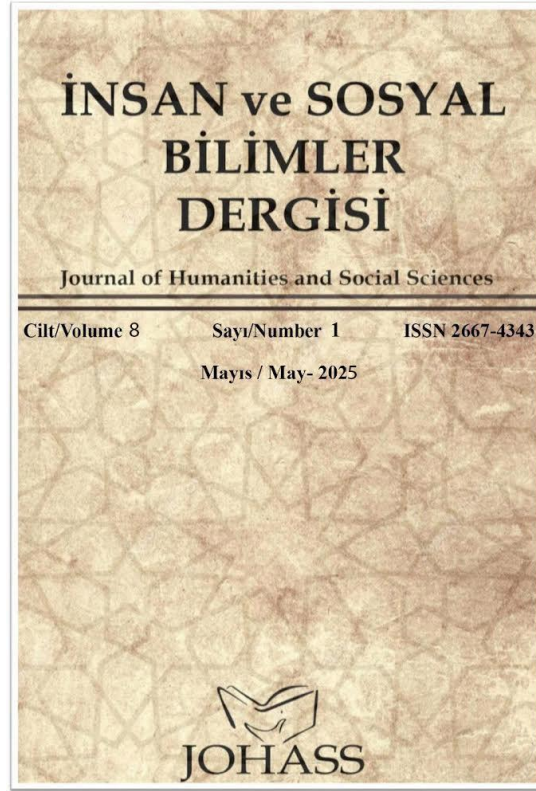


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**Students' Behavioral Intentions Towards Learning and Using Chatbots in Education**

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## **Students' Behavioral Intentions Towards Learning and Using Chatbots In Education**

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### **Abstract**

Chatbots are artificial intelligence programs that interact with humans through text-based communication. These tools, which are widely used in many fields such as health, finance, and e-commerce, also play an important role in education. They contribute to students in various, areas such as providing information about learning materials, assisting with homework, providing guidance, and giving instant feedback. In addition, chatbots can create personalized lesson plans tailored to students' individual learning needs and track students' progress through data analysis. In addition to the advantages offered by chatbots, it is also important to examine students' attitudes towards using these tools. Therefore, this study aims to analyze students' behavioral intentions towards using chatbots in their education and training processes in detail and to reveal the main factors behind these intentions. The quantitative research method was adopted in the study, and a static group pretest-posttest design, one of the experimental designs, was used. Within the scope of the study, unlike the control group, the experimental group used chatbots in the activities included in the lesson plan for seven weeks. Participants were selected by the convenience sampling method, and a total of 72 students were included in the study. In the study, the “Behavioral Intentions towards the Use of Chatbots in Education and Learning” scale was used as a data collection tool. The differences between the pre-test and post-test scores of the groups were analyzed with an independent samples t-test; paired samples t-test was applied to determine the differences within groups. The findings revealed that there was a significant difference in the behavioral intentions of the experimental group towards using chatbots in education and training compared to the control group. In addition, when within-group differences were examined, it was found that there was a significant increase in the behavioral intentions of the experimental group, while there was no significant difference in the control group

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### **Research Article**

**Keywords:** Chatbots, Artificial intelligence tools, Education technology, Technology integration in education.

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## **Introduction**

Digital transformation in education is of great importance today. Digital transformation is based on interactions across all aspects of the education system. However, it also has many advantages in the field of education (Shenkoya & Kim, 2023). These advantages include more effective and equitable learning opportunities, interactive and participatory learning environments, better understanding, meeting individual student needs, and easier access to resources. Furthermore, this transformation provides learners with more learning environments and digital skills (Litvinova et al, 2020; Soldatova et al, 2020).

Artificial intelligence has become increasingly central to the digital transformation process (Adıgüzel et al., 2023; Filiz et al., 2025). Artificial intelligence technology, which imitates human intelligence, is the ability of computers to perform a variety of tasks. Artificial intelligence consists of a set of techniques such as data algorithms, data analysis, machine learning, and deep learning. Through these systems, computers gain human-like intelligence in various fields. Artificial Intelligence, also known as AI, is a rapidly developing field that focuses on the creation and development of intelligent computer systems (Twari et al, 2022). These systems are designed to perform tasks that typically require human intelligence, such as problem-solving, pattern recognition, language understanding, and decision-making. AI technologies aim to simulate and replicate human intelligence, enabling machines to learn, reason, perceive, and interact with their environment in a way similar to how humans do (Devi, 2024). By utilizing algorithms and statistical models, AI systems learn from vast amounts of data and continuously improve their performances over time (Adıguzel et al., 2023). This enables AI systems to make accurate predictions, provide personalized recommendations, automate repetitive tasks, and engage in natural language conversations with humans. Overall, the goal of AI is to create machines that can think, learn, and act like humans, ultimately enhancing human capabilities and improving various aspects of our lives and society (Cerullo & Cerullo 1999). Among artificial intelligence applications, chatbots have gained an important place in the field of education in recent years and have started to play a critical role in the transformation of educational practices (Ayanwale et al., 2024; Tao et al., 2024).

Chatbot derives from the combination of the word “chat,” which means communication, and “bot” which refers to robots in English (Vogel, 2017). According to the Turkish Language Association (2024), the concept of chat is defined as virtual chat; the term bot is defined as a computer program that runs automated tasks via the internet. Khan & Das (2018) defined chatbots as programs that process the natural language input that comes as a result of user

interaction and produce answers to the user. Barış (2020) defined chatbots as an artificial intelligence-supported tool that communicates with users via messaging applications, mobile applications, and websites. Chatbots are computer programs that imitate human commands or conversations and assist users as virtual assistants. These robots can interact with humans and perform various tasks using natural language processing techniques (Luo et al., 2019). Li et al. (2021) define Chatbots as artificial intelligence-featured robots that can better understand written or verbal communication with people and are designed to ensure that users are perceived as if they are talking to human service agents. These robots emphasize that they can communicate and provide feedback in the same natural language as humans can (Ayanwale et al., 2024). According to Vogel (2017), chatbots are computers that interact with systems or users through informal conversations online and in real-time. Chatbots are AI-based software that can simulate human conversation and have become increasingly popular in various industries, including education (Bhutoria, 2022). Kuruca, Üstüner & Şimşek (2022) underline that Chatbots are designed to interact with people via text-based or messaging. In addition, chatbots correspond to users and usually respond in line with the scenario. Chatbot definitions and features in the literature can be summarised as follows.

**Table 1**

*Definitions and Characteristics of Chatbots*

<b>Authors</b>	<b>Definitions and Characteristics</b>
Vogel (2017)	Chatbots are computers that interact with systems or users through informal conversations in real time.
Khan and Das (2018)	Chatbots are programs that process natural language input from user interaction and generate responses.
Barış (2020)	Chatbots are AI-supported tools that communicate with users via messaging applications, mobile apps, and websites.
Luo et al. (2019)	Chatbots can interact with humans using natural language processing techniques and perform various tasks.
Li et al. (2021)	Chatbots are AI-featured robots designed to understand written or spoken communication and make users feel as if they are talking to a human service representative.
Bhutoria (2022)	Chatbots are AI-based software capable of imitating human conversations and are becoming increasingly popular in various sectors, including education.
Kuruca, Üstüner, and Şimşek (2022)	Chatbots are designed to interact with humans via text-based or messaging interactions and usually respond according to a predetermined scenario.

When the definitions of chatbots are examined, it is seen that the common feature of these tools is that they are artificial intelligence-supported programs that can process natural

language inputs by communicating with users in written or spoken form (Khan & Das, 2018; Luo et al., 2019; Li et al., 2021). In this context, the main function of chatbots is to facilitate human-machine communication by generating responses based on user interaction. In addition, the fact that these tools are accessible through various digital channels, such as messaging applications, mobile platforms, and websites, stands out as an important element that supports the user experience (Barış, 2020). The use of chatbots in education has been increasing in recent years and is becoming an increasingly common trend (Fontenelle-Tereshchuk, 2024). This technology offers an interactive and personalized learning environment for learners. Chatbots can provide support to learners about the difficulties they encounter, answer their questions, and make the learning process more effective and efficient. In other words, chatbots facilitate the learning process by providing instant feedback to learners (Adıgüzel et al. 2023). Thus, answering students' questions about their lessons very quickly can increase their motivation. With the development of technology, the use of applications, such as chatbots and real-time messaging, in education has increased. Thus, the technology integration of Chatbots into educational processes has become inevitable. Chatbots were introduced into the field of education in the 1970s through intelligent tutoring systems (Smutny & Schreiberova, 2020). These intelligent agents have the potential to revolutionize the way students learn and interact with educational content (Shahriar & Hayawi, 2023). By using chatbots in education, students can benefit from personalized learning experiences tailored to their individual needs and preferences. This technology allows the delivery of prompt and continuous feedback, which can greatly enhance the learning process. In addition, chatbots can increase the availability of educational resources by providing instant access to information and materials. Furthermore, chatbots can improve the adaptability of educational materials by tailoring them to each student's needs and pace of learning. They can also serve as personal learning companions, guide students throughout their educational journey, and provide motivation and stimulation. In the context of the Indian higher education sector, the application of chatbots— independent of the age, gender, and level of education of the user—delivers a number of benefits. These benefits include personalized learning experiences, instant access to resources, improved adaptability of educational materials, prompt and continuous feedback, and enhanced motivation and stimulation (Cano & Troya, 2023). However, it is crucial to use chatbots responsibly and consciously in education (Bhutoria, 2022). Chatbots are easily accessible is an advantage for learners (Heller et al. 2005). This not only supports interaction but also strengthens peer communication, increases students' motivation to learn, and contributes to the planning of

learning goals and strategies. (Kim et al., 2019; Wu et al., 2020). Based on the literature, we can summarize the use of chatbots in education, as shown in Table 2.

**Table 2**

*Use of Chatbots in Education*

Authors	Use and Benefits of Chatbots in Education
Fontenelle-Tereshchuk (2024)	Interactive learning
Smutny & Schreiberova (2020)	Smart tutoring systems
Shahriar & Hayawi (2023)	Adapted personalised learning
Bhutoria (2022)	Motivation and incentive
Heller et al. (2005)	Easy accessibility
Kim, Yang, Shin & Lee (2019)	Peer communication
Wu et al. (2020)	Increase motivation to learn and plan learning goals and strategies

Today, the role of this technology in education is increasing. Functionally, chatbots usually serve a specific purpose. They provide information to users, answer questions, perform operations, and guide users. In the field of education, chatbots can present course materials to students, answer questions, check assignments, and guide students (Kumaş et al., 2019).

Understanding students' intentions towards AI-based technologies, especially chatbots, is critical for planning effective and sustainable technology integration in the education system. Although the studies on the use of chatbots in education in Table 2 draw attention to the various benefits of these technologies, there are limited studies that directly address students' behavioral intentions towards these tools. To address this limitation, some remarkable studies have been conducted in recent years. For example, Alshammari and Babu (2025) reported that perceived usefulness and ease of use significantly influence behavioral intention through satisfaction. Tao et al. (2024) examined the effects of variables such as social influence, individual innovativeness, and perceived risk on chatbot usage intention in a study with Chinese medical students. Ayanwale and Ndlovu (2024) highlighted the effects of rapport, trust, and trialability on chatbot adoption among undergraduate students. Studies in the literature addressing students' motivations and perceptions regarding their intentions to use chatbots are limited in number.

Knowing students' intentions and motivations for using chatbots in education is important for several reasons. Firstly, understanding students' intentions can help educators and developers design chatbots that meet their specific needs and preferences. Additionally, students' intentions to use chatbots in education affect their engagement and motivation in the learning process. Second, understanding students' motivations for using chatbots can help

educators evaluate the effectiveness of these technologies in facilitating learning outcomes. By understanding why students choose to use chatbots, educators can assess whether these technologies achieve their intended purpose and meet the educational goals set forth (Fontenelle-Tereshchuk, 2024). Additionally, understanding students' intentions and motivations can aid in identifying potential barriers or challenges that may hinder the integration and adoption of chatbots in education.

Artificial intelligence is increasingly being integrated into educational settings to enhance teaching practices and meet students' learning needs (Fahimirad & Kotamjani, 2018). A chatbot is a useful tool for educators, helping them design science units, rubrics, and quizzes. It has also been suggested that future teachers should receive training in applying AI and integrating technology in the classroom (Fontenelle-Tereshchuk, 2024). However, it is important for students to recognize that they have the primary responsibility as learners and should not rely solely on AI applications like chatbots to fulfill their educational role. Additionally, educators have started exploring the potential benefits of using chatbots in education, such as providing personalized tutoring experiences and accessible learning tools for students (Lee & Zhai, 2024). Furthermore, educators believe that AI, including Chatbots, can make education more effective by facilitating personalization of educational activities, increasing the availability of resources, improving the adaptability of educational material to individual student needs, providing prompt and continuous feedback, and enhancing mental motivation and stimulation (Fontenelle-Tereshchuk 2024). Overall, while Chatbot can be a valuable tool in education, it is crucial for students to understand that their role as learners should not be completely reliant on the use of AI applications like Chatbot. Many models have been introduced to determine how students who prefer using chatbot technology accept and intend to use this technology. The models identify actions of individuals and the expectations regarding these actions (Venkatesh et al., 2003). In this respect, by revealing the reasons for accepting chatbot technology in education, an effective approach can be produced on how individuals interact with artificial intelligence tools. This study makes a unique contribution to the field by examining students' behavioral intentions towards the use of chatbots in education with an experimental design. At the end of a seven-week implementation period, the attitudes of students using Chatbots will be observed. The findings will determine whether Chatbots can be used effectively as tools that support teaching strategies such as personalized learning, instant feedback, and motivation enhancement. These results point to the importance of integrating artificial intelligence-based tools into educational policies.

This study set out to explore students' behavioral intentions regarding the use of chatbots in educational settings, with a focus on understanding what drives their willingness to learn and engage with this technology. To achieve this, the following research questions were formulated. Based on this aim, answers to the following research questions were sought.

1. Is there a statistically significant difference between post-test scores of the experimental and control groups?
2. Is there a statistically significant difference between the pre-test and post-test scores within the experimental and control groups?

## **Method**

### **Model**

In this study, rules within the scope of the 'Higher Education Institutions Scientific Research and Publication Ethics Directive' were followed. The study was approved by the Beykoz University Ethics Committee on 29.04.2024 with the number E-45152895-299-2400006416.

With respect to the purpose of the research, the quantitative research method was used in this study. The quantitative research method involved the collection, analysis, and interpretation of quantitative data. Large sample groups are generally preferred for quantitative research methods. The reason is because this method aims at reaching statistically significant results. The quantitative research method generally tries to obtain information based on quantitative data to test hypotheses previously determined by the researcher, to reveal relationships, to detect differences between variables, or to define problems (Creswell, 2013).

In this study, the experimental research pattern, one of the quantitative research methods, was used. Experimental research is a method in which data are developed and evaluated in accordance with valid criteria in environments where variables are created under the control of the researcher in order to reveal the causal-effect relationship (Karasar, 2007). The static group pretest-posttest experimental pattern, one of the experimental research models, was preferred. The static group pre-test and post-test pattern allows individuals to obtain measurements of the dependent variable before the application. In this way, it becomes possible to measure and test the changes by knowing the pre-test results of the groups. In addition, the use of repeated measures has an important place in this pattern (Büyüköztürk et al., 2017). This design was selected for several reasons. Firstly, the research aimed to investigate the causal



impact of a specific educational intervention, which required a method capable of measuring the effects under controlled conditions. The static group pretest-posttest model enables a structured comparison between the experimental and control groups, making it possible to determine whether the intervention produced a measurable change. Secondly, the study was conducted at a foundation university, where students were easily accessible, allowing for the practical implementation of pretest and posttest procedures. Lastly, dividing the participants into control and experimental groups and applying repeated measurements increased the internal validity and robustness of the research design. The research process for the static group pre-test–post-test design is presented in Table 3.

**Table 3**

*Group Model of the Static-Group Pretest-Posttest Design*

Groups	Pre-test	Effect variable	Post-test
Experimental Group	x	Chatbot Tool	x
Control Group	x		x

### **Sample and Population**

A convenience sampling method was preferred in this research. The convenience sampling method refers to collecting data from individuals who are easily accessible to the researcher (Büyüköztürk et al., 2017). The reason for choosing the convenient sampling method is that the researcher works on a student group that is easily accessible in order to speed up the study. The study was conducted with 72 students who took the same course in different groups at a foundation university during the 2023-2024 spring semester. All participants were associate degree students. Of the participants, 39 were female and 33 were male. The age range of the students was between 18 and 20 years. Participants are presented in Table 4.

**Table 4**

*Number of Participants in Experimental and Control Groups*

Groups	N	%
Experimental Group	41	56.9
Control Group	31	43.1
Total	72	100

### **Data Collection Tools**

The data collection tool developed by Mokmin & Ibrahim (2021) was adapted into Turkish by Yıldız Durak & Onan (2023) as “Behavioral Intention Scale for Using/Learning Chatbots in Education.” The validity and reliability of the scale were extensively examined with expert opinions and confirmatory factor analysis results. The scale, which is based on the UTAUT2 model, has a 24-item, 8-subdimensional, 7-point Likert-type structure aiming to measure the use and learning of chatbot technologies in education. The sub-dimensions of the scale are as follows: (1) Performance Expectancy, (2) Effort Expectancy, (3) Attitude towards Educational Development, (4) Social Impact, (5) Facilitating Conditions, (6) Self-Efficacy, (7) Anxiety, and (8) Behavioral Intention towards Chatbot Use/Learning. During the adaptation process, which was carried out by the translation-back-translation method, language and content appropriateness were evaluated by experts. Confirmatory factor analysis ( $\chi^2/df=3.89$ , RMSEA=0.063, GFI=0.91, NFI=0.99, NNFI=0.99, CFI=0.99, IFI=0.99) and Cronbach's alpha coefficient was .96 for the whole scale and 0.84-0.92 for the sub-dimensions. 92% for the whole scale and 0.84-0.92% for the sub-dimensions were evaluated in accordance with the criteria recommended by Field (2018) for CFA and reliability analyses. In addition, since it was stated that there were significant differences ( $p<0.05$ ) in the 27% lower-upper group analysis, it was confirmed that the scale had measurement sensitivity. Accordingly, it was determined that the Turkish version of the scale is a valid and reliable measurement tool.

Firstly, a pre-test was conducted on both the experimental and control groups. Then, the experimental group was asked to use the Chatbot tool in the activities included in the lesson plan for 7 weeks. The control group continued its lessons through traditional learning methods for 7 weeks. The 7-week lesson plan and activities of the Visual Programming I course are presented in Table 5.

**Table 5**

*Lesson Plan*

<b>Name of Visual Programming I Lesson:</b>		
<b>Duration: 7 Weeks</b>		
<b>Week</b>	<b>Subject</b>	<b>Activity</b>
1	Basic Concepts and C# Introduction General information about programming fundamentals is given, and variables, data types and basic operators are explained. The user input and basic output subjects are covered.	Writing your first C# program: Hello World!
2	Control Structures Switch-case structures are explained together with if-else conditional statements and logical operators.	An example for finding number value
3	Loops The subjects for while and do-while loops are covered.	Number guessing game
4	Arrays and Working with Arrays Definition and use of arrays, multidimensional arrays and different operations related to arrays, by accessing the elements of arrays are covered in the course.	Practical examples with arrays: calculating the average, finding the largest/minimum
5	Methods and Functions The definition and use of methods are covered. In addition, methods with/without parameters are discussed, and methods with return values and void methods are clarified.	Practical work with methods: calculator application, factorial calculation
6	Classes and Object-Oriented Programming The definition and use of classes are covered, objects and examples are explained.	Applications related to classes: bank account management, car rental system
7	Participation and Interface The definition of participation and interfaces are covered, examples of their use are given.	Practical applications with interfaces: geometric shapes, music playback application

Post-tests were conducted for both groups at the end of the process. Participants were given general information about the purpose of the research before they answered the scale. The scales were delivered to the participants through an online form. The participants were informed by the researcher that their sincere answers to the scale items would contribute to the research scientifically. Answering the questions took an average of 10 minutes. All participants volunteered to take part in the study.

### **Collection of Data and Analysis**

First, it was assessed whether the study data met the normality assumption. In order for parametric tests to be applied, some prerequisites must be fulfilled. The most important of these

is the normal distribution of data. These coefficients are considered as critical parameters in the evaluation of the normality assumption. (Field, 2018). In this context, skewness and kurtosis coefficients were taken into consideration. Within the scope of the normal distribution test, the skewness and kurtosis coefficients of the pre-test (experimental control) and post-test (experimental control) data were examined. According to the normal distribution test, skewness ( $-1 < .625 < 1$ ) and kurtosis ( $-1 < .170 < 1$ ) were found in the control group pre-test, while skewness ( $-1 < .535 < 1$ ) and kurtosis ( $-1 < -.102 < 1$ ) were found in the control group post-test. In the experimental group pre-test, skewness values ( $-1 < .135 < 1$ ) and kurtosis values ( $-1 < -.325 < 1$ ) were found. In the post-test of the experimental group, the skewness ( $-1 < -.285 < 1$ ) and kurtosis ( $-1 < -.333 < 1$ ) values were calculated. It was observed that the skewness and kurtosis coefficients of the data were between  $\pm 1.0$ . According to the literature, skewness values should typically be between -1 and +1, and values within these limits are considered to meet the normality assumption. (Büyüköztürk, 2017; George & Mallery, 2019; Hair, Black, Babin, Anderson, & Tatham, 2013). This criterion is widely accepted as a standard criterion for assessing normality. In this context, parametric tests were used for data analysis, an independent sample t-test was used to determine intergroup differences, and a paired sample t-test was used to determine intragroup differences.

### **Ethics Committee Approval**

On 16.04.2024, the application made to the Beykoz University Scientific Research and Publication Ethics Board was evaluated through the file numbered E-45152895-299-2400006416, and ethics committee approval was given for the research at the Board meeting dated 29.04.2024.

### **Findings**

The data obtained in this study, which reveal behavioral intentions towards learning and using chatbots in education, are presented in tables based on the subproblems.

### **Findings Concerning Pre-Test Scores of the Experimental and Control Groups Regarding the Participants' Behavioral Intentions towards Learning and Using Chatbots in Education**

An independent samples t-test was conducted in order to identify the differences between the pre-test scores of the participants in the experimental and control groups regarding

their behavioral intentions towards learning and using chatbots in education; the results are given in Table 6.

**Table 6**

*Results of the Independent Sample T-Test Regarding the Pre-Test Scores of the Experimental and Control Group Participants' Behavioral Intentions Towards Learning and Using Chatbots in Education*

Group	N	$\bar{x}$	sd	Max.	Min.	F	df	t	p
Experimental Group	41	3.149	.12	3.46	2.88	.594	70	-.45	.65
Control Group	31	3.162	.11	3.42	2.96				

It is evident on Table 6 that when the average score of the experimental group ( $\bar{x} = 3.14$ ) is compared with the control group average score ( $\bar{x} = 3.16$ ), they are very similar values. Thus, there was no statistically significant difference between the pre-test scores of the students in the experimental and control groups participating in the study concerning their behavioral intentions towards learning and using chatbots in education prior to the study [ $t = -.45$ ;  $p > .05$ ]. It can be concluded that there is no significant difference between the experimental and control groups due to an unbiased assignment. In addition, the fact that the experimental and control groups have not used Chatbots in their previous courses is thought to be a reason for the similarity in terms of pre-test scores.

### **Findings Concerning Post-Test Scores of the Experimental and Control Groups Regarding the Participants' Behavioral Intentions towards Learning and Using Chatbots in Education**

An independent samples t-test was conducted in order to identify the differences between the post-test scores of the participants in the experiment and control groups regarding their behavioral intentions towards learning and using Chatbots in education; the results are given in Table 7.

**Table 7**

*Results of the Independent Sample T-Test Regarding the Post-Test Scores of the Experimental and Control Group Participants' Behavioral Intentions towards learning and using Chatbots in Education*

Group	N	$\bar{x}$	sd	Max.	Min.	F	df	t	p
Experimental Group	41	5.688	.125	5.92	5.38	1.775	70	89.9	p<.001
Control Group	31	3.169	.105	3.42	3.00				

According to Table 7, there is a statistically significant difference between the post-test scores of the students in the experimental and control groups concerning their behavioral intentions towards learning and using Chatbots in education [ $t=89.9$ ;  $p<.05$ ]. According to these results, experimental groups' average scores ( $\bar{x} = 5.92$ ) concerning behavioral intentions towards learning and using Chatbots in education are higher when compared with the average scores ( $\bar{x} = 3.42$ ) of the control group students. It is assumed that by using Chatbot tools for seven weeks, the experimental group students' motivation and positive attitudes towards the lesson improved. Therefore, it can be stated that behavioral intentions towards learning and using Chatbots in education is high. Considering the scale items, it was observed that while the participants showed positive attitudes in terms of performance expectation, effort expectation, attitude towards educational improvement, social influence, facilitating conditions, self-efficacy, behavioral Chatbot using/learning intention dimensions; their anxiety levels decreased.

#### **Findings on the Pre-Test and Post-Test Scores of Behavioral Intentions towards Learning and Using Chatbots in Education among Participants in Experimental and Control Groups**

In order to examine the differences between the pre-test and post-test scores of the participants in the Experimental I and Control I groups, a paired sample t-test was applied to determine the within-group change in their intention to use chatbots in education. The results of the analysis are given in Table 8.

**Table 8**

*Paired Sample T-Test Results for Pre-Test and Post-Test Mean Scores of Participants' Behavioral Intentions towards Learning and Using Chatbots*

Group	N	$\bar{x}$	sd	df	t	p
Post-test Experimental Group- Pre-test Experimental Groups	41	2.538	.158	40	102.3	p <.001
Post-test Control Group- Pre-test Control Groups	31	.006	.160	30	.233	.817

According to the paired sample t-test results presented in Table 8, there was a statistically significant difference between the pretest and posttest scores in the experimental group ( $t = 102.3$ ;  $p < .001$ ). This indicates that the intervention significantly increased participants' behavioral intentions towards chatbot use. The high mean difference ( $\bar{x} = 2.538$ ) clearly demonstrates the magnitude and impact of this change. On the other hand, there was no statistically significant difference ( $t = .233$ ,  $p = .817$ ) between the pretest and posttest scores in the control group. Moreover, the fact that the mean difference was almost negligible ( $\bar{x} = .006$ ) indicates that there was no change in the behavioral intentions of the participants in the control group. These results suggest that the intervention in the experimental group had a positive and significant effect on behavioral intention to use Chatbots, but not in the control group. Thus, it can be said that using Chatbot tools in lessons can increase students' motivation towards lessons and develop positive attitudes. In addition, it can increase their interest in learning and make the learning process more effective

## **Result and Discussion**

Modern advancements in technology have expanded the horizons of education, leading to the integration of artificial intelligence (AI) technologies into educational environments. AI technology strives to create computers and machines (Coppin, 2004) capable of human-like intelligence. This endeavor aligns with the goal of imbuing machines with cognitive abilities akin to those of humans (Chen et al., 2020). Human intelligence is accepted as the whole of all the abilities such as thinking, reasoning, evaluation and drawing conclusions as a result of the efforts made to perform these abilities by machines, artificial intelligence has emerged. Put differently, artificial intelligence endeavors to replicate the cognitive capabilities of the human mind, including problem-solving, decision-making, predictive analysis, and drawing logical conclusions. (Drigas et al., 2009; Arslan, 2020; K1ş, 2019). Techniques of artificial intelligence used in education include Chatbots, specialized knowledge systems, and advanced tutoring

platforms (Meço & Coştu, 2022). Chatbots are intelligent agents developed as part of artificial intelligence technology that can chat with users via text or voice. In education, chatbot systems are primarily used in the context of teaching and learning (Haristiani, 2019). Studies show that chatbots can be used to deliver course content through an online platform online as a conversational agent that can provide accurate information to students (Smutný & Schreiberova, 2020). In addition, educators also see the value of using chatbots in educational settings to provide students with an interactive experience (Okonkwo & Ade-Ibijola, 2021). However, in addition to these advantages, it is thought that students' intentions to use chatbots in education are also important. Therefore, this study aims to reveal students' behavioural intentions towards using chatbots in education and learning.

The study concluded that the experimental group exhibited higher behavioral intentions towards using Chatbots in education and learning compared to the control group. According to the results of the study, although there was no difference in the pre-test results measuring the behavioral intentions of the experimental and control groups towards the use of Chatbots in education and learning, it was determined that the post-test scores of the experimental group were significantly higher. The literature also supports the results of this study. It was observed that students in the experimental group exhibited higher behavioral intentions towards the use of chatbots. This finding emphasizes the positive effect of using chatbots in education on behavioral intentions. As a matter of fact, similar examples of this situation have been found in recent studies. Ahlam et al. (2023) examined the widespread use of the Bashayer chatbot in Saudi Arabia and found that this technology had positive effects on basic skills, motivation and learning techniques in the educational context. The study also observed that users exhibited positive behaviors and attitudes towards the use of chatbots in education. In the experimental group, students showed higher behavioral intentions towards the use of chatbots. In parallel, Wadhawan et al., (2023) stated that chatbots provide significant benefits to educational environments. The simplicity of using chatbots encouraged positive attitudes among students and supported the integration of this technology into learning environments (Belda-Medina & Calvo-Ferrer, 2022).

The findings of the study revealed that there was a significant difference between the pre-test and post-test scores of the students in the experimental group. This result shows that when chatbot technologies are integrated into course content in a pedagogically appropriate way, they can create positive perceptions in students and have significant effects on learning outcomes. The findings overlap with studies on the integration of chatbots into educational



processes (Nikou & Chang, 2023). Neo et al. (2022), in their study examining the classroom applications of an artificial intelligence-based chatbot named MERLIN, reported that students had positive attitudes towards these tools, experienced high levels of motivation, and increased their academic achievement. In addition, students expressed their willingness to use chatbots not only in the current course but also in other courses and subjects. This shows that chatbots are adopted in educational environments as supportive digital learning tools that not only convey information but also increase students' interest in learning. Similarly, chatbots have been reported to enhance personal development and encourage engagement in learning environments (Deveci Topal et al., 2021; Nghi et al., 2019; Arruda et al., 2019). Since chatbots provide information in a practical way, it has been observed that students exhibit positive behaviors towards these technologies (Ayanwale & Ndlovu, 2024). In addition, it was stated that students who realized the benefits of chatbots were more positive towards using this technology (Ayanwale & Molefi, 2024). It is in line with other studies that chatbots effectively support student engagement and motivation (Bilquise et al., 2024; Gulati et al., 2024; Strzelecki, 2024). Overall, chatbots appear to have positive effects on motivation, attitudes and academic outcomes in education and are becoming increasingly important in modern learning environments.

One of the most outstanding features of Chatbots is that they are more successful in activities that require creativity (Zhai, 2022). In this study, the activities included in the lesson planning were also supported by Chatbots. It was observed that behavioral intentions of the experimental group participants towards learning and using Chatbot are education is positive. This finding is in line with the results of many studies on Chatbots. It has been observed that students like interacting with Chatbots, find it interesting and enjoy teaching processes that are developed and implemented interactively. In the study conducted by Ryu and Han (2017), students define artificial intelligence as innovative and exciting. In the study carried out by Nghi et al. (2019) on English education, it was concluded that students found Chatbots fun and exciting. According to a study conducted by Yin et al. (2020) on university students, Chatbot applications have positive impacts on internal motivation levels of the experimental group. Many studies emphasize that the use of artificial intelligence in education has positive effects on students' academic successes (Meço & Coştu, 2022; İşler & Kılıç, 2021; Pokrivcakova, 2019; Grudin & Jacques, 2019; Kim & Han, 2021). Thus, it is believed that students will intend to use Chatbots in their lessons. In addition, being aware of the purpose of using Chatbots positively affects students' intentions to use Chatbots. Brandtzaeg & Folstad (2017) aimed at

revealing why people use Chatbots. They observed that the reason why the 16-55 years old group prefers Chatbots is to obtain information. Making lesson plans accordingly can also affect students' intentions to use it. In the study conducted by Aktay, Gök & Uzunoğlu (2023), the Science lesson was supported with ChatGPT. They have made many suggestions regarding the use of Chatbots in the learning environment. As a result of the study, it was observed that the students wanted to cover the Science lesson again via ChatGPT. In addition, the students stated that they wanted to learn other courses through this application. According to the studies of Romero Rodríguez et al. (2023), it was revealed that their orientational intention to diversify and continue to use ChatGPT at a high rate is influenced by ability, performance motivation and motivation. It can be seen that the post-test regarding the distribution of item scores yielded results in this direction. Huang et al., (2022) found that the use of a chatbot in an online course yielded positive results. However, it has been observed that the use of Chatbot is important for the learning objectives set by teachers. Thus, it is said that they have positive behavioral intentions to use chatbots in education. The results of similar studies obtained in the literature are summarised and shown in Table 9.

**Table 9**

*Similar Studies Obtained in The Literature Are Summarised*

<b>Authors</b>	<b>Findings</b>
Ayanwale and Ndlovu (2024)	It was observed that students exhibited positive behavior towards using chatbots because they provide information in a practical way.
Ayanwale and Molefi (2024)	Students who perceived the benefits of chatbots showed positive behavior towards using them.
Ahlam et al. (2023)	The use of the Bashayer chatbot in education had positive effects.
Wadhawan, Jain, and Galhotra (2023)	The use of chatbots in education is beneficial.
Belda-Medina and Calvo-Ferrer (2022)	The use of chatbots in education is easy, and students showed positive attitudes towards it.
Nikou and Chang (2023)	Chatbots can be a valuable educational tool when used appropriately in lessons.
Neo et al. (2022)	After using the MERLIN AI chatbot, students showed positive attitudes towards it, had high motivation for the course, and high academic success. Students wanted to use chatbots in other courses as well.
Deveci Topal et al. (2021); Nghi et al. (2019); Arruda et al. (2019)	Chatbots positively support students' personal development and have become more widespread in learning environments.
Zhai (2022)	Chatbots are more successful in activities that require creativity.
Ryu and Han (2017)	Students define artificial intelligence as innovative and exciting.
Nghi et al. (2019)	Students found chatbots fun and exciting.

Yin et al. (2020)	Chatbot applications have positive impacts on the internal motivation levels of the experimental group.
Meço and Coştu (2022); İşler and Kılıç (2021); Pokrivcakova (2019); Grudin and Jacques (2019); Kim & Han (2021)	The use of artificial intelligence in education has positive effects on students' academic success.
Brandtzaeg and Folstad (2017)	The reason why the 16-55 years old group prefers chatbots is to obtain information.
Aktay, Gök, and Uzunoğlu (2023)	Students wanted to cover the Science lesson again via ChatGPT and learn other courses through this application.
Romero Rodríguez et al. (2023)	The intention to diversify and continue to use ChatGPT is influenced by ability, performance motivation, and motivation.
Huang, Tavares, Du, and Hew (2022)	The use of a chatbot in an online course yielded positive results. However, the use of chatbots is important for the learning objectives set by teachers.

In conclusion, although there was no difference in the pre-test results measuring the behavioral intentions of the experimental and control groups towards learning and using Chatbots in education, it was observed that the post-test scores of the experimental group were significantly higher. This suggests that Chatbots can have positive effects throughout the learning process. The higher post-test scores of the experimental group indicate that Chatbot use can contribute to learning efficiency.

### **Recommendations**

In the light of the results obtained, the following proposals are made:

1. Given the positive effects of AI-based tools on students' behavioural intentions, it is recommended that these technologies be integrated into educational environments from pre-school onwards.
2. Given that chatbots contribute to the development of positive attitudes towards technology, it is necessary to identify appropriate models for integrating artificial intelligence technologies into learning processes and to plan the process strategically.
3. Given the significant impact of the use of chatbots in higher education, the organisation of artificial intelligence training programmes for academics should be encouraged.
4. It is recommended that educational materials and course content should be redesigned to be compatible with chatbot technologies.

5. Chatbots should be adapted to different courses and subjects in order to support learning processes more comprehensively, and teaching strategies should be developed accordingly.

### **Limitation**

This study has some limitations that should be taken into consideration,

1. Firstly, convenience sampling method was used in the study and participants were not randomly assigned to the experimental and control groups. This may limit the generalisability and internal validity of the findings. Preferring random sampling methods in future studies may provide more robust and widely applicable results.
2. Secondly, the data collection process was based only on quantitative measurement tools. Although the validity and reliability of the scales used increase the internal consistency of the findings, the lack of qualitative data limits a deeper understanding of students' subjective experiences and contextual dynamics.

### **Ethics Committee Approval**

On 16.04.2024, the application made to the Beykoz University Scientific Research and Publication Ethics Board was evaluated through the file numbered E-45152895-299-2400006416 and ethics committee approval was given for the research at the Board meeting dated 29.04.2024.

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