T.C.
ANKARA YILDIRIM BEYAZIT UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES

THE EFFECT OF GAMIFICATION IN TEACHING THE BASIC CONCEPTS OF E-COMMERCE AND AN APPLICATION

MASTER'S THESIS

Musa Kaan ŞAHİN

DEPARTMENT OF MANAGEMENT INFORMATION SYSTEMS

ANKARA, 2023

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Thesis Advisor
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ANKARA, 2023

APPROVAL PAGE

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Director of the Institute of Social Sciences Prof. Dr. Yaşar YİĞİT

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Musa Kaan ŞAHİN

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ABSTRACT

The Effect Of Gamification In Teaching The Basıc Concepts Of E-Commerce And An Application

Gamification is the employment of game-related features in non-game circumstances. Many businesses today use gamified marketing strategies. Companies include gamified activities into their marketing strategy to increase productivity and success in the highly competitive global marketplace. At this phase, we try to imagine how consumers and other individuals may react to gamified marketing initiatives. Purpose of this study is to investigate how gamification affects the instruction of fundamental e-commerce concepts. For that purpose, a game application named "E-Commerce Game" was developed to teach the basics of e-commerce and the effect of the game application was measured with related scales. Descriptive statistics are presented with frequency, percentage, mean and standard deviation values. In the study, KR21 reliability coefficient was calculated for the scale used to determine the level of knowledge of pre-test and post-test levels. Chi-square test was applied to determine the demographic characteristics of the groups. Independent sample t-test was used to examine the differences in the knowledge levels of the groups according to the characteristics of the participants in the study. Paired t-test was used to examine the difference between the pre- and post-measurements of knowledge levels in the groups. In the study, Independent sample t-test was used to examine the differences in the knowledge levels of the groups according to gender, e-commerce and mobile gaming background. Correlation analysis was performed to examine the relationship between age and test success. In the study, p values less than 0.05 were considered statistically significant (α=0.05). Analyzes were made with SPSS 25.0 package program. The results of the research has been discussed in the light of the findings.

Keywords: E-commerce, game, gamification

ÖZET

E-Ticaret Temel Kavramlarının Öğretiminde Oyunlaştırmanın Etkisi Ve Bir Uygulama

Oyunlaştırma, oyunla ilgili öğelerin oyun dışı bağlamlarda kullanılmasıdır. Oyunlaştırılmış pazarlama faaliyetleri günümüzde birçok şirket tarafından kullanılmaktadır. Küresel rekabet ortamında şirketler başarılı ve verimli olabilmek için pazarlama stratejilerine oyunlaştırılmış faaliyetleri de eklemektedir. Bu noktada oyunlaştırılmış pazarlama faaliyetlerinin tüketiciler ve diğer insanlar tarafından ne ölçüde algılandığını anlamaya çalışıyoruz. Bu çalışmada e-ticaretin temel kavramlarının öğretiminde oyunlaştırmanın etkisinin incelenmesi amaçlanmaktadır. Bu amaçla e-ticaretin temel kavramlarının öğretilmesi için "E-Commerce Game" adı verilen bir Uygulama geliştirilip, uygulamanın etkisi ilgili ölçeklerle ölçülmüştür. Tanımlayıcı istatistikler frekans, yüzde, ortalama ve standart sapma değerleri ile sunulmaktadır. Araştırmada ön test ve son test düzeylerinin bilgi düzeyini belirlemek için kullanılan ölçek için KR21 güvenirlik katsayısı hesaplanmıştır. Araştırmaya katılanların özelliklerine göre grupların bilgi düzeylerindeki farklılıkları incelemek için bağımsız örneklem t-testi kullanılmıştır. Grupların bilgi düzeylerinin ön ve son ölçümleri arasındaki farkı incelemek için paired t-testi kullanılmıştır. Araştırmada cinsiyet, e-ticaret ve mobil oyun geçmişine göre grupların bilgi düzeylerindeki farklılıkları incelemek için bağımsız örneklem t-testi kullanılmıştır. Yaş ile test başarısı arasındaki ilişkiyi incelemek için korelasyon analizi yapılmıştır. Çalışmada 0,05'ten küçük p değerleri istatistiksel olarak anlamlı kabul edilmiştir. (α=0,05). Analizler SPSS 25.0 paket programı ile yapılmıştır. Araştırma sonuçları bulgular ışığında tartışılmıştır.

Anahtar Kelimeler: E-ticaret, oyun, oyunlaştırma

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LIST OF ABBREVIATIONS

3D	3 Dimensional
ADSL	Asymmetric Digital Subscriber Line
ARPA	Advanced Research Project Agency
ATM	Automated Teller Machine
BKM Express	Interbank Card Center
CD	Compact Disc
CEO	Chief Executive Officer
DICE	Design Innovate Communucate Entertain
E-Commerce	Electronic Commerce
EDI	Electronic Data Interchange
EFT	Electronic Fund Transfer
ERP	Enterprise Resource Planning
ETBIS	Electronic Commerce Information System
ETDHK	Law on Regulation of Electronic Commerce
ETKK	Electronic Commerce Coordination Board
FPS	First Person Shooter
FTP	File Transfer Protocol
GSM	Global System for Mobile Communications
H&M	Hennes & Mauritz
HTML	Hypertext Markup Language
IT	Information Technology
KEP	Kayıtlı Elektronik Posta
METU	Middle East Technical University
MMO	Massively Multiplayer Online Role-Playing Game
OECD	Organization For Economic Co-operation and Development
POS	Point of Sale
RPG	Role Playing Games
RTGS	Real Time Gross Settlement
SDML	Signed Document Markup Language
SMS	Short Message Service
SPSS	Statistical Package for the Social Sciences

TEMA	The Turkish Foundation for Combating Soil Erosion for Reforestation and the Protection of Natural Habitats
TGNA	Turkish Grand National Assembly
TTNET	Turk Telekom Net
TUBITAK	The Scientific and Technological Research Council of Turkey
TUENA	Turkey National Information Infrastructure
TURKSTAT	Turkish Statistical Institute
ULAKBIM	Turkish Academic Network And Information Center
UN-CEFACT	The United Nations Centre for Trade Facilitation and Electronic Business
UNCITRAL	United Nations Commission On International Trade Law
WAP	Wireless Application Protocol
WTO	World Trade Organization
WWW	World Wide Web
YOK	Council of Higher Education

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1. INTRODUCTION

The progress of today's society has influenced the corporate world, as well as businesses and organizations. Due to this, it is evident that organizations, businesses, and their managers and staff members all need to undergo certain adjustments. The growth and excessive usage of the internet have led to several important changes. This communication tool has enabled us to connect, bringing customers and businesses closer together and increasing our vulnerability as a result.

A lot has changed in the marketing industry recently, particularly with the introduction of the internet and online social networks. Events have on a new dimension for both consumers and companies with the rise of internet social networks, which has affected marketing strategies. The conventional marketing paradigm is strongly impacted by all of these new shifts, which call for reevaluating marketing principles and strategies. Later, a more individualized marketing strategy that suggests customized and exclusive offerings was implemented, building on the mass marketing strategy using standardized items. Consumer behavior has altered and is currently taking on a new shape. Consumers nowadays are more demanding and unpredictable.

Product management is the main emphasis of marketing 1.0, while communitarianism is the foundation of marketing 2.0. With the appearance of tools with the name Web 2.0, participation has been increased. It's time to move on to Web 3.0 as collaborative and interactive Web 2.0 grows. The participants' collaboration represents this new era. As a result, Marketing 3.0, a new marketing strategy, was created and put into practice. This innovative strategy adds to the picture of intercultural and interspiritual interaction defined by the network's pervasiveness and intelligence (Erragcha & Romdhane, 2014).

It is not surprising that marketers must now take into account this new development when defining their marketing strategies in order to remain competitive and creative. Likewise, it is not surprising that the knowledge and skills needed to deal with changing consumer behavior, significant shifts in markets and consumers, sensitive corporate boundaries, and the resulting need for developing new projects are also changing. However, it is noted that repositioning oneself in the socio-technical context results in a marketing strategy that manages the value created by users and that businesses leave the consumer as the center of attention and focus on people, as they should be at the level reported by the

company's profitability and its social component. According to Erragcha and Romdhane (2014), these two require marketing based on both cultural and spiritual collaboration.

Although play is typically thought of as something children do, it is a process that occurs all throughout a person's life. In addition to serving as a natural learning environment for children, games also serve as delightful pastimes for adults (Sandberg & Samuelsson, 2003). According to Salen and Zimmerman (2004), a game is a system in which participants engage in artificial competition within the confines of predetermined rules, producing quantifiable results. The fundamental principles of the games, which have been played in various ways throughout history, have not changed, although they have undergone changes throughout time as a result of advancements in internet technology. From physical activities to education, games are employed in a wide range of contexts (Yim and Graham, 2007).

Gamification is a notion that has lately gained attention due to the popularity of video games. In order to improve or enhance the customer experience, it is frequently favored in a variety of industries, including banking, advertising, commerce, and marketing. Gamification, in contrast to games, refers to surroundings and procedures created to let people feel the same emotions they have when playing a game without removing them from the context of the actual world (Arkün-Kocadere & Samur, 2016). This environment and process design include game components (Werbach & Hunter, 2012).

The term "gamification" has been defined in various ways throughout the literature, including the use of game mechanics and thought processes to answer questions and draw users' attention (Zichermann & Cunningham, 2011), the use of mechanics, dynamics, and its components to encourage desired behavior (Lee & Hammer, 2011), and the use of game design elements in areas that are not games (Deterding et al., 2011).

Early in the 20th century, businesses started using game themes by giving away free items in exchange for frequent sales of their goods. In 2009 and 2010, the notion of "gamification," which is defined as the use of game design principles in settings other than games, began to gain attention. According to McCormick (2013), gamification is becoming more prevalent in today's business and commerce environment.

1.1. Purpose and Importance of Research

Gamification has recently grown significantly in relevance in education and is still quite popular in many sectors. The impact of gamification on learners' attitudes, motivation, and learning process has been the subject of several research. It has been discovered that these ideas have a close connection to one another based on research done in the sectors of gamification and e-commerce. Gamification is being used by a number of well-known e-commerce businesses to increase their market worth. It is crucial that people who have a lot of information and awareness develop into better performers in various fields. Therefore, the study was used to increase students' awareness and knowledge of gamification and e-commerce. When gamification and e-commerce are taken into account, we can observe that there isn't a lot of study devoted to using a recently built application to teach e-commerce notions via gamification. It is believed that this will make our work a valuable resource for further research. As part of this study, we developed a game application to teach the fundamentals of e-commerce, particularly to individuals who are unfamiliar with it. We did this to see how well a game application teaches new e-commerce ideas. The goal of this study is to determine whether or not understanding the fundamentals of e-commerce is significantly impacted by our gaming application.

1.2. Limitations of the Research

This study only included 80 students from the experimental group and 80 students from the control group who agreed to take part in the study after being contacted by the researcher using a basic random sampling approach.

The target population for the study was chosen to be AYBU undergraduate MIS students enrolled in 2021–2022.

Only the qualifications assessed by the Personal Information Form and the E-Commerce Basic Concepts Knowledge Level Scale were examined in the research.

The study is restricted to evaluating how well the experimental group understand the e-commerce principles taught by an application.

1.3. Main Problem of Research

The main problem of this study is to determine whether using a gaming application to teach students about the fundamentals of e-commerce is a useful way to raise their level of understanding.

Sub-Problems of Research

- Do the knowledge level scores of the basic concepts of e-commerce differ according to the gender of the participants before and after the game application?
- Is there a statistically significant relationship between the effect of game application used in teaching basic concepts of e-commerce and ages of participants?
- Do the knowledge level scores of the basic concepts of e-commerce differ according to the e-commerce background of the participants before and after the game application?
- Do the knowledge level scores of the basic concepts of e-commerce differ according to mobile game background of the participants before and after the game application?
- Do the test scores before and after the game application used in teaching basic e-commerce concepts show a significant difference?

2. LITERATURE REVIEW

2.1. E-Commerce Within Conceptual Framework

It is the needs of people that change the course of trade in the world. In the early stages of humanity, it has been seen that survival and nutrition are the most basic needs of people living in nature and they struggle for these needs. With the settled life of people, production started and as a result, trade started with the exchange of surplus products. Trade has changed and developed as a result of the developments in the economic systems in the world and different concepts have emerged as a result of these developments.

E-Commerce is not a concept independent of commerce, but is a form of commerce that emerges as a result of the introduction of new tools in trade, and the use of new methods by those who are dealing with trade. E-commerce development is increasing and becoming widespread as a result of technological developments. For this reason, e-commerce is important for states and parties who are stakeholders.

While e-commerce provides a serious market opportunity, it also draws it into a serious competitive environment. For this reason, businesses engaged in traditional trade are making serious investments in order to benefit from modern trade opportunities. This situation increases the entrance to the e-commerce market, as well as increases the level of competition, thus increasing the service quality of the companies towards their interlocutors. In this section, e-commerce will be evaluated with a comprehensive and detailed holistic approach.

2.1.1. Definition, Scope, Features and Development of E-Commerce

With the rapid spread of information technologies in the world, the fact that people can easily access unlimited information has brought serious changes in the way of doing business in the economy and business life. Technological developments in the world, especially the rapid development of information technologies, have been instrumental in the spread of 'E-commerce' made by virtual means.

In the last periods of the 20th century, with the internet, which has transformed the production and consumption of products into a faster, dynamic, non-physical and global

situation and has a great impact on the formation of the new global economy, the world states have gained the feature of unlimited, timeless and intangible marketplaces (Yaltı, 2003).

The Internet has provided a wide range of commercial activities to its e-commerce counterparts; examining, choosing, ordering and paying for all kinds of goods or services over the Internet, and then receiving the desired product in traditional ways, on the other hand, physical activities such as newspapers, magazines, photographic software, etc. It has become possible to reach non-intermediary digital products without an intermediary and to receive the product by downloading it via computer, as well as to access a wide range of services such as information, accounting, law, security, health services through data centers, and to invest on the internet, gamble and open accounts in banks. Yaltı, 2003).

2.1.2. E-Commerce Definition

Information and communication technologies over electronic media have been used since the 1980s. However, e-commerce over the internet network was started in 1997. Most of the experts attribute the main reason for the growth of the internet to the fact that the transactions made due to e-commerce can be made over the internet (Karadağ, 2006).

Electronic commerce has eliminated the need for the concepts of time and space, which are the most important stages in commercial activities. In this respect, it has become a tool that makes life easier for customers. Before electronic commerce, many companies' advertising understanding were using common communication tools to their potential customers; newspaper, television and radio, but today, new advertising techniques are used through the internet. From this point of view, electronic commerce appeals to a more widespread customer base than traditional commerce (Zerenler, 2013).

It has been very difficult to define the scope of e-commerce since its borders are not fully defined and it is in a constant state of development. E-commerce was not defined until the Law on the Regulation of Electronic Commerce was enacted.

Many different definitions have been made by both national and international organizations regarding electronic commerce. These definitions are included;

According to ETDHK, e-commerce is defined as all kinds of online economic and commercial activities carried out over the electronic environment without confrontation of the parties (ETDHK, 2014).

According to ETKK, e-commerce is a set of commercial transactions that aim to add value by transmitting, processing and storing digital information in the form of images, sounds and texts over the networks of individuals and institutions (Alkan, 2003).

Electronic commerce according to the WTO; *"The production, advertising, sales and distribution of goods and services over telecommunication networks."* (Taşlıyan, 2006). The World Trade Organization divides the electronic commerce process into three stages. These are (Canbaz, 2013);

1- The stage of researching the buyer and seller,
2- The stage of distribution of the products to the buyer,
3- The stage of making the payment transaction by agreement of the buyer and the seller.

According to UN-CEFACT, e-commerce is the transfer of all business-related information used during the execution of management and consumption transactions in the electronic environment between producers, consumers, government institutions, private institutions and other organizations through electronic means. (Çetin & Çitli, 2012).

According to the Organization for Economic Co-operation and Development (OECD), e-commerce is defined as making all transactions related to commercial activities involving institutions and individuals over internet networks (Erbaşlar & Dokur, 2016). OECD definition is the most widely accepted one in the international arena. According to this definition, it is seen that electronic commerce is a process and consists of the following transactions (Özbay & Akyazı, 2004):

- Conducting research by informing companies on electronic media before trading,
- Meeting of companies on electronic environment,
- Making the payment process of the transactions,
- Fulfillment of commitments, delivery of goods or services to customers,
- After-sales maintenance, support, etc. services.

Electronic commerce according to UNCITRAL, within the scope of commercial transactions, it is defined as the exchange of all kinds of data messages on electronic media by using less complex data transmission methods such as fax and telephone, together with methods such as electronic internet, data exchange, mail (Taştekin, 2018).

According to the European Commission, electronic commerce is defined as the fact that the activities in the enterprises are based on the electronic processing and transmission of written, visual and audio (Dundar, 2018).

As a result of the definitions made by experts, national and international organizations, there are several common features related to the definition of e-commerce. Their common features are listed below (Erbaşlar & Dokur, 2016);

- Electronic commerce activities can be carried out over closed or open networks.
- Buyers, sellers, private/public institutions and organizations and other organizations are parties to electronic commerce.
- Among the tools of electronic commerce; telephone, fax, internet, TV, EDI, radio, ATM, EFT etc. take place.

It is important to define electronic commerce according to the status of transactions made between individuals and institutions via the internet in the electronic environment or at the global level. For this reason, there are different views on the definition of E-Commerce. According to these views, "*electronic commerce is a concept that covers the sale and purchase of all kinds of goods and services using computer technology, electronic communication channels and related technologies (such as smart card-smart card, electronic fund transfer-EFT-, POS terminals, fax).*" (Ersoy, 1999).

Recently, the concepts of indirect e-commerce and direct e-commerce have begun to be used. Direct e-commerce is defined as the online ordering, delivery and payment of intangible products and services such as music listening and downloading programs, software programs and databases. The concept of e-commerce, which is used for products and services made physically with traditional methods, if the order and payment is delivered online, is defined as indirect e-commerce (Yamamoto, 2013).

In the definitions made above, it is not a correct approach to define electronic commerce as different from traditional commerce. For example, finding the cart wheel is

like finding a car tire. They are different from each other but not independent. While defining e-commerce, it should not be a concept independent of trade, but should be defined as a model of doing business that emerges as a result of the use of new methods by those dealing with trade with the introduction of new tools in trade.

In the definitions related to electronic commerce, a definite determination has not been made about which deliveries will be considered as electronic commerce. For this reason, it is necessary to determine which services will be evaluated within the scope of electronic commerce.

2.1.3. Scope of E-Commerce

Due to the developments in the field of information and communication technology, the increase in competition in the world has caused a serious transformation in businesses. With the change in the information management logic of the companies in question, it has led the companies to be more innovative, dynamic, efficient, flexible and competitive. Along with these developments and innovations, e-commerce has become important because it allows the transfer of documents, information, data and records to be used in commercial activities to electronic environment and to carry out these transactions in electronic environment (Yılmaz, 2011).

In addition to traditional commercial transactions, e-commerce also allows the exchange of digital products such as movies, programs and music. In this respect, e-commerce has included the ability to exchange new products and services as well as physical products and services into our lives. For example, in the past, it was necessary to either go to the cinema or buy the CD of that movie to watch a movie, but now it is possible to buy the movie by downloading it online through e-commerce (Kılınçkaya, 2017).

Scope of e-commerce is the whole of the production of commercial products and services over information and communication networks, and the management and marketing of commercial transactions through these networks (Alkan, 2003).

E-Commerce does not only consist of the purchase and sale of goods and services on electronic media, but also it covers wider activities. Therefore, it is not easy to determine the boundaries of e-commerce. However, activities in general within the scope of e-commerce are summarized as follows (Organ & Çavdar, 2012);

- Production, purchase and sale of products and services in electronic environment,
- Taking-giving orders and making deals,
- Promotion, advertisement and information,
- Transfer of intellectual property rights,
- Keeping and monitoring accounting records,
- Fund transfer with electronic bank transactions,
- Transactions related to electronic money,
- Electronic stock exchange and stock market,
- Direct marketing to the consumer,
- Electronic signature, electronic notary, etc. trusted third-party transactions,
- Distribution of digital content,
- Public procurement in electronic environment,
- Instant information creation and transfer,

It can be listed as taxation transactions on electronic media. However, the following activities are within the scope of electronic commerce. (Kelen, 2015);

- Business and transactions between institutions,
- Support services offered in addition to the services provided,
- E-journals and e-books,
- E-ticket applications,
- Online education services.

2.1.4. Features of Electronic Commerce

The electronic commerce environment is a platform where large, small, unorganized, organized, individual or mass producers exist. This environment is not restricted to industrial or manufacturing goods. Electronic commerce is an environment where all kinds of production such as service, idea, information, etc. are in question. Thanks to the unique features of electronic commerce, businesses have had the opportunity to carry out their commercial activities in conditions close to the free market (Yamamoto, 2013).

Although electronic commerce has its own characteristics, its basic features can be summarized as follows (Sugözü & Demir, 2011);

- It is carried out interactively between the business partners.
- In the e-commerce system, it is not simple to determine the market share of the companies and the consumer audience.
- It is simple to reach the target audience in e-commerce.
- E-commerce allows consumers to shop without interruption.
- E-commerce creates a new business and trade culture.
- Although the e-commerce system is reliable in general, it further increases the reliability of e-commerce through new technologies.
- In addition to tracking the preferences and habits of consumers through e-commerce, a personalized trade can be made between the buyer and the seller.
- It is possible to access products and services sold over the internet via e-commerce from anywhere in the world.
- For businesses, e-commerce is the gateway to the world.
- E-commerce allows products and services to be classified and sorted and has the ability to offer these products and services in the same environment.
- Businesses can quickly respond to buyers' purchase requests thanks to e-commerce.

2.1.5. E-Commerce Development Process

The development of electronic commerce has taken place as a process. The developments in the field of communication can be summarized as the invention of the internet and the development of information and communication technologies. Within the scope of the process consisting of three stages, the development of electronic commerce in the world and in Turkey will be explained.

2.1.5.1. Development of E-Commerce in Turkey

In Turkey, as a result of high-speed internet services being introduced into homes together with fiber internet, there has been a significant increase in the number of people using electronic media as a shopping platform. Therefore, the concept of e-commerce has gained an important place in our lives today (Şetvan, 2007).

The developments in the field of internet in Turkey have followed a faster pace than the developments in other technological fields. Ege University pioneered and established the Turkish Universities Research Institutions Network in 1987. This network pioneered the arrival of the internet in Turkey (Karabulut C., 2019).

Internet started to be used in Turkey as a result of the studies initiated by TUBITAK and METU in 1991 on the internet (Demirdöğmez, Gültekin, & Taş, 2018, s.34). The internet was used internationally for the first time on April 12, 1993, via a leased line between Ankara and Washington (Karabulut C., 2019).

The Internet was first used in METU. Other universities followed the university in question between 1994-1996 in terms of internet use. In Turkey, the internet was used in universities in the first years. After that websites such as Ekşi Sözlük and Mynet started to use internet. (Demirdöğmez, Gültekin, & Stone, 2018). Internet use in commercial establishments started in 1994 with the Central Bank of the Republic of Turkey. Widespread use by other organizations and households started in 1997 (Şaklar, 2019).

Türk Telekom lodged the TURNET tender in 1995 in order to popularize the internet throughout the country. As a result of the establishment of the National Academic Network and Information Center (ULAKBİM) by TÜBİTAK and YÖK, an infrastructure system called ULAKNET has been created. With ULAKNET, it is aimed to provide uninterrupted access to national and international resources as a result of increasing information access by universities and R&D institutions (Zerenler, 2013).

With the introduction of Turkey's first internet infrastructure, TURNET, in 1996, new internet service provider companies emerged. With this development, internet service has become available not only to academic institutions and large enterprises, but also to everyone (Gökgül, 2014).

The first legislative work on electronic commerce in Turkey was carried out by TUBITAK on August 25, 1997 (Canpolat, 2001). According to the decisions taken as a result of this meeting, it was decided to establish an electronic commerce network. With this decision, TÜBİTAK started the TUENA application. (Kahveci, 2019). In order to spread electronic commerce in Turkey, ETKK was established under the chairmanship of the Undersecretariat of Foreign Trade and at the same time the secretariat of TUBITAK (Canpolat, 2001).

Applications related to electronic commerce in Turkey have been widely seen in the banking sector. The Central Bank of the Republic of Turkey established the electronic fund transfer (EFT) system as one of electronic commerce payment instruments in 1992 (Central Bank of the Republic of Turkey, 2014). The establishment of the EFT system is important in terms of being the basis for the payment methods to be used in electronic commerce transactions to be made in the following years (Şakirler, 2019).

With the studies initiated by TTNET in 1998, it was aimed to make the internet widespread and cheaper throughout the country (Zerenler, 2013). With the widespread use of the internet in Turkey since 1998, businesses have increased their interest in electronic commerce, and as a result, businesses have tended to operate in the electronic environment.

ETKK continued its activities until 2003. Instead of this board, the Electronic Commerce Board (ETIK) was established to continue the activities of the Electronic Commerce Working Group. In addition to the legal committee under ETIK, 8 different committees were established and studies on electronic commerce development processes continued (Küçükyılmazlar, 2006).

Another important development in electronic commerce is that the Electronic Signature Law No. 5070 was enacted on January 23, 2004. Within the scope of this law, details regarding the legal and technical aspects of the use of electronic signatures are explained (Electronic Signature Law, 2004). This law shows that the issue of Electronic Commerce has become important.

The most important reason for the need for an electronic signature is to provide security in legal transactions, to eliminate uncertainty in identification and to ensure that the transactions made are not denied.

The necessity of electronic signature involves processes such as ensuring security in legal transactions, preventing denial, and correctly identifying the person performing the transaction (Erturgut, 2003).

The Electronic Commerce Directive Working Group was established in 2008 with the support of the Undersecretariat of Foreign Trade and other institutions. Reports that will form the basis of the draft law of electronic commerce started to be prepared by this board. As a result of these studies, in 2010, “Draft Law on the Regulation of Electronic Commerce”

was prepared. This draft was sent to the TGNA, but it was not accepted. The draft, which was re-examined and shaped by the Ministry of Justice, was accepted in 2014 and entered into force in 2015 under the name of Law No. 6563 on the Regulation of Electronic Commerce (Demirdöğmez, Gültekin, & Taş, 2018).

The electronic commerce law aims to regulate the principles and procedures related to electronic commerce (ETDHK, 2014). Various communiqués and regulations have been issued as sublegislation of this law.

The Communiqué on Electronic Commerce Information System and Notification Obligations entered into force in 2017 in order for consumers to shop in a secure environment in electronic commerce and to monitor e-commerce businesses in a healthy way. Based on this communiqué, an information portal named ETBIS was created and put into service in 2017. E-commerce businesses have to register on this platform (Ticaret Bakanlığı, 2019).

We can briefly summarize the developments related to electronic commerce sector in Turkey as follows;

In 1998, the first corporate e-commerce site in Turkey was established under the name infoshop.com. This site continues its activities under the name of Hepsiburada.com (Erbaşlar & Dokur, 2016).

"Sahibinden.com", one of the biggest sites among the electronic commerce and advertisement platforms in Turkey, started its activities in 2000 with 2700 advertisements. GittiGidiyor.com, the e-commerce site established as the first online marketplace in Turkey, was founded in 2001. Mobile phone, television, white goods, computers, clothing, etc. thousands of products have been offered for sale in a total of 4000 categories. It was purchased by E-Bay in 2011. "getir.com", which provides access to many products, mainly food and beverage, via mobile application, started its operations in 2015 (Gugu, 2020).

As of the end of 2004, together with e-commerce sites, 12 banks, including Akbank, Garanti Bank, Halkbank, Yapı Kredi Bank, HSBC, Finansbank, İşbank and Denizbank, have made almost all of the trasactions online. (Şanlı, 2005).

It is seen that the internet in Turkey, initially started to be used in universities and research areas, then it was used in other areas while the first use of the internet was way before it was used in Turkey.

2.1.5.2. Development of E-Commerce in the World

With the development of computer and communication technologies and mobile devices, the internet has become one of the most important concepts of today. Internet usage has increased rapidly and the number of Internet users has exceeded 4 billion today (Erdör, 2019).

The first applications that will form the basis of the Internet are based on the tension between the USA and the USSR. After the launch of Sputnik, the first artificial satellite of Russia, in 1957, the main purpose of the US Department of Defense was to create a network where communication can be maintained in disaster and war situations, and started the "Advanced Research Project Agency (ARPA)" project (Deniz, 2001).

A network called ARPANET was established in 1969 by the Defense Advanced Research Projects Agency to continue its work within the US Department of Defense. ARPANET has incorporated universities and research institutions over time (Gugu, 2020).

The internet, which was designed for military purposes, was later used for academic studies. The network, such as ARPANET, which was created on the grounds of being used in the field of military defense, has become a tool that makes people's lives easier today. Today, with the development of technology, the internet has become cheaper and accessible for everyone. In this direction, it has contributed to globalization by accelerating the development in electronic commerce (Koçak, 2004).

Electronic communication and communication technologies have been used in commerce since the 1980s. However, the use of internet technology in the field of electronic commerce has only just begun. Electronic commerce has shown a trend of increase in direct proportion to the internet. With the widespread use of the internet, websites have become the natural bazaar of e-commerce together with the e-mail application. The use of the Internet to sell commercial products was initially used on a trial basis; however, big companies were born with the services they sell only on the internet, such as Amazon.com and Yahoo. This

showed that the existing internet could be used widely in commerce (Erbaşlar & Dokur, 2016).

Computer and internet were used to serve a limited number of people in the early days. In the process, especially in the United States and Canada, the internet has started to be a tool for electronic commerce since 1995 (Mucuk, 2016).

The increase in the use of the internet in the world, the diversification with the change in marketing methods and the importance of customer services have had a great impact on the development of Electronic Commerce. The development process of electronic commerce in the world is summarized below in a chronological and historical context:

1969: A network called ARPANET was established by the Defense Advanced Research Projects Agency in 1969 to continue its work within the US Department of Defense. The first message was sent via the internet (ARPANET) from a computer at the University of California to a computer at the Stanford Research Center on October 29, 1969, at 22:30 (Erbaşlar & Dokur, 2016).

1971: The first e-mail was sent by Ray Tomilson (Erbaşlar & Dokur, 2016).

1971 or 1972 : ARPANET was used among students at the Stanford Artificial Intelligence Laboratory and Massachusetts Institute of Technology to sell cannabis. This event is described in John Markoff's book "What the Dormouse Said" as the seminal act of trade (Power, 2013).

1978: The first spam mail was sent by Gary Thuerk (Erbaşlar & Dokur, 2016).

1979: The first online shopping system was invented by Michael Aldrich (Erciyes, 2019).

1981: Business-to-business (B2B) online shopping was made for the first time in England by Thomson Holidays (Bafava, 2014).

1982: Minitel Application was introduced in France by France Telecom and used for online ordering (Altun, 2016).

1984 : Gateshead SIS / Tesco made the first business-to-consumer (B2C) online shopping (Erciyes, 2019). CompuServe launched the Electronic Shopping Center in the USA and Canada in April 1984 (Karakaya, 2020).

1985: ' www.symbolics.com' registered as the first domain (Erbaşlar & Dokur, 2016).

1987: Software and shareware were first sold by Swreg. In addition, software developers have started to sell the products they have developed through electronic accounts online (Altun, 2016).

1989: WWW HTML language was created at CERN (Karakaya, 2020).

1990: The first web browser program (www-WorldWideWeb) was written by Tim Berners-Lee with a NeXT computer (Yamamoto, 2013). The first search engine named Archie appeared (Erbaşlar & Dokur, 2016).

1992: The book named Marin's Press written by The Stores of the Future, JHSnider and Terra Ziporyn was published. (Yamamoto, 2013). The first photograph was uploaded to the internet (Erbaşlar & Dokur, 2016).

1993: The web browser named Mosaic was put into practice (Altun, 2016).

1994: The first transaction took place in the field of e-commerce. Musician Sting's music album CD "Ten Summoner's Tales" sold for $12.48 on Net Market's website. The ad, sponsored by AT&T, was served by hotwired.com as the first banner ad. This advertisement was promoting 8 different art museums (Erbaşlar&Dokur, 2016). Navigator web browser was implemented by Netscape in October under the code name Mozilla. Pizza Hut started taking pizza orders online. The first online transaction bank was opened. Orders have started to be taken over the internet, and it has become possible to sell books, bicycles and flowers via the internet (Erciyes, 2019).

1995: The first serious e-commerce site in the USA "Amazon.com" was founded by Jeff Bezos. The online shopping site eBay was founded by Pierre Omidyar. For the first time, non-commercial internet radio stations Radio HK and NetRadio started to broadcast uninterruptedly (Altun, 2016). In these years, the concept of e-commerce started to come to the fore in Turkey (Erbaşlar & Dokur, 2016).

1998: Electronic mail (e-mail) stamps could be purchased and downloaded over the Internet (Karakaya, 2020). The first corporate e-commerce site in Turkey was established under the name infoshop.com. This site continues its activities under the name of Hepsiburada.com (Erbaşlar & Dokur, 2016).

1999: Business.com was purchased by eCompanies for $7.5 million. A software program called Napster, which allows peer-to-peer file sharing, has been put into use (Altun, 2016). Alibaba Site was established in China. The e-commerce volume has reached $150 billion (Karakaya, 2020).

2000: The Dotcom Crisis (dot-com epidemic) occurred (Yamamoto, 2013).

2001: In December 2001, Alibaba.com reached profitability (Karakaya, 2020). The e-commerce site Gittigidiyor was established in Turkey (Erdör, 2019).

2002: PayPal was purchased by eBay for $1.5 billion (Erciyes, 2019).

2003: Amazon.com announced its first operating year annual profit. The company won 73 million $ (Hansell, 2004).

2004: China's first online B2B e-commerce platform, DHgate.com, was established (Karakaya, 2020).

2005 :YouTube emerged on the internet (Bafava, 2014).

2006: YouTube was purchased by Google for $1.65 billion (Erbaşlar & Dokur, 2016).

2007: Business.com was purchased by RH Donnelley for $345 million (Altun, 2016).

2008: Online retail sales volume realized through electronic commerce in the USA increased by 17% compared to 2007 and reached $204 billion (Erciyes, 2019).

2009: Amazon.com purchased Zappos.com for $928 million (Yamamoto, 2013). Trendyol started operations in Turkey (Erdör, 2019).

2011: Online retail sales volume with e-commerce in the USA increased by 12% compared to 2010 and amounted to $197 billion (Yamamoto, 2013).

2012: Mobile applications became popular in e-commerce (Yamamoto, 2013). Website n11.com started operating in Turkey (Erdör, 2019).

2016: Jet.com was purchased by Walmart for $3.3 billion (Karakaya, 2020).

2017: Souq.com, the largest e-commerce site in the Middle East, was purchased by Amazon.com (Karakaya, 2020).

2018: Amazon.com market cap reached $1 trillion (Karakaya, 2020).

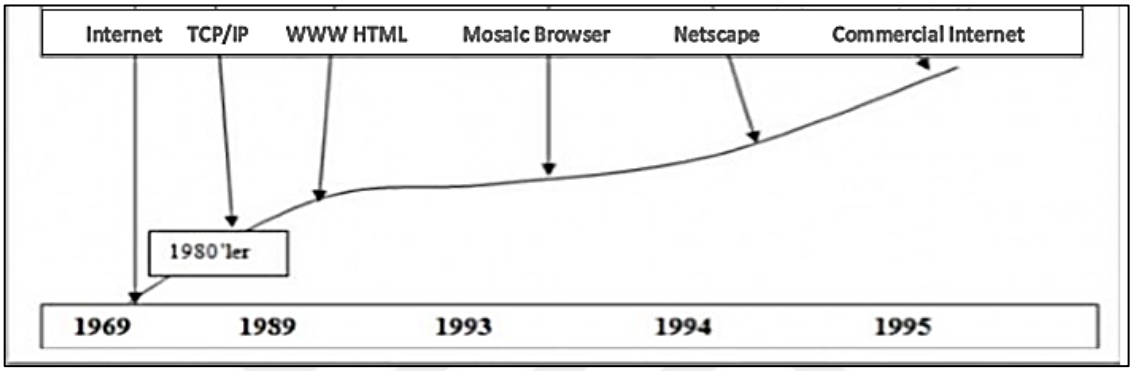


Figure 1. Major Events in the Development Process of Internet and E-Commerce
Source: Erbaşlar & Dokur (2016)

When the development process of e-commerce is examined, it is seen that the use of the internet has increased with the widespread use of e-commerce. In Figure 1, it is seen that the processes are divided into phases in summary, and the greatest development of e-commerce was after 1995 when the internet became widespread.

2.2. Advantages and Disadvantages of E-Commerce

As a result of the developments in the field of information and communication technologies and the increase in the use of the internet, electronic commerce has made trade in the environment widespread. The electronic environment has attracted the attention of people and businesses that trade in the traditional way. Since the nature of the trade carried out in the electronic environment is different, the tools and methods used are different. These differences can create advantages as well as disadvantages for electronic commerce.

2.2.1. Advantages of E-Commerce

Among the marketing methods, the most effective and direct marketing method is internet marketing. Wide range of segments and countries with the provision of access to the distance, monitoring and following consumer attitudes and behaviors is through electronic commerce. The first medium in which advertisements turn into sales is the internet. It directs users to the point of sale with minimum effort (Erdem & Efiloğlu, 2005).

According to Rintamäki et al. (2021), customers experience more pressure to make purchases in physical stores than they do online. The opportunity to touch and feel objects before purchasing them, the physical presence of salesmen, and the sense of urgency engendered by a physical store atmosphere are a few things that may be used to explain this.

From this point of view, electronic commerce provides many conveniences. The advantages of electronic commerce are examined by dividing them into two groups, from the customer side and the seller side.

Advantages of electronic commerce for companies can be listed as (Erdem & Efiloğlu, 2005);

- As a result of reducing costs, marketing to wider and different segments,
- Reduction of marketing stages with effective use of time,
- While consumers are making their purchases, they have the methods to control this process,
- Being able to access information easily and open to interaction with many different methods,
- Being able to access information quickly, continuously and uninterruptedly,
- reducing the barriers to entry to the electronic market and giving everyone equal access opportunity.

Advantages of electronic commerce for consumers can be listed as (Erdem & Efiloğlu, 2005);

- Giving the opportunity to choose a wide range of services and products,
- Immediate response to needs, no time constraints,
- Increasing the quality of services received,
- Giving the opportunity to buy many new products and services,

- Products and services tailored to the wishes of consumers,
- Allowing significant price reductions.

2.2.2. Disadvantages of E-Commerce

The fact that the internet appeals to a wide user community due to its features and that the internet does not require a large investment has caused businesses to be willing to take part in this environment and to establish websites (Erbaşlar & Dokur, 2016). However, there are some disadvantages in electronic commerce where information and internet technology are lacking.

These disadvantages (Sugözü & Demir, 2011);

- It does not appeal to people who do not want to use computers and internet due to security concerns,
- It causes unemployment increase as the labor, storage, archiving, etc. requirements required in traditional trade are eliminated,
- It causes security problems compared to the traditional methods, as there is no opportunity for the buyer and the seller to meet directly,
- The consumer does not have the opportunity to try and examine the product they want to buy,
- In electronic commerce, the buyer has to wait for the shipping time.
- The fact that enterprises engaged in electronic commerce activities are not protected at a high level in terms of security,
- Problems experienced in the product return due to the fact that the buyer and the seller are in different cities or countries,
- Since consumers have the opportunity to compare prices between companies, it becomes difficult for companies that do not have competitive power in the market to make sales,
- The feeling of distrust towards companies excluding global or corporate companies, as a result of consumers refraining from providing card information on the website in transactions made in the electronic environment,
- The differences between the product shown on the websites and the product sent to the consumer can be summarized as differences in quality and visuality.

2.2.3. Differences Between E-Commerce and Traditional Commerce

Electronic Commerce is a new form of impression of commerce. In fact, it can be used in methods and tools used in electronic commerce. The most obvious differences between electronic commerce and traditional commerce usually arise from communication and confirmation processes. There are more than one way in the classical method of performing data transfer. However, the methods used in traditional commerce are not faster than e-mail and other data transfer areas used in electronic commerce. In Table 1, the traditional and electronic trade of the companies that make purchases is shown in a comparative way (Erbaşlar & Dokur, 2016).

Table 1. Comparison of Traditional Commerce with Electronic Commerce

	Traditional Trade	**Electronic trade**
Purchasing		
Methods of Obtaining Info	Adverts, Interviews, Magazines	Internet Pages
Demand Statement Method	Written Form	E-mail
Request Confirmation	Written Form	E-mail
Price research	Interviews, Catalogs	Web Pages
Ordering	Fax, Written Form	EDI, E-Mail
Supply Company		
Stock control	Telephone, Written Form, Fax	EDI, Online Database
Shipment Preparation	Telephone, Written Form, Fax	EDI, Online Database
Waybill Section	Written Form	EDI, Online Database
Invoicing	Written Form	EDI, E-Mail
Person or Company Who Ordered		
Delivery Confirmation	Written Form	EDI, E-Mail
Payment Program	Written Form	EDI, Online Database
Payment	Postal, Wire Transfer, Collector	EDI, EFT, Internet Banking

Source : Erbaşlar & Dokur (2016)

2.3. Tools Used in Electronic Commerce

Commercial transactions performed in the electronic commerce environment are generally carried out via the internet. In addition, in the past, when computer and internet usage was not common, it was performed by means of tools such as telephone, television, EDI, EFT. In order to shop, they need to support each other and most of these communication tools, which are still in use today, provide one-sided communication. Despite this,

commercial activities carried out with these tools, which eliminate the obligation of buyers and sellers to come together, are also included in electronic commerce due to their nature (Coşkun, 2004).

E-Commerce is carried out by using one or more tools at the same time (Akar & Yurter, 2015). There is a variety of tools used in electronic commerce. The vast majority of the tools have been invented and used in daily life before today. E-commerce tools such as EFT, EDI, television, telephone, fax have been in our lives for a long time. This shows that electronic commerce is not a new subject. However, with the widespread use of the internet, it is seen that e-commerce is carried out with newly discovered tools and techniques (Erbaşlar & Dokur, 2016). Electronic commerce is carried out with vehicles used over systems that can be connected via satellite, through systems that carry audio and video over wired networks (Yamamoto, 2013).

The tools used in e-commerce are given in Table 2 below.

Table 2. Tools Used in Electronic Commerce

TV	World Wide Web (www)
Radio	File Transfer Protocol (FTP)
Telephone	E-mail
Fax	Verbal Message (Voice Mail)
Electronic Payment and Money Systems · Cash machines (ATM) · POS machines · Credit Cards	Conference Systems · Teleconference · Video Conferencing · Data Conference
Intranet: Closed Computer Networks · WAS · EFT	Global Systems Technology for Mobile Communication (GSM) · Short Message Service (SMS) · Wireless Application Program (WAP)

Source : Erbaşlar & Dokur (2016)

2.3.1. Traditional Tools

The tools that have been used in electronic commerce for years are telephone, television, fax, EFT, EDI and electronic payment and money systems. Those are the tools used in traditional trade.

Telephone

The telephone is one of the oldest and most important tools of electronic commerce. Since the first long-distance telephone call between the USA and Europe in 1913, it has continued its development and has become today's wireless mobile phone. Telephone was one of the commonly used tools before electronic commerce became widespread (Zerenler, 2013).

The most important feature of the phone is that it has a very common usage area among people. Today, the telephone is still used in a significant part of the services in the activities of the enterprises (Çakırer, 2013). While it is widely used in phone product orders, another important feature is that it is used as a verification tool (Alptürk, 2005).

Recently, it offers service to customers with numbers starting with 444 or 0850, used by large companies and banks. With the use of ADSL, information sharing and access costs have decreased as the problem of busy ringing during internet use has disappeared (Mankan, 2011).

In the past, the telephone was used only as a means of communication between two people, but today, teleconferences and video conferences can be made and the internet can be used at the same time, and the desired product and service can be provided easily (Şakirler, 2019).

Fax

Fax is used to quickly transfer written text and documents from one place to another. In electronic commerce, it has contributed to the ease of commercial transactions as it provides fast communication (Canbaz, 2013). In addition, it adds a formal dimension to verbal communication (Akar & Yurter, 2015). However, factors such as the fact that fax is not a cheap means of communication, that it does not allow voice communication, and that it is not widely used by everyone constitutes the problems of fax (Altun, 2016). Also, the low image quality of the documents sent via fax is another problem. Therefore, the e-commerce transactions to be performed via fax are very limited and generally aim to send documents (Karakaya, 2020).

TV

Television has been an indispensable part of daily life for a long time and is one of the traditional tools of e-commerce (Erbaşlar & Dokur, 2016). Television, which is used by large masses, is a one-way communication tool. Although televisions are one-way, they have a serious communication effect on large masses thanks to their visual and auditory features. In this respect, buyers are informed by means of the definition and advertisement of electronic commerce through television channels.

The shortcoming of television from other tools is that it is a one-way communication tool. With the development of new technologies in the world, televisions can be connected to the internet through some devices. For this reason, televisions continued to become an important tool in e-commerce.

Electronic Payment and Money Systems

ATM machines that allow retail banking transactions, money withdrawal, payment, deposit, money transfer, checking accounts, trading of securities such as stocks and bonds without the need to go to the bank, POS machines that transfer credit card information to the bank via telephone lines, and credit cards have become important e-commerce tools today (Erbaşlar & Dokur, 2016).

Electronic Data Interchange (EDI)

EDI is an important electronic commerce tool that exchanges information and documents through computer networks without using the human factor (Ceran & Çiçek, 2007).

EDI is a system that is effective in reducing the transaction costs of institutions and providing simultaneous information sharing with the external environment. Since the EDI system is not used by other than users, it is only open to users, so it provides confidence to those who use the system (Dereli, 2015). However, due to the high cost of using the system, it has not been widely used.

Electronic Funds Transfer (EFT)

It was introduced in 1992 in order to enable the Central Bank to make interbank payments through the RTGS system. EFT enables fast transfer of money between banks and reduces cash circulation in the market. In addition, banks provide the opportunity to perform an effective and simple fund management, to provide reliable service to the customer quickly, and to monitor bank transactions instantly (Erbaşlar & Dokur, 2016).

2.3.2. New Vehicles

Technological developments in the field of informatics and communication have brought about the emergence of new tools, since the target audience in trade is large. With the use of new tools, the volume of electronic commerce has contributed both in the world and in our country. The Internet is the most used or the basis for the use of other tools in electronic commerce.

Internet (www)

The Internet is widely used by users as one of the tools of electronic commerce. The first steps of the Internet were taken in 1989. The use of the Internet through the "www", which was established on the basis of hypertext (metatext) technology, has ceased to be a tool used only by researchers and institutions such as universities, and has spread to wide circles (Erbaşlar & Dokur, 2016).

It is possible to carry out the process from the production process of a product or service to the final consumer's hand, while it is not possible with other electronic commerce tools.

Making the Internet more effective than other tools; It allows the transmission of image, sound and a written text to be done faster. (Gugu, 2020). Another effective feature of the Internet (www) is that it is simple to access other internet tools such as FTP, gopher, news networks via www pages (Erbaşlar & Dokur, 2016).

The Internet, which is considered to be the most important invention of the world in recent times, continues to develop day by day. Radio reached fifty million users in thirty-eight years, television reached fifty million users in thirteen years, and the internet reached

fifty million users in 5 years. This situation shows the importance of the internet, which has managed to reach a large community in a short time, among e-commerce tools (Altun, 2016).

With the widespread use of the internet in Turkey, it has become the most widely used electronic commerce tool. The summary of the data of the Household Information Technologies Usage Survey numbered 30574 published by TURKSTAT on 27.08.2019 is given below (TUIK, 2019);

- The rate of people using the internet in 2018 was 72.9%. This rate increased to 75.3% in 2019.
- Internet access from home increased from 83.8% in 2018 to 88.3% in 2019.
- While the rate of houses providing internet access via broadband was 82.5% in 2018, this rate was 87.9% in 2019.
- While the rate of online shopping was 29.3% in 2018, it increased to 34.1% in 2019.

When the data of TUIK is examined, it is seen that internet usage is increasing, and there is also an increase in those who shop online. The fact that this situation was valid for previous years, and the internet usage rates for the years 2009-2019 are shown in figure 2. It is observed that there has been a regular increase in internet usage since 2009, and this is due to internet access. In addition, it is seen that the increase in the internet affects the growth of electronic commerce, and there is a regular increase in e-commerce.

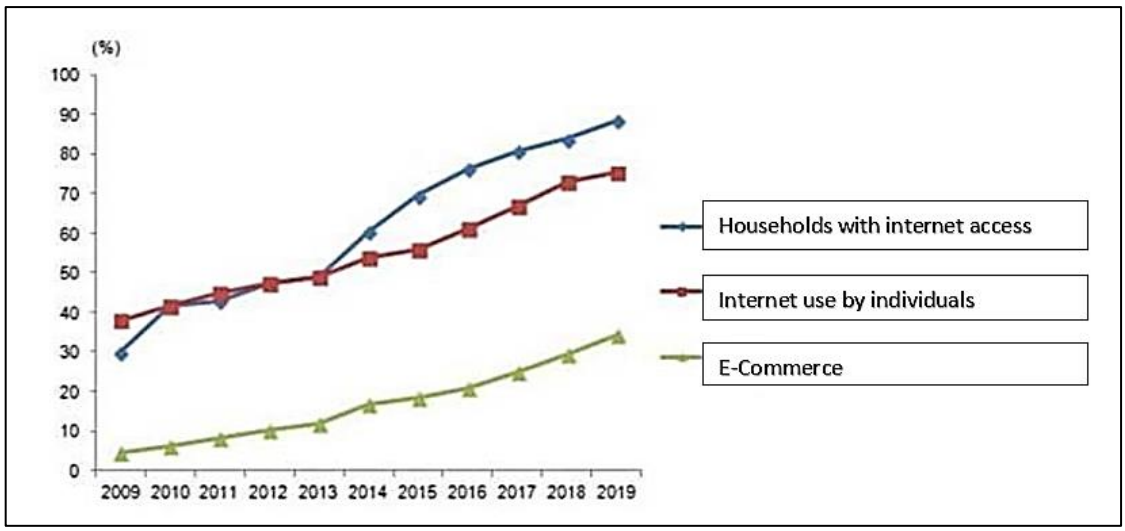


Figure 2. Internet Usage Rates

Source: TUIK (2019)

In the graph, the internet usage rates between 2009-2019 are given, it is seen that both internet access and internet shopping of individuals have increased with internet usage. This shows that the spread of the internet has an increasing effect on e-commerce.

Electronic Mail (E-Mail)

The message, which is sent via e-mail to someone using the internet anywhere in the world over the internet network, reaches the receiver within a few minutes depending on the conditions at the point where the receiver is located. E-mail is a fast and inexpensive method of communication, considering the high cost of long distance calls between countries (Erbaşlar & Dokur, 2016).

Today, an e-mail address is requested during the registration process of the product or service to be purchased through electronic commerce. After the necessary information is entered during the product or service order, an information mail is sent to be confirmed via e-mail. In this respect, the e-mail address can be considered as a type of personal electronic address identity (Şakirler, 2019).

In Turkey, KEP is accepted as an e-mail or mail that complies with international standards, legally valid and technically secure (PTT, 2020). KEP is an electronic mail system that is signed by using an electronic signature and a timestamp. KEP assures who the sender and receiver of the message are, what the sent messages are and whether their content is not changed by others (Şakirler, 2019).

In the 18th article of the Turkish Commercial Code; *"Denunciations or warnings between the merchants regarding default of the other party, termination of the contract, withdrawal from the contract are made through a notary public, registered letter, telegraph or registered electronic mail system using a secure electronic signature."* In this statement, the legal validity of KEP has been mentioned (Turkish Commercial Code, 2011). At the same time, KEP has legal validity both in tax laws and according to the provisions of the notification law. This situation reveals that e-mails can be used as a legal evidence.

File Transport Protocol (FTP)

FTP, which means file transport protocol, is a network protocol that allows file exchange between systems of computers on the internet (Erbaşlar & Dokur, 2016). While transferring files with FTP, after establishing a connection between two computers, receiving and sending files between computers are performed with the help of a series of commands created with FTP (Şakirler, 2019). FTP is an effective tool that enables the transfer of files from one computer to another, as in Figure 3 (Karakaya, 2020).

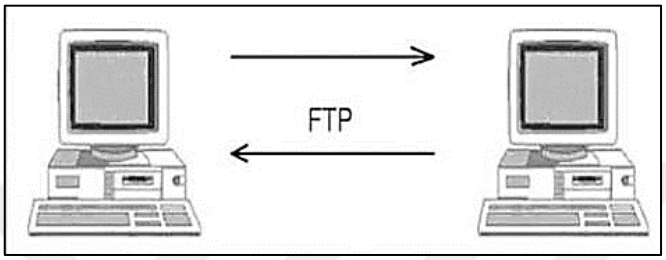


Figure 3. Transferring Files Between Computers Using FTP
Source: Karakaya (2020)

Radio Application Program Protocol (WAP)

It is a technology that provides internet content over mobile communication tools such as handheld computers and mobile phones. With the development of GPRS and 4,5G technologies, it has started to lose its importance (Erciyes, 2019).

Since more advanced technologies are used in smart phones as an alternative to WAP, its use in e-commerce is decreasing.

News Networks (USUNET)

News networks are based on the work of two graduate students at a university in the USA in 1979 (Erbaşlar & Dokur, 2016).

USENET is a discussion platform where different news and articles are posted, where many network users from different parts of the world meet. On this platform, discussion groups such as newsgroups are classified according to their topics and created in a certain hierarchy. Users send their messages to the appropriate chunk. Mail sent by users is

transmitted via a protocol. After the message sent by a person is classified, it can be read from anywhere in the world through the USUNET Service Server (Erbaşlar & Dokur, 2016).

There are many different newsgroups in the USENET structure. Network News - Newsgroups examples are given in Table 3.

Table 3. Newsgroups - Network News

Group Name	Explanation
Bionet	Biology related research
Biz	The business world
Comp	Computer
News	News about network news
Rec	Games, hobbies
Sci	Scientific topics other than biology research
Soc	Social discussion groups, different ethnic and cultural groups
Talk	Issues related to politics

2.4. Payment Methods Used in E-Commerce

The most widely used payment tool in electronic commerce transactions is the credit card. Apart from this, payments can be made for transactions performed in electronic environment by using bank cards (debit card), virtual card, prepaid cards, mobile phones and mobile applications (Özmen, 2013). With the widespread use of electronic commerce, many different payment instruments have been developed in order to make secure payments (Gugu, 2020).

BKM Express was developed as a payment system in our country in order to spread electronic commerce. Payment systems such as PayPal, iPara, PayU, online wallets and mobile payment systems, which are widely used in electronic transactions in the world, are included in the electronic commerce ecosystem (Özmen, 2013).

In traditional commerce, the customer sees the product, inspects it, and ultimately pays, which is not possible in electronic commerce. For this reason, payments are made electronically through the banks of both parties (Gugu, 2020).

Credit Card

It is a payment tool that allows the customers of institutions authorized to issue cards to purchase goods and services and withdraw cash loans within the limits determined by them, without using cash. Credit card is also called plastic money (Erciyes, 2019).

Credit Card is one of the most frequently used fast payment methods in electronic commerce transactions. The fact that the user base is widespread and has a standard infrastructure in most of the countries has made it a more preferred payment method in electronic shopping. The security of shopping is ensured by using SSL and SET protocols that encrypt this information in order to prevent the card information from being captured by someone else when shopping (Erbaşlar & Dokur, 2016).

The fact that the credit card is a solution tool in payment systems, together with the internet, has made a great contribution to the spread of electronic commerce. The use of credit cards is increasing, and it has a positive contribution to the expansion of electronic commerce as it allows a simple payment process.

Electronic Money

Electronic money has emerged as an alternative to cards with magnetic tape as a result of digital technological developments (Öztürk & Koç, 2005). Electronic money is a currency developed to be used in electronic shopping. It is possible to describe it as the electronic equivalent of store checks that are generally used. People who want to benefit from the electronic money system should open an account in any of the banks where the business is working by downloading the software programs developed by the businesses providing this service (Erbaşlar & Dokur, 2016).

Electronic money software enables the desired amount of money to be withdrawn from a bank account and stored electronically for use in electronic shopping. When shopping online, e-money containing serial numbers is deleted from the computer of the person making the purchase and transferred to the computer of the interlocutor (Erbaşlar & Dokur, 2016).

Virtual Card

The fact that credit card information has the risk of being accessed by others has led to the development of a new payment system, called virtual card, to be used in transactions made in electronic environment via the internet (Karagül, 2013).

A virtual card is a credit card that is not used physically, but only used for electronic shopping. Virtual Card, by connecting to the bank account used by the user, contains the credit card information numerically. The virtual card contains the card number and security number (Çakırer, 2013). It is a card where the user can set the limit of the card. The cardholder can set his limit as much as the amount he will shop at each time he makes a purchase. Therefore, the risks that may arise from the use of unauthorized persons are minimized.

Electronic Check

Electronic Check is a bank payment tool that is reliable enough to be used on the internet, where the payment is committed with a digital signature without using paper (Genç, 2013). E-Check is a payment tool that allows sites that operate in the electronic environment to evaluate and process the payments they make as check. The e-Check application was developed in the USA by the Financial Services Technology Consortium using a markup language called SDML (Elibol & Kesici, 2004).

In the electronic check system, it is done without the need for a credit card by using the necessary bank account information. The user pays a kind of electronic commerce site by issuing a check (Erbaşlar & Dokur, 2016).

PayPal

Paypal is the name of a service that transfers money under the supervision of a single institution through digital passbooks opened in electronic environment (Yamamoto, 2013). PayPal is an alternative payment method that allows people to shop electronically or transfer money to people they want by using e-mail without the need for card users to use their credit card information (Altun, 2016).

Card Users, who are uneasy about sharing their information on the sites they shop for security reasons, open a PayPal account in this system and make their payments from this account. The account created in the PayPal system is linked to a credit card. Card information and delivery information are protected by PayPal with encryption method (Özmen, 2013).

In the PayPal application, which has users from many countries, users of this system are divided into four groups according to their options to receive the money saved in their PayPal accounts (Altun, 2016);

- Those in the first group can transfer their accumulated money to their bank accounts in their home countries or to their bank accounts in the USA.
- Users in the second group can transfer their accumulated money to their bank accounts in the USA or request them in the form of a check.
- Users in the third group, including Turkey, can only transfer their savings to their accounts in a US bank.
- Users in the fourth group can only transfer money with their PayPal accounts, but cannot receive money.

PayU

PayU is a subsidiary of Nasper, which includes e-commerce and media brands. PayU is a system that started its operations in our country in 2011 and allows payments to be made within the framework of a single contract or agreement without using a virtual POS for purchases made in the electronic commerce environment. Thanks to the virtual POS of the system, electronic commerce transactions can be made with a credit or debit card. The payment page complies with international security standards (T.C. Ministry of Development, 2013).

iPara

iPara is an online payment system launched on 14 November 2011 by Gittigidiyor.com founders. It was purchased by Multinet in February 2013. In this system, online customers who want to shop from electronic commerce platforms that have a contract with iPara are provided the opportunity to shop by entering their iPara passwords via e-mail without having to provide their credit card information (Özmen, 2013).

BKM Express

BKM Express payment system, developed by BKM with banks and active companies of the electronic commerce sector, is a modern system that enables shopping for card payments made on the internet. The most important and distinctive feature from other payment systems is that it is the only service offered with the support of all banks. BKM Express system, which was developed as an alternative to the 3D Secure system, works like PayPal in e-commerce payments, but this system does not have the features of sending money or receiving payments to people (T.C. Ministry of Development, 2013).

International Security Platform (3D Secure)

Different applications have been developed to increase security in payment systems in digital environments. One of these applications that is widely used is the 3D Secure Payment System (Yamamoto, 2013). The 3D Secure system, developed by MasterCard and Visa, is a system in which additional authentication is made by using a password valid by the card issuing bank while shopping (Altun, 2016).

This system appears as a verification system for card users as a 3D payment option during payment transactions on electronic commerce platforms. 'Verified by Visa®' and 'MasterCard® SecureCode' logos mean that purchases made from related merchants are under the guarantee of MasterCard and Visa. By this means, both cardholders and member merchants are secured against possible cyber theft (Altun, 2016).

Pay at the door

Payment at the Door System is among the payment systems that have become widespread in recent years. In this system, the price of the product sent by the seller is paid in the form of cash or credit card to the cargo company officials during the delivery of the order (Gugu, 2020).

Payment at the door system is perceived as more reliable for buyers. The reason is that in electronic shopping, sometimes a different product is sent instead of the desired product, and the buyer has the opportunity to return the product during delivery process without

receiving it. Another reason is that buyers who are uneasy about sharing their debit or credit card information prefer this payment method more (Sugözü & Demir, 2011).

Apart from those, there are some shortcomings in this payment method in terms of e-commerce sellers. The most important of these deficiencies is that the product does not reach the buyer or the customer who requests the product gives up the product until it reaches the cargo door. The shipping fee of the orders that cannot be found or for some reason is not delivered is paid by the seller (Özmen, 2013). Such problems experienced by the seller put the sellers in a difficult situation regarding the use of the payment system at the door.

Mobile Payment

It is a payment system that allows businesses to make collections through GSM networks. In order to use this system, businesses must register on this site. Payment is made by adding the cost of the shopping to the telephone bill (Erden, 2014). This payment system is one of the methods businesses use to increase their sales. The mobile payment system is widely used in the purchase of digital programs and games downloaded to be used on smartphones. For the use of the mobile payment system, an ordinary smartphone is sufficient.

EFT and Remittance

Remittance method is the money/funds transfer between the accounts of different individuals and institutions in the same bank. EFT, on the other hand, is the money transfer transactions made between different banks. It is one of the methods used by the buyer to pay cash fees to the seller, especially in electronic commerce transactions (Sugözü & Demir, 2011).

Cryptocurrencies

Cryptocurrencies have entered the ecosystem with bitcoin since 2009. Although Cryptocurrency is a new product, it has become important as a payment method in e-commerce with its rapidly growing variety of options. When trading any product or service with intermediary institutions such as Visa and MasterCard, it avoids the costs and

commissions that arise by sending the money from its own digital wallet to the seller's digital wallet in the form of electronic codes (Özsoy, 2019).

Although cryptocurrencies are discussed under the title of electronic money, the origin of these currencies is the currencies used at a global level, which is secured by a blockchain technology without being dependent on any central authority (Gürleyen, 2019).

Along with the advantages of cryptocurrencies, there are also some problems. At the beginning of these problems is the prediction that the use of crypto money will cause tax evasion. In addition, there is not enough infrastructure related to cryptocurrencies. The system may not work due to power cuts, line failures or some problems. Thus, cryptocurrencies cannot be used and payments are delayed. Despite this, it is becoming increasingly popular today and is envisaged as a payment tool that will become more widespread in the future (Gugu, 2020).

Other Payment Methods Used in E-Commerce

In electronic commerce, different payment methods are used according to the nature of the transactions. Apart from the abovementioned payment methods, a number of payment methods have also been developed. Some of these payment methods are given below (Elibol & Kesici, 2004);

Escrip: A tool usually used for payments such as donation payments.

IPIN: A system that reflects internet expenses on ISP bills,

PCPay: A smart card based system,

ECharge My Phone: A system integrated with the phone bill,

First Virtual: It is a system where a third party collects the payments and transfers them to the relevant parties.

In Electronic Commerce, it is important that payment methods are diverse, secure, comprehensive and fast.

2.5. Types of E-Commerce

The classification of electronic commerce is generally classified according to the nature of the activities carried out in the electronic environment and according to the relationship between the parties.

2.5.1. Types of Electronic Commerce by Activities

In electronic commerce, the internet has made it possible to trade both tangible and intangible products. According to the nature of the products in electronic commerce, it is divided into two as indirect electronic commerce and direct electronic commerce (Özdemir S., 2013).

2.5.1.1. Indirect Electronic Commerce

In the indirect electronic commerce method, payment and order are made on the internet, while the delivery of the purchased product is made physically with traditional methods. In some cases, payment can be made physically with applications such as payment at the door. In this method, since the delivery of the product is made physically, the effect of customs taxation continues. This method of commerce is called indirect e-commerce (Keleş, 2019).

2.5.1.2. Direct Electronic Commerce

In the direct electronic commerce method, all stages of the trade begin in the electronic environment and are completed in the electronic environment. Namely, in this method, after the order and payment are made electronically, the product is delivered electronically. The products in question are not physical products as in the traditional method, but non-physical products. For example, virtual education, movies, music, software products, consultancy services. Since these products are not actually delivered, they are more difficult to be subject to customs procedures and taxation. Today, however, governments still use technology to tax and track this e-commerce. Governments usually tax such services with the source deduction method.

2.5.2. Types of Electronic Commerce in Terms of Relationships Between Parties

We can gather the parties using electronic commerce under three main headings. These are companies (businesses), consumers (citizens) and the government. Although similar applications and technologies are used in electronic commerce, the classification according to the parties of the transaction is as follows (Keleş, 2019).

Table 4. Types and Parties of Electronic Commerce

Types of Electronic Commerce		**Requesting**		
		State	**Businesses**	**Consumer (Citizen)**
presenting	**State**	G2G (Coordination)	G2B (Information)	G2C (Information)
	Businesses	B2G (Purchase)	B2B (Electronic Commerce)	B2C (Electronic Commerce)
	Consumer	C2G (Tax Payment)	C2B (Price Comparison)	C2G (Auction)

Source: Özdemir S. (2013)

The use of all of the above-classified jobs has not become widespread, and the way they operate has not been clarified. However, the most common ones among the parties in the table are electronic commerce between businesses (B2B) and electronic commerce between businesses and consumers (B2C), which are becoming more and more common (Keleş, 2019).

The aim of the parties in electronic commerce is to provide more benefits with less cost. Technology reduces the communication costs between the parties in the field of e-commerce as in most areas. Thus, parties can communicate faster with less cost.

2.5.2.1. Business-to-Business (B2B) Electronic Commerce Model

The B2B electronic commerce model, which is the trade model in which companies aim to sell their goods and services to other companies by creating catalogs, is called "Business to Business" (Erbaşlar & Dokur, 2016).

The B2B e-commerce model is rapidly developing and becoming widespread due to the advantages it provides to the parties. We can count the factors that develop the B2B e-

commerce model as the rapid spread of internet use in the business world, its growth, dynamism, extraordinary changes in costs, increased transaction speed and the interest of large enterprises (Buluş, 2016). The impact of the B2B e-commerce model on the stock and inventory systems of the enterprises has been inevitable. With the B2B e-commerce model, companies get rid of the costs caused by idle stocks and can establish and manage their stock methods on more realistic foundations (Özdemir S., 2013).

B2B e-commerce model, which expresses the provision of goods or services from company to company, is one of the first commercial transactions carried out in electronic environment. Since consumers are not a party to these transactions, companies using this e-commerce model are not known to the public. However, electronic commercial transactions between companies constitute the majority of transactions made in electronic environment. The B2B e-commerce model constitutes the most successful and stable examples in the internet environment today. Intercompany electronic commerce constitutes a large part of electronic commerce in the USA, and the use of this model is very common (Maimaiti, 2019).

In this trade model, companies communicate with other companies in a virtual environment in order to supply the goods and services they need. Usually, companies do not see each other and only trade takes place in the virtual environment.

The working model of e-commerce carried out by companies over the virtual environment is summarized in the figure below.

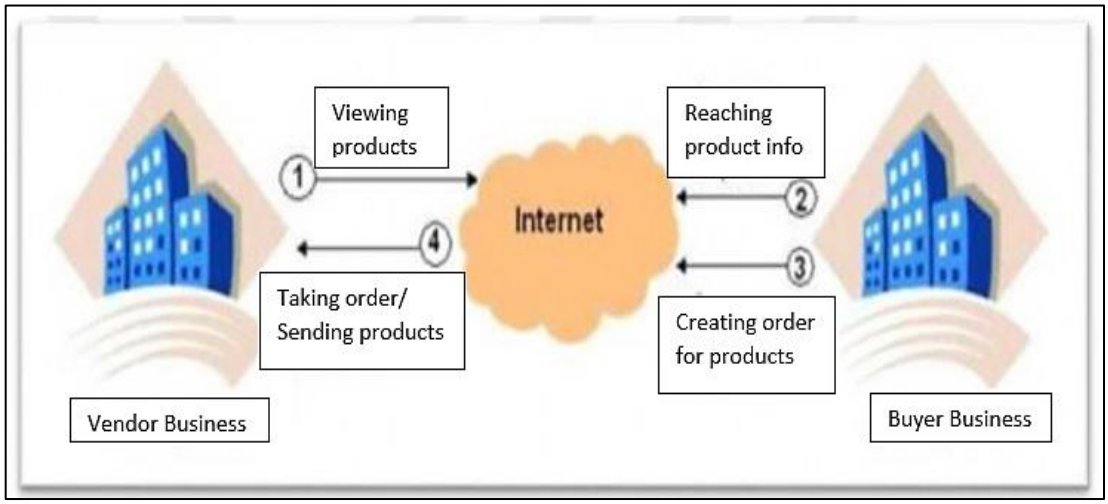


Figure 4. Working Method of B2B Electronic Commerce Model

2.5.2.2. Business-to-Consumer (B2C) Electronic Commerce Model

The process in which companies aim to sell to final consumers through virtual store applications with the help of internet and computer is called company-consumer electronic commerce (B2C). Virtual stores, which can be sold all over the world without time and place constraints, have decreased the sales prices as the companies reduce their marketing costs. For this reason, the B2C e-commerce model is spreading rapidly and its usage area is increasing. Namely; A business-to-consumer e-commerce model is applied in areas such as shopping, news, finance, entertainment, and travel (Maimaiti, 2019).

In the e-commerce model between the company and the consumer, information such as price information, return and delivery conditions, warranty conditions of the products and services to be purchased are presented in the virtual environment and the consumer performs order and payment transactions in the virtual environment via the internet. The growth share of the company-consumer e-commerce model is lower than the B2B model. The main reason for this is; Although the B2C e-commerce model is for retail sales and has a lower volume in terms of quantity and amount, the B2B e-commerce model is for wholesale sales (Keleş, 2019).

The working system of the company-consumer electronic commerce model is given in figure 5.

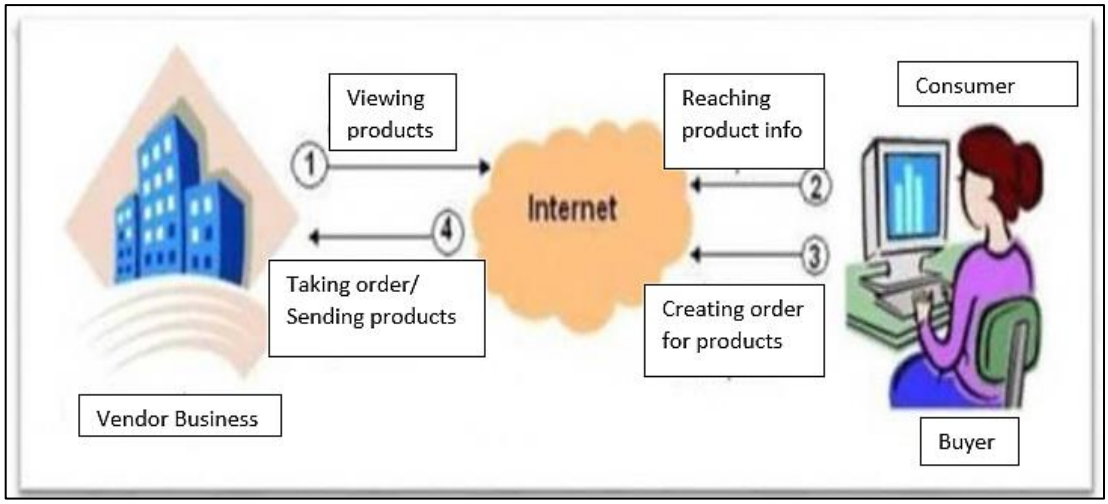


Figure 5. Working Method of B2C Electronic Commerce Model

Source: Erbaşlar & Dokur (2016)

The B2C e-commerce model, which is the type of shopping made by the end consumers over the internet, is spreading rapidly due to the developing technology today. Thanks to the more common electronic devices such as phones and tablets, shopping on companies' virtual sites has become very fast and easy.

2.5.2.3. Business-to-Goverment (B2G) Electronic Commerce Model

It is a type of electronic commerce between companies and public institutions. Public institutions have to have some tools and facilities in order to serve the citizens. Now, public institutions also purchase goods and services from companies for these tools and investments via the internet. E-procurements of public institutions can be given as an example of electronic commerce between the company and the public administration.

Another dimension of electronic commerce between the company and the public administration is the websites used by the government to exchange data with companies. Public administrations receive and process statements from companies in areas such as taxes and customs in electronic form, and payments and similar transactions are made online. Thus, public institutions can provide fast and qualified service with minimum cost.

2.5.2.4. Citizen-to-Government (C2G) Electronic Commerce Model

Citizens can perform many services such as social security and taxation, which they receive from state institutions, over the internet. In the C2G e-commerce model, the usage area is increasing day by day with the start of providing services such as "passport, driver's license, marriage, death registration" (Keleş, 2019).

The services that citizens benefit from on the websites of public institutions increase the welfare of the citizens and increase the accessibility of the services. In our country, the use of e-government applications, which has increased in recent years, has a great contribution to the state and citizens. For example, a citizen who needs an official document should apply to a public institution and get this document. However, if the citizen uses e-government application, he will be able to obtain the document he needs in a very short time over the internet. In this way, citizens will meet their needs without incurring any trouble and cost, and the state will provide services without incurring personnel and stationery expenses.

2.5.2.5. Consumer-to-Consumer (C2C) Electronic Commerce Model

The consumer-to-consumer electronic commerce model defines the virtual trade between two consumers. It is still widely used in Turkey. In this model, people who want to sell their products usually advertise on the website and make sales and payment transactions on the same site. The website, on the other hand, mediates this electronic commerce and receives a commission. Some websites, on the other hand, advertise the products to be sold within the rules they set, and the sale and payment of the product are actually made. Examples of these two processes are available in Turkey. Examples of these e-commerce sites are gitgidiyor.com, n11.com, sahibinden.com, letgo.com, and armut.com, where goods and services are traded.

2.6. Gamification

2.6.1. Game Concept

The game is a goal-oriented activity in which inadequate tools and methods are deliberately chosen. While the rules in the game allow better and worse tools and methods to be used equally; Just following the rules alone is not enough to win. The rules of the game are inseparable from the purpose of the game. Because breaking the rule in a game makes it impossible to reach the goal. If the rules are broken, it becomes impossible to reach the goal. Unless the rules of the game are followed, the game is not actually played and cannot be won unless the game is played (Suits, 2012).

If we define the game in terms of form, we can express it as an action that feels outside the ordinary life, is free and fictional, and has the ability to absorb the player completely (Huizinga, 2013). The aim of the player in playing the game is to participate in the game, to win the game or to be ahead of other players in order to finish the game in the first place. The purpose of participating in the game is not like a part of the game, this purpose is only one of the human-specific goals such as wealth, fame, security (Suits, 2012). It provides a unique and absolute order within the boundaries of the playground. The game is the order itself, the violation of this order spoils the game, destroys the quality and value of the game (Huizinga, 2013).

The game is explained as an activity where following the rules constitutes part of the purpose and the rules of the game can always be replaced by other rules, and the player can always leave the game. The reason why we obey the rules in a game is that the rules create the necessary conditions to enter the event. Games are activities where the rules are not separated from the aims, as well as the activities where adherence to these rules is never binding. It is possible for a person playing a game to have rules out of the game that go beyond the rules of the game (Suits, 2012).

The community of players exhibits a general orientation towards continuity, even if the game is over. The desire to leave together and go beyond the general measures is not limited to the playing time (Huizinga, 2013).

Classical definitions in game studies state that open rule systems and the actors involved in these systems are characterized by competition for separate goals or outcomes (Deterding et al., 2011). Play is a formal system that is complete and self-sufficient in structure, representing the reality subset. Poorly designed games allow situations not addressed by the rules to develop. However, a properly designed game prevents this situation, the rules cover all the possibilities encountered in the game (Crawford, 1982).

Origin of the game has been defined as the way to get rid of excess life energy. According to other theories, the living being is under the rule of innate imitation while playing, satisfying the need for relaxation or preparing for the serious activities that life will demand from him, or enabling man to control himself. In some assumptions, at the root of the game, there is a desire to dominate and a search for being able to do something or determine something in the need of competition. According to some theories, play is the fulfillment of a tendency that leads to acting too one-sidedly, or the fulfillment of desires that cannot be realized in real life, thus eliminating the sense of personal self (Huizinga, 2013).

The basic elements in the definition of game, constructed by Elliot Avedon and Brian Sutton-Smith, deal with the use of control systems, volunteering, the fact that the game is a competition and producing an unbalanced result. Games are an exercise in systems of voluntary control, which is a competition between rules and constrained forces to produce an unbalanced outcome. Avedon and Sutton-Smith's definition of play distinguishes it from

less formal game activities, but does not include all the elements found in other authors' definitions of play (Altarriba, 2014; Salen and Zimmerman, 2003).

Before David Parlett defines the game, he discusses the distinction between official and informal games. Official games are developed games that serve a specific, non-entertainment purpose (Sailer et al., 2017).

Salen and Zimmerman (2017) defined the game as a system that gives measurable results in which players enter into an artificial conflict defined by the rules.

Greg Costikyan expresses the game as “a structure that has an inner meaning and that the players in the game absolutely have a goal”. The definitions created by several theorists and designers are generally of similar nature, and in most concepts such as 'rules', 'goals', 'fun', 'problem solving' are repeated. Therefore, it would not be wrong to define the game as follows. The game is a problem-solving activity that approaches the subject with a fun attitude (Altarriba, 2014; Salen & Zimmerman, 2003).

In an article he published, Richard Bartle researched why different people play games with a large social aspect. Bartle has divided the players of such games into four groups: Socializer, Explorer, Achiever, and Killer. While the categories are complementary, they provide a basis for understanding what a user expects from a gaming experience (Denton, 2020).

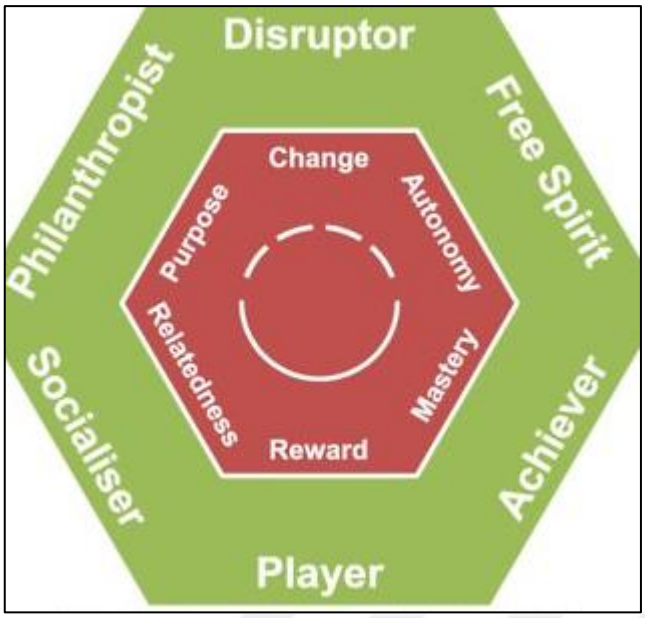


Figure 6. Andrzej Marczewski's User Segmentation Model in Gamification
Source: Altarriba (2014)

Clark C. Abt explains the definition of game in a traditional way as follows. It is an activity that tries to achieve the goals of two or more independent decision makers in a restrictive context with rules between opponents trying to win the game in line with the goals. Clark C. Abt mentions four basic terms while describing the game;

- The game is an activity,
- Games allow players to make active decisions,
- Games have goals,
- There are rules that limit and structure game activity.

Games are structures that exist with their formal elements and have dramatic elements that give players experience. There are physical and conceptual limits to the rules of the game. When playing a game, we put aside the rules of life and take the rules of the game into account. Actions in the game have no real-life consequences. Game systems are closed systems separate from the real world. Games interact with players by involving them in a conflict structured by their formal and dramatic elements. Players try to achieve their goals by following the rules and procedures in the game. Games reveal the winner by producing solutions with unequal uncertainties and end this uncertainty (Fullerton, 2014).

An official game definition has two main components. Those are the rules and materials accepted in a competition which has a goal. In both components, the idea of winning by rules is the basic idea for the game definition. Chris Crawford (2003) describes game in four basic categories, which he calls representation, interaction, conflict and reliability.

- Representation: The game is a closed system that subjectively represents a subset of reality. The game constitutes a subjective and deliberately simplified representation of emotional reality.
- Interaction: The only way to properly represent the complex webs of cause and effect where everything is interconnected is allowing the viewer to explore, generate causes, and observe their effects.
- Conflict: Conflict, which is an inherent element of all games, is always present in the game, arising from the interaction in the game.
- Reliability: The game is a tool to provide psychological experiences of conflicts and dangers while excluding their physical realizations (Salen & Zimmerman, 2003).

To summarize, the game is a non-real environment where the players try to achieve their goals by obeying the rules and interacting among themselves.

2.6.2. Game Features

It is claimed that game is an important behavior that facilitates creativity and therefore innovation both in the natural world and in human society. The concept of game applies to thoughts as well as visible actions. The majority of the game can go on in one's mind and may not manifest itself in overt behavior. Although there is often a time gap between the gaming experience and the beneficial results, the impact of the game can be immediate in some cases. In such cases, the individual acquires skills that increase his timelines and solves the problem with a chance of survival or an immediate benefit (Bateson & Martin, 2013).

A game presents itself as an integrated experience, but it is made of smaller parts. These are called game elements. It is noted that some of the elements are objects, some are relations and some are abstract concepts. In the Microsoft Language Quality Game, the game

elements include the competition between international offices and a score table that allows participants to compare their performance (Werbach and Hunter, 2012).

Juul (2003) defines games as "official rule-based systems with a variable and measurable outcome, in which different values are assigned to different outcomes". The player strives to influence the outcome, feels connected to the outcome, and the results of the activity in the game are also optional. Salen and Zimmerman (2003) explained the game elements with four basic elements:

- Players: They are important elements that interact with the game system to create artificial experiences different from everyday life.
- Conflict: It includes competition and cooperation between players as well as the struggle against the game system.
- Rules: They determine the game limits and freedoms in the system.
- Numerical result: it is one of the items that result in winning, losing or numerical points at the end of the game.

McGonigal (2011) explains some of the game elements as feedback system, voluntary participation and voluntary play. *Feedback system*; it informs the players about the achievements, points, level and scores and creates a preview of the proximity to the next goal, keeping the player motivation constant. *Voluntary participation;* it allows players to accept the game by knowing what the features in the game are. *Volunteer game* ; it provides the basis for more than one player to participate in the game, ensuring that challenging and stressful game activities are experienced in a safe and enjoyable environment.

Elements of the game, in other words game-specific elements, can only be complex when there are no visual elements such as progress bars. Game elements can be classified into various levels of abstraction. Some examples of concrete elements are badges and leaderboards typically seen in games. Abstract examples are time constraints and game styles (Cheong, Filippou, & Cheong, 2013).

The game is designed with empowering contexts, interactions and mechanisms that create a more immersive game feel. A game is an inherently persuasive piece of work because it is voluntary and goal-directed in nature. While the games move towards their goals, they do this in a non-coercive way like persuasive technologies (Werbach, 2014). As Huotari and Hamari point out, games experiences include feelings of pleasure, tension, or

mastery. A successful game is interesting and players undertake to play it voluntarily (Werbach, 2014). The player's experience is affected not only by game elements, but by the interaction of all elements and how well the gamified activity or system adapts to its goals (Cheong, Filippou, & Cheong, 2013). When players complete missions, they are expected to have positive emotions due to overcoming challenges. The games try to provide and increase these emotions with reward missions that instantly recognize the success of the players. The missions give them points, trophies or items when they are completed. On the other hand, when players fail, they are expected to feel anxiety. A degree of anxiety is acceptable and it is undesirable to turn into frustration. To avoid this, mission strings are carefully designed to suit players' skills at any level, with low penalties for not encouraging trial and mission repetition. If the difficulty of the tasks is balanced correctly, it can make the players highly motivating (Dominguez et al., 2013).

2.6.3. Gamification Concept

The first emergence of the term gamification started to gain momentum with the term “applying a game-like accelerated user interface design to make electronic operations more fun and faster” produced by computer programmer Nick Pelling (Herger, 2014; Werbach and Hunter, 2012).

Gamification means the use of game elements and game design techniques in non-game contexts (Werbach & Hunter, 2012). In another definition, gamification is the use of game elements in non-game areas in order to increase the user's experience and participation (Deterding, 2012). According to another definition, gamification is characterized as solving problems using game mechanics by involving users in the game thinking process. Understanding this framework makes gamification both powerful and flexible. It can be easily applied to any problem that can be resolved and can affect people in terms of motivation and behavior (Zichermann and Cunningham, 2011). Gamification uses game mechanics, or functional game elements like leaderboards or points, to pique players' interests and spur them on to greater competition and rewards (Rodrigues et al., 2021a). A game is a system that elicits an emotional response in which players engage in an abstract challenge with rules and feedback, resulting in a measurable outcome. Gamification, on the other hand, uses game-based mechanics and game thinking to solve problems by encouraging motivating actions to energize people (Deterding, 2012).

Gamification is about applying game mechanics to non-game activities in order to make the game more interesting. Typical game mechanics include levels, badges and achievements to generate interest and maintain interaction (Routledge, 2016).

According to Kapp (2014), gamification is the use of game-based mechanics, game thinking and aesthetics for the purposes of bringing people together, encouraging learning, providing motivation and solving problems. From this point of view, it can be said that points, awards and badge applications, which are often considered as gamification, are not gamification, and games are the least useful components (Kapp, 2012).

Werbach and Hunter (2012) define game elements as a gamification toolkit. They refer to game elements as unique features of games that can be applied in gamification.

Scot Harris and Kevin O'Gorman (2014) define gamification, based on gamification.org's definition, as "the presence or addition of game-like features in anything that is not traditionally considered a game". Gamification refers to a service development process to support user value creation and enjoyable experiences. It shows that the use of game design elements can enhance the user's experience and outcome. It expresses the utilitarian side of gamification since the user should support the creation of value (Stieglitz et al., 2017).

It is evident in the Gamification 101 whitepaper prepared by the Bunchball company, one of the most successful proponents of gamification techniques: "Gamification is the application of game mechanics to non-game activities to change people's behavior" (Fuchs et al., 2014).

Gamification takes motivational techniques that video game designers have used for years to motivate players and uses them in non-game contexts. These techniques include, but are not limited to, giving users goals to achieve, rewarding them with badges, engaging them in competition, encouraging them to collaborate in teams, giving them status by leveling up, and getting them to win. Other expressions that can be used to describe gamification are: to measure and motivate, commitment, reputation, recognition and rewards and to guide and empower high-value activities. If the basic theme passing through these concepts and the basic definition of gamification are blended with their essence, people are motivated through data (Paharia, 2013).

To summarize, gamification is not "game first and foremost". It can be defined as the inclusion of non-game elements by using the reward systems and competitive elements used in the games.

2.6.3.1. Elements of Gamification

While gamified systems rely on psychological and virtual rewards for meaningful behavior, standard incentive systems like to offer cash and rewards. When governments, businesses, and organizations embrace game thinking and mechanics, they can better interact with individuals, drive innovation, and ultimately increase revenue. Gamification is much more than just game mechanics like points and badges. Gamification is not just about winning innovative and virtual rewards, it is important in incentives, only the best ideas and mechanics from games should be used to achieve the desired effect (Zichermann & Linder, 2013).

In the studies carried out; The use of game mechanics such as leaderboards shows that when salary and bonuses are added, it can motivate employees (Werbach & Hunter, 2015). Different components and mechanical design business dynamics should be carefully designed and considered to support these dynamics themselves should be clearly linked to key business processes and desired results (Wood and Reiners, 2015).

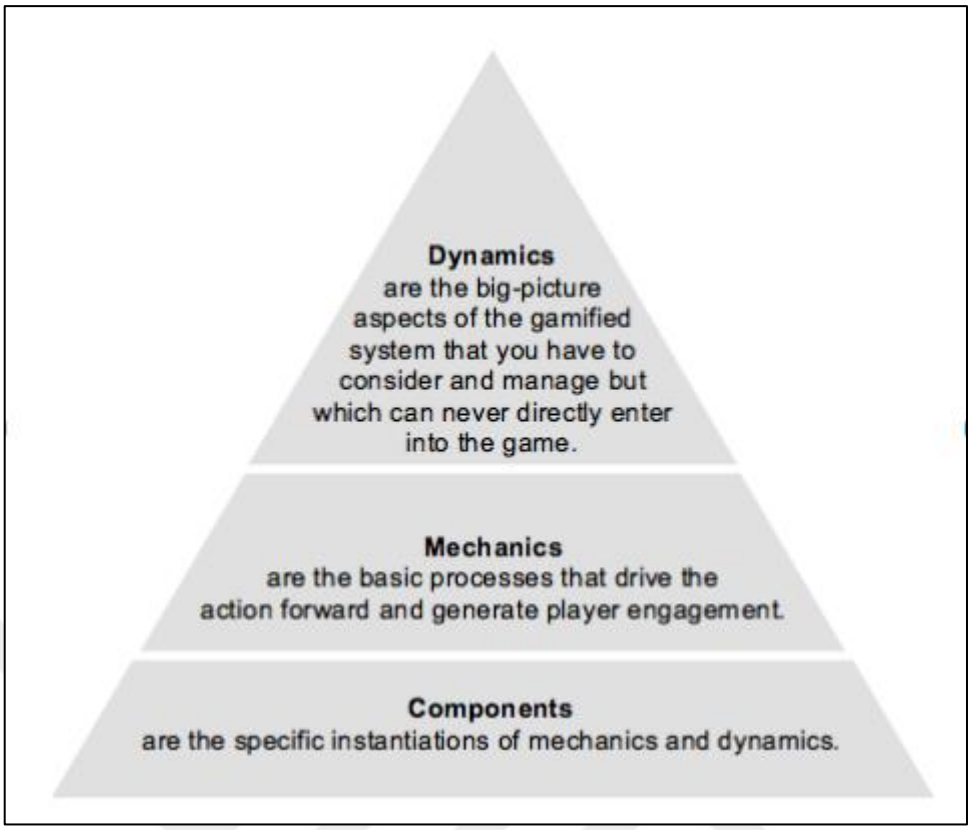


Figure 7. Werbach and Hunter's Pyramidal Gamification Structure

Source: Werbach and Hunter (2012)

As seen in Figure 7, Werbach and Hunter (2012) developed a three-level pyramid model consisting of dynamics, mechanics, and components. The dynamics at the top of the pyramid are the most abstract elements that affect the overall gamification design, form and setup. Elements such as constraints, emotions, storytelling, progression, and relationships are examples of dynamics. They are the elements that ensure user participation and highlight the action. Elements such as challenge, award winning, cooperation and competition, luck factor can be given as examples for mechanics, while elements such as avatars, badges, points, virtual items, leaderboards, levels can be given as examples for components.

2.6.3.1.1. Dynamics

Dynamics has been defined as one of the big picture features that must be taken into account and managed in the gamified system but can never be directly entered into the game (Zichermann & Linder, 2013). Werbach and Hunter (2012) states that there are five elements of dynamics in the gamification pyramid: constraints, emotions, storytelling, progression and relationships. These elements can be defined as follows (Werbach and Hunter, 2012);

- *Constraints:* Limitations or mandatory tradeoffs.
- *Emotions:* Curiosity, competitiveness, disappointment, happiness, etc.
- *Narrative:* Structures that make a game a coherent and ongoing story.
- *Progression:* Progress, which is the key element of the player's growth and development phase or mastery, passes through social interaction (Zichermann & Linder, 2013). There are two types of loops to develop: Interaction loops and progression ladders. Interaction loops at the micro level, are responses that explain what players do, why they do it, and what the system does. Progress ladders provide a macro perspective to the player's journey (Werbach & Hunter, 2012).
- *Relationships: S*ocial interactions that create feelings such as friendship, status and scarifice, etc. (Werbach & Hunter, 2015).

2.6.3.1.2. Mechanics

It is the mechanics that form the basis of game and gamification design, game mechanics elements include challenge, chance, competition, cooperation, feedback, resource acquisition, rewards, trades, spins, win situation. These items serve as guiding messages for users to "win". These elements can be defined as follows (Werbach & Hunter, 2012; Zichermann & Linder, 2013);

- *Challenge*: Tasks that require effort for the user to complete, such as puzzles or other tasks. Difficulties are defined with a list of goals to be reached (Wood & Reiners, 2015).
- *Chance*: It refers to the randomness criteria. Studies show that our brain prefers the chance of a random big reward to the certainty of a modest reward that reaches a higher number over time (Werbach & Hunter, 2015).
- *Competition*: A rivalry or challenge between two players trying to beat another.
- *Cooperation*: Players must work together to achieve a goal that is not possible alone.
- *Feedback*: In a gamified system, feedback can be the cornerstone of effective motivation. Well-designed feedback loops push users towards desired behaviors. Loops manage performance feedback from a range of sources, including input from colleagues, defined progress toward business goals. Loops allow employees to

continuously monitor their performance by using this feedback (Werbach & Hunter, 2012).

- *Resource Acquisition*: It is the process of obtaining useful or collectible items (Werbach and Hunter, 2015).
- *Rewards*: It can be defined as benefits for certain actions or achievements. One of the most important elements of the gamified system is the rewards.

The purpose of a good gamified system is to offer a series of rewards that activate the inner desires of individuals (Zichermann & Linder, 2013).

- *Transactions*: It is a buying and selling transaction between players directly or through intermediaries.
- *Turns*: They show sequential participation among alternate players.
- *Win States*: Goals that make a player or group a winner, draw and loss situations are related concepts (Werbach & Hunter, 2012).

2.6.3.1.3. Components

Components are individual building blocks introduced to gamify a system and they can be found separately in games (Wood and Reiners, 2015). Component elements in Werbach and Hunter (2012) gamification pyramid are achievements, avatars, badges, boss battles, collections, combat, content unlocking, gift giving, leaderboards, levels, scores, missions, social graphics, teams and virtual items (Werbach & Hunter, 2012). All game components are seen as feedback forms. For example, elements such as scores, leaderboards, levels and achievements are seen as a way of showing feedback on performance (Werbach & Hunter, 2015).

- *Achievements*: They are the goals of the user and represent milestones in the history. A success can be the termination of a product, the accumulation of activity in a certain time period or a series of resources (Wood and Reiners, 2015).
- *Avatars*: A visual representation of a player's character. More detailed description of avatars are always better. If the avatars do not respond correctly and do not reflect the possible audience, the target audience should be changed (Werbach & Hunter, 2015).

- *Badges*: A special icon that appears when a user reaches a certain set of requirements. This may not seem very important, but badges can be powerful motivations (Werbach & Hunter, 2012). Badges, along with trophies and other achievement symbols, are part of the overall "achievements" category within game design. What makes success appealing is that earning them gives the user the opportunity to feel successful. This creates a point of contact for the gamified system to communicate with users and bring them back to the experience (Zichermann & Linder, 2013).
- *Boss Fights* (especially difficulties at the climax of a level): The model used in most games includes a period of relative ease followed by a steadily increasing difficulty at the end of each chapter. They are also created to make players feel like they are experts in some part of the game to allow them to experience mastery satisfaction. The final difficulty of a level, known in games as a boss fight, provides a different mastery experience. The biggest challenges that players can barely overcome are those that produce an explosion of positive emotions, which in terms of gameplay is called an epic win (Werbach & Hunter, 2015).
- *Collections (*sets items or badges to collect): The progression ladders reflect the fact that the game experience changes as players progress. This usually means an increased level of difficulty. In the gamified system, the player journey should be planned as a collection of shortterm tasks and long-term goals (Werbach & Hunter, 2015). Badges allow users to showcase their achievements to others and keep track of what they are doing. In addition, some users may exhibit a strong desire to collect badges, allowing them to create and complete collections (Zichermann & Linder, 2013).
- *Combat*: For years people have debated which superhero would win in wars. A wide variety of design approaches and strategies can be used in gamification, the most powerful tool for connecting with the masses. The critical point is to have a great product and story (Zichermann and Linder 2013).
- *Content Unlocking*: It is seen as a key element in a successful game strategy (Zichermann and Linder, 2013). Features can be used when players reach their goals (Werbach & Hunter, 2012).
- *Gift giving (Gifting)*: It is an opportunity to share resources with others by offering free things such as gifts, cash or gift cards (Werbach & Hunter, 2015; Zichermann & Linder, 2013).

- *Leaderboards*: The leaderboards are designed to show the list of users in descending order from the highest scoring to the lowest scoring (Zichermann & Linder, 2013). Players often want to know what level other players are at. The leaderboard allows players to progress through the game in a way that points or badges cannot. On the other hand, leaderboards can be powerfully motivating. Knowing exactly how far the best players are can cause other players to feel competitive or stop trying. Leaderboards can reduce it to zero-sum fights to dominate a game. This naturally closes some people and makes them behave less desirable than others (Werbach & Hunter, 2015).
- *Levels*: Players start from Level 1 and go through more and more difficult stages as they progress. Reaching a new level, players get an achievement called "leveling up". Leveling shows progress and provides opportunities to encourage feedback (Werbach & Hunter, 2015). As the players progress through the levels and start doing something in the game, their experience and investments become more fun and important (Zichermann & Linder, 2013).

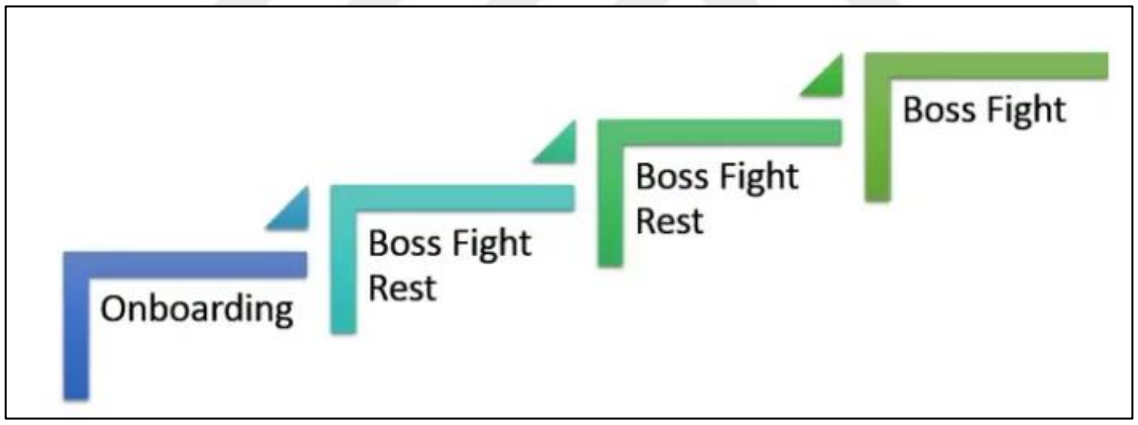


Figure 8. Ladder of Progress
Source: Werbach and Hunter (2012)

According to Figure 8; progress ladder is a cycle that starts from the beginner level, where the levels get harder at each step and success is achieved by skipping one more level. In the gamification system, the progression loop (ladders) works at the macro level, in broader activity structures (Werbach & Hunter, 2012).

Levels and leaderboards are another way to show if a player has more or less status in a particular game; it can be a powerful tool in the search for participation (Zichermann & Cunningham, 2011).

- *Points*: This is the typical method used in gamification systems. Points show the player how good he is. Someone who earns 5000 points is considered more successful than someone who scores 3000 points. Points represent the actual "playground" of the game, describing progress from the beginning of the game to their goals.
- *Quests*: They are defined as predefined challenges related to objectives and rewards.
- *Social Graph*: It is considered as the representation of the social networks in the game of the players.
- *Teams*: Those are defined groups of players working together for a common purpose (Werbach and Hunter, 2012).
- *Virtual Goods*: They are assets that are perceived as valuable. They provide a sense of individuality, as they provide an advantage to the user or serve to distinguish the user in some way (Wood & Reiners, 2015).

2.6.3.2. Psychological Basis of Gamification

At the first Gamification conference held in 2010, Gabe Zicherman used the phrase “75% of gamification is psychology and 25% is new technologies” (Carr, 2011). The foundations of psychology began with Pavlov, Watson and Thorndike's first experimental research on learning, with their studies on how humans and animals behave in a certain situation in the laboratory (Barlı, 2008).

In the 1970s, operant conditioning and behavior reinforcement methods were dominant in the field of psychology (Ersoy, 2017). The "learning by trial and error" studies conducted by Edward Thorndike between 1874-1949 laid the foundations of the operant conditioning approach. Operant conditioning, a theory introduced to the literature by Frederic Skinner, argued that behavior is shaped by its consequences and can be conditioned not only by reactions but also by actions (Can, Azizoğlu & Aydın, 2015).

Ivan Pavlov, a Russian physiologist who lived between 1849 and 1936, has done most of his physiological research on the conditioning of dogs. While examining salivation in his experiments with dogs, Pavlov examined whether a ringing sound or light flash, which is a neutral stimulus in terms of the salivary reflex, would cause a salivation reflex. In the experiment, a light was turned on where the dog could see and meat was given to the dog a few seconds after the light. After repeating this order many times, only when the light was on, the dog salivated as if he had been given meat. Pavlov called the dog's secretive behavior to light the conditioned response. In Pavlov's experiment, repeatedly giving meat and conditioned stimulus together strengthens and reinforces the bond between the two (Baysal and Tekarslan, 1998; Cüceloğlu, 2002). When dogs that react to a ringing or flashing light do not show the expected behavior after a while, the food has been reused. So that, the relationship is reinforced and the expected behavior pattern is repeated (Can, Azizoğlu & Aydın, 2015).

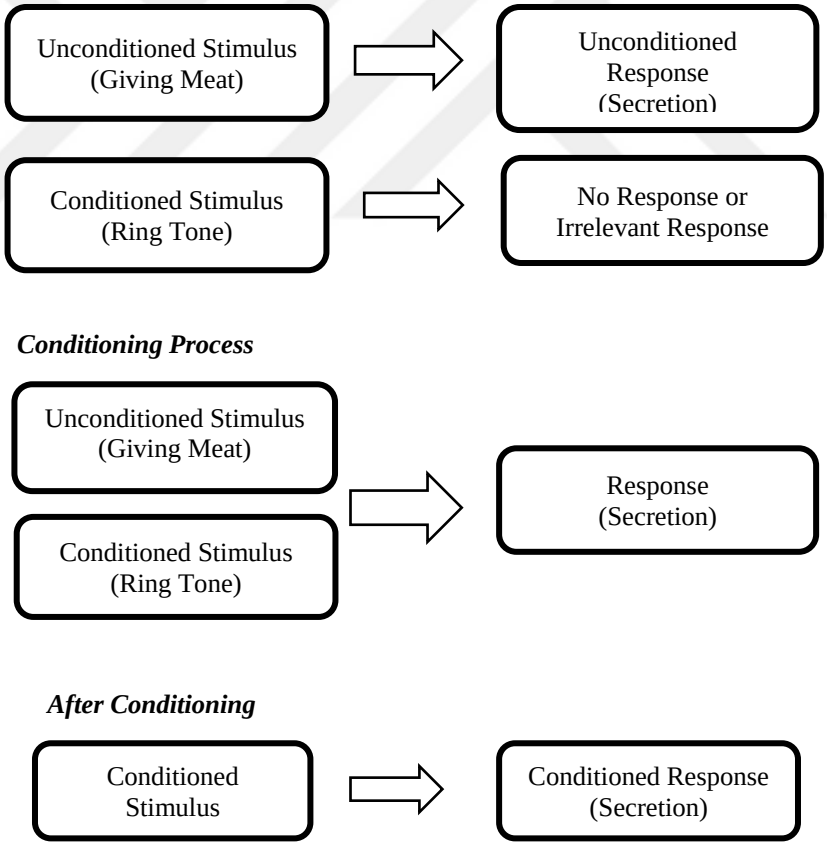


Figure 9. Classical Conditioning

Source: Can, Azizoğlu and Aydın (2015)

The discipline of psychology is the science that explains and predicts individual behavior based on the nature of the individual, and focuses on individual differences (intelligence, attitudes) and processes (motivation, perception). These differences and processes serve to comprehend different reactions to similar situations and warnings (Baysal & Tekarslan, 1998). The science of psychology emphasizes that while giving priority to the observability and scrutiny criteria in examining the individual, it should also take into account the environment of the individual, the individual's culture and social customs (Tutar, 2018).

The psychological theory most closely related to gamification is gamified instructional design theory. This theory explains two important psychological processes in which game elements can be used to influence learning in the context of gamification. In both processes, it shows the effect of gamification on learning through a mediator behavior or attitude caused by the use of game elements in teaching. In particular, gamification should be designed to influence a particular attitude or behavior. For example, game narrative can be used to improve affective attitudes towards education, or game objectives can be used to increase learner meta-cognitive activity (Reiners & Wood, 2015).

While operant conditioning focuses on increasing the possibility of reinforcing a behavior, rewards and punishments play an important role in creating and maintaining the behavior (Erbaş & Yücesoy-Özkan, 2017). In the context of gamification, rewards are much more common than punishments. Recognition of achievements such as using leaderboards, scores or badges is often used to reward target behaviors (Gangadharbatla & Davis, 2016). Through operant conditioning, individuals establish a relationship between behaviors and outcomes. Operant conditioning is a process that aims to change behavior through the use of positive and negative reinforcements or punishments. Behaviors reinforced in operant conditioning tend to increase. Behaviors that cannot be reinforced tend to fade (Erbaş & Yücesoy-Özkan, 2017). Although Guthrie's ideas on reward, motivation, and reinforcement are similar to those of Pavlov and Thorndike, they are unique in some ways. He argued that motives are stimuli that keep the organism in motion until it reaches a goal (Yeşilyaprak, 2018). Operant conditioning can delay the extinction of the behavior by creating a "maybe I will get a reward this time" mentality (Reiners and Wood, 2015)

Skinner (1953) examined the different ways that reward systems change behavior. Skinner's concepts are used to change user behavior in reward-based gamification. Thanks

to Skinner's concept of behavior, it can increase user engagement. When the player sees rewards for certain behaviors, game designers decide which behaviors are valuable. Reward systems work as long as the rewards continue to come, and the research by Skinner shows how the timing of rewards can be used to produce a behavior after the rewards are received through operant conditioning (Reiners and Wood, 2015).

Fogg's Behavior model (2009) has been very successful in persuading people to exhibit certain behaviors and helps to understand why users behave in a certain way and how certain behaviors can be modeled (Reiners and Wood, 2015). Rewards and punishments are important to create and maintain behavior according to operant conditioning. In the 1970s, few scientists introduced the concept of intrinsic motivation, claiming that behavior can be formed and shaped without reward or punishment. Rewards are important tools for acquiring a behavior. Rewarding can be used as an extrinsic motivation tool in establishing a behavior. According to Deci and Ryan, giving rewards to people with intrinsic motivation kills their intrinsic motivation. Therefore, it is necessary to determine what kind of activities will be rewarded while rewarding (Ersoy, 2017). If behavioral theories are used as one of the various approaches to understand the motivation and behavior of employees in order to provide support and assistance for psychological problems that may affect employees' performance, they can provide a useful perspective on needs and motivations (Denhardt et al., 2019).

Modeling productive behaviors is critical to success, and understanding these theories helps design a behavior model that is not only fun for users but also useful for businesses. These persuasion and behavior modeling theories help designers to understand broader objectives in business and design mechanics in a gamified environment (Reiners & Wood, 2015).

It can be demonstrated that incentive gamification is able to manage the link between personal dexterity on learning experiences and individual performance. Incentive gamification is one of the job designs that may assist increase individual performance in the industrial revolution era 4.0. It has been demonstrated that the new incentive gamification approach helps digital employees perform better on an individual basis and learn more (Adhiatma, Sari, & Fachrunnisa, 2022).

To summarize; psychology is the science that examines the different behaviors of individuals against similar situations and stimuli. At this point, gamification explains that the use of rewarding, which is a game mechanic, creates a behavioral change in individuals.

2.6.3.3. The Emergence of Gamification

Historically, games have been studied in countless ways, from economists using game-like simulations to literary theorists who study meaning of "game" in language and literature (Salen & Zimmerman, 2003). Although the concept of game is very old, based on the idea that anything that people do for entertainment purposes can be called a game, the concept of gamification is a new concept (Yıldırım and Demir, 2014). The concept of gamification was first introduced by British researcher Nick Pelling in 2002 (Marczewski, 2015). It was first used in 2008 as a term originating from the digital media industry (Deterding et al., 2011; Terrill, 2008).

Although concepts pointing to gamification have been used in different ways such as "entertainment that increases exploratory ability" by Grace and Hall since 2008, "games that improve productivity" by McDonald, Musson and Smith, and "hands-on game" on natronbaxter.com, Jesse Schell in 2010 used the concept of gamification for the first time at the DICE (Design Innovate Communucate Entertain) conference with his presentation of "Future of The Games" (Yıldırım and Demir, 2014).

Although the term gamification was first used in 2008, it did not attract much attention and became widespread until 2010 (Deterding et al., 2011). In other words, gamification started to become widespread after 2010. Although it emerged in the digital media sector, the concept of gamification has spread rapidly among other sectors after 2010, and has started to be used in many areas such as business, tourism, education, health and marketing. Since then, it has been followed with interest as a very popular concept in many sectors such as information, technology, education and marketing (Burke, 2014).

Kleinberg defined the concept of gamification as "the application of game-related concepts to non-game areas in order to provide the desired behavior from an audience" (Kleinberg, 2011) and this definition has been implemented in different sectors.

Gamification was previously included in software as a yesocial reward, its popularity attracted the attention of entrepreneurs and half of the companies seeking funding used

gamification techniques in their presentations (Denton, 2020). Over time, companies using gamification techniques have started to create gamification platforms within their own structure, and marketers have started to use game elements in their marketing initiatives (Denton, 2020).

Although the term gamification was first coined by British researcher Nick Pelling in 2002, the development of the concept goes back much earlier. Because the term was formed theoretically by developing in the historical process.

Cracker Jack, which is also called the world's first junk food produced in the USA in the 1890s, especially for consumption in the increasing number of open-air cinemas, used gamification, with a different toy coming out of each box. After Cracker Jack became popular especially in baseball games, it started to give stickers and badges of baseball players instead of toys, and especially collectors bought crazy products to collect all the players (Yılmaz, 2018).

The scout movement was founded in 1908, and the scouts awarded various badges to members to recognize their achievements in various fields. Scouts have earned these badges for being proficient in an activity, acting according to the organization's principles, and participating in special events. In practice, having a scout uniform and more badges was seen as a success (Denton, 2020).

In 1981, the world's first "frequent flyer program", "AAdvantage", was launched by American Airlines. The program in question aimed to encourage customer loyalty by offering various rewards, and wanted to reward customers who travel frequently. Today, a different type of the model in question is frequently encountered in cafes (Denton, 2020).

Holiday Inn (1983) and National Rental Car (1987) launched the first reward programs in their industries. Both programs aimed to increase the number of customers and to maintain the number of customers gained. Because companies do not want to lose their customers to rival companies due to national and international competition, and they make the necessary plans for this (Denton, 2020).

Finally, in 1999, the importance of entertainment in the digital world was better seen and an article on the subject was published by Stephen W. Draper (Denton, 2020). Nick Pelling introduced the concept of “gamification” at the end of all these processes

(www.growthengineering.co.uk/history-of-gamification/, 2019). When the historical process is examined, it shows that the concept was not born out of nowhere, it was actually applied in different ways by various companies and positive results were obtained.

In 2005, the first modern gamification platform was established by Rajat Paharia. Rajat Paharia has added a game mechanics layer to these sites in order to increase participation in websites, and he has mentioned 10 basic principles that form gamification in his study "Gamification 101: An Introduction to Game Dynamics". These principles are; quick feedback, transparency, goals, badges, leveling up, onboarding, competition, collaboration, community and points (Denton, 2020; www.growthengineering.co.uk/history-of-gamification/, 2019).

In 2010, Nathan Lands started to use the term 'Gamify' to describe the act of applying the game technique in non-game activities. Non-gaming engagements or fields of activity include almost every field of the private sector such as marketing, education, banking, manufacturing, energy and trade (www.growthengineering.co.uk/history-ofgamification/, 2019; Denton, 2020) .

Founded in 2010 by Daniel Rust and Mark Michael, the DevHub company added a point system to its website, increasing user participation by 70%; In 2014, 9 out of 10 companies reported that their gamification efforts were successful (Denton, 2020).

The emergence of gamification has been historically explained. However, the reason for its emergence needs to be examined by classifying it in terms of technological development and modern age.

2.6.3.3.1. Technological Development

The game is played at every stage and place where people exist throughout the history of humanity, when the environment and conditions are fulfilled, which does not matter for the old or the small individual. The game can also be defined as the common concept of human history. The concept of gamification first became widespread in the 1900s, then in 2000 and 2010 with the increase in technological developments (Lightning and Demir, 2014). In technological developments, the concept of game is defined by the concepts of play and game. The concept of “play” means game in Turkish. “Play” indicates time to spend time for fun. “Game”, on the other hand, is a game and a recordable activity that is played

according to a certain time and standard within a certain plan of the game. Considering development of technology and concept of fourth generation, the technological development of gamification has led to the emergence of gaming platforms. Game platforms have also revealed many game genres with the development of technology. Even on social media platforms, technological developments have emerged in which the game is played. Games are played on computers, tablets, online platforms over the internet, through many software and all kinds of technology (Bozkurt and Genç-Kumtepe, 2014).

Today, games have become the lives of individuals. With the development of technology, individuals can find all kinds of games in digital environments. With the widespread use of games and gamified applications in the daily life process, game activities, which are effective practices related to learning and awareness, have become available for the performance and effectiveness of learning-teaching activities (Yıldırım and Demir, 2014).

Gamification is in linear proportion with developing technology. In the current period, with the increase in information technologies, game platforms have also increased. These platforms are reaching more and more users as time goes on.

The concept of game is used commonly in technological and global markets. With the development of gamification and the increase in technological development, more gaming platforms are emerging. To follow up by experiencing rich and personalized information by using technology and by experiencing real information can be done by gamification in today's world. Therefore, it was necessary to define and understand gamification in detail (Bozkurt and Genç-Kumtepe, 2014).

2.6.3.3.2. Modern Age

Today, with the development of technology, the fact that individuals live in the age of digitalization provides the opportunity to offer games and gamification to individuals more broadly. It is aimed to expand the gamification by further developing the digital language in the current period and later periods, which is called the modern age. The increase in gaming opportunities has allowed the game industry to develop. In the modern era, the game has started to be used in many areas with technology and the digital world. Technological

developments have led to the emergence of many game genres. With the emergence of digital software and digital platforms, games have started to develop more (Prensky, 2001).

Many new concepts are used in gaming platforms made using modern methods and digital innovations. The game industry and participants use '3D', 'action', 'mass online', 'platform' and 'education' game grouping types to show that games are created with their distinguishing features. Accordingly, while the three-dimensional concept indicates the visual features of the game; action is about content. While 'MMO' or mass online games determine the number of participants in the game and the way the game is played (gameplay), on the other hand, 'platform' is about the mechanical world of the game. While 'FPS' (action game over primary player), which is one of the expressions in digital games, explains the view of the participant, the working of time and the way of playing are specified in real-time strategy games. In "adventure" games, the story of the game shows how the game content is handled. 'RPG' (Role playing games) games determine the proportion of the story and dialogues in the game and the gameplay style specific to the game genre (Zimmerman and Salen, 2004).

Games used by gamers and famous game magazines are classified as strategic, adventure and sporting activity. These classifications, when evaluated, are important elements to direct consumers' purchasing perceptions. However, in the classifications, questions about which features of the games consumers adopt and buy are not clear. When grouping the games, it is unclear how they are formed and the extent of the interaction (Fencott et al., 2012).

Educational digital games allow participants of all ages to easily teach any subject, prolonging the focus time of the participants, determining the scope of lifelong learning, and learning through digital games makes the work of educators more effective and efficient. In addition, educational digital games encourages the use of complementary or enriching educational activities. Game platforms, which are applied in every field, are also widely used in the field of education. In "educational games" a category is applied regarding purpose and content. The reasons for the use of digital games in the classroom could be listed as attracting attention, providing motivation, ensuring the continuity of interest, containing rich visual content, affecting the learning period significantly and providing a meaningful learning quality (Doğusoy & İnal, 2006). It is suggested that digital games will be beneficial when used for learning activities; However, it is also important to examine the demographic

structure of the participants who will use the games. Comprehensive studies are needed to bring digital games to classrooms in Turkey. In the context of these evaluations, it is necessary to investigate appropriate education levels within the scope of development and learning psychology for the use of digital games in education (Demirel, Seferoğlu, & Yağcı, 2005).

2.6.3.3.3. Consumption Age

The popularity of video games after the 1970s pushed the gaming industry to expand the market by reaching many people of all ages, genders and cultures. This mobility in the game market has affected a large part of the society and made games a natural part of human life (Schell, 2014). Since most of the new generations grow up in digital environments, they have a technological device or can use computers, smart phones, internet and social media effectively. Moreover, by devoting more time to digital media applications and games, they communicate more with their peers online (Kennedy & Fox, 2013). Not just as new generations, today, almost everyone is online in places such as social media, digital media, etc. Transferring new things to the other side in every field is now carried out with this method. In order to attract the attention of those who want to see entertainment and learning together, education and information flow should be enriched with technological opportunities and turned into a kind of game-entertainment (Yıldırım and Demir, 2014).

Online environments and mobile devices have a great impact on gamification, as well as the entertainment-oriented nature of games. In addition, considering that today's societies use social media effectively, the inclusion of social elements in gamification practices enables those who use digital media to be motivated more easily by meeting their communication needs (Ruhi, 2015). Today, gamification has started to be used in every field gradually. Gamification activities are used to solve problems related to the adaptation of a newcomer to the company culture. Also, if customers have problems in loyalty to the business and product, gamification activities are used to overcome them. In addition, one of the methods that businesses have used recently is gamification techniques, which are used to increase the motivation of the employees in achieving great commercial goals (Berber, 2018).

2.6.3.4. Gamification Examples in the World and Turkey

Today, there is hardly any industry where gamification is not applied. It is used increasingly in many different fields such as education, production, health, trade, marketing, tourism, computer programming, press-broadcasting, sports, art, accounting and librarianship. Even in business models that do not require innovation and that repeat itself, a simple rewarding method such as "employee of the month" provides an efficiency increase of 5-10% (Yılmaz, 2018). In this method, the photograph of the employee selected as the employee of the month hangs on the board at the appropriate place of the enterprise throughout the year, and giving a certificate to the employee of the month with a ceremony with a symbolic cost keeps the internal motivation and competition alive. Gamification has been widely integrated into sectors such as health, education, tourism and marketing in recent years (Miller, 2017).

Here are some of best recent gamified application examples;

- Monday: You may improve the cohesiveness, effectiveness, and productivity of your team by altering any process to meet your requirements.
- Strava: An online tool for tracking physical activity called Strava also has social networking capabilities. Using GPS data, you may primarily utilize it for cycling and jogging.
- Instagram: That popular social media website includes different types of filters and icons which keeps the user engaged and entertained.
- Netflix: The "Fast-laughs" increase time the user spend on the platform and present a fun process (Gamify, 2022).

2.6.3.4.1. Gamification in Marketing

Innovation in technology has altered how businesses draw in clients and sell their goods and services (Al-Zyoud, 2021). This case biring about gamification in business world and gamified commercial activities increased drastically. Although each gamified application wants to serve a different purpose, the common goal of their businesses is to meet the basic needs of their customers and generating potential customers. (Gölbaşı and Gökcek, 2022). Personalized consumer experiences and creating value with customers are often expressed as key motivations for using a gamification strategy (Raftopoulos, Walz and Greuter, 2015). Gamification systems that emphasize economics and performance (such as

awarding incentives and upgrading badges) may boost consumers' perceptions of enjoyment and social engagement, which can considerably increase impulsive purchases. Males and younger digital natives favor gamification mechanisms that are achievement-related, but older and female digital natives are more impacted by gamification mechanisms that are economics-related (Zhang et al., 2021).

On mobile e-commerce platforms, users' belief that they spend less time/energy playing games has a favorable effect on their motivation to play games. Additionally, gamification influences consumers who utilize mobile commerce platforms to make more likely purchases. Perceived value and platform purchase intention are mediated by game usage intention. In addition, female gamers are far more prevalent on mobile commerce platforms, and they are also much more likely to make purchases. The more money users spend on the site, the more eager they are to buy. Users with various levels of education did not, however, have significantly different purchasing intentions (Yu and Huang, 2022).

In the United States, Starbucks digitally awards its coffee-drinking customers one star per coffee and one coffee out of 15 stars. The accumulated stars can be gifted to a customer in another branch whenever desired. The system is implemented digitally. This application aims to increase customer loyalty by rewarding method. Classification such as silver and gold membership can also be made according to the amount of coffee consumed. The name of this model used is called the hook model (Yılmaz, 2018).

On the famous gamified e-commerce website Pinduoduo, there is a second special price for many products if they are purchased in multiple numbers. To reach this price, if you connect via WeChat and chat with your friends through a special interface, you can buy a certain number of this product with a special link, while the package, which is normally 30 Yuan, can be purchased at a discounted price of 15.99, while if you make a bulk purchase, it drops to 9.99 Yuan. For this, the necessary purchases must be completed within 24 hours from the link you will create. In the feature called “Price Chop”, a model has been introduced for a product you want, if you make 500 people visit that page (without making a purchase), you can get that product completely free of charge. Even if you don't shop in the application, which has classical gamification mechanics, earning points by 'check-in', earning extra points by inviting a friend, and the leaderboard screens according to the Yuan earned from bulk purchases are also very interesting. In 2019, they commissioned a virtual tree and a model in which the grown products are sent to you free of charge. Especially during the

pandemic, 2 million virtual trees were grown and their fruits were added to the real order. Pinduoduo has recently launched a Candy Crash-like game called "Duo Duo Orchard", especially for those who do not have enough time to grow trees in practice, but have time to 'explode sugar' hyper-casual game disease. In the game, which has already been played 60 million times, points to be spent on shopping are earned in return for achievements (Yılmaz, 2021).

China-based fast fashion retailer Shein has achieved rapid success in recent years, surpassing brands such as H&M. Shein, which has become the world's largest online-only retailer, now accounts for 28% of the fast fashion market in the US. Shein remains immensely popular, especially among Generation Z consumers, largely thanks to influencer marketing, low prices, and gamification techniques. Shein uses a point system to engage users and encourage them to take certain actions within the app. These points can be redeemed for a $1 discount for 100 points up to 70% of an order. You can earn points by verifying your e-mail address, opening the app every day for 7 days, or writing a review about a product. Shein also blends gamification with a social component, rewarding users when they participate in "clothing contests" where users post photos of a combination of outfits that they've purchased using the app. (Garrison, 2021).

French cosmetics brand Clarins, which wants to increase the participation in its mailing lists, decided to gamify its application with a passion-style game called Beauty Wheel. Similar to the classic wheel of fortune program we know from television, users "spin the wheel" to get discounts on their favorite products. Clarins identified the users most likely to join the game and directed traffic to a site where users could join the game. This game resulted in a very high increase in retention among new users, with Clarins achieving a 45% lead ratio, significantly higher than the industry average. (Garrison, 2021).

As we know, Yemeksepeti is one of the first companies to use gamification in Turkey. It gives you tasks on your own profile and allows you to enter into a sweet competition with other users. This increases the time spent on the site and the number of pages visited. The food cart says that it has realized one of the biggest gamification projects in Turkey, and its goal here is to create an opinion leader for each district, as well as sales, and ensure that the people who follow it order from different restaurants (Eminoğlu, 2018).

2.6.3.4.2. Gamification in Human Resources

Institutional gamification is used in various business areas such as human resource management, enterprise resource planning (ERP), information technology (IT), project management, market research and marketing. Huotari et al. stated that by supporting the overall value of the user in corporate gamification, stakeholder engagement towards value creation would better adapt to the corporate focus (Raftopoulos, Walz, & Greuter, 2015).

One of the areas where gamification is used is the human resources unit. Companies are looking for new solutions to engage their employees and enable them to work with greater enthusiasm and contribute to achieving their business goals. Gamification has been used in different processes of Human Resources, especially during the last 5 years (Ergle and Ludviga, 2018).

Gamification is an innovative approach to contemporary human resource management. Research conducted by the American Education and Development Association in 2013 found that 23% of organizations used gamification in their education and development process and it has shown that this method is effective in 99% of cases. In addition, 4 out of 10 organizations that do not use gamification stated that they plan to start using it next year (Ergle and Ludviga, 2018).

Looking at the examples in Turkey, it is seen that Izgoren Academy has a work in the field of human resources. The Academy has created a game called "Being a CEO" that can be played in both traditional and orientation areas. This game with various levels is a Monopoly-like game with dice and tasks. With the point accumulation system, the transition to the next level is made. While anyone is a newcomer in the first part, he can become a manager and eventually a CEO in time, and difficulties at all levels can be experienced (Ünsal and Yılmaz, 2019).

Doğuş Go Development School received the title of "Best Corporate Education Software" with its project in 2017 and added the project to the education topic the following year. In gamification, the training lines of the employees within the company were transformed into a tree metaphor. This tree began to grow with training or participation in surveys, and withered for vice versa. At the end of the year, the condition of the trees was checked. With those with high growth rates, Doğuş management team cooperated with

TEMA and transformed their virtual trees into physical tree donations (Ünsal and Yılmaz, 2019).

Allianz company, together with Salesmot company, added a gamification application called “Allianz Nine Kingdoms” to its business processes. In order to increase the performance and motivation of the call center personnel, as the users reached the basic performance criteria, they strengthened their heroes in the game. At the end of the month, looking at the outputs of this project, gifts were given to the employees, increasing their performance and motivation (Ünsal and Yılmaz, 2019).

2.6.3.4.3. Other Gamification Examples

It is seen that gamification is generally used in marketing and sales fields. Examples of gamification used in the world and in Turkey, apart from the above-mentioned topics, are discussed under this heading, including the areas where they are mostly used, such as promotional and social activities.

Nike Plus in the field of sports and health, and Foursquare in the social field are the pioneers and best examples of gamification. Foursquare is an application where users comment on the places they go, get suggestions for places that suit their preferences using location tools, and score them (Yıldırım and Demir, 2014). Badges are earned, points are collected, and placed on the leaderboard by reporting location in the application. This situation encouraged to report places and make comments, and thanks to the scoring made, the relevant people were able to choose a place. Nike Plus, on the other hand, is a social fitness application that aims to increase users' desire to do sports in a competitive environment. With the wristband given to the users, the distance and time they run are determined. While trying to beat his own score, the person competes with other users and settles in the leaderboard by fulfilling the tasks in the race (Zichermann & Cunningham, 2011; Bahçeci & Uşengül, 2018; Yıldırım & Demir, 2014). The Nike company used gamification in the "Life Coach" application, the daily calories burned by the users were measured with the Nike Life Coach bracelet they wore on their arms, the calories burned were uploaded and shared on the Nike Life Coach site over the internet in the form of points collected, and the motivation of the individuals was tried to be kept alive. With this application, which aims to protect public health, Nike company both advertised the company and earned income with Nike Life Coach bracelet sales (Yıldırım and Demir, 2014).

Piano Stairs was the most popular and common application of Volkswagen's project named “The Fun Theory”. In this application, it was aimed to use the normal stairs next to the escalators at a subway exit, for this a piano mechanism was added next to the normal stairs. During the application, two out of every three people preferred the normal staircase with a piano mechanism instead of the escalator. In this gamification, making normal ladders fun has increased its use (Yılmaz, 2018).

In England, in the campaign of the Municipality of Reading called “Beat the Streets”, a card was distributed to the citizens, if this card was read at the traffic lights, the person was informed of how far he had walked, the people who walked the most were put on the leader's table, this situation attracted the attention of the elderly. Sponsors participating in the campaign also rewarded those who walked the most, and at the end of the campaign, the number of people walking and walking distance were greatly increased (Yılmaz, 2018).

3. METHODOLOGY

3.1. Methodology of The Research

In this section, the model of the research, the study group, the data collection tools used in the research, the statistical techniques used in the process and data analysis are mentioned.

3.2. Model of the Research

The study was planned in experimental method and quasi-experimental design was used. One form of design that is frequently applied in academic investigations is the quasi-experimental design. In this type of design, a training program is put into practice, a pre-test is conducted before the program and the participants' prior knowledge is assessed, a post-test is conducted to ascertain the application's impact on the target audience, and the results of the pre-test and post-test are compared (Thyer, 2012). In the study, two groups called experimental and control groups were determined. Sensitivity has been shown to ensure that the general characteristics of the groups are similar. Game application was applied to the experimental group, while the control group was given classical education only through presentation on the subject. Knowledge scales were applied to both groups before and after the education. In the study, the information statements about e-commerce knowledge level were prepared in a way that they were true or false. It was determined that the knowledge scale, the reliability levels of which were calculated for both tests, was a consistent measurement tool. It was determined that the distribution of the difficulty levels of the questions was at acceptable levels in the groups. Information on the general characteristics of the participants was obtained. Evaluations were made with a score level of “1” for correct statements and “0” for incorrect statements. Total knowledge level was determined by adding the scores of correctly given statements. In addition, the correct response rates of the 20-item scale were also examined as a general success variable. In both groups, the development levels were determined according to the initial level and it was examined which groups benefited from the education more or less according to the personal characteristics within the group.

In the study, an education program was planned for the experimental group students for the development of basic e-commerce concepts. The experimental group students received a total of 6 hours of practical gamified education. The knowledge levels of the students, whose knowledge of basic e-commerce concepts were measured before the education, were also measured after the education. The effect of gamified education was examined over the average level of knowledge.

The control group chosen among the students had similar characteristics with the experimental group. The group defined as the control group was given 6 hours of classical education through presentation on the subject. After the control group's basic e-commerce concepts knowledge level pre-test study, the knowledge test was applied again when the classical education is completed. These knowledge levels were evaluated in the analyzes in terms of both the knowledge development of the control group and the average knowledge level of the experimental group.

3.3. Universe and Sample of the Research

The universe of the research consisted of undergraduate MIS students studying at AYBU in the period of 2021-2022. Between these dates, there are 331 students in the department. It was seen that it would be sufficient to apply the sample of the research with the simple random sampling method with 5% error and 90% confidence, with 152 students. In this context, it was determined that 160 students, 80 in the experimental group and 80 in the control group, would form the sample. It was assumed that the adults participating in the research answered the questions in the Personal Information Form and the E-Commerce Basic Concepts Knowledge Level Scale sincerely and reflecting their real situations. In addition, it could be stated that the groups were taken in equal proportions in terms of gender distribution and that the two groups were proportionally homogeneous in the analyses.

3.4. Main Problem of Research

The main problem of this study is to determine whether using a gaming application to teach students about the fundamentals of e-commerce is a useful way to raise their level of understanding.

3.5. Sub-Problems of Research

- Do the knowledge level scores of the basic concepts of e-commerce differ according to the gender of the participants before and after the game application?
- Is there a statistically significant relationship between the effect of game application used in teaching basic concepts of e-commerce and ages of participants?
- Do the knowledge level scores of the basic concepts of e-commerce differ according to the e-commerce background of the participants before and after the game application?
- Do the knowledge level scores of the basic concepts of e-commerce differ according to mobile game background of the participants before and after the game application?
- Do the test scores before and after the game application used in teaching basic e-commerce concepts show a significant difference?

3.6. Data Collection Tools

The "Personal Information Form" and "Knowledge Level Scale for E-Commerce Basic Concepts" are used in this study to collect demographic data about the participants and assess their knowledge of e-commerce fundamentals prior to and following the game application, respectively.

3.6.1. Personal Information Form

The researcher developed a form called the personal information form to ask participants for details such as their gender, age, e-commerce and mobile gaming history.

3.6.2. Knowledge Level Scale for E-Commerce Basic Concepts

In the study, a measurement tool consisting of 20 items and prepared by the researcher himself was used as a data collection tool. With the scale, it was aimed to determine the knowledge level of the participants about the basic concepts of e-commerce. In the study, the answers given to the questions created with the aim of determining the knowledge levels of 20 statements for the pre-test were examined. The reliability level of the knowledge scale was found to be 0.89, ie high (KR-21=0.89, KR-21>0.70). It has been seen that the scale has sufficient reliability to determine the level of knowledge. There was no need to remove any

questions from the scale. The statements in the scale were asked at two different levels as true and false. Correct statements were scored as "1" and incorrect statements as "0". When viewed on the basis of questions, questions q3, q4, q6, q11 and q14 express difficult questions and correspond to 25% of the total questions. Questions q1, q7, q16 and q17 were determined as easy questions. These questions are about 20% of the total questions. In general, it was seen that the level of reliability was high and the ratio of easy-difficult questions was at sufficient levels. In scoring the level of success in the study, the scores obtained were converted into a 100-point system and the analyzes were made based on those scores so that the results could be more meaningful and understandable.

Table 5. Examination of The Reliability Of The Knowledge Test

Question	Pre- test	Post-test
Q1	Very Easy question	Very Easy question
Q2	Normal	Normal
Q3	Difficult question	Normal
Q4	Difficult question	Normal
Q5	Normal	Normal
Q6	Difficult question	Normal
Q7	Very Easy question	Easy question
Q8	Normal	Normal
Q9	Easy question	Easy question
Q10	Easy question	Easy question
Q11	Difficult question	Normal
Q12	Easy question	Very Easy question
Q13	Easy question	Easy question
Q14	Normal	Normal
Q15	Difficult question	Normal
Q16	Very Easy question	Normal
Q17	Very Easy question	Very Easy question
Q18	Difficult question	Normal
Q19	Normal	Easy question
Q20	Normal	Normal

KR-21 Reliability test

In the study, the answers given to the questions created with the aim of determining knowledge levels with 20 expressions for the post-test were examined. The reliability level of the knowledge scale was found to be 0.92 and high (KR-21=0.92, KR-21>0.70). It has been seen that the scale has sufficient reliability to determine the level of knowledge. There was no need to remove any questions from the scale. The statements in the scale were asked at two different levels as true and false. Correct statements were scored as "1" and incorrect

statements as “0”. It was seen that all the questions we considered on the basis of expression were easy questions, very easy questions and normal level questions. This may be due to the second application. However, in the study, Q1, Q12 and Q17 were determined as easy questions. These questions are about 15% of the total questions. In general, it was seen that the level of reliability was high and the rates of easy-difficult questions were at sufficient levels. In scoring the level of success in the study, the scores obtained were converted into a 100-point system and the analyzes were made based on those scores so that the results could be more meaningful and understandable. In addition, development levels were calculated as post-pretest levels in the study. This parameter shows the development level with respect to the initial level.

3.7. Analysis of Data

Descriptive statistics are presented with frequency, percentage, mean and standard deviation values. KR-21 is one of the famous Kuder-Richardson reliability formula. KR-21 coefficients, computed from simple summary statistics, can be used in cases in which journal authors do not provide the test score reliability (Feldt & Brennan, 1989). In the study, KR-21 reliability coefficient was calculated for the scale used to determine the level of knowledge of pre-test and post-test levels. To demonstrate a normal distribution, values for skewness and kurtosis between -2 and +2 are deemed acceptable (George & Mallery, 2010). Tests with a normal approach were chosen in the study because the distribution of the pre-test and post-test scores was normal, the number of data was n=80 within the group, and the skewness and kurtosis values were between -2 and +2. Chi-square test was applied to determine the demographic characteristics of the groups. To investigate the variations between the two groups, an independant sample t-test is conducted (Sekaran, 2003). The means of the data from two related samples are also compared using a paired sample t-test (Samuels & Gilchrist, 2014). Independent sample t-test was used to examine the differences in the knowledge levels of the groups according to the characteristics of the participants in the study. Paired t-test was used to examine the difference between the pre- and post-measurements of knowledge levels in the groups. In the study, Independent sample t-test was used to examine the differences in the knowledge levels of the groups according to gender, e-commerce and mobile gaming background. The correlation coefficient, a statistic that quantifies the strength of the seeming linear link between the variables under consideration, is used to quantify correlation. A correlation coefficient of zero indicates that

no linear relationship exists between two continuous variables, and a correlation coefficient of −1 or +1 indicates a perfect linear relationship. (Mukaka, 2012). Correlation analysis was performed to examine the relationship between age and test success. In the study, p values less than 0.05 were considered statistically significant (α=0.05). Analyzes were made with SPSS 25.0 package program.

3.8. Assumptions of The Research

It is assumed that the knowledge scale used in the study is at a sufficient level to measure the students' knowledge levels of E-Commerce Basic Concepts.

It is thought that the knowledge scale applied to measure the knowledge levels of E-Commerce Basic Concepts is perceived by the students in a similar way and answered sincerely.

In the study, it is thought that the knowledge levels of the experimental and control groups about E-Commerce Basic Concepts before the study were at similar levels.

In the study, it was predicted that the rates of age, gender, e-commerce and mobile game history of the experimental and control groups would not be different.

It is assumed that the applications made are perceived by all students in a similar way and that all students' desire for participation will be high.

3.9. Features of Application and Download Link

We have created a game application in which the basic principles of e-commerce are taught. The game were first played and evaluated with a game developer to determine errors. After that, my advisor and some sample students were given the game to play and criticize. The ones who try the game were generally positive about the game and shared their positive and negative critics. Afterward, we revised the game once more and presented to be played by our attendants. Our game is basically a platform game and we have a character who pass the questions by answering them. There are 25 questions in our game application. You have to answer all the questions to finish the game. In the game, you have 15 minutes and 10 life numbers. There are some spaces and traps that cause the character to lose life points. The character can walk and jump over obstacles. Therefore you should not only answer the

questions and but also take care of the traps and spaces. Also, there are some blank scenes that cause you to lose time. you can fall those scenes in some questions if your answer is wrong. For each wrong answer, you will lose 1 health point and 10 seconds from your timetable. If you answer a question at the first shot you will get a diamond and 10 gold coins. If you answer in the second shot or later, you will get only 10 gold coins.

There are also informations parts which are shown with icons of well-known e-commerce companies. You can benefit from them for more information. The game is saved after 6th question. At the end of the game, the analysis part where you can see your scores is shown.

Start, Settings, high scores, badges and exit buttons are present on main menu if you want to check before starting the game. In the badges section, badge rewards are explained in detail. You can click the answers with the mouse click if you use a computer. If you have mobile phone you can click the buttons normally. Unfortunately the game is compatible with Android and Windows Operating System. You should be aware of that before downloading the game.

The purpose of the platform game application is to teach the basic concepts of e-commerce and to examine the productivity of gamification tools using the renowned and versatile game engine "Unity." Unity uses C Sharp software background. Therefore, game codes were created with C Sharp. The game was designed to be an entertaining and educative application to enhance information level and to raize awareness of participants in terms of e-commerce and gamification. It also can be considered as a serious game since it aims teaching a topic more than entertaining the players. We assume that thanks to the application, the participants of our study will obtain more familiarity in terms of e-commerce and gamification concepts and they will become more productive and competent in gamified e-commerce concepts.

The download link of our game app: https://github.com/Mks07/mksd

Figure 10. Game Main Menu

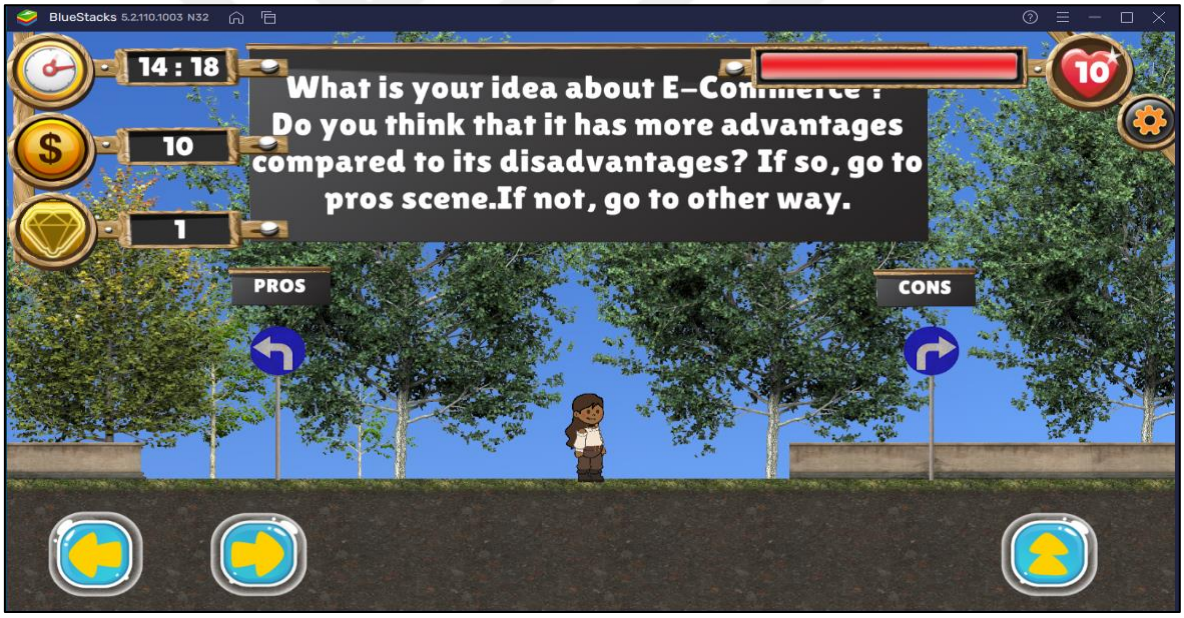


Figure 11. Game in Action

Figure 12. Scoreboard of the Game

3.10. Game Development with Unity

We wanted to teach the basic concepts of e-commerce with a platform game to scaffold the learning process for our attendants in an entertaining, fascinating and instructive way. The platform assets and the character were bought from Unity Asset Store. Other icons related to e-commerce were added from freepick.com and shutterstock.com. We created a platfrom game using Unity Game Engine and C Sharp since platfrom games have a positive effect to attract user attention. So that, we presumed that the attendants would enjoy the game and learning process. Here are presented stages and codes of the game.

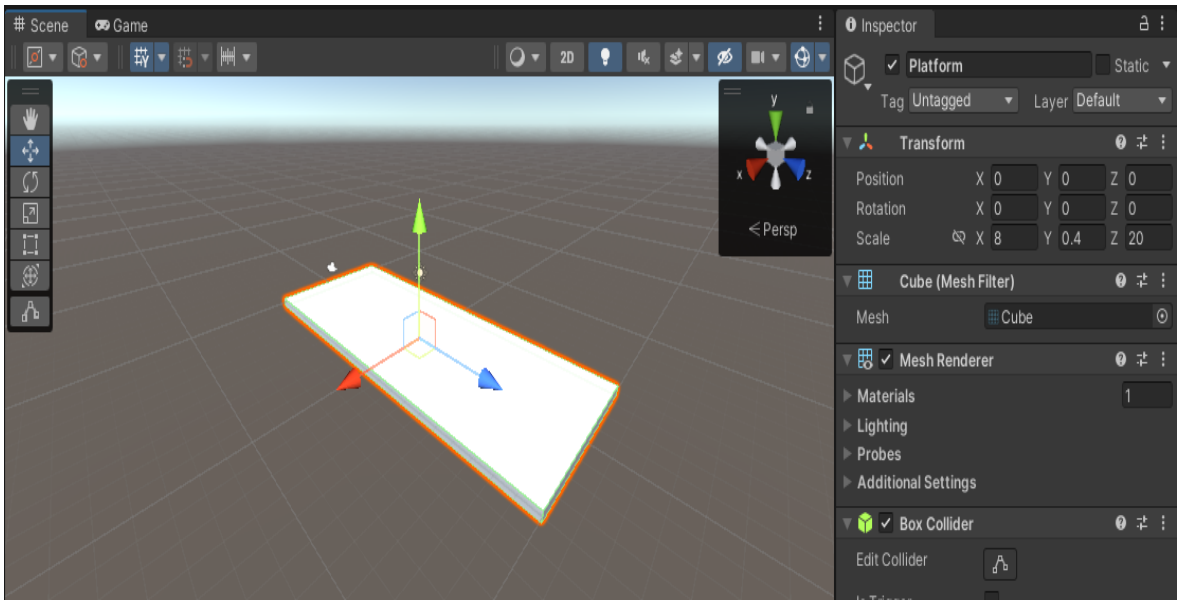


Figure 13. Unity User Interface Main Screen

The screenshot in Figure 13 shows Unity User Interface on which game objects, images and figures are placed and rotated.

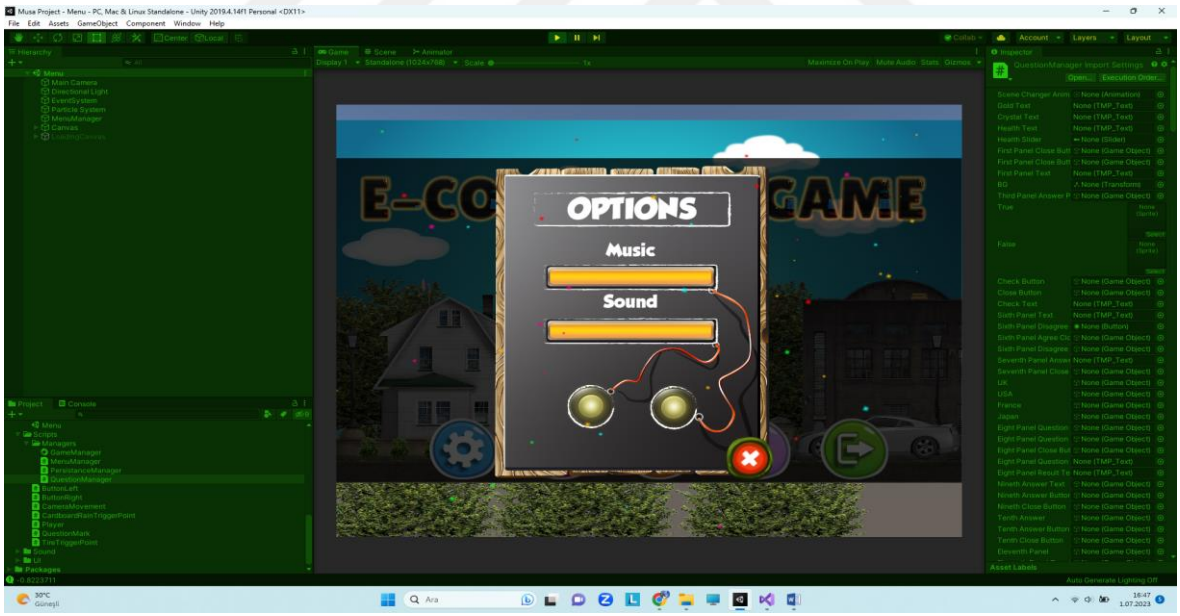


Figure 14. Options

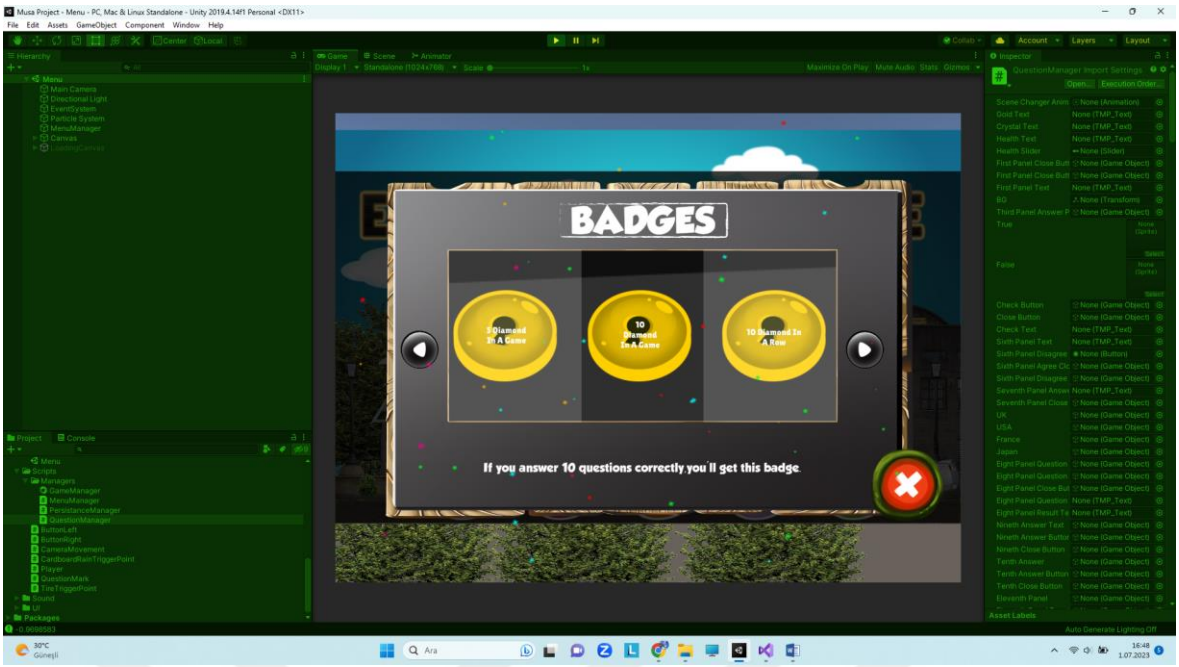


Figure 15. Badges

The game elements shown in Figures 14 and 15 are added on the main menu and physical adjusments were performed as planned.

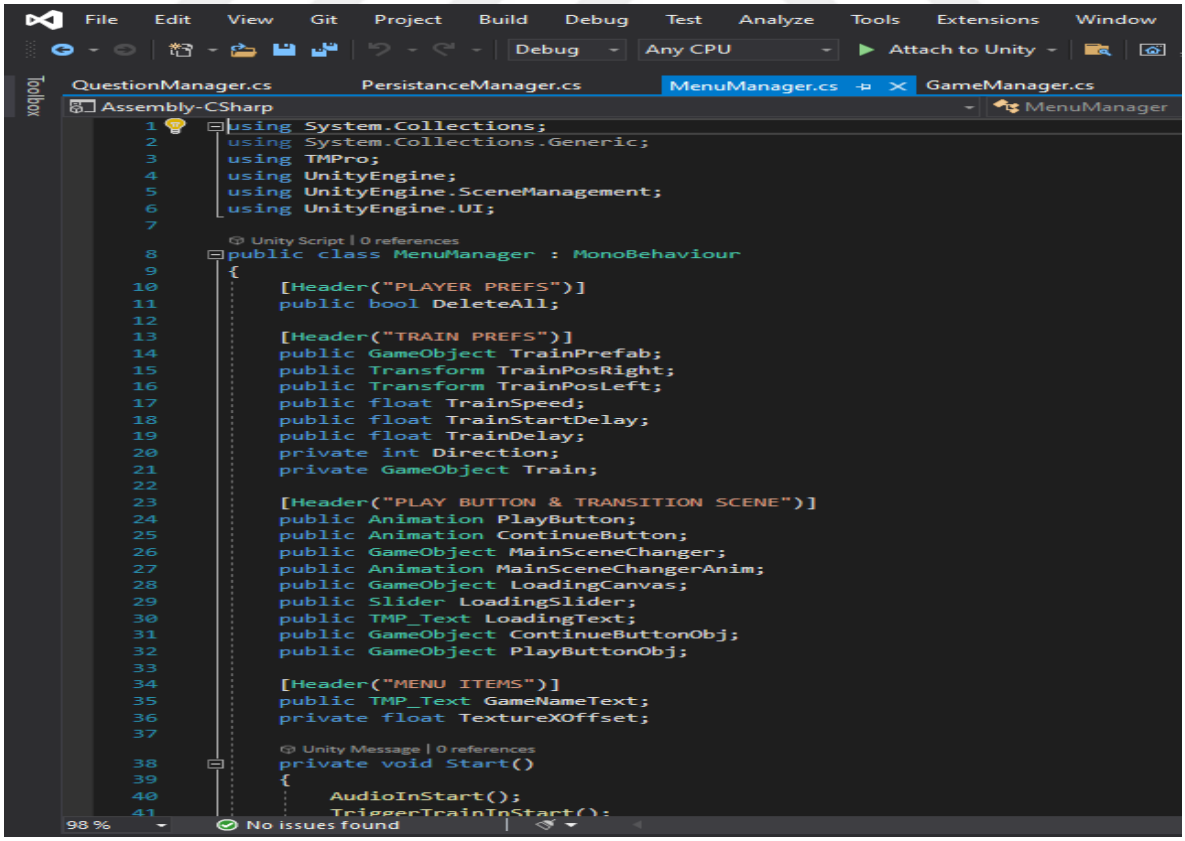


Figure 16. Menu Manager

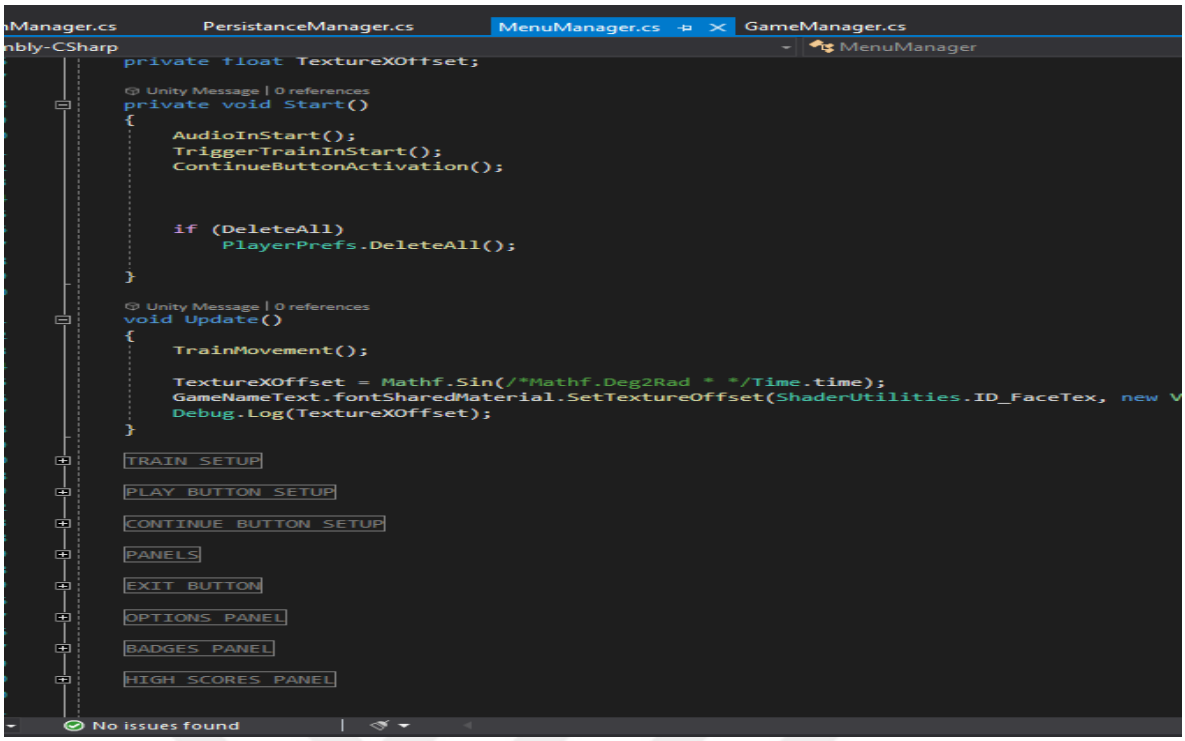


Figure 17. Menu Manager

The screenshots in Figures 16 and 17 shows Microsoft Visual Studio where the codes are written in C Sharp Language. The codes given are main menu codes that run the elements on the first screen.

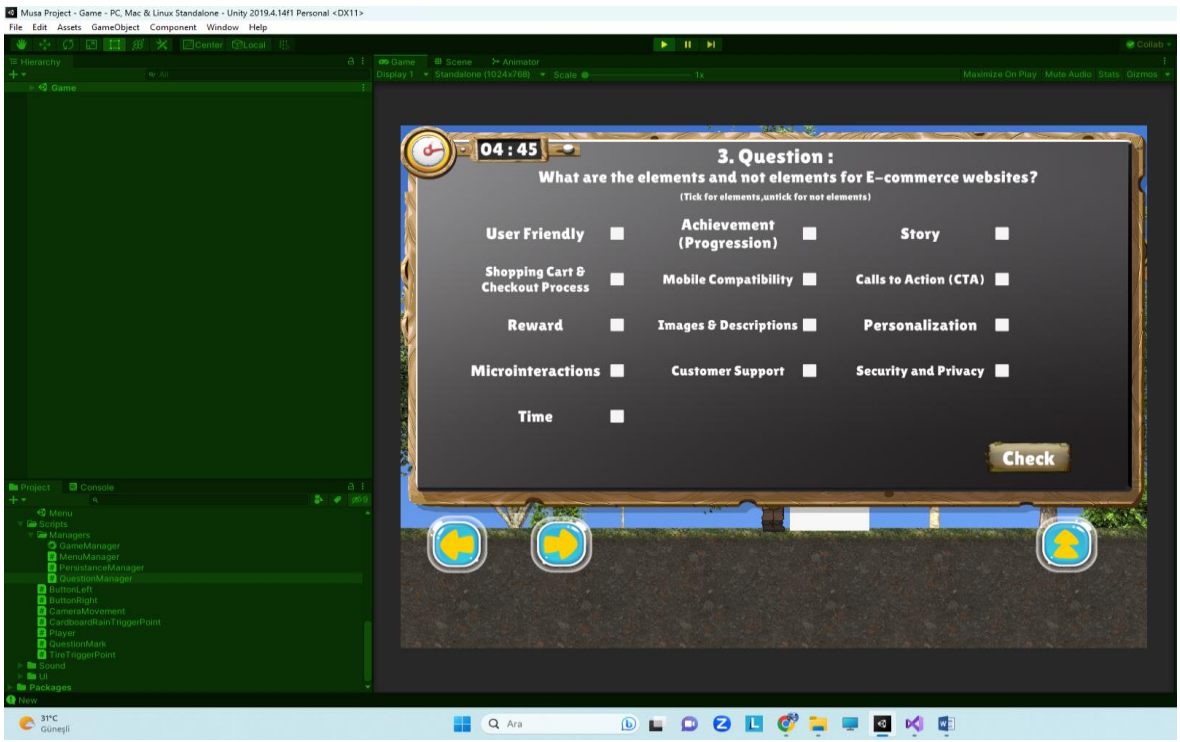


Figure 18. A sample Quesition

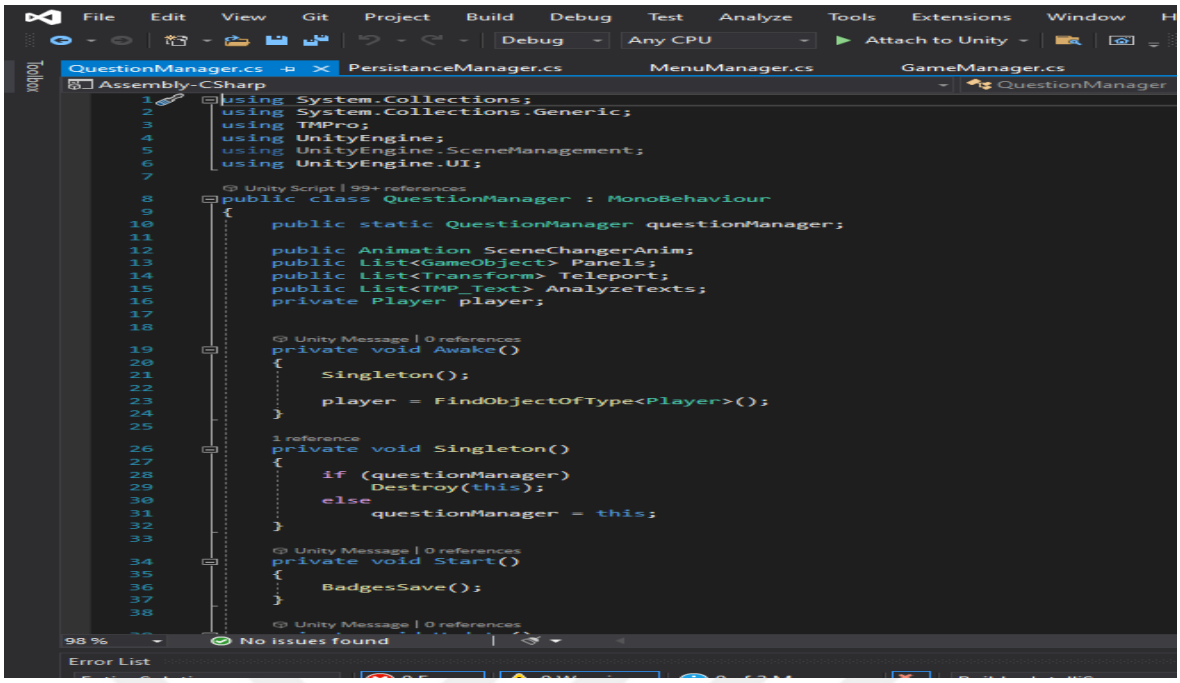


Figure 19. Question Manager

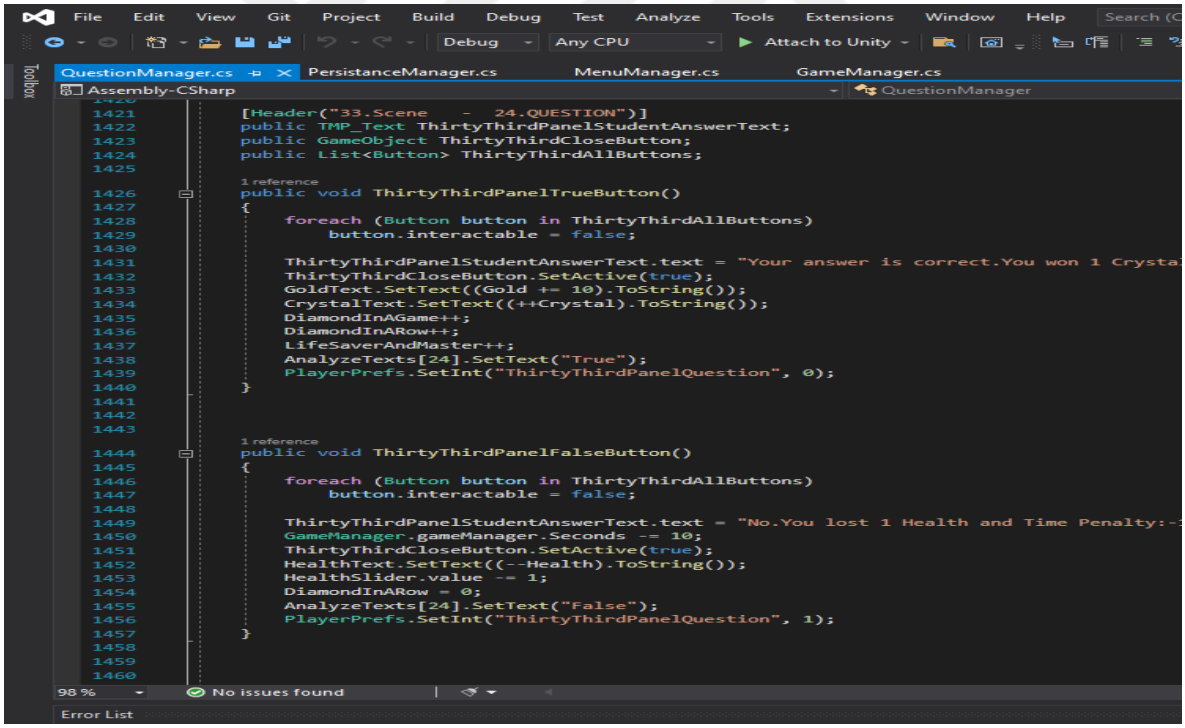


Figure 20. Question Manager

In Figures 18, 19 and 20, a part of codes from question manager tab and a sample question are shown. Each question is checked and evaluated one by one not to cause any problem for end usersin terms of correct and wrong answers.

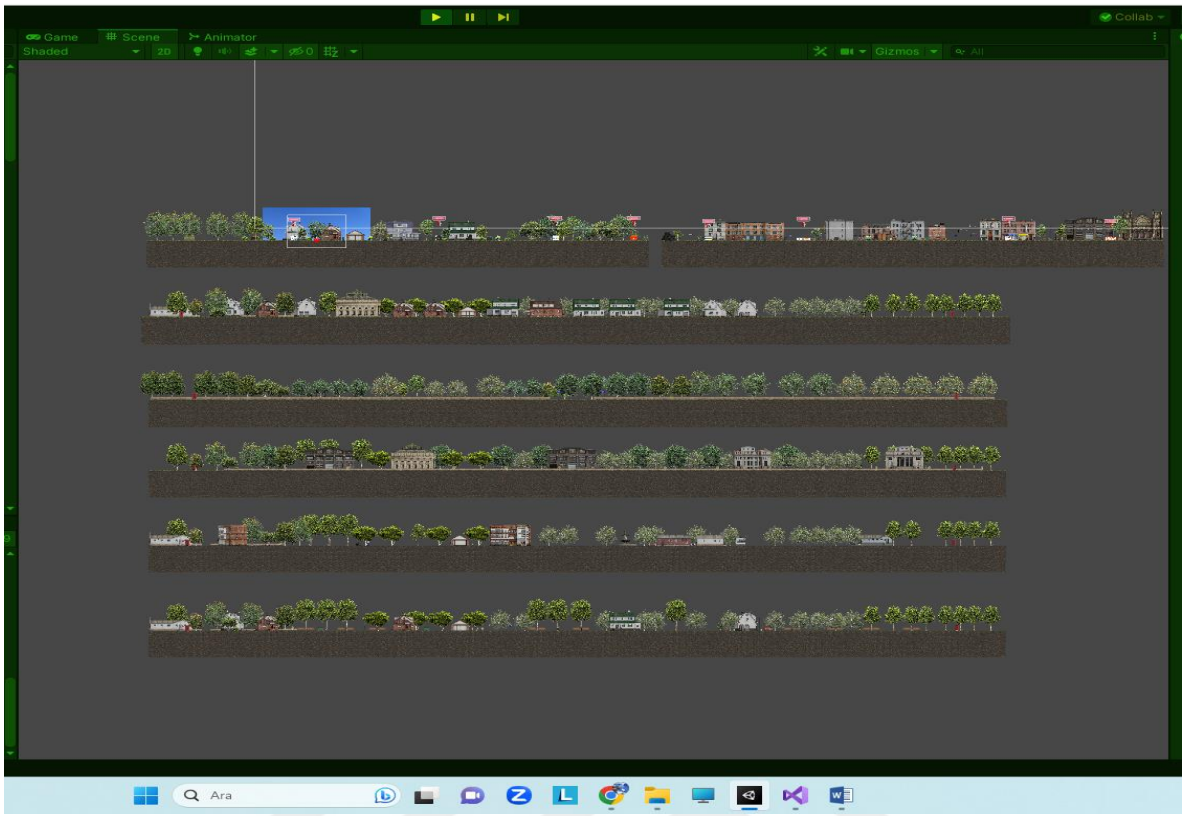


Figure 21. Scenes of Game

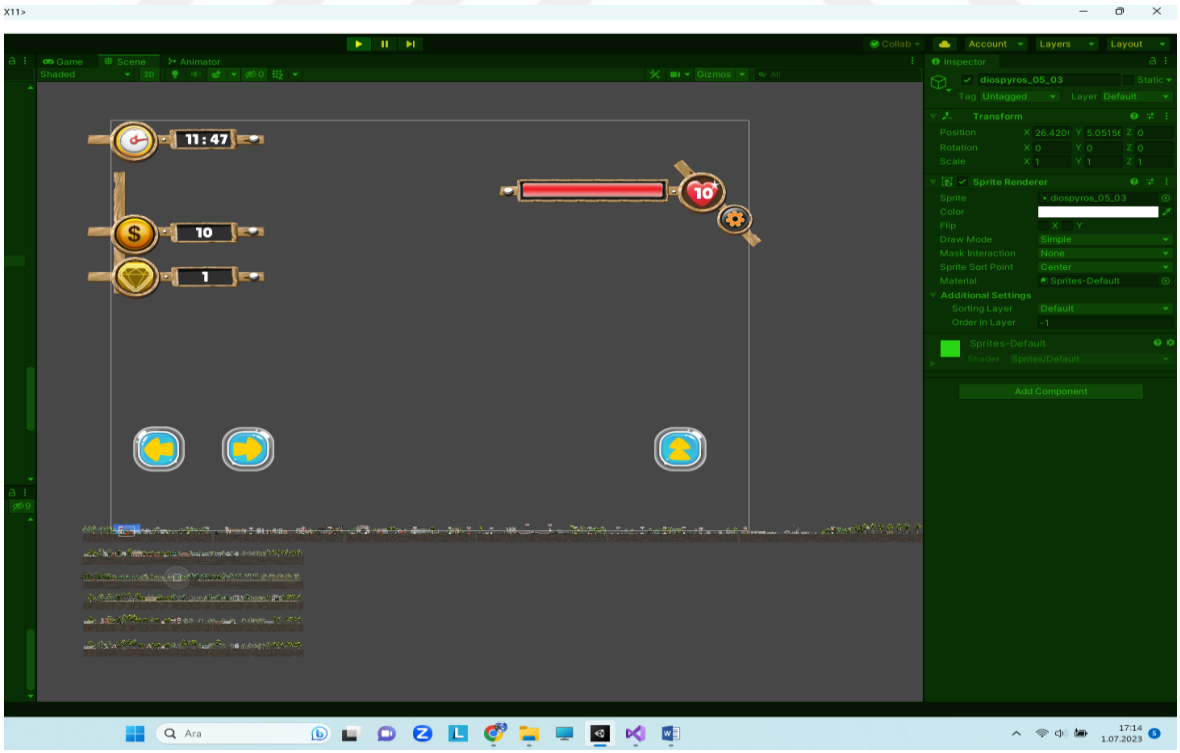
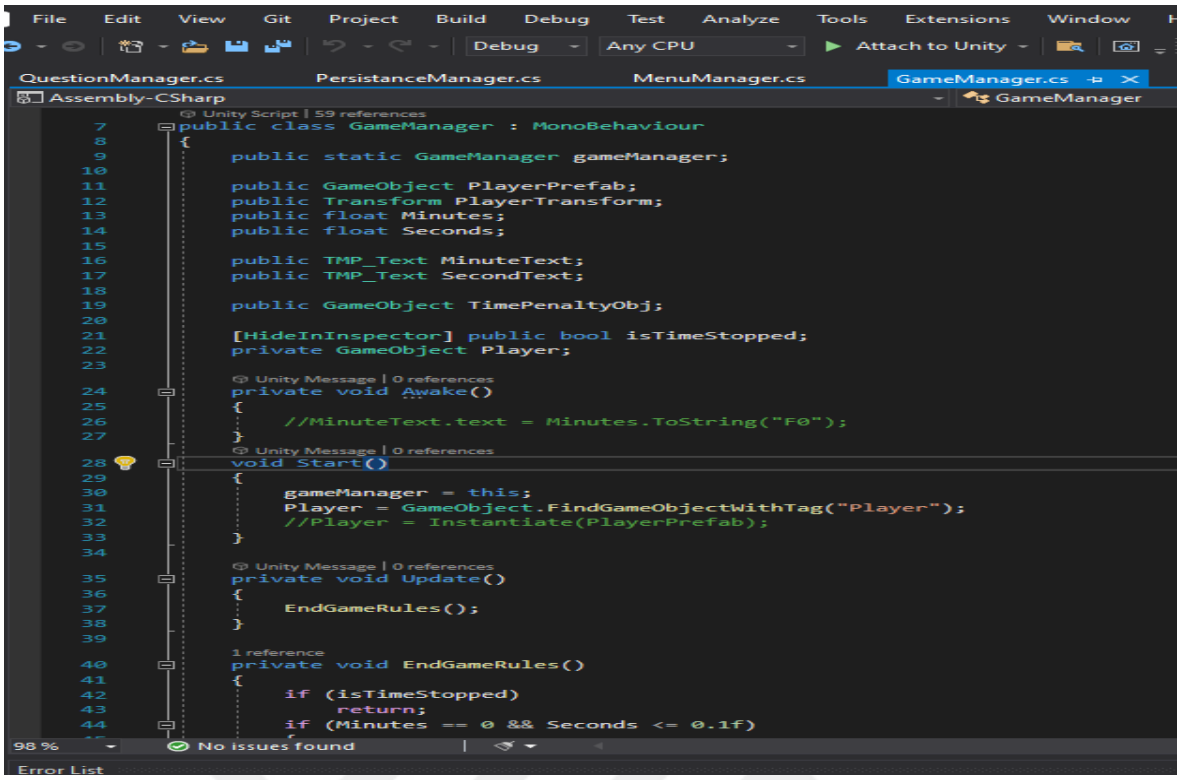
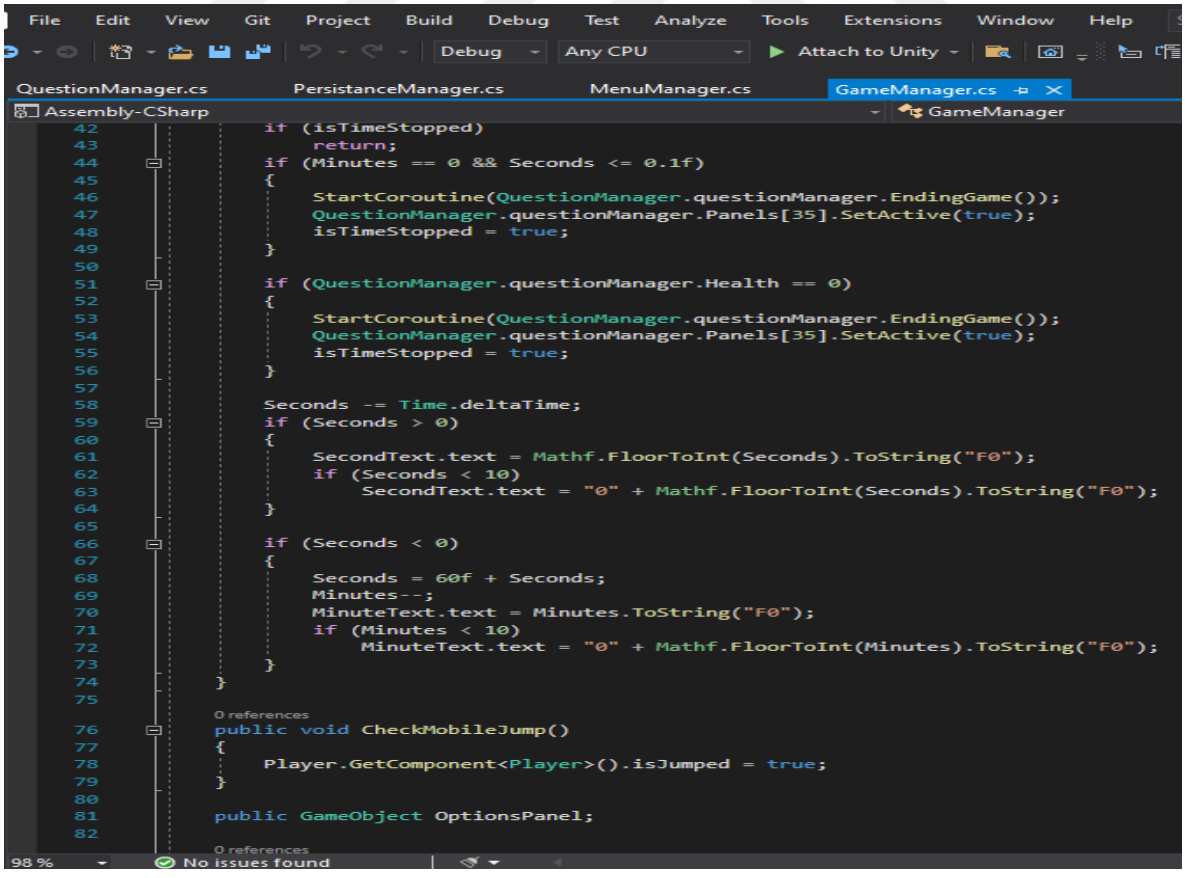


Figure 22. Life, Time and Prize Icons of Game



```
File  Edit  View  Git  Project  Build  Debug  Test  Analyze  Tools  Extensions  Window
Debug  Any CPU  Attach to Unity
QuestionManager.cs  PersistanceManager.cs  MenuManager.cs  GameManager.cs
Assembly-CSharp  GameManager
Unity Script | 59 references
public class GameManager : MonoBehaviour
{
    public static GameManager gameManager;

    public GameObject PlayerPrefab;
    public Transform PlayerTransform;
    public float Minutes;
    public float Seconds;

    public TMP_Text MinuteText;
    public TMP_Text SecondText;

    public GameObject TimePenaltyObj;

    [HideInInspector] public bool isTimeStopped;
    private GameObject Player;

    Unity Message | 0 references
    private void Awake()
    {
        //MinuteText.text = Minutes.ToString("F0");
    }
    Unity Message | 0 references
    void Start()
    {
        gameManager = this;
        Player = GameObject.FindGameObjectWithTag("Player");
        //Player = Instantiate(PlayerPrefab);
    }

    Unity Message | 0 references
    private void Update()
    {
        EndGameRules();
    }

    1 reference
    private void EndGameRules()
    {
        if (isTimeStopped)
            return;
        if (Minutes == 0 && Seconds <= 0.1f)
98 %  No issues found
Error List
```

Figure 23. Game Manager



```
File  Edit  View  Git  Project  Build  Debug  Test  Analyze  Tools  Extensions  Window  Help
Debug  Any CPU  Attach to Unity
QuestionManager.cs  PersistanceManager.cs  MenuManager.cs  GameManager.cs
Assembly-CSharp  GameManager
        if (isTimeStopped)
            return;
        if (Minutes == 0 && Seconds <= 0.1f)
        {
            StartCoroutine(QuestionManager.questionManager.EndingGame());
            QuestionManager.questionManager.Panels[35].SetActive(true);
            isTimeStopped = true;
        }

        if (QuestionManager.questionManager.Health == 0)
        {
            StartCoroutine(QuestionManager.questionManager.EndingGame());
            QuestionManager.questionManager.Panels[35].SetActive(true);
            isTimeStopped = true;
        }

        Seconds -= Time.deltaTime;
        if (Seconds > 0)
        {
            SecondText.text = Mathf.FloorToInt(Seconds).ToString("F0");
            if (Seconds < 10)
                SecondText.text = "0" + Mathf.FloorToInt(Seconds).ToString("F0");
        }

        if (Seconds < 0)
        {
            Seconds = 60f + Seconds;
            Minutes--;
            MinuteText.text = Minutes.ToString("F0");
            if (Minutes < 10)
                MinuteText.text = "0" + Mathf.FloorToInt(Minutes).ToString("F0");
        }
    }

    0 references
    public void CheckMobileJump()
    {
        Player.GetComponent<Player>().isJumped = true;
    }

    public GameObject OptionsPanel;

    0 references
98 %  No issues found
```

Figure 24. Game Manager

The loading of a game, its levels, and the storage of level data like score, prize-earned, and level numbers are all handled by the Unity Game Management System. In Figures 21, 22, 23 and 24, scenes of the game, life number, prize, time icons and the codes of the Game Manager Tab are presented.

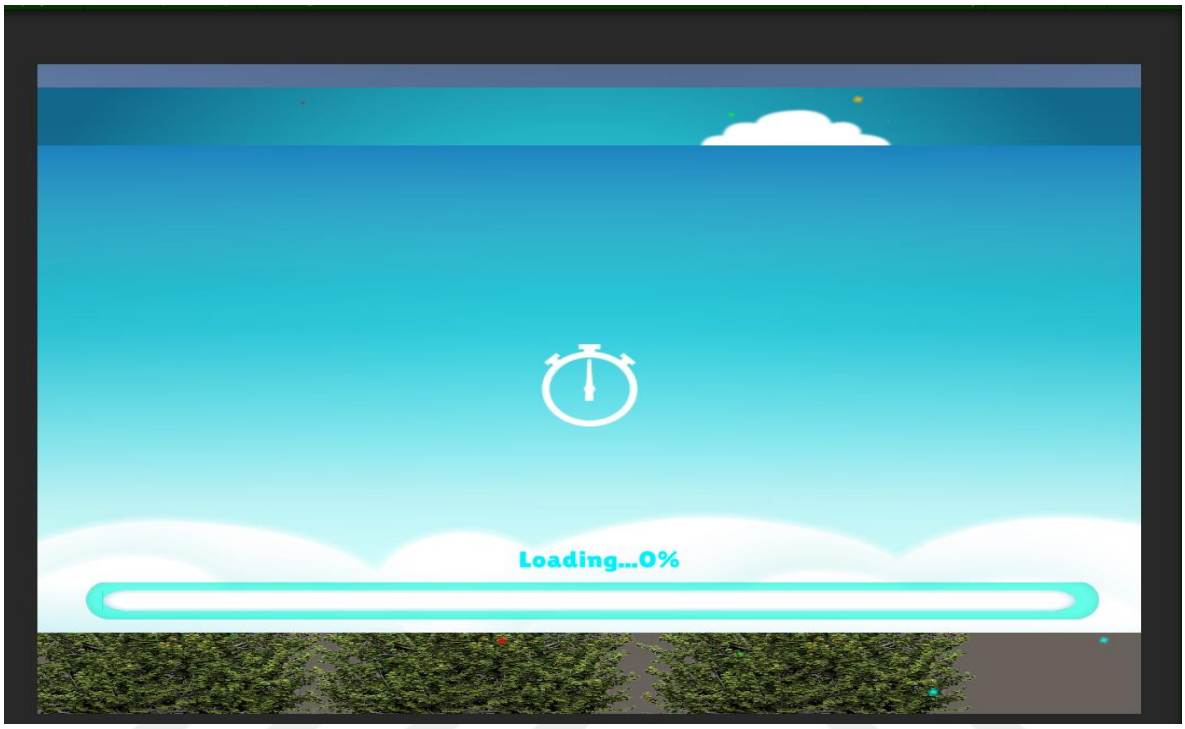


Figure 25. Loading Scene of Game

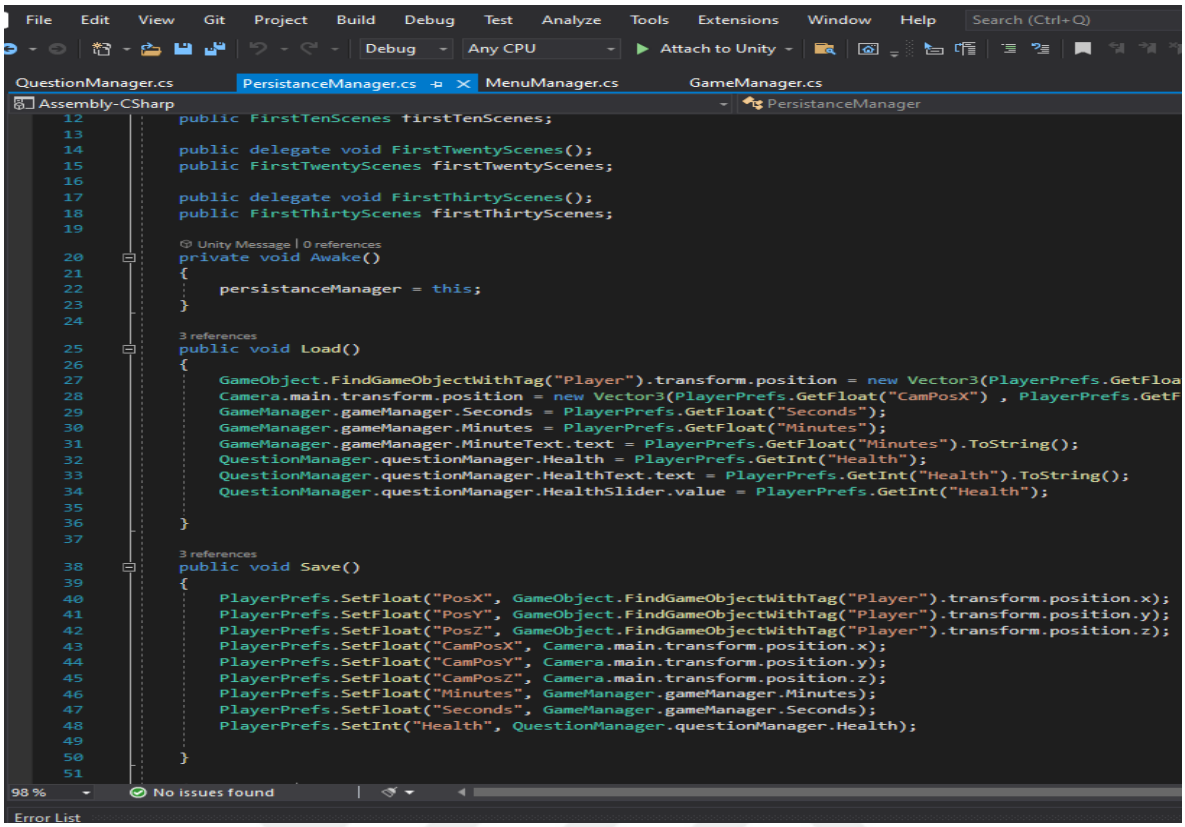


Figure 26. Persistance Manager

A mechanism called persistence is used as a "save game" feature for physical locations. When the program is relaunched, for instance, it can remember where a gaming board was put in the environment. In Figures 25 and 26, it can be seen the codes of Persistance Manager Tab.

4. FINDINGS AND DISCUSSION

4.1. Findings

Table 6. Examination of demographic and other characteristics of the groups

		Grup				p
		Control		Experiment		
		n	%	n	%	
Gender	Male	48	60,0%	46	57,5%	0,81
	Female	32	40,0%	34	42,5%	
E-Commerce Background	Basic	69	86,3%	66	82,5%	0,67
	Advanced	11	13,8%	14	17,5%	
Mobile Game Background	Basic	4	5,0%	4	5,0%	0,99
	Advanced	76	95,0%	76	95,0%	

Chi-square test

It was determined that the genders of the participants in the control and experimental groups did not differ substantially. It was observed that the rates were 60% male and 40% female participants in the control group, 57.5% male and 42.5% female participants in the experimental group (p=0.81).

It was determined that the rate of participants in the control and experimental groups having an advanced level e-commerce background did not differ significantly. It was observed that there were 13.8% participants in the control group and 17.5% in the experimental group with an advanced level e-commerce background (p=0.67).

It was also determined that the rate of advanced level mobile game background of the participants in the control and experimental groups did not differ significatly. It was observed that 95% of the participants in the control group and 95% of the participants in the experimental group had an advanced level mobile gaming background (p=0.99).

Table 7. Examination of Pretest Levels in Control and Experiment Groups

	Grup		p
	Control X±s.d.	Experiment X±s.d.	
Pre-Test Score	10,33±1,68	10,04±2,72	0,82
Pre-test Success percentage	%52±%8	%50±%14	0,74

Independent Sample t-test

It was observed that the pre-test scores of the experimental and control groups were not significantly different. It was determined that the pre-test success scores were 10.04±2.72 in the experimental group and 10.33±1.68 in the control group and at similar levels (p=0.82).

It was observed that the percentage of pre-test success in the experimental and control groups was not significantly different. It was determined that the pre-test success percentages were 50%±14% in the experimental group and 52%±8% in the control group and at similar levels (p=0.82).

It was determined that the achievement levels of both groups before the application were similar. This is an indication that the experimental research assumptions in this experimentally designed study have been fulfilled.

Table 8. Examination of Posttest Levels in Control and Experiment Groups

Measure	**Group**		**p**
	Control X±s.d.	Experiment X±s.d.	
Posttest Score	11,55±1,20	13,64±2,74	0,01
Posttest Success percentage	%57±%6	%68±%14	0,01

Independent Sample t-test, Significant Difference at the 0.05 level

It was observed that the post-test scores of the experimental and control groups were significantly different. It was determined that the post-test success scores were 13.64±2.74 in the experimental group and 11.55±1.20 in the control group (p=0.01). It was observed that the post-test success of the experimental group was significantly higher.

It was observed that the post-test success percentages of the experimental and control groups were significantly different. It was determined that their improvement was 68%±14% in the experimental group and 57%±6% in the control group (p=0.01). It was observed that the development of the experimental group was significantly higher.

It was seen that the experimental group had a higher level compared to the post-test scores of the two groups whose pre-test success levels were equal. This can be expressed as an indication that the success score and percentage of success of the experimental group increased significantly compared to the control group thanks to our game application.

Table 9. Examination of Development Levels in the Control and Experiment Group

Measure	Group		p
	Control X±s.d.	Experiment X±s.d.	
Percentage of Improvement Compared to Beginning	%5±%9	%19±%22	0,01

Independent Sample t-test, Significant Difference at the 0.05 level

It was observed that the test success development levels were significantly different in the experimental and control groups. It was determined that their improvement was 19±22% in the experimental group and 5%±9% in the control group (p=0.01). It was observed that the development of the experimental group was significantly higher. This result is another finding that shows the effectiveness of our application. While the experimental group showed an average improvement of 19%, the control group showed an improvement of 5%.

Table 10. Examination of Pre-Test and Post-Test Scores in the Control Group

Group	Test	X±s.d.	p
Control (n=80)	Pre-Test Score	10,33±1,68	0,09
	Final Test Score	11,55±1,20	
	Pre-test Success percentage	%52±%8	0,08
	Posttest Success percentage	%57±%6	

Paired t test

According to the results, it was seen that the pre-test and post-test scores in the control group were not significantly different and there was not any meaningful change in the control group scores according to the pre-test and post-test results. Although the success level before the education was 10.33±1.68 in the control group, it increased to 11.55±1.20 after the education, but this increase was not found to be a significant increase (p=0.09).

It was determined that there was not a significant change in the control group according to the pre-test and post-test success levels. Although the success level in the control group was 52%±8% before the education, it increased to 57%±6% after the education, it was determined that this was not a significant increase (p=0.08).

Table 11. Examination of Pre-Test and Post-Test Scores in the Experimental Group

Group	Test	X±s.d.	p
Experiment (n=80)	Pre-Test Score	10,04±2,72	0,01
	Final Test Score	13,64±2,74	
	Pre-test Success percentage	%50±%14	0,01
	Posttest Success percentage	%68±%14	

Paired t-test, Significant Difference at the 0.05 level

According to the results, it was seen that the pre-test and post-test scores of the experimental group were significantly different. It was determined that the post-test scores increased significantly compared to the pre-test scores. In the experimental group, the level of success before the application increased from 10.04±2.72 to 13.64±2.74, showing a significant improvement (p=0.01).

It was determined that the pre-test and post-test success percentages were significantly different in the experimental group. It was determined that the post-test percentages increased significantly compared to the pre-test percentages. In the experimental group, the level of success before the application increased from 50%±14% to 68%±14%, showing a significant improvement (p=0.01).

Table 12. Examination of Percentage of Improvement Compared to Beginning Level in the Control Group According to the Characteristics of the Participants

Control Group		Percentage of Improvement Compared to Beginning X±s.d.	p
Gender	Male	%4±%8	0,41
	Female	%7±%10	
E-Commerce Background	Basic	%5±%9	0,75
	Advanced	%7±%10	
Mobile Game Background	Basic	%10±%12	0,14
	Advanced	%5±%9	

Independent Sample t-test

In the control group, it was observed that gender did not have a significant effect on developmental levels. It was determined that male and female participants in the control group achieved similar levels of improvement (p=0.41).

It was observed that the status of having an advanced level e-commerce background in the control group did not have a significant effect on their development levels. It was determined that the participants in the control group, with or without an advanced level e-commerce background, achieved similar levels of improvement (p=0.75).

It was also observed that having an advanced level mobile gaming background in the control group did not have a significant effect on their developmental levels. It was determined that the participants in the control group, with or without an advanced level mobile gaming background, achieved similar levels of improvement (p=0.14).

Table 13. Examination of Percentage of Improvement Compared to Beginning Level in the Experimental Group According to the Characteristics of the Participants

Experimental Group		**Percentage of Improvement Compared to Beginning X±s.d.**	**p**
Gender	Male	%21±%22	0,16
	Female	%16±%21	
E-Commerce Background	Basic	%16±%22	0,03
	Advanced	%30±%19	
Mobile Game Background	Basic	%18±%21	0,01
	Advanced	%44±%17	

Independent Sample t-test, Significant Difference at the 0.05 level

It was observed that gender did not have a significant effect on developmental levels in the experimental group. It was determined that male and female participants in the experimental group achieved similar levels of improvement (p=0.16).

It was observed that the status of having an advanced level e-commerce background in the experimental group affected their development levels. It was determined that the level of development of the participants with an advanced level e-commerce background in the experimental group was higher than the participants with a basic level e-commerce background (p=0.03)

It was observed that the mobile game background in the experimental group affected their development levels. It was determined that the level of development of the participants with an advanced level mobile gaming background in the experimental group was higher than the participants with a basic level mobile gaming background (p=0.03)

In the experimental group, the group with advanced level mobile gaming and e-commerce background benefited more effectively from the application. It can also be stated that there is not a significant development according to gender.

Table 14. The Correlation of Percentage of Improvement with Test Scores Compared to Beginning Level in Control and Experiment groups According to Age Variable

Group			Percentage of Improvement Compared to Beginning
Control (n=80)	Age	r	-0,04
		p	0,73
Experimental (n=80)		r	0,05
		p	0,67

Pearson correlation test

In the study, it was observed that there was no significant relationship between the percentages of development according to the age of the participants in the control group (r=-0.04, p=0.73).

In the study, it was observed that there was no significant relationship between the percentages of development according to the age of the participants in the experimental group (r=0.05, p=0.67).

It can be stated that age has no effect on the development of test success in both study groups. The achievements of participants of different ages are similar in both groups.

Table 15. The correlation of Percentage of Improvement with Test Scores Compared to Beginning Level in Control and Experiment groups

Group			Percentage of Improvement Compared to Beginning
Control (n=80)	Pre-test Success percentage	r	-0,42
		p	0,01
	Posttest Success percentage	r	0,41
		p	0,01
Experimental (n=80)	Pre-test Success percentage	r	-0,89
		p	0,01
	Posttest Success percentage	r	0,49
		p	0,01

Pearson Correlation test, Significant Correlation at the 0.05 level

In the control group, it was observed that the pre-test success percentage level was negatively and moderately correlated with the level of development. It was observed that the development levels of the participants with lower knowledge levels at the beginning were at higher levels. (r=-0.42, p=0.01).

In the control group, it was observed that the post-test success percentage level was positively and moderately correlated with the level of development. It was observed that the development levels of the participants with higher knowledge level at the post-test were at higher levels (r=0.41, p=0.01).

In the experimental group, it was seen that the pre-test success percentage level was negatively and very strongly correlated with the level of development. It was observed that the development levels of the participants with lower knowledge level at the beginning were at higher levels (r=-0.89, p=0.01).

In the experimental group, it was observed that the post-test success percentage level was positively and moderately correlated with the level of development. It was seen that the development levels of the participants with higher knowledge level at the post-test were at higher levels (r=0.49, p=0.01).

According to the results, the high level of development of the experimental group participants is related to the low pre-test success. This result states that the participants of the experimental group, whose initial level of knowledge was low, showed higher levels of development after the application. It was also determined that the participants whose

knowledge level was high as a result of the pre-test had a significant improvement, but their improvement percentage was more limited compared to participants with limited knowledge.

4.2. Discussion

The study was conducted using a game-based application to improve students' awareness and knowledge about e-commerce. After the effectiveness of the application is proven, it is thought that it is important to raise conscious individuals by including it in the curriculum. In addition, the absence of such a study in the literature will shed light on future studies in the light of the data to be obtained and will close the gap in the literature.

Among N=331 students at the undergraduate level of MIS Department at AYBU in the 2021-2022 period, 160 students, n=80 experimental and control groups, were included in the study with 5% error and 90% confidence, using simple random sampling method. The study was applied in an experimental design and it was determined that the general characteristics of the groups were similar in terms of being comparable.

KR-21 reliability test, chi-square test, independent sample t test, paired t test and correlation analysis were performed in the study. P values less than 0.05 were considered statistically significant in the analyses, and SPSS 25.0 package program was used in the data analysis.

After it was determined that the groups were comparable, it was determined that the success levels of both groups were similar before the education and application. This is an indication that the experimental research assumptions are fulfilled. It was seen that the experimental group had higher levels than the post-test scores of the two groups whose pre-test success levels were similar. It was observed that the success score, percentage of success and development levels of the group receiving the game-based education were significantly higher than the group receiving the classical education. This result shows the effectiveness of the application. While the group receiving game-based education showed an average improvement of 19%, the level of development of the group receiving classical education was determined to be 5%.

It was determined that the gender, e-commerce and mobile game background characteristics of the classical education group did not have a significant effect on their

development levels. On the other hand, it was seen that the knowledge level of the participants with advanced mobile game and e-commerce background was higher in the group included in the game applied for the basic concepts of e-commerce. However, it was determined that there was no significant development according to gender.

It was determined that there was no significant relationship between the development percentages of the participants according to their ages in both groups, in which a game program for the basic concepts of classical education and e-commerce was applied.

It was seen that the development in the e-commerce knowledge levels of the participants who were applied the game program was positively related to the success of the pre-test. It was determined that the participants of the experimental group with low initial level of knowledge showed higher levels of development after the application. This is another case that shows the effectiveness of the application.

The main problem of the study was determined as the examination of whether the game program applied for the basic concepts of e-commerce is an effective method to increase the knowledge level of the students significantly.

In general, it has been seen that the game application is an effective method to increase the knowledge level of the basic concepts of e-commerce. It can be stated that the application is an effective method since it is seen that the knowledge level of the group receiving education with the game application has improved significantly, and the development of the group receiving classical education is at lower levels.

Findings related to sub-research questions were mentioned as follows:

- The 1st research question in the study is “Do the knowledge level scores of the basic concepts of e-commerce differ according to the gender of the participants before and after the game application?” When analyzed according to the results; it has been determined that female and male participants have developed at similar levels.
- The 2nd research question is “Is there a statistically significant relationship between the effect of game application used in teaching basic concepts of e-commerce and ages of participants?’’ when evaluated, it was seen that age did not have a relation on the development of test success in both study groups and the achievements of participants of different ages were similar in the experimental and control groups.

- The 3rd research question is “Do the knowledge level scores of the basic concepts of e-commerce differ according to the e-commerce background of the participants before and after the game application?” When examined, it was determined that the level of development of the participants with advanced e-commerce background was higher in the experimental group.
- The 4th research question is “Do the knowledge level scores of the basic concepts of e-commerce differ according to mobile game background of the participants before and after the game application?” For this purpose, it was determined that the level of development of the participants with an advanced mobile gaming background was higher than the participants with a basic mobile gaming background.
- The 5th research question is “Do the test scores before and after the game application used in teaching basic e-commerce concepts show a significant difference?” When the post-test scores of the two groups with equal pre-test achievement levels were examined, it was seen that the experimental group had higher levels. This situation can be expressed as an indication that the application given increased the success score and success percentage of the experimental group significantly compared to the control group. While the experimental group showed an average improvement of 19%, the control group showed an improvement of 5%. In addition, the pre-application success level in the experiment group showed a significant improvement from 50%±14% to 68%±14%. These findings demonstrate the efficacy of the gaming application used to teach e-commerce basic notions.

The case that there were not many studies in the literature related to our topic has been evaluated as the prevalence of game-based education systems in recent years and the importance of internet-based, distance education systems with the effect of the pandemic. This situation increases the importance of the study once more.

When similar studies are examined, Hsu And Chen (2018) showed that the game experience is effective to support students' overall value creation by using game design elements.

According to Prensky (2001), gamification can provide both social and epistemic value. Gamification is an appropriate method to encourage academic development and participation.

It was observed that the application developed according to the digital game-based learning design model by Zin, Jaafar, And Yue (2009) increased the participants' knowledge about related subjects.

Siswanto (2016) stated that the positive relationship between innovation orientation and e-satisfaction orientation indirectly affects e-loyalty in his study with the aim of revealing the relationship between the application of gamification strategy in e-commerce, customer satisfaction and loyalty.

De Queirós and Pinto (2017) examined the effectiveness of the digital game-based learning system. He evaluated the effect of gamification on intrinsic motivation and need satisfaction and stated that the system is an effective tool to increase the amount of performance.

Tobon et al. (2020) in their study to explore the role of gamification and the use of game mechanics in enabling consumer interaction with online retailers; has shown that gamification strategies are important for creating their own "games", increasing competitive pressure among retailers.

Hall et al. (2018) investigating the effects of gamification on online trust, testing the effect using e-commerce website, ebay; conducted the study to explore how a particular type of visual design element implemented on websites affects users' online trust. At the end of the study; they stated that gamified items implemented on websites have the potential to increase users' trust in an online seller. It has also been noted that gamification indeed has a significant positive effect on building trust online.

Robson (2015) developed a new conceptual model to predict behavioral intention towards gamified e-banking to examine the impact of a gamified business practice on sociability. Robson (2015) stated that at the end of the study, the motivation of customers to use the website and the financial return increased.

Despite the fact that the relevant studies, to some extent, appear to differ with respect to subject, methodology or content, it is clear from both these and the current study that game-based learning has favorable impacts on overall outcomes.

5. CONCLUSION

E-commerce and gamification could be considered as related components. Our findings also point out that gamification can be used to learn new concepts related to e-commerce, and that it can help global marketing increase revenue, clients, and recognition because people are naturally drawn to games even when they are doing something important like shopping. There are plenty of applications that allow gamification in marketing, and we are now aware of employing game components in both national and international markets. On the other hand, can we think of a game application that instructs us on how to understand and apply fundamental and sophisticated shopping principles and advice? For instance, using an e-commerce game to teach the fundamentals of an e-commerce website may be conceivable. Furthermore, by merely participating in an e-commerce game, we can shop and acquire brand-new, tangible goods. However, it is crucial to take the necessary security precautions and prevent fraud. As a result, we want to touch on that topic using our recently constructed gaming application, and we anticipate that this app may serve as a foundation for future research since there are not much research focusing on teaching basic principles of e-commerce with a game application.

In our study, we taught the fundamentals of e-commerce through gamification, and we found that the outcomes had a favorable impact on learning. This instance suggests that gamification is not only a successful method for teaching young students simple and fundamental concepts, but also a novel and alluring method for teaching adults abstract and, to some extent, sophisticated topics. In addition, social interaction and player motivation are typically quite strong in a game. As a result, the length and productivity of the learning process both considerably improve. Theoretically, this kind of gamification might be used in various sectors to raise learners' knowledge levels by grabbing their attention. Another contingency of our investigation is represented by that scenario.

We found out in this study that:

- Female and male participants have developed at similar levels.
- Age did not have a relation on the development of test success in both study groups and the achievements of participants of different ages were similar in the experimental and control groups.

- The level of development of the participants with advanced e-commerce background was higher in the experimental group.
- The level of development of the participants with an advanced mobile gaming background was higher than the participants with a basic mobile gaming background.

- When the post-test scores of the two groups with equal pre-test achievement levels were examined, it was seen that the experimental group had higher levels.

When all the things mentioned here are taken into consideration we can come to the conclusion that our game has a positive effect in terms of learning basic principles of e-commerce for our attendants.

According to the results obtained in the study, although it is seen that the development is higher in the game-based group than in the classical education group, the results should not be reflected in general according to the limitations of the study. The application was conducted on the experimental group that consists of 80 MIS undergraduate students at AYBU in the period of 2021-2022. It would be healthier to evaluate the results obtained in this context. In the study, it was decided on the developments based on the knowledge levels determined by the knowledge level scale of the basic concepts of e-commerce. In addition, it should be taken into account that the similarity levels of the participants in both groups were examined according to characteristics such as gender, age, e-commerce bacground and mobile game background.

We can suggest that:

- Since the e-commerce-based game system is seen to be effective, necessary adaptations can be made and added to the education curriculum.
- The knowledge scale used in the study can be used in the literature by conducting more effective reliability and validity studies in future studies.
- Detailed examination of the results can be made by repeating the study in different fields and at different educational levels.
- The e-commerce game used can be revised considering the conditions of the country and shopping habits.

E-commerce websites can benefit from gamification in a more extended way using game-like environments.

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7. APPENDIXES

APPENDIX-1. Ethics Committee Approval

ANKARA YILDIRIM BEYAZIT ÜNİVERSİTESİ (AYBÜ)
SOSYAL VE BEŞERİ BİLİMLER ETİK KURULU
PROJE ONAY BELGESİ

Ankara Yıldırım Beyazıt Üniversitesi Sosyal Bilimler Enstitüsü Yönetim Bilişim Sistemleri bölümü öğrencilerinden Musa Kaan ŞAHİN'in, **E-Ticaretin Temel Kavramlarının Öğretilmesinde Oyunlaştırmanın Etkisi ve Bir Uygulama** adlı araştırması değerlendirilmiştir.

Proje etik açısından uygun bulunmuştur. [X]
Proje etik açısından geliştirilmesi gerekmektedir. [ ]
Proje etik açısından uygun bulunmamıştır. [ ]

AYBÜ SOSYAL VE BEŞERİ BİLİMLER ETİK KURULU KARARI (Etik Kurul tarafından doldurulacaktır)	
Araştırma kodu (Yıl – Araştırma sıra no)	2021-416
Başvuru formunun Etik Kurula ulaştığı tarih	19.11.2021
Etik Kurul Karar toplantı tarihi ve karar no	09.12.2021-34
Yer	Yıldırım Beyazıt Üniversitesi, Esenboğa Külliyesi
Katılımcılar	Formda imzası bulunan üyelerimiz toplantıya katılmıştır.

KURUL BAŞKANI VE ÜYELER:

Prof. Dr. Hakkı ODABAŞ	Başkan
Prof. Dr. Mehmet Ali ZENGİN	Üye
Doç. Dr. Behlül TOKUR	Üye
Doç. Dr. Özge GÖKBULUT ÖZDEMİR	Üye
Doç. Dr. Ali POLAT	Üye
Doç. Dr. Musa ÖZTÜRK	Üye
Dr. Öğr. Üyesi Semih CEYHAN	Üye
Dr. Öğr. Üyesi Recep YORULMAZ	Üye
Dr. Öğr. Üyesi Ömer ASLAN	Üye
Dr. Öğr. Üyesi Keziban Büşra KAYNAK EKİCİ	Üye
Dr. Öğr. Üyesi Gülay YAZICI	Üye

APPENDIX-2. Attendant Information Form

- (Please fill in the information below accordingly.)

1. ***Age***

2. Gender

☐ Female ☐ Male

3. Do you have any undergraduate or associate degree education other than the department you are studying? If yes, what are they?

4. Your interests:

5. How long do you play mobile games on average per week?

I do not play mobile games. ☐

2-4 hours ☐

4-6 hours ☐

6-8 hours ☐

8-10 hours ☐

10-12 hours ☐

12 hours and over ☐

6. Do you play platform games?

Often ☐

Sometimes ☐

Rarely ☐

Never ☐

7. Your favorite platform game/games (Write if any).

8. On average, how much of your shopping do you do online?

I do not do online shopping. ☐

% 10-20 ☐

%20-40 ☐

%50 ☐

%50-70 ☐

%70-90 ☐

%100 ☐

9. Sites you use for online shopping

10. Have you been interested in online sales before? If so, what kind of work did you do? (Please give brief information.)

Contact information

E-mail Address:

APPENDIX-3. Pre-Post Test Questions

(Please mark the correct options.)

1. What is the name given to the production, promotion, sales, insurance, distribution and payment transactions of goods and services over computer networks?

A. Primary distribution

B. Secondary distribution

C. Electronic commerce

D. Factorial production

2. The word-of-mouth spread on the Internet is called ….. .

Which of the following correctly fills in the blank in the sentence above?

A. Social media

B. Permission marketing

C. Viral marketing

D. Pop-up advertisement

3. Which of the following is not a layer of TCP/IP?

A. Application layer

B. Software layer

C. Physical layer

D. Transport layer

4. Which of the following can be given as an example of goods that may be subject to indirect e-commerce?

A. Entertainment contents

B. Computer software

C. Betting sites

D. Food products

5. From the perspective of entrepreneurs in Turkey, which of the following is the most important factor that restricts entrepreneurs' online sales?

A. Height of customers' order cancellations

B. Level of firm income

C. Logistics problems

D. Security problem related to payments

6. Which of the following is not a type of e-commerce?

A. Consumer-to-government E-Commerce

B. Business-to-business E-Commerce

C. Government-to-consumer E-Commerce

D. Consumer-to-consumer E-commerce

7. Which of the following is not one of the benefits of e-commerce technologies to users?

A. Personalization of e-commerce technology.

B. Allowing businesses to cross country borders.

C. Increasing information share with social technology.

D. Causing shallow information in the market.

8. Which of the following is not one of the activities included in logistics management?

A. Fleet management

B. Stocking

C. Order completion

D. Financing

9. Which of the following statements about e-commerce is false?

A. The Internet has created new knowledge-based products.

B. The fact that the Internet is a new sales channel reduces product prices.

C. Offering some services and products for free may destroy competitors.

D. Internet requires high storage cost, which increases the product cost.

10. What is the name given to the rights of the creator on intellectual works related to fine arts such as composition, novel and poetry?

A. Copyright

B. Trademark right

C. Patent right

D. Title right

11. Which of the following is not a function of a brand?

A. Advertising

B. Distinctiveness

C. Citation

D. Price guarantee

12. The address of a business in the form of "www.********.com" is expressed by which of the following concepts?

A. Domain name

B. Server name

C. Second level domain

D. Brand

13. E-government applications are within the scope of which of the following types of electronic commerce?

A. Government-to-consumer e-commerce

B. Consumer-to-government e-commerce

C. Business-to-government e-commerce

D. Government-to-business e-commerce

14. Which of the following is not one of the problems caused by globalization in tax law practices?

A. Increasing tax evasion

B. Causing double taxation

C. Inadequacy of classical tax methods

D. Driving countries to apply high taxes

E. Leading to tax avoidance

15. For which E-Commerce site does grocery delivery have an important place in commerce transactions?

A. Wayfair
B. E-Bay
C. Walmart
D. Amazon

16. Which is not one of the main features of e-commerce sites?

A. Progress and success

B. Mobile compatibility

C. Customer Support

D. Privacy and security

17. What kind of work might the following stages be?

* Brainstorm your strengths and a complete a detailed list.
* Focus on weaknesses.
* Review internal analysis.
* Identify the threats.
* Take action.

A. Mechanistic Analysis.
B. Inferential Analysis
C. Swot Analysis
D. Predictive Analysis.

18. What kind of gamification user focus on achievement and collection and interested in game mechanics such as levels and badges?

A. Enjoyer
B. Self-seeker
C. Networker
D. Farmer

19. Which of the following is not an element of E-Commerce gamification?

A. Leaderboards
B. Tutorials
C. Level up
D. Badges

20. What could be the biggest reason behind combining gamification elements and E-Commerce?

A. Costumers like playing games while shopping.
B. E-Commerce websites are obscure and dull.
C. Gamification enhances costumer interest and interaction.
D. Video games has become a new type of E-Commerce shopping.

APPENDIX-4. How To Play The Game

We have created a game in which basic principles of e-commerce are taught. It is a platform game and we have a character who pass the questions by answering them. There are 25 questions in our game application. You have to answer all the questions to finish the game. In the game, you have 15 minutes and 10 life numbers. There are some spaces and traps that cause the character to lose life points. The character can walk and jump over obstacles. Therefore you should not only answer the questions and but also take care of the traps and spaces. Also, there are some blank scenes that cause you to lose time. you can fall those scenes in some questions if your answer is wrong. For each wrong answer, you will lose 1 health point and 10 seconds from your timetable. If you answer a question at the first shot you will get a diamond and 10 gold coins. If you answer in the second shot or later, you will get only 10 gold coins.

There are also informations parts which are shown with icons of well-known e-commerce companies. You can benefit from them for more information.

The game is saved after 6th question. At the end of the game, the analysis part where you can see your scores is shown.

Start, Settings, high scores, badges and exit buttons are present on main menu if you want to check before starting the game. In the badges section, badge rewards are explained in detail.

You can click the answers with the mouse click if you use a computer. If you have mobile phone you can click the buttons normally. Unfortunately the game is compatible with Android and Windows Operating System. You should be aware of that before downloading the game.

If you would like to run the game in your PC which has Windows Operation System You need to download the program named “Bluestacks”. So that, you can play the game in your computer.

Good Luck!