. Participants stated that it is important and necessary to include technology in educational activities and that the use of gamification techniques can make the environment fun and motivating for students. In the application part of the study carried out by Can and Aras (2017), as a result of the teachers' opinions regarding the use of information technologies in the primary school music lesson, the conclusion that the course should be supported by information technology applications to make the course fun and enjoyable is similar to the results obtained regarding the technology in the analysis phase of the study.

During the design phase, the participants stated that the educational features of the software should be convenient for the age group that it addresses, the content should be well integrated with the features of gamification, the levels should be linked, and the user should be directed with the feedback. It is stated that the software should include images that are simple and understandable in the visual design features, and also it should be suitable for the age and interest of the user rather than text. In multimedia features, it has been reported that the software should be set up to appeal to many senses and should interact with other users to enable the student to learn with fun. In the content features, it has been reported that the software should be designed with levels that move from easy to hard, and the guidance and help areas should be well planned and the user should not get lost in the software. Besides, the installation should be easy, the size of the software should be small, and the use of the application should be simple and easy to understand. In the study carried out by Edip (2019), within the scope of the design and development research model, an educational box game was developed to reduce physical or verbal violence caused by the lack of communication experienced by children and to direct children to non-violent communication, and in the design phase of the study, through the opinions of four game design experts and three PCG (Psychological Counseling and Guidance) experts, it is concluded that in the educational content of the game, the game should include the universal children's rights information child-adult communication methods, measures that can be taken for communication accidents identified in the needs and target audience analysis, empathy development studies, units to be applied in case of exposure to violence, verbal communication reinforcement studies, and affirmation statements.

During the development phase, the mobile application was found sufficient in terms of educational content and output. Its design and its multimedia features were appreciated, and the received criticism and suggestions were about the size of the texts and transition durations. It has been stated that the software contains gamification features and can provide motivation as a result of these features, and it has also received some suggestions. These suggestions focus particularly on the leaderboard in the application. However, in addition to the process and budget, the leaderboard could not be added with the idea that it may have a negative effect on the student. In the study carried out by Bozkurtlar and Samur (2017), it was aimed to observe the influence of gamification on the tools used in classroom management. For this purpose, the opinions of the students about the reward, score, and leaderboard, which are among the game elements, were obtained as a result of the questionnaire and interviews consisting of 69 questions, and as a result of the study, the results that the students did not like to get negative points, and the opinions of the students who were in the lower rank in the leader board were negatively affected.

Guidance and help features were found adequate and accessible. The instructive text on how to use was found sufficient. It has been reported in general that there is no problem in installation and use. In general evaluations, the advantages and disadvantages of the application were specified and some suggestions were reached. Accordingly, the application has advantages that increase motivation, encourage practicing, make learning permanent, and support education. The disadvantages include the concerns of the participants that have not been realized yet. Concerns, such as if a technical problem arises or if it results in an asocialization of the student as a result of intense interest in practice, have been identified as disadvantages. Likewise, concerns have been expressed that the content of the application will not be sufficient to play the guitar at a high level. The application tries to gain a habit of practicing in the student and offer motivational effects on the student by starting guitar education at the beginner level and putting guitar education in a fun framework. In this context, there is no target for students to play high-level guitars. In the study carried out by Kara and Cağıltay (2020), it was aimed to design, develop and apply smart toy technology for preschool children, and in the development phase of the study, for this purpose, process evaluations were made with preschool children, preschool teachers, and academicians for the smart toy of which prototype was developed. As a result of the feedback in these evaluations, the necessary revisions were made and the final version of the smart toy was revealed.

After the necessary corrections were made in the development phase following the expert opinions, the implementation phase was started with 6 guitar students in the 9th grade for the pilot application. Students used the application for 8 weeks and shared their experiences. Students stated that the mobile application is instructive and fun to practice with. They described the level of easy-to-hard construction as good, and they reported that they were very impressed and motivated by the rewards at the end of the levels. They reported that gamification features created a sense of competition among them in the lesson, but this situation triggered repetition and learning. In the study carried out by Hitchens and Tulloch (2017), it was aimed to determine whether students would perceive gamification activities positively in the classroom gamification approach, and in this direction, the software was developed with classroom activities. While most of the students stated that gamification was useful and entertaining after the application, a few students disagreed.

Students reported that besides the effect of the application to improve their playing skills, they also developed personally because they had just learned the guitars and guitarists involved in the application. They also reported that they got used to playing with the metronome thanks to the application, their finger transitions were accelerated and their sight-reading has improved. Erim and Yöndem (2009), in their study with experimental and control groups, searched the effect of video model-assisted teaching on classical guitar student performances at the beginning phase, and as a result of this study, this method of teaching positively affected students' performance on guitar holding, right and left hand and playing. It is possible to say that the study in terms of the effect of technological methods on the student has reached similar results to the study of Erim and Yöndem (2009). Students have adopted using the application *Gitarist* in the lesson and asked for the use of such applications in other lessons. Through the application, students reported that their willingness to play, their interest, and their motivation

increased. In his study, Wagner (2016) added his piano exercises to small digital games to evaluate the effect of gamification on students' motivation. The researcher focused on the flow experience in his study and asked the participants questions about flow experiences in this direction. As a result of the research, the researcher concluded that the flow experience in motivating students in music education has benefits, as well as technology helps the student and teacher connect outside the class hours and provide feedback to students in their applications. Also Molero et al. (2021), in the study titled "A novel approach to learning music and piano based on mixed reality and gamification", tried to eliminate the motivation deficiencies of children who are new to music by using the piano education application HoloMusic XP, which was developed through gamification, and as a result of the experimental studies, they concluded that the motivation of the students increased.

According to guitar teachers, in the last evaluation phase, a mobile application called *Gitarist* has been described as very successful, motivating, engaging, and convenient for today's needs. Its design is engaging, plain, simple, and easy. The content was found to be sufficient in general, but it was recommended to be developed. They reported that the application has gamification features, especially the setting up with levels and the rewards are successful, and in this sense, it is fun. Thus, they stated that the application has an important place in instrument education, it can increase the motivation and the success of students with the effect of technology and gamification, and the teacher can make the job easier. They stated that they support its use in the lesson and can be used as a support to the lesson. The study by Graham and Schofield (2018) aimed to test and observe how users will use the video game "Rocksmith" to learn to play guitar. As a result of the data of the study, it was concluded that "Rocksmith" can be used as a learning tool and that users think it is fun and useful because they are interested in a learning experience and it teaches certain aspects about playing guitar. Besides, users stated that they did not want to proceed in some parts of the game called "Rocksmith", due to the failure to give notes and techniques correctly, and in some parts, they had difficulties due to the early level of difficulty.

Following the results of the data obtained from all phases of the study, the mobile application was developed as a product to be used in the 9th grade instrument (guitar) education lessons of the fine arts high school music department.

Considering the findings and results obtained during the study, suggestions were made in line with the outcomes of the mobile application called *Gitarist*, which was developed for the 9th-grade individual instrument (guitar) training courses of the fine arts high school music department.

1. Considering the effects of gamification that become visible with technological developments, it is recommended to use such applications based on gamification to provide a facility in practice and encourage students to play.
2. It is recommended to use this kind of application in extracurricular studies to enable the student to practice correctly by self-control within the scope of gamification techniques and to develop self-discipline.
3. It is recommended to use an effective gamification method in the study areas such as classical guitar history, literature, and composers, where more theoretical knowledge is concentrated.
4. The developed application has a feature that can be adapted to other instruments besides the guitar within the scope of individual instrument training courses. Accordingly, it is recommended that the application named *Gitarist* should be adapted to other instruments.
5. Considering the results, it can be understood that gamification has motivational effects on students. From this point of view, it is recommended to use gamification in other fields of music education.
6. In line with the outcomes of the mobile application, considering the requirements of the age and the problems in instrument education, it is suggested that this study and similar others can be carried out and used in all institutions that provide music education, not only in fine arts high schools.

Acknowledgement

This study is based on the first author's doctoral dissertation under the supervision of the second author.

This study was supported by Marmara University Scientific Research Project numbered EGT-CDRP-101018-0522. We would like to thank Marmara University Scientific Research Projects Unit for their contributions.

The authors would like to acknowledge Prof. Dr. Ahmet BEŞE of Atatürk University Department of American Culture and Literature for his proofreading of the paper in English.

REFERENCES

Bell, S. J., & Shank, J. D. (2007). *Academic librarianship by design: A blended librarian's guide to the tools and techniques*. American Library Association.

Berber, A. (2018). *Oyunlaştırma: Oynayarak Başarmak*. Seçkin.

Birch, H. (2013). *Motivational Effects of Gamification of Piano Instruction and Practice* (Unpublished doctoral thesis). University of Toronto.

Bozkurtlar, S., & Samur, Y. (2017). Sınıf Yönetiminde Oyunlaştırmaya Yönelik Öğrenci Görüşlerinin İncelenmesi [The Investigation of The Students' Views on Gamification in Classroom Management]. *Ege Journal of Educational Technologies, 1*(2), 103-124.

Can, A. A., & Aras, T. (2017). Bilişim Teknolojilerinin İlköğretim Müzik Dersinde Kullanımına Yönelik Öğretmen Görüşlerinin Değerlendirilmesi [The Evaluation of Teacher's Point of Views About The Practice of Information Technologies in Primary Education Music Class]. *Atatürk University Journal of Institute of Fine Arts*, *39*, 9-30.

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From Game Design Elements to Gamefulness: Defining Gamification. *In Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments* (p. 9-15). ACM. https://doi.org/10.1145/2181037.2181040

Edip, S. (2019). *Oyun Tasarımı Anahtarı Modeline Göre Bir Kutu Oyunu Tasarlanması, Geliştirilmesi ve Değerlendirilmesi [Design, develop and evaluate a board game according to game design key model]* (Unpublished master's thesis). Bahçeşehir University.

Erim, A., & Yöndem, S. (2009). Video Model Destekli Öğretimin Gitar Performansına Etkisi [The Effect of Model Aided Teaching on Guitar Performance]. *Buca Faculty of Education Journal*, (26), 45-55.

Graham, K., & Schofield, D. (2018). Rock god or game guru: Using Rocksmith to learn to play a guitar. Journal of Music, *Technology & Education*, *11*(1), 65-82. https://doi.org/10.1386/jmte.11.1.65_1.

Hanus, D., M., & Fox, J. (2015). Assessing The Effects of Gamification in The Classroom: A Longitudinal Study on Intrinsic Motivation, Social Comparison, Satisfaction, Effort, and Academic Performance. *Computers & Education*, 80, 152-161. https://doi.org/10.1016/j.compedu.2014.08.019.

Hitchens, M., & Tulloch, R. (2017). A Gamification Design for The Classroom. *Interactive Technology and Smart Education*, *15*(1), 28-45. https://doi.org/10.1108/ITSE-05-2017-0028.

Kara, N., & Cağıltay, K. (2020). Smart toys for preschool children: A design and development research. *Electronic Commerce Research and Applications*. http://doi.org/10.1016/j.elerap.2019.100909.

Kim, S., Song, K., Lockee, B., & Burton J. (2018). *Gamification in Learning and Education: Enjoy Learning Like Gaming*. Springer International Publishing AG. ISBN-13: 978-3319472829.

Kurtuldu, K. M. (2010). Piyano Eğitiminde Başarısızlık Nedenlerine Yönelik Öğrenci Görüşlerinin Değerlendirilmesi [Assesment on Student's View About Failure Reasons in Piano Education]. *Kastamonu Education Journal*, *18*(3), 917-930.

Manzano-León, A., Camacho-Lazarraga, P., Guerrero, M.A., Guerrero-Puerta, L., Aguilar-Parra, J.M., Trigueros, R., & Alias, A. (2021). Between Level Up and Game Over: A Systematic Literature Review of Gamification in Education. *Sustainability*. https://doi.org/10.3390/su13042247

Molero, D., Schez-Sobrino, S., Vallejo, D., Glez-Morcillo, C., & Albusac, J. (2021). A novel approach to learning music and piano based on mixed reality and gamification. *Multimedia Tools and Applications*, 80, 165-186. https://doi.org/10.1007/s11042-020-09678-9.

Özmenteş, S. (2013). Çalgı Eğitiminde Öğrenci Motivasyonu ve Performans [Student Performance and Motivation in Instrument Education]. *Journal of Research in Education and Teaching*, *2*(2), 320-331.

Pelling, N. (2011). The Short Prehistory of "Gamification" Funding Startups (&Other Impossibilities). Retrieved November 13, 2019 from https://nanodome.wordpress.com/2011/08/09/the-short-prehistory-of-gamification/.

Peng, F. (2021). Optimization of Music Teaching in Colleges and Universities Based on Multimedia Technology. *Advances in Educational Technology and Psychology*, 5, 47-57. https://doi.org/10.23977/aetp.2021.55009.

Putz, L.-M., Hofbauer, F., & Treiblmaier, H. (2020). Can gamification help to improve education? Findings from a longitudinal study. *Computers in Human Behavior*. *110*(September 2020), 106392 https://doi.org/10.1016/j.chb.2020.106392

Richey, R. C., & Klein, J. D. (2007). *Design and Development Research Methods, Strategies, and Issues.* Taylor & Francis Group, Routledge. https://doi.org/10.4324/9780203826034

Richey, R. C., & Klein, J. D. (2014). Design and Development Research. Spector, J. M., Merrill, M.D., Elen, J. & Bishop, M.J. (eds.). *Handbook of Research on Educational Communications and Technology* (s. 141-150). Springer. https:// doi.org/10.1007/978-1-4614-3185-5_12.

Shelton, K., & Saltsman, G. (2007). Using the ADDIE Model for Teaching Online. *International Journal of Information and Communication Technology Education*, *2*(3), 14-26. https://doi.org/10.4018/jicte.2006070102

Wagner, C. (2016). Digital Gamification in Private Music Education. *Antistasis*, *7*(1), 115-122.

Zichermann, G., & Cunningham, C. (2011). *Gamification by Design Implementing Game Mechanics in Web and Mobile Apps*. O'Reilly Media, Inc.

TÜRKÇE GENİŞLETİLMİŞ ÖZET

2000 yılından itibaren mobil cihazlardaki artış ve dijital oyun kavramının yükselişi ile birlikte özellikle pazarlama, ekonomi gibi iş hayatındaki sektörlerin oyun kurgusunu kendi sistemlerine entegre etme düşüncesi, farklı kavramların ortaya çıkmasına ön ayak olmuştur. Bu kavramlardan en önemlisi hiç şüphesiz oyunlaştırmadır. Deterding ve diğerlerine (2011) göre "oyunlaştırma, oyun tasarım ögelerinin oyun olmayan içeriklerde kullanılmasıdır. Oyunlaştırmanın, oyun ögelerinin ve oyun tasarım tekniklerinin gerçek yaşam içerisindeki motivasyona yönelik sorunların çözümüne odaklı kullanımı, oyun ile arasındaki ayrım açısından önem teşkil eder.

Pek çok eğitimci, sınıflarında öğrencilerin motive olamamasından dolayı zorluklar yaşamakta ve buna bağlı olarak da öğrenciler, sınıf etkinliklerine aktif olarak katılmamaktadır (Kim vd., 2018). Bugünün toplumunda eğitim ile teknoloji arasında olması gereken bağı kurabilmek amacına ulaşıldığında, öğrencilerin artan motivasyonu ve sonucunda gerçekleşen ortama bağlılığını gözlemleyebilmek olasıdır. Bu amaca ulaşmada oyunlaştırmanın eğitime dahil edilmesi önemli bir adım olarak düşünülmektedir. "Sınıf içerisinde oyunlaştırmanın uygulanmasıyla, öğrenciler yeni yollar sayesinde öğrenmeye daha motive olabilir ya da oyunlaştırma sayesinde sınıf içerisindeki sıkıcı görevlerden zevk almayı başarabilirler" (Hanus & Fox, 2015).

Eğitimin her alanında karşılaşılan öğrencilerdeki ilgi ve motivasyon eksikliğinin, çalgı eğitiminde de büyük problemlerden biri olarak karşımıza çıktığını söylemek mümkündür. Bu bağlamda, günümüz açısından değerlendirildiğinde müzik eğitiminin alt boyutu olan çalgı eğitiminin içerisinde teknolojik gelişmelerin eksikliği ve oyunlaştırma yöntemi doğrultusunda çalgı (gitar) eğitimine yönelik nasıl bir tasarım oluşturulabileceği araştırmanın problem durumunu oluşturmaktadır.

Araştırma, çalgı (gitar) eğitimi dersi için oyunlaştırma yöntemine yönelik eğitsel yazılım geliştirmeyi amaçlamaktadır. Problem durumunun çözümü sürecinde, yol gösterici olarak tasarım ve geliştirme araştırması yönteminin analiz, tasarım, geliştirme, uygulama ve değerlendirme aşamaları gerçekleştirileceğinden, bu aşamalar içerisinde yer alan süreçler alt problem durumu olarak ele alınmıştır. Bu süreçlere ilişkin;

1. Oyunlaştırma yöntemi doğrultusunda çalgı (gitar) eğitimi dersi için geliştirilecek olan eğitsel yazılımın analiz aşaması nasıl gerçekleştirilmiştir?
2. Oyunlaştırma yöntemi doğrultusunda çalgı (gitar) eğitimi dersi için geliştirilecek olan eğitsel yazılımın tasarım aşaması nasıl gerçekleştirilmiştir?
3. Oyunlaştırma yöntemi doğrultusunda çalgı (gitar) eğitimi dersi için prototipi geliştirilen mobil uygulamanın geliştirme aşaması nasıl gerçekleştirilmiştir?
4. Oyunlaştırma yöntemi doğrultusunda çalgı (gitar) eğitimi dersi için prototipi geliştirilen mobil uygulamanın uygulama aşaması nasıl gerçekleştirilmiştir?
5. Oyunlaştırma yöntemi doğrultusunda çalgı (gitar) eğitimi dersi için prototipi geliştirilen mobil uygulamanın değerlendirme aşaması nasıl gerçekleştirilmiştir? soruları çalışmanın alt problemlerini ortaya koymaktadır.

Araştırmada, çalgı (gitar) eğitimi dersi için oyunlaştırma yöntemine yönelik eğitsel yazılım geliştirmek amaçlandığından, tasarım ve geliştirme araştırması yöntemi ve öğretim tasarımı modellerinden ADDIE modeli kullanılmıştır. "ADDIE öğretim tasarımı modeli, öğretim materyallerinin geliştirilmesi için organize bir süreç sağlayan jenerik bir öğretim modelidir" (Shelton & Saltsman, 2007).

Çalışmada, oyunlaştırma yöntemi doğrultusunda geliştirilmesi planlanan yazılımın analiz aşamasında, çalgı (gitar) eğitiminde öğrencilerin motivasyonlarına ilişkin karşılaşılan problemleri ve dersteki teknolojik yaklaşımları ortaya çıkarmak için uzman görüşlerini almak, tasarım aşamasına yönelik uzman görüşlerini almak, uzman görüşleri doğrultusunda mobil uygulama olarak prototipi geliştirilecek yazılımın analize ve tasarıma uygunluğunun değerlendirmesini yapmak için tekrar uzman görüşüne

sunmak, pilot uygulaması sonucunda mobil uygulamaya yönelik öğrenci görüşlerini almak ve değerlendirme aşamasında mobil uygulamanın içerik ve işlevsellik açısından değerlendirmesini yapmak adına gitar eğitimcilerinin görüşlerini almak amacıyla nitel araştırma yöntemi içerisindeki görüşme tekniklerinden yararlanılmıştır.

Analiz aşamasında, farklı illerdeki güzel sanatlar liseleri müzik bölümlerinde çalgı (gitar) eğitimi dersini veren 12 gitar eğitimcisi ile görüşmeler gerçekleştirilmiş ve katılımcıların çalgı eğitimi dersi, teknoloji ve oyunlaştırma yöntemi hakkındaki düşünceleri aktarılmıştır.

Tasarım aşamasında, yazılımın eğitsel, görsel tasarım, çoklu ortam, içerik, yönlendirme ve yardım, kurulum ve kullanım özelliklerinin nasıl olması gerektiği konusunda bir gitar eğitmeni, bir oyun tasarım uzmanı, bir yazılım uzmanı ve bir öğretim teknolojileri uzmanından alınan görüşler analiz edilmiştir ve aktarılmıştır.

Geliştirme aşamasında, analiz aşamasında belirlenen durum ve ihtiyaçlardan yola çıkıp tasarım aşamasında katılımcıların sunduğu görüşler neticesinde prototipi geliştirilen gitarist uygulamasının çeşitli boyutlarda değerlendirilmesi amacı ile uzmanların görüşlerine başvurulmuş ve görüşler doğrultusunda "gitarist" adlı uygulamanın ilk hali ortaya çıkarılmıştır.

Uygulama aşamasında, ilk hali ortaya çıkarılan *Gitarist* adlı uygulamanın, Kars Gülahmet Aytemiz Güzel Sanatlar Lisesi Müzik Bölümü 9. sınıf 6 gitar öğrencisi üzerinde pilot uygulaması yapılmış ve öğrencilerin görüşleri alınmıştır.

Çalışmanın son aşaması olan değerlendirme aşamasında ise farklı illerdeki güzel sanatlar liselerinde görev yapan gitar öğretmenlerine ulaşılmış, uygulamanın içerik ve işlevsellik bakımından değerlendirilmesi adına öğretmenlerin görüşleri alınmıştır.

Çalışmanın bütün aşamalarından elde edilen verilerin sonuçları doğrultusunda geliştirilen mobil uygulama, güzel sanatlar liseleri müzik bölümü 9. Sınıf çalgı (gitar) eğitimi derslerinde kullanılmak üzere bir ürün olarak ortaya çıkarılmıştır.

Gitarist adlı mobil uygulamanın çıktıları doğrultusunda; çalışma kolaylığı sağlaması ve öğrenciyi çalışmaya teşvik etmesi açısından oyunlaştırma yöntemine dayalı bu tarz uygulamalardan faydalanılması, öğrencinin oyunlaştırma teknikleri kapsamında kendi kendini kontrol ederek doğru çalışabilmesi ve çalışma disiplinini geliştirmesi açısından ders dışı çalışmalarda bu tarz uygulamaların kullanılması, kuramsal bilgilerin yoğunlukta olduğu çalışma alanlarında etkin ve etkili biçimde oyunlaştırma yönteminden faydalanılması, Gitarist adlı uygulamanın diğer çalgılara da uyarlanması, müzik eğitiminin diğer alanlarında da oyunlaştırma yönteminden faydalanılması, bu ve buna benzer çalışmaların sadece güzel sanatlar liseleri müzik bölümlerine değil müzik eğitimi veren bütün kurumlara yönelik yapılabileceği ve bu kurumlarda kullanılması önerilmektedir.