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Examining Stakeholders' Opinions on Coding Education in Primary Schools

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Abstract
Coding means writing down the steps to be followed in order to carry out any operation through computers, using commands step by step. In other words, it is the job of finding a solution to an existing problem by using the language that the computer understands. Thanks to coding education, students are provided with skills such as research, problem solving, computational thinking, making inventions, developing projects, questioning and producing from a very young age. For this reason, people in later ages will research, question, think analytically and produce in all areas of their lives, even if they are not in the software business. It is also known that coding skills increase children's ability to look at problems from different perspectives, think systematically, produce solutions, think creatively and establish cause-effect relationships, which requires them to use higher-level thinking skills. The purpose of this research is to determine stakeholders' opinions regarding coding education. While determining stakeholders' opinions, the case study approach, one of the qualitative research methods, was used. Research; It was carried out with 25 stakeholders including teachers, administrators and parents. Data were collected through a semi-structured interview form and face-to-face interviews. According to the research results, teachers, administrators and parents; that coding education is beneficial, that it improves students' thinking skills, that this education should start from the primary school level, and that education started at an early age can develop various skills in students, that teachers must also receive education in order to provide coding education, that coding education should be among the compulsory courses in primary school education programs, and they stated that this education is a need today.

Keywords: Coding, Coding education, Stakeholders' opinions

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Introduction

Coding

In recent years, coding education has become a very common activity, especially for young children. Programming or coding education is provided in both private and public schools from kindergarten to high school. The widespread use of coding tools that make the programming teaching process enjoyable makes teaching programming or coding to children easier (Erol, 2020).

When the literature was examined, it was seen that various definitions of the concept of coding were made. Turan, Akça and Küçükkurt (2016) defined coding as the process of bringing commands together in order to direct the computer. Kesici and Kocabaş (2007) defined coding as the processing algorithm that is put forward in the process of running and compiling the operations of computers by converting them into command sequences. Yiğit (2016) defined coding as the task of producing a solution to a problem or problem in a language that the computer can understand in order to solve an existing problem or problem. Wood (2003) defined coding as the process of applying solutions to a problem situation with or without a computer, evaluating the result, and revising the procedures in case the result does not reach the solution. Ülkar (2016) defines coding as writing in a language electronically in a computer environment in order to create software or applications or design a web page. He stated that there are hundreds of languages related to coding, and that when this knowledge or skill is learned, it will be possible for people to create their own applications or software.

Coding is the process of writing one or more commands to perform an action on a computer system. It is to write the algorithm developed to achieve any goal using a programming language. Computer programming or coding; It is the development and implementation process using various command sets to perform a specified process or task on the computer, to try to solve the problems encountered and to ensure the necessary interaction between the computer and the human (Sayın and Seferoğlu, 2016).

According to Mclennan (2017), coding (or programming) is the fundamental language of today's digital age. It involves the step-by-step process of creating the instructions that the computer understands or needs for its programs to run. Gaming systems, mobile phones, tablets, washing machines and even cars use coding to function properly.

Coding education

Coding means writing down the steps to be followed in order to carry out any operation through computers, using commands step by step. In other words, it is the job of producing solutions to existing problems by using the language that the computer understands (Yiğit, 2016). Coding; It means following the instructions given step by step and explaining exactly what needs to be done through computers in steps (Eba, 2023). Thanks to coding education, students are taught skills such as research, problem solving, computational thinking, making inventions, developing projects, questioning and producing from a very young age. For this reason, people in later ages will research, question, think analytically and produce in all areas of their lives, even if they are not in the software business (BtDersleri, 2023).

The basis of coding education is the tendency to recognize a problem and try to produce solutions for this problem (Erümit, Zirve, Aksot, & Şahin, 2017). It is thought that thanks to coding education started at an early age, children can be successful in other fields thanks to this education, even if they do not continue their education in the software field in the future (Karabak and Güneş, 2013). It is also known that coding skills increase children's ability to look at problems from different perspectives, think systematically, produce solutions, think creatively and establish cause-effect relationships, which requires them to use higher-level thinking skills (Yükseltürk and Altıok, 2016). In addition, with coding education, students; While their skills such as creativity, digital literacy, analytical thinking, problem solving, spatial thinking skills, process and result-oriented thinking skills, collaborative working and learning skills develop, their learning habits by doing and experiencing also develop (Akpınar and Altun, 2014; Demirer and Sak, 2016). However, children who acquire coding skills at an early age; Experiences such as thinking, problem solving and communication. These are of great importance in acquiring 21st century skills, which are very valuable for the future success of our children in the digital world (Mclennan, 2017).

According to Delebe (2018), coding education; Coding or programming is largely included in the education system as early as preschool or primary school in order to raise individuals who produce, question, criticize and are

expected to acquire the necessary skills in line with the needs of the current period. Coding education has an important role as it is not only limited to computer science, but also provides interdisciplinary interaction. For this reason, children are expected to acquire computational thinking skills from an early age and the ability to produce solutions to problems in different fields.

The reason for coding education is not only to produce software or applications, but also to develop information literacy by using information technologies, to communicate, to express oneself, to do research, to share information, to work collaboratively, to solve problems, to structure existing knowledge, to code. and increasing their skills in developing original products (Sayın and Seferoğlu, 2016). While coding, students need to be able to think critically about more than one problem and systematically solve the problems they encounter. Even if students do not want to continue their education in the software field, they will be able to use the skills that coding brings to them throughout their lives (Dizman, 2018). In addition, it is known that coding skills increase students' thinking skills, which require the use of higher-level thinking skills, such as systematic thinking, looking at problems from different perspectives and producing solutions, establishing cause-effect relationships and creative thinking (Yükseltürk and Altıok, 2016).

Coding Education in Primary School

Many countries have included coding education in primary school curricula to try to improve students' problem-solving skills and logical thinking skills. The number of countries adding coding education to their curriculum is increasing day by day.

In our country, it was ranked 1-4 in 2018. Coding education at the grade level was included in the curriculum within the scope of the information technologies and software (ICT) course. In order to provide coding education, the Ministry of Education has prepared a number of electronic books for teachers and students and supported teachers in providing this education. The MEB BTY course program aims to provide students with skills such as algorithm design, computational thinking, problem solving and logical inquiry. The books prepared for the purpose of providing coding education with this program were prepared by taking into account the teacher skills, the existing technology infrastructure in schools and the readiness levels of the students in order to implement the BTY course. The prepared books include coding activities for schools with technological infrastructure, and computer-free activities such as games, paper-pencil, and drama for schools without technological infrastructure. The main purpose of the program is to provide students with computational thinking skills (MEB, 2018).

Coding education, which has a very important place in education, has started to take its place among the education programs in our country in recent years. The applicability of coding education, which is taught mostly from the secondary school level, to the primary school level is among the topics of curiosity. Based on this context, the purpose of our research is to examine stakeholders' opinions on coding education in primary school.

Method

Model of the Research

While examining stakeholders' opinions regarding coding education in primary schools, a case study, one of the qualitative research methods, was used. Case study is a qualitative research method used to investigate a phenomenon in the context of real life, when the boundaries between the context and the phenomenon are not clearly evident in the first place (Yin, 2009). According to Gall, Borg and Gall (1996), a case study is used to better see and define the details of a situation, to develop some explanations for a situation and to evaluate this situation in all its aspects (Quoted by: Büyüköztürk, 2020).

Working group

The study group of this research consists of stakeholders, including school administrators, teachers and parents of primary school students working in Elazığ in the 2021-2022 academic year. The distribution of the study group is given in Table 1.

Table 1. Distribution of the study group

Working group	N
School Administrator	5

Teacher	10
Guardian	10
Total	25

Data Collection and Application

Data were collected through the Semi-Structured Interview Form prepared by the researchers and by face-to-face interviews.

Analysis of Data

Content analysis was used to determine the codes and categories of the data. Content analysis can be called a repeatable, systematic technique in which some words of a text are summarized into smaller categories with coding created according to predetermined rules (Büyüköztürk et al., 2020). The questions in the semi-structured interview form include questions about coding education in primary school. In order for the coding to be reliable, the categories were determined separately by the researchers and then combined and inconsistencies were eliminated.

Ethics approval notification

Ethical permission was obtained as a result of the decision taken at the meeting of Inönü University Scientific Research and Publication Ethics Committee Social and Human Sciences Scientific Research and Publication Ethics Committee Commission dated 26.10.2023 and numbered 13/1.

Results and Discussion

Teachers, administrators and parents who participated in the meeting were asked, "Have you heard of coding education before?" "What are your thoughts on this subject?" was asked. The categories/codes and their frequency values determined as a result of the responses received from teachers, administrators and parents are given in Table 2.

Table 2. Opinions on coding education

	Category/Code		**Frequency**
Teacher (T)	Yes		9
		Useful	4
		Reasoning ability	2
		Computer programming	one
		Problem solving skills	one
		Foundation of software education	one
	No		one
Manager (M)	Yes		5
		The best way to understand technology	3
		An education that every child should receive	2
		Useful	2
		Due to the times	one
Parent(P)	Yes		10
		It will form the basis for the professions of the future	3
		computer alphabet	2
		so much fun	one
		Useful for children	one
		Improves children's perspective	one

	In recent years, much emphasis has been placed on	one
	Education that teaches application and game design	one
	computer program given commands	one

Since the teachers, administrators and parents interviewed pointed to more than one category while expressing their opinions, the number of opinions in the categories obtained was higher than the number of teachers, administrators and parents who participated in the study.

When Table 2 is examined, 9 of the teachers who participated in the interview stated that they had heard of coding education before, and 1 teacher stated that he had not heard of coding education before. Teachers who have heard of coding education before also say that this education; they stated that it is useful, reasoning skills, computer programming, problem solving skills and the basis of software education.

All of the managers who participated in the interview stated that they had heard of coding education before. Managers of this education; they stated that it is the best way to understand technology, an education that every child should receive, useful and a necessity of the age.

All of the parents who participated in the interview stated that they had heard of coding education before. Parents of this education; they stated that it is a computer program that will form the basis for the professions of the future, is the alphabet of the computer, is very entertaining, useful for children, improves children's perspective, has been emphasized a lot in recent years, teaches how to design applications and games, and gives commands.

T1: "Coding is quite necessary and even inevitable in today's age."
T5: "Coding education is necessary because it provides students with reasoning and problem solving skills."
M5: "I think it will be beneficial for children in terms of reasoning and problem-solving skills."
M4: "Coding education is an education that every child should receive. It is a necessity of the age. "
P8: "I know coding education as the alphabet of the computer."
P2: "It is an education that has been emphasized a lot in recent years. I think it is very necessary. "

Teachers, administrators and parents who participated in the interview were asked, "Do you think coding education is important?" "Why?" was asked. The categories/codes and their frequency values determined as a result of the responses received from teachers, administrators and parents are given in Table 3.

Table 3. Opinions on the importance of coding education

	Category/Code	**Frequency**
Teacher (T)	Important	10
	Improves thinking skills	15
	Improves problem solving skills	5
	Improves creative thinking skills	2
	Improves analytical thinking skills	2
	Improves thinking power	2
	Improves reasoning skills	one
	Improves analysis ability	one
	Supports multidimensional thinking	one
Manager (M)	Important	5
	Students care about innovations	one
	necessity of the age	2
	Improves problem solving skills	one
	Improves analytical thinking skills	one
	Improves communication skills	one
	Improves digital literacy skills	one
	21st century skills are gained	one
	Important	10

Parent(P)	The importance of technology is increasing day by day	4
	It allows people to improve themselves	one
	Children who know coding are more advanced	2
	Gives children problem solving skills	one
	Gives children social skills	one
	Teaches children to use their imagination	one
	Teaches basic computer programs	one
	Now everything is produced with software	one

When Table 3 is examined, all of the teachers who participated in the interview think that coding education is important. Teachers of this education; they stated that it improves thinking skills, problem-solving skills, creative thinking skills, analytical thinking skills, thinking power, reasoning skills, analysis skills, and also supports multi-dimensional thinking.

All managers who participated in the interview think that coding education is important. Managers of this education; they stated that it is important to students, that it is a necessity of the age, that it improves problem-solving skills, analytical thinking skills, communication skills, digital literacy skills, and at the same time, this education provides 21st century skills.

All of the parents who participated in the interview think that coding education is important. Parents of this education; He stated that technology is important because its importance increases day by day, it allows people to improve themselves, children who know how to code will be at a more advanced level, it provides children with problem-solving skills and social skills, it teaches children how to use their imagination and basic computer programs, and everything is now produced with software. They did.

> *T4: "Yes. I think it is useful because it improves creative thinking and problem solving skills."*
> *T1: "Coding education is necessary because it develops analytical thinking and reasoning skills. It also supports multidimensional thinking "*
> *M2: "Yes. It improves the student's problem solving skills. "It also provides students with 21st century skills."*
> *M4: "Coding education is necessary because it develops students' digital literacy skills and supports their ability to communicate. "*
> *P8: "Yes, I think so. "Coding education helps children learn basic computer programs."*
> *P2: "Yes, it's true. Technology is becoming more and more important and coding education allows people to improve themselves. "*

Teachers, administrators and parents who participated in the interview were asked, "At what level of education do you think coding education should start?" "Why?" was asked. The categories/codes and their frequency values determined as a result of the responses received from teachers, administrators and parents are given in Table 4.

Table 4. Education level at which coding education should begin

	Category/Code	**Frequency**
Teacher (T)	Primary school	8
	The tree bends when it is young	one
	The brain is more open to learning	one
	The ability to analyze is acquired early	one
	Be open to group work	one
	Pre-school	2
	Gains the ability to phase the task	one
	Gains the ability to perform the task	one
	Work discipline is created	one
	Primary school	3
	Improves digital literacy skills	one

Manager (M)	21st century skills are gained	one
	Pre-school	2
	Can be given with verbal residences	one
	Primary school	5
	Contributes to children's mental development	2
	Basic education is the reason for success	one
	Increases children's learning speed	one
Parent(P)	Pre-school	3
	The period when children's mental development is at its best	one
	Because it is learned more easily through games	one
	in 2nd grade	2
	Knowledge learned at a young age is more permanent	one

When Table 4 is examined, 8 of the teachers who participated in the interview think that coding education should start from the primary school level, while 2 teachers think that it should start from the pre-school level. Teachers who think that coding education should start from the primary school level; they stated that the tree bends when it is young, the brain is more open to learning during this period, the ability to analyze is acquired early and it is open to group work. Teachers who think that coding education should start at the pre-school level; they stated that the skill of phasing the task and the ability to perform the task are acquired more easily in early childhood and that work discipline is established in the early period.

While 3 of the managers who participated in the interview think that coding education should start from the primary school level, 2 managers think that it should start from the pre-school level. Administrators who think that coding education should start from the primary school level; He thinks that it improves digital literacy skills and provides 21st century skills. Administrators who think that coding education should start at the pre-school level also say; He stated that this education can only be given to students through verbal commands.

While 5 of the parents who participated in the interview think that coding education should start from the primary school level, 3 of them think that it should start from the pre-school level and 2 think that it should start from the 2nd grade. Parents who think that coding education should start from the primary school level; He stated that it contributes to the mental development of children, that basic education is the reason for success and that it increases the speed of children's learning. Parents who think that coding education should start at the pre-school level; they mentioned that this is the period when children's mental development is at its best and that they learn more easily through play. Parents who think that coding education should start from the 2nd grade also mentioned that the knowledge learned at a young age will be more permanent.

T6: "It should start in primary school. The brain is more open to learning. "
T3: "It should start in pre-school. It ensures the formation of work discipline in the child. "
M1: "It should start in primary school. "It can even be given with verbal commands before school."
M3: "It should start in primary school. Develop digital literacy skills. "
P4: "Should start from 2nd grade"
P6: "It should start in primary school. Basic education is the reason for success. It also increases children's learning speed. "

Teachers, administrators and parents who participated in the interview were asked, "Do you think coding education can be useful for primary school students?" "Why?" was asked. The categories/codes and their frequency values determined as a result of the responses received from teachers, administrators and parents are given in Table 5.

Table 5. Benefits of coding education for primary school students

Category/Code	**Frequency**
Yes	10
Improves Thinking Skills	7
Improves problem solving skills	2
Improves creative thinking skills	one
Improves analytical thinking skills	one

Teacher(T)		Improves abstract thinking skills	one
		Sees relationships between events and situations	one
		Understands cyclical concepts	one
	It is interesting		one
	product reveals		one
	Acquire useful skills		one
	start early		one
	It is necessary to keep up with the times		one
	Broadens children's horizons		one
Manager(M)	Yes		5
		Provides different thinking skills	3
		Allows children to develop themselves	one
		Makes commands easier to understand	one
		Learns the basis of technological development	one
		It would be interesting	one
		Develops the child's imagination	one
		Develops the child's creativity	one
		Supports learning with fun	one
Parent(P)	Yes		10
		Supports cognitive development	4
		Supports problem solving skills	3
		More equipped students are produced	2
		Contributes to attention development	2
		Provides thinking skills	one
		Provides programming skills	one
		Children understand that the computer is not just a game	one

When Table 5 is examined, all of the teachers who participated in the interview think that coding education will be beneficial for primary school students. Teachers of this education; He stated that it improved his thinking skills, problem solving skills, creative thinking skills, analytical thinking skills and abstract thinking skills. In addition, thanks to this education, teachers can help students; that students can see the relationships between events and situations, understand cyclical concepts, they stated that it can attract the attention of children, create products, acquire useful skills, keep up with the times, and broaden children's horizons.

All of the managers who participated in the interview think that coding education will be beneficial for primary school students. Managers of this education; they stated that it provides different thinking skills, allows children to develop themselves, makes it easier to perceive commands, teaches the basis of technological development, is interesting, develops the child's imagination, develops the child's creativity and supports learning by having fun.

All participants in the interview think that coding education will be beneficial for primary school students. Parents of this education; they stated that it supports cognitive development, supports problem solving skills, raises better equipped students, contributes to attention development, provides thinking skills, provides programming skills and helps children understand that computers are not just a game.

T2: "Yes, it might be interesting."
T1: "Students learn useful information and create a product. "
M5: "Yes. Because it allows children to develop themselves."
M2: "Yes, because it develops the child's imagination and creativity. It also supports learning by having fun. "
P9: "I think coding is useful for primary school students. Because it gives children thinking skills. It improves problem solving skills."

P1: "Yes, it is definitely useful. Because it supports cognitive development and contributes to raising better equipped students. "

The question "What kind of effects do you think coding education starting at an early age can have on the child?" was asked to the teachers, administrators and parents who participated in the interview. The categories/codes and their frequency values determined as a result of the responses received from teachers, administrators and parents are given in Table 6.

Table 6. Effects of coding education starting at an early age

	Category/Code	Frequency
Teacher(T)	Improves mental skills	10
	Improves problem solving skills	3
	Contributes to mental development	one
	Improves analytical thinking skills	one
	Improves semantic thinking skills	one
	Improves ability to use abilities	one
	Supports learning skills	one
	Uses imagination	one
	Project-oriented thinker	one
	Improves self-confidence	one
Manager(M)	Improves personal skills	6
	Uses technology correctly	2
	Learns to achieve the goal	one
	learns to strive	one
	Invests in the future	one
	Becomes a self-confident individual	one
	Improves mental skills	4
	Mathematical intelligence develops	one
	Gains problem solving skills	one
	Gains analytical thinking skills	one
	Gains algorithmic thinking skills	one
Parent(P)	Improves mental skills	11th
	Improves thinking skills	4
	Learning happens more easily	3
	Improves problem solving skills	2
	Strengthens mathematical intelligence	one
	Improves imagination	one
	Improves personal skills	2
	They become self-confident	one
	Can use technology effectively	one

When Table 6 is examined, 10 of the teachers who participated in the interview stated that coding education started at an early age improved students' mental skills, and 1 stated that it improved students' self-confidence. Teachers who stated that this education improved their mental skills; students improve their problem solving skills, they stated that it contributes to mental development, improves analytical thinking skills, improves semantic thinking skills, improves the ability to use one's abilities, supports learning skills, requires the use of imagination and supports project-oriented thinking.

While 6 of the managers who participated in the interview stated that coding education started at an early age improves students' personal skills, 4 of them stated that it improves their mental skills. Administrators stated that students improved their personal skills thanks to this education; they stated that they used technology correctly,

learned to achieve their goals, learned to strive, invested in the future and grew up as a self-confident individual. Managers who stated that this education improved their mental skills; they stated that it develops mathematical intelligence, provides problem solving skills, analytical thinking skills and algorithmic thinking skills.

11 of the participants stated that coding education started at an early age improves students' mental skills, and 2 of them stated that it improves personal skills. Parents stated that this education improved their mental skills; they stated that it improves thinking skills, learning occurs more easily, improves problem-solving skills, strengthens mathematical intelligence and develops imagination. Parents stated that their students improved their personal skills thanks to this education; they stated that they were more self-confident and could use technology more effectively.

> *T4: "Education that starts at an early age provides children with skills such as mathematics, thinking, creative activities and teamwork."*
> *T10: "Coding education started at an early age develops students' semantic thinking and ability to use their skills. It also supports their learning skills."*
> *M3: "The child who receives coding education at an early age develops algorithmic thinking skills and thus becomes a more self-confident individual."*
> *M1: "Coding education started at an early age teaches students to reach their goals and to strive. Thus, students invest in the future. "*
> *P10: "It develops the child's imagination. It strengthens mathematical intelligence."*
> *P7: "Thanks to coding education that starts at an early age, children can use technology effectively and become more self-confident."*

The question "Do you think teachers should be given coding education?" was asked to the teachers, administrators and parents who participated in the interview. The categories/codes and their frequency values determined as a result of the responses received from teachers, administrators and parents are given in Table 7.

Table 7. Opinions on providing coding education to teachers

	Category/Code	Frequency
Teacher (T)	Yes it should be given	9
	Teachers should update themselves	3
	Must follow technological developments	2
	He should know enough to teach his students	one
	No it should not be given	one
Manager (M)	Yes it should be given	5
	Must be face to face	one
	The teacher must be at a level to provide this education.	one
Parent (P)	Yes it should be given	10
	To be more beneficial to children	2
	Since not every teacher knows this education	one
	In order to provide coding education to his students	one

When Table 7 is examined, 9 of the teachers who participated in the interview think that teachers should be given education on coding, while 1 teacher thinks that it should not be given. Teachers who think that teachers should be trained; they stated that teachers should update themselves, follow technological developments, and know how to code enough to teach students.

All of the administrators who participated in the interview think that teachers should be given education on coding. Administrators stated that this education that should be given to teachers should be face-to-face and that the teacher should be at a level to give this education.

All participants in the interview think that teachers should be given education on coding education. Parents and teachers; they stated that they should receive this education in order to be more beneficial to children, that not every teacher knows this education and that they can provide coding education to their students.

T2: "Yes, it should be given. Because teachers should update themselves by following technological developments."
T9: "Yes, they should because teachers should follow technological developments and know enough coding to teach it to their students."
M3: "Yes, it should be given, but this education should be face-to-face."
M5: "Yes it should. Educations should especially be face-to-face and the teacher should be able to provide this education. "
P7: "Yes, it should be given. "Teachers must learn coding in order to provide this education to their students."
P7: "Yes, it should be given because not every teacher knows this education. They need this education to be able to teach their students."

Teachers and administrators who participated in the interview were asked, "Have you participated in the coding education programs offered through ÖBA?" "Do you think it is important for teachers to receive this education?" was asked. The categories/codes and their frequency values determined as a result of the responses received from teachers and administrators are given in Table 8.

Table 8. Opinions on the importance of teachers receiving coding education

	Category/Code		**Frequency**
Teacher (T)	I did not participate		10
	It is important		8
		Children can be taught problem solving skills	one
		Children can be taught creative thinking skills	one
		Since today is the age of technology	one
	It doesn't matter		2
Manager (M)	I did not participate		5
	It is important		4
		Not enough announcement and importance was given	one
		Must be face to face	one
		Must be application based	one
		Teachers must be equipped to provide this education.	one
	It doesn't matter		one

This question, which is among the interview questions, is only among the teacher and administrator questions. When there was no such education for parents, this question was not asked to parents. When Table 8 is examined, all of the teachers who participated in the interview said that they did not participate in the coding education program offered through ÖBA. However, 8 of the teachers stated that receiving this education was important, and 2 of them stated that it was not important. Teachers stated that it is important to receive coding education; He stated that it can provide children with problem-solving skills and creative thinking skills, and that it is necessary to receive this education since today is the age of technology.

All of the managers who participated in the interview said that they did not participate in the coding education program offered through ÖBA. However, 4 of the administrators stated that it was important to receive this education and 1 stated that it was not important. Managers stated that it is important to receive coding education; they stated that there are not enough announcements and importance given to coding education, that these educations should be face-to-face and practice-based, and that teachers should be equipped to provide this education.

T5: "I did not participate. It is absolutely important because today is the age of technology. "
T2: "I didn't attend, but it is important to have this education to teach children problem solving and creative thinking skills. "
T8: "I did not participate. "I think it is not important for teachers to receive this education."
M4: "I did not participate. "It is important because teachers must be equipped to provide this education."

M1: "I did not participate, but I think it is important to receive coding education, but the education should be face-to-face."
M5: "I did not participate. "I think it is not important for teachers to receive this education."

Teachers who participated in the interview were asked, "If you had sufficient knowledge and equipment about coding education, would you give this education to your students?" and administrators were asked, "If you had teachers with sufficient knowledge and equipment about coding education, would you encourage them to give this education to their students? " question was posed. The categories/codes and their frequency values determined as a result of the responses received from teachers and administrators are given in Table 9.

Table 9. Opinions on providing coding education to students

	Category/Code	**Frequency**
Teacher (T)	Yes I would	9
	No I wouldn't	one
Manager (M)	I would definitely encourage	3
	Yes, I would encourage	2

This question, which is among the interview questions, is only among the teacher and administrator questions. When there is no such thing as parents being able to provide such education to students or encouraging teachers in this regard, this question was not asked to parents. When Table 9 is examined, 9 of the teachers who participated in the interview stated that they could provide this education to their students if they had sufficient knowledge and equipment, and 1 stated that they would not provide this education.

Three of the administrators who participated in the interview stated that if there were teachers with sufficient knowledge and equipment working in their institutions, they would definitely encourage students to provide this education, and 2 of them stated that they could encourage teachers in this regard.

T4: "Yes, I would."
T1: ""Yes, I would. "
T8: "No, I wouldn't."
M4: "I would definitely encourage it."
M2: " Yes, I would encourage "
M5: " I would definitely encourage it."

The question "What are your opinions about the contributions of starting coding education at an early age to students?" was asked to the teachers, administrators and parents who participated in the interview. The categories/codes and their frequency values determined as a result of the responses received from teachers, administrators and parents are given in Table 10.

Table 10. Contributions of starting coding education at an early age to students

	Category/Code	**Frequency**
Teacher (T)	Improves thinking skills	9
	Improves creative thinking skills	2
	Improves problem solving skills	2
	Improves systematic thinking skills	one
	Improves scientific thinking skills	one
	Contributes to the development of attention	one
	Improves algorithmic thinking skills	one
	Improves decision-making skills	one
	Improves creative thinking skills	one
	becomes more successful	2
	Provides technological skills	one
	Provides teamwork skills	one

	Helps to overcome problems	one
	Improves imagination	one
Manager (M)	Improves cognitive skills	6
	Problem solving skills improve	2
	Thinking skills improve	one
	A sense of self-confidence develops	one
	They improve attention and focus	one
	Increases the brain's learning power	one
	They use technology correctly	2
Parent (P)	Improves cognitive skills	12
	Improves mental skills	4
	Attention and focus skills improve	2
	Develops a different perspective	2
	The concept of location and direction develops	one
	Creative thinking skills develop	one
	Improves visual intelligence	one
	Improves problem solving skills	one
	They adapt more easily to technological developments	4
	Improves imagination	one
	They can design simple games	one
	Supports fine motor development	one

When Table 10 is examined, 9 of the teachers who participated in the interview said that coding education started at an early age improves students' thinking skills, 2 said that students will be more successful, 1 said that it provides technological skills, 1 says that it helps them gain teamwork skills, and 1 says that it helps them overcome problems and 1 of them said that it improved their imagination. In addition, teachers who said that this education improved their thinking skills; they stated that it improves creative thinking, problem solving, systematic thinking, scientific thinking, algorithmic thinking, decision making and creative thinking skills and contributes to the attention development of students.

6 of the administrators who participated in the interview stated that coding education started at an early age improves students' cognitive skills, and 2 of them stated that it enables them to use technology correctly. Managers who say that their cognitive skills have improved with this education; they stated that it improves problem solving and thinking skills, develops a sense of self-confidence, contributes to attention and focus, and increases the learning power of the brain.

12 of the parents who participated in the interview stated that coding education started at an early age improved students' cognitive skills, 4 stated that they adapted to technological developments more easily, 1 stated that it improved their imagination, 1 stated that they could design simple games, and 1 stated that it supported their fine motor development. In addition, parents said that this education improved their cognitive skills; they stated that it improves mental skills, attention and focus skills, a different perspective, the concept of location and direction, creative thinking skills, visual intelligence and problem-solving skills.

T7: "Coding education provides individuals with problem solving, team feeling and collaboration skills."
T10: "Coding education improves individuals' creative thinking skills, problem solving skills and systematic thinking skills. It also provides technological skills. "
M1: "With coding education, children learn to use technology correctly."
M4: "Coding education improves individuals' problem solving skills and thinking skills. They develop a sense of self-confidence. Finally, they improve their attention and focus."
P9: "Coding education gives children the opportunity for creativity."
P7: 'Thanks to coding education, students adapt to technological developments more easily. They can design games at a simple level. Coding education also supports fine motor development."

The question "Do you think coding education should be included among compulsory courses starting from primary school?" was asked to the teachers, administrators and parents who participated in the interview. The categories/codes and their frequency values determined as a result of the responses received from teachers, administrators and parents are given in Table 11.

Table 11. Opinions on including coding education among compulsory courses

	Category/Code	Frequency
Teacher (T)	Yes it should be taken	8
	From 4th grade	one
	No it should not be taken	2
	Must be included in the program as an elective	one
Manager (M)	Yes it should be taken	4
	From primary school	one
	Not as a separate course but in conjunction with other courses	one
	No it should not be taken	one
Parent (P)	Yes it should be taken	9
	It should be mandatory	2
	Definitely a must buy	one
	From primary school	one
	No it should not be taken	one
	Should be elective	one

When Table 11 is examined, 8 of the teachers who participated in the interview think that coding education should be included among the compulsory courses starting from primary school but should start in the 4th grade, while 2 teachers think that coding education should not be included among the compulsory courses but should be included in the program as an elective course.

While 4 of the managers who participated in the interview think that coding education should be included among the compulsory courses starting from primary school and should be included in the program in conjunction with other disciplines, not as a separate course, 1 manager thinks that coding education should not be included among the compulsory courses.
While 9 of the parents who participated in the interview think that coding education should be included among the compulsory courses starting from primary school, 1 parent thinks that coding education should not be included among the compulsory courses, but should be included in the program as an elective course.

T3: "It should be included among the compulsory courses."
T2: "It should be included among compulsory courses and should start from the 4th grade."
M5: "It should be among the compulsory courses."
M1: " It should be included among compulsory courses and should not be taught as a separate course but in conjunction with other courses. "
P6: "It shouldn't be mandatory. "It should be an elective course."
P10: " It should definitely be included in compulsory courses and taught from primary school onwards."

The question "Why students should be given coding education?" was asked to the teachers, administrators and parents who participated in the interview. The categories/codes and their frequency values determined as a result of the responses received from teachers, administrators and parents are given in Table 12.

Table 12. Reasons for providing coding education to students

	Category/Code	Frequency
	Improves thinking skills	9
	Improves problem solving skills	3

Teacher (T)	Improves creative thinking skills	2
	Improves systematic thinking skills	one
	Improves mathematical thinking skills	one
	Improves algorithmic thinking skills	one
	Improves analytical thinking skills	one
	Gains technological skills	3
	Lays the foundation of the software	2
	It is equipped	one
Manager (M)	Improves cognitive skills	9
	Problem solving skills improve	2
	Improves quick thinking skills	2
	They learn to code	one
	Production and product creation skills develop	one
	Improves creative thinking skills	one
	Improves systematic thinking skills	one
	They gain analytical thinking skills	one
	They use technology correctly	one
	Motor skills improve	one
	They discover what they are best at	one
	It is the need of the age	one
Parent (P)	Contributes to mental development	7
	It also facilitates learning in other fields	2
	They improve themselves	2
	Develops a different perspective	one
	Analytical thinking skills develop	one
	Learning speeds increase	one
	They can use technology effectively	3
	Their self-confidence improves	one

When Table 12 is examined, 9 of the teachers who participated in the interview think that the reason why students are given coding education is to improve their thinking skills, while 3 think that it provides them with technological skills, 2 think that they have laid the foundation of the software, and 1 thinks that they are better equipped. Teachers who think that coding education improves their thinking skills; they stated that they have problem solving, creative thinking, systematic thinking, mathematical thinking, algorithmic thinking and analytical thinking skills.

While 9 of the managers who participated in the interview think that the reason why students are given coding education is to improve their cognitive skills, 1 thinks that it enables them to use technology correctly, 1 thinks that it improves motor skills, 1 thinks that it enables them to discover their best aspects, and 1 thinks that it is a necessity of the age. . Managers who think that coding education improves cognitive skills; they stated that they have problem solving, fast thinking, coding, production and product creation, creative thinking, systematic thinking and analytical thinking skills.

While 7 of the parents who participated in the interview think that the reason why students are given coding education is that it contributes to mental development, 3 of them think that it helps them learn to use technology effectively and 1 of them thinks that it improves their self-confidence. Parents who think that coding education contributes to mental development; they stated that it could be in the form of facilitating their learning in other fields, improving the students themselves, developing a different perspective, analytical thinking and increasing their learning speed.

T2: "In order for the child to be better equipped."

T10: "By providing coding education to students, their mathematical thinking skills, algorithmic thinking skills and analytical thinking skills can be improved. In addition, students gain technological skills and thus lay the foundation for software. "
M4: "Because it provides creative thinking, problem solving and systematic thinking skills."
M1: "By providing coding education to students, they learn how to code, develop their ability to produce and create products, and improve their creative thinking skills. Students also learn to use technology in the right way."
P5: "Because it improves their self-confidence.
P6: "By providing coding education to students, it facilitates their learning in other areas and thus improves themselves."

Teachers, administrators and parents who participated in the interview said, "Coding education is also included among the 21st century skills." "Do you think coding education should be among the 21st century skills?" was asked. The categories/codes and their frequency values determined as a result of the responses received from teachers, administrators and parents are given in Table 13.

Table 13. Opinions on whether coding education is a 21st century skill

	Category/Code	**Frequency**
Teacher (T)	Yes it should be included	10
Manager (M)	Yes it should be included	5
Parent (P)	Yes it should be included	10

When Table 13 is examined, all of the teachers, administrators and parents who participated in the interview think that coding education should be among the 21st century skills.

T2: "It should take place"
T9: "It should definitely be included. "
M1: "Yes, it should be included."
M5: "It must be included. "
P8: "Absolutely yes"
P3: "Yes, it should. "

The question "Can coding education be seen as a need in education?" was asked to the teachers, administrators and parents who participated in the interview. The categories/codes and their frequency values determined as a result of the responses received from teachers, administrators and parents are given in Table 14.

Table 14. Opinions on whether coding education is needed or not

	Category/Code	**Frequency**
Teacher (T)	Yes it can be seen	9
	No	one
Manager (M)	Yes it can be seen	5
Parent (P)	Yes it can be seen	10

When Table 14 is examined, 9 of the teachers who participated in the interview see coding education as a need in education, while 1 teacher does not see it as a need. All of the administrators and parents who participated in the interview stated that they saw coding education as a need in education.

T2: "No."
T8: "Yes, it is a need. "
M5: "It is definitely a need."
M2: "Yes, it is a need. "
P8: "Yes it can be seen."
P1: "It is definitely a need."

Teachers, administrators and parents who participated in the meeting asked, "Can coding education be given to every child?" The question "Does this require a certain competency?" was posed. The categories/codes and their frequency values determined as a result of the responses received from teachers, administrators and parents are given in Table 15.

Table 15. Competencies required for coding education

	Category/Code	Frequency
Teacher (T)	Yes it can be given	7
	Suitable for development level	3
	Individual differences should be taken into account	2
	To those who have talent	2
	No it should not be given	3
Manager (M)	Yes it should be given	4
	According to each child's level and ability	3
	According to each child's interests	2
	No it should not be given	one
	Requires certain competence	one
Parent (P)	Yes it should be given	9
	No qualification required	2
	If there is no problem in understanding ability	one
	Unless there is a special situation	one
	More for those with sufficient digital competence	one
	Even if at a basic level	one
	No it should not be given	one
	Coding education requires a strong memory	one

When Table 15 is examined, 7 of the teachers who participated in the interview think that coding education can be given to every child, while 3 of them think that it cannot be given to every child. Teachers who think that coding education can be given to every child, have the competencies required for this education; they stated that the development level should be appropriate, individual differences should be taken into account, and the child should have talent in this field.

While 4 of the managers participating in the interview think that coding education can be given to every child, 1 thinks that it cannot be given to every child. Administrators who think that coding education can be given to every child should provide the competencies required for this education; they stated that it should be suitable for each child's level, ability and interest. Administrators who think that coding education cannot be given to every child also stated that this education requires a certain competence.

While 9 of the parents who participated in the interview think that coding education can be given to every child, 1 thinks that it cannot be given to every child. Parents who think that coding education can be given to every child; they stated that no competency is required, unless there is a problem with the child's ability to understand, if there is no special situation, and those who have sufficient digital competence can be given coding education, albeit at a basic level. The parent who thinks that coding education cannot be given to every child also stated that this education requires a strong memory.

T8: "I think it should be given to children with talent."
T3: "Yes. It can be given to students whose developmental level is appropriate and individual differences are taken into consideration."
M4: "It can be given taking into account the interests of each child."
M2: "No it should not. Coding education requires a certain competence. "
P3: "It should be given to every child starting from primary school."
P7: "If there is no problem in the child's comprehension skills or if there is no special situation, coding education can be given."

The question "How do you think a child who receives coding education develops mentally and socially?" was asked to the teachers, administrators and parents who participated in the interview. The categories/codes and their frequency values determined as a result of the responses received from teachers, administrators and parents are given in Table 16.

Table 16. Opinions on the mental and social development of the child receiving coding education

	Category/Code	Frequency
Teacher (T)	Mentally	15
	Reasoning skills improve	3
	Problem solving skills develop	3
	Systematic thinking skills develop	2
	Analytical thinking skills develop	one
	Perception improves	one
	Imagination develops	one
	Generates bright ideas	one
	Abstract thinking skills develop	one
	Creativity improves	one
	Establishes cause and effect relationship	one
	Socially	6
	Participates in team work	2
	Takes responsibility	one
	Self-confidence improves	one
	Communication power improves	one
	Becomes active	one
	It improves positively	4
Manager (M)	Mentally	9
	Problem solving skills improve	2
	Thinking skills improve	2
	Solution-oriented thinkers	2
	They think fast	one
	Creative thinking skills develop	one
	Analytical thinking skills develop	one
	Socially	5
	Increases self-confidence	3
	They express themselves easily	one
	Supports sociality	one
	It improves positively	one
Parent (P)	Mentally	11th
	Develops a different perspective	4
	Makes you think practically	3
	Improves mathematical intelligence	2
	Analytical thinking skills develop	one
	Improves imagination	one
	Socially	5
	Social relationships are strengthened	4
	Increases self-confidence	one
	It improves positively	3

When Table 16 is examined, 15 of the teachers who participated in the interview think that coding education will improve students mentally, 6 of them socially and 4 of them in a positive way. Teachers who think that this education will improve their students mentally; they stated that their reasoning, problem solving, systematic thinking, analytical thinking, abstract thinking, establishing cause and effect relationships, and generating bright ideas will improve their skills and creativity, and their perception and imagination will also improve. Teachers who think that their students will develop socially with this education; they stated that they could participate in team work, take responsibility, improve their self-confidence, improve their communication skills and be more active.

9 of the managers who participated in the interview think that coding education will improve students mentally, 5 socially and 1 positively. Administrators who think that this education will improve their students mentally; they stated that problem solving, thinking, solution-oriented thinking, fast thinking, creative thinking and analytical thinking skills will improve. Administrators who think that this education will help students develop socially; they stated that it would increase their self-confidence, enable them to express themselves easily and support sociality.

11 of the parents who participated in the interview think that coding education will improve students mentally, 5 think that it will develop them socially and 3 think that it will improve them positively. Parents who think that this education will improve their students mentally; they stated that they can develop a different perspective, enable them to think practically, develop mathematical intelligence, develop analytical thinking skills and develop imagination. Parents who think that this education will improve their students socially: they stated that it would strengthen their social relationships and increase their self-confidence.

T5: "Mentally; It provides skills such as reasoning, problem solving and analytical thinking. Socially; "It provides teamwork skills."
T2: "A child who receives coding education develops imagination, creativity, abstract thinking skills, generates bright ideas and establishes cause and effect relationships. In addition, the child takes responsibility and becomes more active. "
M2: "It improves the child's creativity skills. "His self-confidence increases."
M5: "Children who receive coding education think faster, their thinking skills improve, their problem solving skills improve and they think solution-oriented."
P4: "It develops in a positive direction."
P9: "Children who receive coding education think faster, their thinking skills improve, their problem solving skills improve and they think solution-oriented."

Teachers, administrators and parents who participated in the interview were asked, "Could there be difficulties in the coding education to be given during the primary school period?" What difficulties may occur?'' question was posed. The categories/codes and their frequency values determined as a result of the responses received from teachers, administrators and parents are given in Table 17.

Table 17. Difficulties of coding education in primary school

	Category/Code	**Frequency**
Teacher (T)	It is possible	10
	Lack of technological equipment	3
	economic difficulties	3
	Children's development may not be appropriate	2
	lack of infrastructure	one
	Educator competence	one
	Impossible	3
Manager (M)	It is possible	6
	Students who do not have technological devices have difficulty	one
	May not be suitable for every child	one
	The quality of the education provided may not be sufficient	one
	Educator competence	one
	lack of infrastructure	one
	Lack of equipment	one

	Impossible	one
	If the necessary conditions are met	one
Parent (P)	It is possible	8
	May not interest every child	2
	Each student's learning level varies	2
	Lack of infrastructure in schools	one
	Education may not be given enough importance	one
	There may not be enough time allocated to education	one
	Children become anxious when they do not understand the system and the language	one
	Impossible	4
	It would be fun for kids	one

When Table 17 is examined, 10 of the teachers who participated in the interview think that the coding education to be given in the primary school period may have some difficulties, while 3 of them think that it will not have any difficulties. Teachers who think that they have some difficulties; the difficulties that may be experienced while giving coding education in primary school; they expressed these as lack of technological equipment, economic difficulties, education may not be suitable for children's development, lack of infrastructure and inadequacy of educators in this regard.

While 6 of the administrators who participated in the interview think that coding education to be given in primary school may have some difficulties, 1 of them thinks that there will be no difficulties if the necessary conditions are met. Managers who think that they have some difficulties; the difficulties that may be experienced while giving coding education in primary school; they stated that students who do not have technological devices may have difficulty, they may not be suitable for every child, the quality of the education provided may not be sufficient, educators may not be competent in this regard, there is a lack of infrastructure and equipment.

While 8 of the parents who participated in the interview think that the coding education to be given during the primary school period may have some difficulties, 4 of them think that there will be no difficulties and even it can be fun. Parents who think that they have some difficulties say that the difficulties that may be experienced while giving coding education in primary school are; they stated that it may not attract the attention of every child, the learning level of each student may differ, there is a lack of infrastructure in schools, not enough importance and time may be devoted to coding education, and children may become anxious when they do not understand the system and language.

> *T7: "Infrastructure may be inadequate. "The development of every child may not be appropriate."*
> *T2: "Lack of technological equipment, insufficient infrastructure and the competence of educators in this field."*
> *M4: "The quality of the education provided may not be sufficient."*
> *M3: "Students who do not have technological tools may struggle. It may not be suitable for every child."*
> *P2: "I don't think it will be a problem, in fact it will be fun for children."*
> *P6: "It may not be of interest to all children. Education may not be given enough importance. Children also get anxious when they do not understand the system and the language."*

Teachers, administrators and parents who participated in the meeting were asked, "What kind of equipment should be in schools to provide coding education?" "Do you think schools are sufficient in this sense?" was asked. The categories/codes and their frequency values determined as a result of the responses received from teachers, administrators and parents are given in Table 18.

Table 18. Opinions on the equipment that should be available in schools for coding education

Category/Code	**Frequency**
Not enough	8
Technological equipment is missing	4
Visual materials are missing	one

Teacher (T)	No domain experts	one
	Infrastructure is inadequate	one
	Mostly not enough	2
Manager (M)	Not enough	5
	Technological equipment is missing	2
	Visual materials are missing	one
	Infrastructure is missing	one
Parent (P)	Not enough	10
	Technological infrastructure is lacking	7
	Educator is missing	2
	Class sizes are large	one
	It would be enough	3
	Having a computer laboratory is sufficient	3

When Table 18 is examined, 8 of the teachers who participated in the interview think that schools do not have enough equipment to provide coding education, while 2 teachers think that it is mostly not enough. Teachers who think that schools are not adequately equipped; they stated that technological equipment was lacking, visual materials were missing, there were no field experts and the infrastructure was inadequate.

All of the managers who participated in the interview think that schools do not have sufficient equipment to provide coding education. Administrators in schools; they stated that technological equipment, visual materials and infrastructure were lacking.

All of the parents who participated in the interview think that schools do not have sufficient equipment to provide coding education. Parents in schools; He stated that the technological infrastructure and educators were lacking and the class sizes were crowded. In addition, 3 parents stated that the deficiencies in coding education could be eliminated if there were computer laboratories in schools.

T4: "It is not enough. "Every student should have a computer and people who are experts in this field should work in schools."
T5: "It is not enough. Technological equipment and visual materials are lacking. "
M4: "It is not sufficient. "There are no visual equipment in schools to provide coding education."
M1: "It is not sufficient. Schools lack technological equipment and infrastructure. "
P10: "It is not enough, but coding education can be provided if there are computer laboratories in schools."
P8: "It is sufficient. Having computer laboratories in schools is sufficient for coding education. "

The question "How do you evaluate the fact that coding education starts from primary school in private schools and does not start in public schools?" was asked to the teachers, administrators and parents who participated in the interview. The categories/codes and their frequency values determined as a result of the responses received from teachers, administrators and parents are given in Table 19.

Table 19. Opinions about coding education being given in private schools but not yet in public schools

	Category/Code	**Frequency**
Teacher (T)	Inequality	9
	contrary to equal opportunity	5
	Conditions are not equal	2
	Double standard	one
	There is not enough support for public schools	one
	Not required in public school	one
	Private schools offer to impress parents	one
Manager (M)	Inequality	5
	inequality of opportunity	2
	Private schools raise their students with more self-confidence	one
	Private schools have different perspectives on life	one

	Administrators and parents in private schools are more conscious	one
Parent (P)	Inequality	7
	Conditions are not equal	3
	Costs are high in public schools	one
	Private schools do not have financial difficulties	one
	Technological infrastructure is inadequate in public schools	one
	Parents and educators in public schools are not sufficiently aware	one
	It should be offered in public schools as soon as possible	3
	By education enough educators	one
	It's too late	one

When Table 19 is examined, 9 of the teachers who participated in the interview think that it is inequality that coding education is given in primary schools in private schools but has not yet started in public schools, while 1 teacher thinks that it is not necessary for this education to be given in public schools. Teachers who think that not starting coding education in public schools is an inequality; He stated that it is against equality of opportunity, conditions are unequal, double standards are applied and sufficient support is not provided to public schools. The teacher, who thought that coding education was not necessary in public schools, also stated that private schools gave coding education to impress parents.

All 9 of the administrators who participated in the interview think that it is inequality that coding education is given in primary schools in private schools but has not yet started in public schools. Managers of this situation; they stated that it creates inequality of opportunity, private schools raise their students more self-confident, private schools have a different perspective on life, and administrators and parents in private schools are more conscious.

While 7 of the parents who participated in the interview think that it is inequality that coding education is given in primary schools in private schools but has not yet started in public schools, 3 parents think that coding education should start as soon as possible in public schools. Parents think that not starting coding education in public schools is inequality; they stated that the conditions are not equal, the costs are high in public schools, private schools do not have financial difficulties, the technological infrastructure in public schools is inadequate, and parents and educators in public schools are not sufficiently conscious. In addition, parents stated that it is necessary to train a sufficient number of educators who know coding education and start this education in public schools, and that it is already late.

> *T8: "I don't think it is very necessary. "Private schools provide coding education to impress parents."*
> *T5: "I see it as inequality. It is against equal opportunity. First of all, the conditions students have are not equal. "*
> *M4: "It proves that there is inequality of opportunity in education."*
> *M2: "I see it as inequality. Private schools raise their students more confident. This is also private schools have a different outlook on life. "*
> *P7: "It should be given in public schools as soon as possible. In fact, the fact that it has not started by this time shows that it is too late."*
> *P1: "I see it as inequality. I think the conditions are not equal, but I think the cost of providing this education in public schools is high and private schools do not have financial problems."*

Conclusion

As a result of the interviews with the teachers, the following results were obtained;

While 9 out of 10 teachers who attended the meeting had an idea about what coding education is, 1 teacher had never heard of coding education before. Teachers who know coding education also generally think that the education is useful. All of the managers who participated in the interview said that they had heard of coding education before. Managers generally think that coding education is the best way to understand technology. All of the parents who participated in the interview said that they had heard of coding education before. Parents generally think that coding education is an education that will form the basis for the professions of the future.

All of the teachers who participated in the interview think that coding education is important and that coding education in general improves thinking skills. All of the managers who participated in the interview think that coding education is important and that this education has gained importance because students generally care about innovations. All of the parents who participated in the interview think that coding education is important and that this education is gaining importance as the importance of technology in general increases day by day.

While 8 of the teachers who participated in the interview think that coding education should start from primary school, 2 teachers think that education should start from pre-school. While 3 of the managers who participated in the interview think that coding education should start from primary school, 2 of them think that education should start from pre-school. While 5 of the parents who participated in the interview think that coding education should start from primary school, 3 think that this education should start from preschool and 2 think that it should start from the 2nd grade. Bozpolat and Topdağı (2022) stated that teachers should start providing coding education, especially from primary school, and that this education will provide thinking skills, problem solving, project generation and basic algorithm-related skills. In addition, teachers expressed their opinions that there are certain characteristics and qualifications that students must have in order to provide coding education, and that teachers who can provide this education must also have some qualifications.

Although all of the teachers who attended the meeting thought that coding education could be beneficial for primary school students, the majority thought that coding education improved their thinking skills. Although all of the managers participating in the interview think that coding education can be beneficial for primary school students, the majority think that it provides them with different thinking skills. Although all of the parents who participated in the interview think that coding education can be beneficial for primary school students, the majority think that this education supports cognitive development.

Most of the teachers who participated in the interview think that coding education started at an early age will improve students' mental skills. Most of the managers who participated in the interview think that coding education started at an early age improves students' personal skills. Most of the parents who participated in the interview think that coding education started at an early age will improve students' mental skills.

While 9 of the teachers who participated in the interview think that teachers should be given coding education, 1 thinks that this education should not be given. All of the administrators and parents who participated in the interview think that teachers should be given coding education.

None of the teachers who participated in the interview have participated in the coding education programs offered through ÖBA, but 8 of our teachers think that this education is necessary, while 2 of our teachers think that it is not necessary. Not all of the managers who participated in the interview have attended the coding education programs offered through ÖBA, but all of our managers think that this education is necessary.

While 9 of the teachers who participated in the interview think about giving this education to their students if they have sufficient knowledge and equipment about coding education, 1 of our teachers does not think about giving this education. All of our managers who participated in the interview stated that they would encourage the teachers working in their institutions to provide this education to students if they have sufficient knowledge and equipment about coding education.

The majority of the teachers who participated in the interview think that coding education started at an early age improves students' thinking skills. The majority of the managers who participated in the interview think that coding education started at an early age improves students' cognitive skills. The majority of the parents who participated in the interview think that coding education started at an early age improves students' cognitive skills. Ülger (2022) received from teachers, teachers; they stated that coding education is suitable for all fields and all ages, and that they want to use coding in course contents, school activities, student competitions and projects, and thus their students' problem-solving skills can be improved.

Most of the teachers who participated in the interview think that coding education should be compulsory in primary school programs. Most of the administrators who participated in the interview think that coding education should be included in primary school curricula. Most of the parents who participated in the interview think that coding education should be compulsory in primary school programs.

The majority of the teachers who participated in the interview think that coding education should be given on the grounds that it improves students' thinking skills, the majority of administrators develop cognitive skills, and the majority of parents contribute to mental development. Şenol (2019) study, classroom teachers; they stated that

coding education is an important tool in gaining thinking skills, but teachers need support to provide coding education.

All of the teachers, administrators and parents who participated in the interview think that coding education should be among the 21st century skills. Anılan and Gezer (2020), classroom teachers expressed the opinion that students' skills such as problem solving, analytical and creative thinking can be improved with coding education.

The majority of teachers, administrators and parents who participated in the interview see coding education as a need.

While the majority of the teachers who participated in the interview think that coding education should be given to every child, some teachers think that instead of giving it to every child, it should be given to children who meet certain criteria. While the majority of the administrators who participated in the interview think that it should be given to every child, one administrator also thinks that a certain level of competence is required to provide this education. While the majority of the parents who participated in the interview think that it should be given to every child, one parent thinks that it is necessary to have a strong memory for this education. Şenol and Demirer (2017) also stated that it is possible to start coding education from a young age and apply it at all levels. In this context, the studies mentioned are similar to the research results.

All of the teachers, administrators and parents who participated in the interview think that students who receive coding education will develop mentally and socially.

While most of the teachers, administrators and parents who participated in the interview think that the coding education to be given in the primary school period may have some difficulties, some teachers do not think that it will have any difficulties.

Most of the teachers, administrators and parents who participated in the interview think that schools are not sufficiently equipped to provide coding education. Şenol and Demirer (2017) stated in their study that classroom teachers see coding education among the 21st century skills and that they see coding education as a tool to gain these skills, but they need an information technologies class, internet infrastructure and materials for coding education.

Most of the teachers, administrators and parents who participated in the interview describe the fact that coding education is given in private schools but not in public schools as inequality. They think that this situation creates inequality of opportunity between private schools and public schools.

Recommendations

As a result of interviews with teachers, administrators and parents, the opinions of education stakeholders regarding coding education were determined. The opinions received show that coding education is a need in the education system. For this reason, researchers can design experimental studies on coding education. Opinions of prospective teachers regarding coding education can also be obtained. Teachers can be provided with this education by providing in-service education on coding education.

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Author (s) Contribution Rate

The authors contributed equally to this work.

Ethical Approval

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