

# Evaluation of middle school 5th and 6th grade information technologies and software course curriculum within the framework of Demirel's analytical curriculum evaluation model

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## ABSTRACT

The aim of this study is to evaluate the 5th and 6th grade information technologies and software curriculum within the framework of Demirel's analytical curriculum evaluation model. The research is a qualitative descriptive study. The data of the study were obtained by examining the "middle school 5th and 6th grade information technologies and software course curriculum", which was updated by the Ministry of National Education (MONE) in 2018, through document analysis. The findings were determined by analyzing the research data with descriptive analysis method in accordance with qualitative research. While determining the findings of the research, the program evaluation scale was used in the context of Demirel's analytical program evaluation model. The program evaluation scale consists of context, objectives, content, process and evaluation criteria. In addition to these criteria, it was discussed whether the program meets the needs and expectations of the society, the interests and needs of the students, the innovations in information and technology, and whether the achievements in the program cover the skills and core values in the program. As a result of the study, through the evaluation of the Information Technologies and Software course curriculum within the framework of DAPDEM, the strengths of the curriculum and the parts that need to be developed were revealed. It is thought that these findings will guide future curriculum development studies.

## Introduction

Information, communication and technology... These concepts are indispensable in our lives in the Turkey of 2023 and the combination of these concepts creates information technologies. Information technologies affect various areas of life by enabling rapid integration of technological advances into daily life and rapid access to information. Considering that it affects every aspect of life, the information technologies and software course curriculum taught in schools needs to be evaluated and updated from different perspectives.

When the literature on information technologies and software curriculum is examined; a study evaluating the information technologies and software (ITS) curriculum according to Eisner's educational criticism model (Göçer, 2021), a study on the preparation of sustainable information technologies curriculum development model (SÖPGEM) (Özer, 2017) are presented. There are sample studies in which the information technologies and software course curriculum is examined and evaluated in line with teacher opinions (Arslan, 2014; Aykaç & Uzgur, 2016; Aytekin, 2019; Baran et al, 2016; Çakır & Tazıcı, 2016; Durdukoca & Arıbaş, 2011; Karakuş et al, 2015; Sak, 2017; Sarıkoz & Alpan, 2019; Yurdakul & Kurt, 2011). It was presented in a study comparing the similar and different features of IT curricula in Turkey and developed countries (Tarım & Senemoğlu, 2022). There are studies evaluating the information technologies and software curriculum in the context of student opinions (Aytekin, 2019; Bulut, 2018; Gündüz & Demir, 2020; Öztuzcu & Karamete, 2022; Sarıkoz & Alpan, 2019). In addition, there is a study comparing the 2012 and 2017 information technologies and software curricula (Karaman & Karaman, 2019), an evaluation of the information technologies and software curriculum update proposal (Mercimek & İlic, 2017), and studies on the information technologies and computer science curriculum update process (Gülbahar & Kalelioğlu, 2018). It was presented in a study in which the middle school information technologies curriculum was evaluated in the context of the metaverse concept (Sırkıntı & Bolat, 2023). It was presented in a study in which the neglect of all education programs applied in secondary schools was evaluated according to Eisner's educational criticism model (Gökmen, 2023). Media and information literacy in the designated curriculum: presented in a systematic review of its integration (Rojas-Estrada et al., 2024). There is also a study on the design and implementation of an online game to improve learning motivation and achievement in the ICT curriculum (He et al., 2024). When these studies are examined in depth, it is seen that the curriculum of the information technologies course has been examined from a broad perspective from different dimensions, but the information and communication technology (ICT) curriculum has not been addressed in the literature within the framework of Demirel's analytical curriculum evaluation model (DAPDEM).

DAPDEM is basically based on two dimensions: First, it includes studies focusing on the analysis of documents related to the program; second, it includes the views of the stakeholders of the program (Aygören & Er, 2020).

According to Göçer (2021):

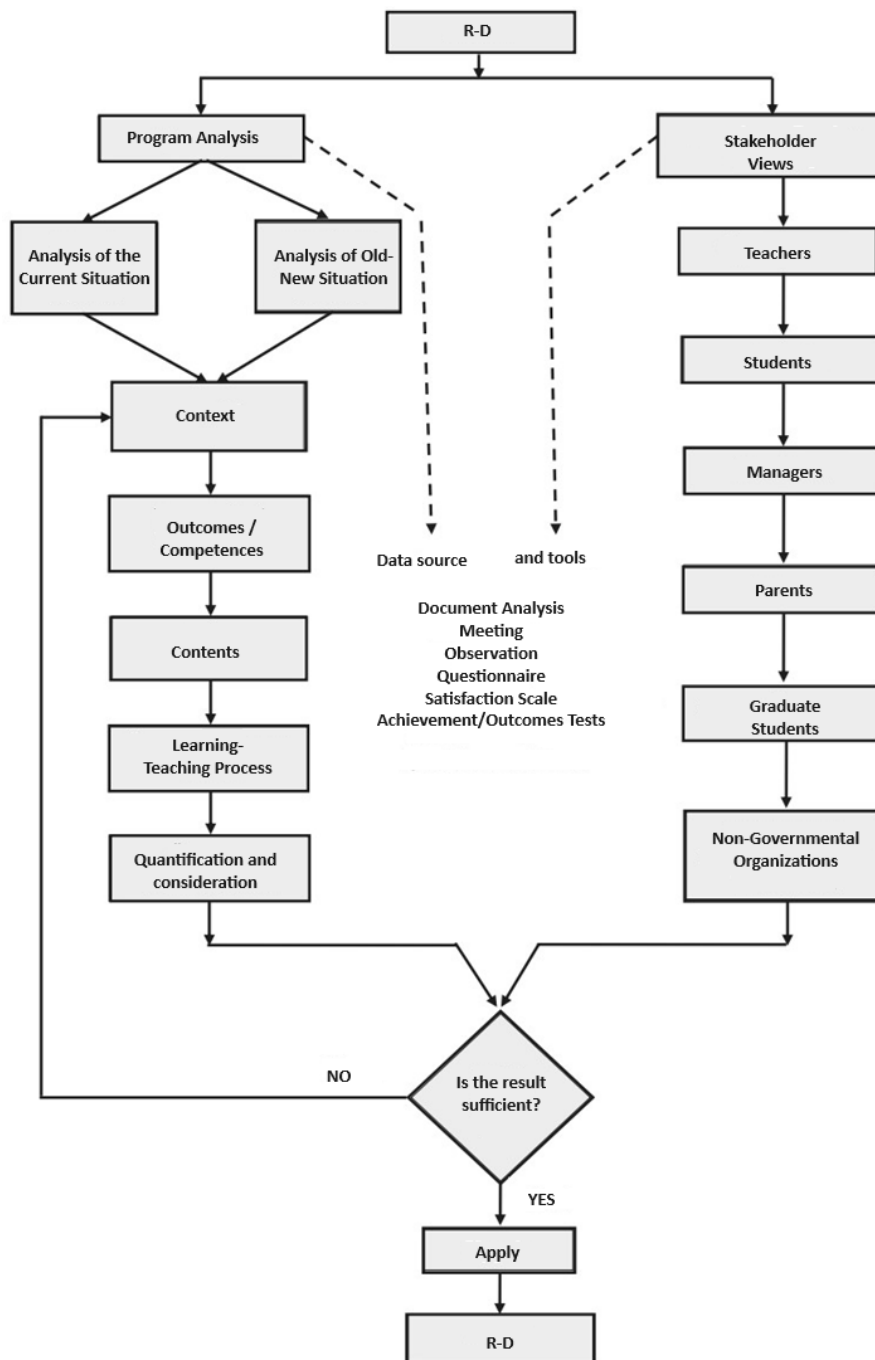
*"The first dimension of the model focuses on the analysis of the curriculum and this analysis starts from the curriculum design. In this context, the basic philosophy of the program, the learning theory or theories applied, the components of the program (objectives, content, process, assessment) and the relationships between these components are examined in detail. After the analysis of the curriculum design, an assessment of the current situation is requested. This assessment is done using SWOT analysis to identify the strengths and weaknesses of the program, as well as opportunities and threats related to the implementation of the program. It is also recommended that the needs analysis conducted during the development of the program design is also evaluated at this stage. Finally, it is emphasized that the program documents should be examined in detail to assess the input, process and output dimensions of the prepared program (p. 37)."*

Again, according to Göçer (2021):

*"In the second dimension of the model, it is important to evaluate the stakeholders who will implement the curriculum separately. In this context, the opinions of field experts and curriculum development experts, teachers, students, administrators, inspectors, parents and non-governmental organizations should be taken. The opinions obtained from these stakeholders should be taken into account in the analysis and decision-making processes of the curriculum. Various measurement tools such as*

observations, interviews, questionnaires and tests can be used to obtain opinions. In this way, it is ensured that the perspectives of different stakeholders are taken into account in the implementation of the curriculum and the necessary steps for improving the curriculum are identified (p. 38)."

In the analytical evaluation model, it is suggested that a decision should be reached as a result of the evaluation of opinions on all aspects of the program. This decision may involve the implementation of the program based on the conclusion about the adequacy of the program, or it may involve reviewing the deficiencies in the program design and making improvements (Demirel, 2013).



**Figure 1** Analytical program evaluation model, DAPDEM (Demirel, 2013)

The aim of this study is to evaluate the 5th and 6th grade information technologies and software curriculum in the framework of DAPDEM. In the study, the first dimension of DAPDEM, the

curriculum, is analyzed and the analysis process starts with the curriculum design. Accordingly, the philosophy on which the curriculum is based, the theories of learning, the elements of the curriculum (objectives, content, process, assessment) and the relationships between the elements are examined respectively. It is important that the curriculum of the information technologies and software course is examined according to DAPDEM, the issues that do not work in the curriculum are corrected, and the improvement studies related to the curriculum are carried out by the curriculum developers/experts. Because DAPDEM is a comprehensive approach developed to objectively evaluate the effectiveness and efficiency of educational programs. Moreover, this model is designed to cover all components of the curriculum. These components include objectives, content, learning-teaching processes and evaluation methods. Thus, every aspect of the program is examined in detail. It is thought that making the necessary corrections about the program will positively affect the aspect of the ICT curriculum that is put into practice in schools. In this context, the following research questions are sought to be answered:

- 1) How is the information technologies and software curriculum expressed according to the dimensions of context, objectives, content, process and evaluation in the first part of Demirel's analytical curriculum evaluation model?
- 2) Does the information technologies and software curriculum meet the needs and expectations of society, students' interests and needs, and innovations in information and technology?
- 3) Does the ICT and software curriculum cover the skills and core values in the curriculum?

## **Theoretical framework**

### **Secondary school 5th and 6th grades 2018 information technologies and software curriculum**

The Secondary School 5th and 6th Grade Information Technologies and Software Course Curriculum, which was updated by the Ministry of National Education in 2018, was prepared to enable students to use information technologies to fulfill the requirements of the digital age. The curriculum aims to enable students to acquire basic knowledge in information technologies and to use these technologies creatively, ethically and actively. The 2018 Information Technologies and Software curriculum is based on progressive educational philosophy and is based on constructivist learning theory. This envisages that students take an active role in the learning process and construct knowledge through their own experiences and discoveries. The curriculum is structured around four main themes covering information technologies and software:

1. *Information and Communication Technologies*: Enables students to actively use basic computer skills and digital technology tools. This theme includes topics such as hardware and software knowledge, internet networking (MONE, 2018).
2. *Algorithm and Programming*: Aims to develop students' problem-solving skills. It includes algorithmic thinking, writing simple programs and software development processes. This theme specifically aims to develop problem solving and analytical thinking skills (MONE, 2018).
3. *Digital Literacy*: It covers students' ability to access, evaluate and use information in the digital world. Media literacy, digital ethics and digital citizenship are included under this theme (MONE, 2018).
4. *Safe Internet Use*: It aims to teach students to use the internet safely. This theme includes topics such as internet safety, cyberbullying, protection of personal data and internet ethics (MONE, 2018).

The curriculum consists of teaching methods and techniques that support the constructivist approach. These teaching methods and techniques include project-based learning, cooperative learning, problem solving and game-based learning.

- Project-Based Learning: Students develop projects to solve real-world problems and use information and communication technologies in this process (MONE, 2018).
- Collaborative Learning: Encourages students to learn together and learn socially from each other through group work (MONE, 2018).
- Problem Solving: Enables students to identify and solve various problems using information and communication technologies (MONE, 2018).
- Game-Based Learning: It enables students to learn ICT topics in a fun and interactive way through games and simulations (MONE, 2018).

The curriculum provides a variety of methods for assessing and evaluating students' ICT and software skills. These assessment methods include performance tasks, project assessments, peer assessment and self-assessment. Continuous feedback mechanisms enable students to monitor their own progress and further improve their learning processes.

In conclusion, the 2018 Secondary School 5th and 6th grade Information Technologies and Software Curriculum has been prepared with a comprehensive approach that aims to raise students as active and conscious individuals in the digital world. Based on progressive educational philosophy and constructivist learning theory, the program enables students to develop an in-depth understanding of information technologies and to use these technologies creatively, ethically and effectively.

## **Method**

### **Research model**

This research is a qualitative descriptive study. The data of the study were obtained by examining the "Secondary School 5th and 6th Grade Information Technologies and Software Course Curriculum" updated by the Ministry of National Education in 2018 through document analysis. Document analysis involves the evaluation of written materials that contain information about the events or phenomena intended to be examined (Yıldırım & Şimşek, 2011: 187). The findings were determined by analyzing the research data with descriptive analysis method in accordance with qualitative research. Descriptive analysis involves the process of categorizing and summarizing the data and drawing conclusions.

### **Data collection and analysis**

The data of the study were obtained by examining the 5th and 6th grade information technologies and software course curriculum according to Demirel's analytical curriculum evaluation model. The curriculum evaluation scale in the curriculum analysis dimension of Demirel's model consists of context, objectives, content, process and evaluation. In addition to these criteria, it was discussed whether the curriculum meets the needs and expectations of the society, the interests and needs of the students, and the innovations in information and technology; and whether the achievements in the curriculum cover the skills and root values in the program. The purpose of selecting the middle school 5th and 6th grade information technologies and software course curriculum in the study is that it is taught in schools as the latest curriculum updated in 2018.

## Validity and reliability

During the study, the information technologies and software curriculum was examined one by one by the authors in terms of the measurement dimensions of Demirel's analytical curriculum evaluation model. As a result of the examinations, the authors compared the effects they obtained. In order to determine the compliance with the criteria, the authors came together and made a joint decision. During the data collection, an evaluation of the validity and reliability of the curriculum was made based on the principle of consensus and disagreement. In order to ensure the reliability of the study, the structure of the curriculum, which was actively implemented in schools, was discussed with the field teachers and the findings were clearly expressed according to DAPDEM after the pilot study.

## Findings

### Curriculum Evaluation Scale

#### Context

#### ***Is there a specific philosophy on which the curriculum is based?***

The philosophy of the curriculum is not clearly stated in the prepared program. However, it is clearly understood from the following statements (MONE, 2018) that the program is based on the philosophy of progressive education:

*"During this course, in addition to theoretical knowledge, it should be enriched with practical application opportunities. Students should be supported to develop their own projects and products. Comprehension and organizing strategies should be used to enable students to combine their new knowledge with their past experiences. For this purpose, methods such as project-based studies, design-oriented learning, tutorial learning, and cooperative learning can be used. In this context, problem-solving and project-centered teaching approaches should be adopted." (p. 8).*

#### ***Is the curriculum based on a specific learning theory or theories?***

The learning theory on which the curriculum is based is not explicitly mentioned in the prepared program. However, it is clearly understood from the following statements (MONE, 2018) that the curriculum is based on constructivist learning theory:

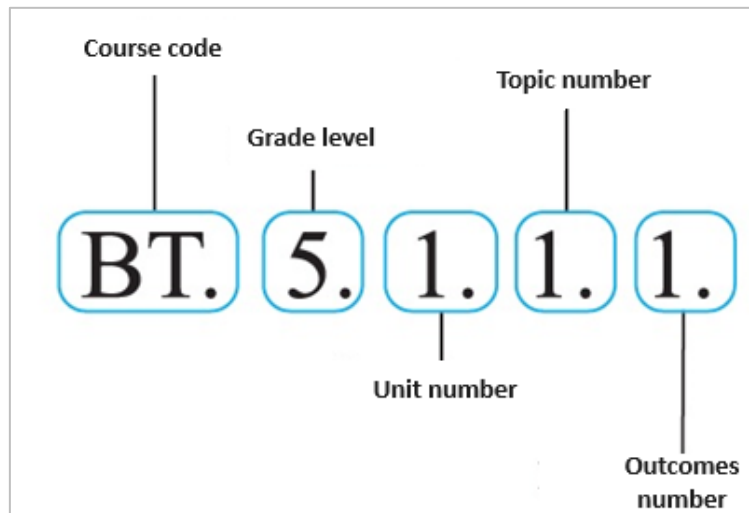
*"Social coding environments can be used for sharing and collaboration. Through these platforms, students and teachers can share their software with other internet users, work on projects together, and generate new ideas from existing projects. In addition, hardware such as computers, tablets or robot kits can be used in ICT and software lessons. For schools lacking technical facilities, activities and drama processes can be planned and implemented without computers." (p. 9).*

#### ***Is a user guide prepared for the program?***

In the program, there are statements guiding the teacher under the title of "issues to be considered in the implementation of the information technologies and software course curriculum" (MONE, 2018):

*"Where there is a lack of technical infrastructure in schools, it is important to develop a variety of activities and applications so that students can learn without using computers. In addition, in order to provide students with rich learning experiences, different hardware and software options were encouraged to be included in the curriculum and flexibility was provided in terms of technical requirements and level of knowledge. In this way, it was ensured that the curriculum could be preferred and implemented in accordance with various technological possibilities." (p. 8).*

In addition, the structure of the program is mentioned under the title "structure of the information technologies and software course curriculum ". It is emphasized that the program is based on a unit-based approach. Under the title of units, the topics, concepts and skills of the units are included. In the diagram showing the structure of the objectives in Figure 2, the objectives of the curriculum are numbered based on the course code, grade level, unit number, subject number and objective number (p. 9). When considered in this context, the curriculum has a guiding aspect in terms of guiding the teacher.



**Figure 2** Diagram showing the structure of the outcomes

### **Objective**

***Are the objectives/outcomes/competencies expressed in accordance with the principles of progressive classification according to the characteristics of the subject area?***

Information technologies and software course curriculum is expressed gradually in the cognitive field in the renewed bloom taxonomy, and in the affective field according to Krathwohl et al.

***Are the objectives appropriate for the student level?***

It can be inferred from the following statements (MONE, 2018) that the curriculum is appropriate for the developmental level of students:

*"In the process of developing curricula, an approach that ensures a harmonious balance between all components has been adopted, taking into account the existing scientific knowledge and experiences regarding the multifaceted development of human beings." (p. 6).*

*"Curricula have been developed on the basis that human development is not completed at any one stage and continues throughout life." (p. 6).*

*"The process of development is not uniform or standardized, and although it continues throughout life, it progresses in stages. At each stage, the developmental characteristics of individuals differ, and the beginning and end of the stages are not homogeneous. Therefore, programs are structured to take this diversity into account." (p. 6).*

***Are the examples of activities suitable for the objectives given correctly?***

In the content of the information technologies and software course secondary school 5th and 6th grade curriculum:

- General and special objectives of the program
- Perspective of the program (values and competencies)

- Measurement and evaluation approach of the program
- The structure of the program, outcomes and explanations are included.

However, the program does not include examples of activities related to the outcomes.

### Content

*Is the content prepared in accordance with the objectives and is the relationship between objectives and content established?*

Figure 3 and Figure 4 show the number, duration and ratio of units, subjects and the number, duration and ratio of achievements related to these subjects. (p. 10).

UNIT NAME	5TH GRADE			
	TOPIC NAME	TOTAL NUMBER OF OUTCOMES	CLASS HOURS	RATIO %
INFORMATION TECHNOLOGIES	1 The Importance of Information Technologies in Daily Life 2 Computer Systems 3 File Management	12	6	8
ETHICS AND SECURITY	1 Ethical Values 2 Digital Citizenship 3 Privacy and Security	9	8	12
COMMUNICATION, RESEARCH AND COLLABORATION	1 Computer Networks 2 Research 3 Communication Technologies and Collaboration	12	8	11
PRODUCT CREATION	1 Image Processing Programs 2 Word Processing Programs 3 Presentation Programs	15	14	19
PROBLEM SOLVING AND PROGRAMMING	1 Problem Solving Concepts and Approaches 2 Programming	27	36	50
<b>Total</b>		<b>75</b>	<b>72</b>	<b>100</b>

**Figure 3** Grade 5 units, subject areas and duration (MONE, 2018)

UNIT NAME	6TH GRADE			
	TOPIC NAME	TOTAL NUMBER OF OUTCOMES	CLASS HOURS	RATIO %
INFORMATION TECHNOLOGIES	1 The Importance of Information Technologies in Daily Life 2 Computer Systems 3 File Management	12	6	9
ETHICS AND SECURITY	1 Ethical Values 2 Digital Citizenship 3 Privacy and Security	15	6	8
COMMUNICATION, RESEARCH AND COLLABORATION	1 Computer Networks 2 Research 3 Communication Technologies and Collaboration	13	8	11
PRODUCT CREATION	1 Image Processing Programs 2 Word Processing Programs 3 Presentation Programs	12	16	22
PROBLEM SOLVING AND PROGRAMMING	1 Problem Solving Concepts and Approaches 2 Programming	25	36	50
<b>Total</b>		<b>77</b>	<b>72</b>	<b>100</b>

**Figure 4** Grade 6 units, subject areas and duration (MONE, 2018).

The subjects included in the curriculum have been prepared in a way to meet the objectives and the relationship between objectives and content has been established. Achievements can be reached by teaching these subjects. Examples of units, topics and achievements are presented below (MONE, 2018).

*BT.5.2.1.1. Explains the basic concepts of ethics and informatics ethics.*

(Example of learning outcome on ethical values from ethics and security unit)

*BT.6.1.3.1. Describes the basic properties of files according to file extensions.*

(Example of achievement on file management from information technologies unit)

***Is the content arrangement appropriate to the subject area?***

Content arrangement in the curriculum was made in accordance with the subject area. The content is structured in a way to go from simple to difficult, from part to whole. It is seen that important criteria are taken into consideration in the selection of content. The content is consistent with the objectives, appropriate to scientific criteria and students' characteristics, useful, learnable, compatible with social realities, close to life, functional and up to date.

In the context of the criteria to be considered in content selection, a few examples from the units and topics (5th and 6th grade) in the curriculum are presented in Table 1 below (MONE, 2018).

**Table 1** 5th and 6th grade unit and topic examples

Unit	Topic
Information technologies	Computer systems
Communication, research and collaboration	Communication technologies and collaboration
Product creation	Presentation programs
Problem solving and programming	Programming

***Are students' interests, cognitive, affective and kinesthetic developmental characteristics taken into account in the selection of content?***

It is seen that the content of the curriculum is taken into consideration according to the developmental characteristics of the students and the subjects are shaped according to the interests and needs of the students. Students who actively use information technologies in their daily lives are curious about innovations with the development of technology day by day. The subject of programming in the curriculum arouses endless curiosity in students. With the development of artificial intelligence, the increase in the use of social media, and the widespread use of Office programs in daily life, students' interests remain alive on the subjects. Word processing programs, presentation programs, spreadsheet programs and research topics in the curriculum support this idea (MoNE, 2018).

It is seen that students' cognitive, affective and kinesthetic developmental characteristics are taken into consideration in the selection of the content. It can be inferred that the topics were chosen to provide students with higher level thinking skills. It can be said that the topics were chosen with the idea that students would enjoy learning, develop a sense of self-confidence, and at the same time gain habits while practicing and easily transfer the learning they apply.

**Process**

***Are the teaching strategies, methods and techniques appropriate for the objectives and are they used?***

The inference that the teaching strategies, methods and techniques given in the curriculum are appropriate for the objectives can be expressed in the context of the following examples (MONE, 2018).

*"In order for students to combine their new knowledge with their past experiences and to structure this knowledge, meaning making and organizing strategies should be used. To achieve this goal, project work, design-oriented learning, learning by teaching, collaborative learning methods and techniques can be used. In this context, problem solving, and project-based teaching approaches should be adopted." (p. 8).*

*"Both individual and group work should be preferred." (p. 8).*

The strategies, methods and techniques included in the curriculum are compatible with the subjects and outcomes included in the content of the program, and how they should be used in the program is specified in the explanation of the outcomes in certain frameworks.

#### *BT.6.4.1. Tabulation Programs*

*BT.6.4.1.3. Makes calculation operations on the table he/she created.*

It is ensured that calculations are made using different formulas.

***Are the examples given for the teaching of the lesson student-centered and are they consistent with the program objectives?***

In the curriculum, examples of the course are mentioned in a simple way in the explanation of the learning outcomes.

#### *BT.5.2.2. Digital Citizenship*

*BT.5.2.2.1. Understands the purposes and importance of digital citizenship applications.*

Applications such as e-government, e-appointment, e-banking, e-school are examined.

*BT.5.2.2.2. Recognizes that digital identities may not reflect reality.*

Emphasizes being honest in online environments and not creating fake identities.

#### *BT.5.2.3. Privacy and Security*

*BT.5.2.3.1. Identifies the components that are important for privacy.*

Concepts such as password security, security of personal information, privacy are emphasized.

*BT.5.2.3.2. Distinguish between information that should remain confidential and information that can be shared.*

Students are encouraged to act responsibly about the nature of the information they share.

#### *BT.5.4.2. Word Processing Programs*

*BT.5.4.2.2. formats the text in the document created for a specific purpose.*

Formatting is provided by using features such as font, paragraph setting.

#### *BT.6.3.2. Research*

*BT.6.3.2.2. Distinguishes harmful and unnecessary content while accessing information.*

It is ensured that they make inquiries from different sources with skeptical approaches about the accuracy of the information accessed.

*BT.6.3.2.3. Expresses the concept and importance of information management.*

The necessity of being sensitive about information pollution is emphasized.

#### *BT.6.5.2. Programming*

*BT.6.5.2.1. Recognizes the interface and features of a block-based programming tool.*

Open source or freely available programming platforms can be used.

The teaching strategies, methods and techniques included under the heading of issues to be considered in the implementation of the curriculum guide the learning-teaching process of the course and are consistent with the program objectives. The teaching strategies, methods and techniques in the curriculum such as cooperative learning, problem solving, project-based learning, individual work, group work and drama technique in a computer-free environment put the student at the center of the learning-teaching process and focus on the constructivist learning theory on the basis of a progressive educational philosophy. When the achievements in the curriculum are examined in general, it can be inferred that the learning-teaching processes are student-centered and that students learn by doing and experiencing by using the demonstration method.

*BT.5.4.3. Presentation Programs*

*BT.5.4.3.3. Edits the presentation created with the presentation preparation program.*

It is ensured that features such as changing the slide layout, adding animation and interaction are used.

The items in the title of the specific objectives of the Information Technologies and Software course curriculum also support the above-mentioned ideas. (MONE, 2018).

*"The information technologies and software curriculum aims to enable students to develop the skills of accessing and using internet-based resources, to acquire problem solving and computational thinking skills, to make collaboration skills a part of the learning process, to benefit from social environments in the learning process and to share what they have learned, to acquire the ability to use at least one programming language, and to develop innovative and original projects for problems encountered in daily life." (p. 8).*

***Are the instructional materials appropriate for the objectives and easily accessible for the region where the program will be implemented?***

The following statements are included in the curriculum:

*"In order for students to acquire the targeted skills, they need to develop an understanding of the principles of the functioning of computers and other components, the ability to perform basic operations on files, understanding the communication processes of different systems and individuals, the ability to access and share accurate information using effective search methods, the ability to communicate and collaborate effectively using communication technologies, the ability to use and manage various social environments effectively, the ability to communicate information and ideas in text, audio and video formats, the ability to present and visualize in different formats such as pictures and numbers, the ability to select and use the right tools and approaches in knowledge structuring processes, the ability to design, develop, publish and present products such as audio, video, animation and web sites, the understanding of algorithm design, the ability to use variable, assignment, sequential logic, decision structure, loop and function structures to solve problems, the ability to select and apply the appropriate programming approach. " (p. 9).*

As can be understood from the above statements in the curriculum, ICT products are needed as teaching materials. In addition to ICT products, it is also important to provide the necessary hardware and software infrastructure in schools. When all conditions are appropriate, the subjects and achievements targeted to be gained with technological materials in schools can be easily gained. However, it is not possible to provide these materials in every region where the curriculum

will be implemented. In some rural areas, the information technologies and software course, which is taught as a compulsory 2-hour course in 5th and 6th grades, is taught with printed and written teaching materials without technological facilities. At this point, it becomes difficult for students to acquire the above skills in the curriculum. The following skills, which are selected as examples from the curriculum, seem to be possible to gain with printed and written teaching materials:

*"...the importance of information and communication technologies in daily life, the positive and negative effects of information and communication technologies in cultural, social, individual and social terms,*

*... information privacy and security, ethical values, digital citizenship." (p. 9).*

## **Evaluation**

### ***Are there examples of how the target-behaviors will be tested?***

The curriculum does not include a separate assessment example for each outcome. In the curriculum, there is no mention of any measurement and evaluation tool on how the general evaluation will be made. However, there are some general statements about general assessment under the title of "measurement and evaluation approach in curricula" (MONE, 2018)

*"It is not human nature for the assessment and evaluation process to be standardized for everyone. Therefore, diversity and flexibility in the assessment and evaluation process should be at the forefront. Curricula provide guidance in this regard but cannot be expected to include all assessment and evaluation elements." (p. 6).*

### ***Do the examples given in the test situations measure the behaviors of the related subjects? Do they coincide with the progressive classification level of the objectives?***

The curriculum does not include examples of assessment. Therefore, there are no clear and specific statements about the measurement of the objectives. It is not mentioned with which assessment and evaluation tools the objectives of the Information Technologies and Software course should be measured, but under the heading "assessment and evaluation approach in curricula", some principles on how to evaluate these objectives are included in very general terms. (MONE, 2018)

It is possible to summarize the principles guiding measurement and evaluation practices in curricula as follows:

1. Measurement and evaluation activities should be compatible with all elements of the curriculum and should be based on the limits of the outcomes and explanations.
2. The curriculum does not determine the measurement tools and methods that can be used in the measurement process with precise boundaries; instead, it assumes a guiding role. However, it is emphasized that the necessary technical and academic standards should be followed when selecting the preferred assessment and evaluation tools.
3. Assessment and evaluation practices in education are an integral part of education and are carried out at every stage of the process. Measurement results are considered from a holistic perspective, not only in isolation but also in conjunction with the processes followed.
4. Due to the fact that each student has individual differences, it is not appropriate to talk about a single, universal and uniform assessment and evaluation method that covers all students. It is not possible to measure and evaluate students' academic progress using only one method or technique.

5. Education encompasses cognitive (understanding knowledge), emotional (understanding and managing emotions) and behavioral (developing skills and abilities) dimensions. Therefore, assessments based only on cognitive measures are not considered sufficient.
6. Measurement and evaluation are carried out with a multifaceted approach and requires the active participation of teachers and students.
7. Individuals' characteristics such as interests, attitudes, values and achievements may change over time. Therefore, it is important to assess these characteristics not at a single point in time but through measurements that take into account changes over time (p. 6).

### ***Are alternative assessment approaches used to evaluate the objectives?***

The curriculum does not mention any traditional or complementary assessment and evaluation tools for the evaluation of the objectives. However, when the units, subject areas and outcomes are examined, some inferences can be made about the measurement and evaluation process of the program. Sample achievements related to these inferences and the appropriate assessment and evaluation tool for these achievements are given in Table 2 below.

**Table 2** Examples of outcomes and measurement instruments

Lesson Outcomes	Gains measurement and evaluation tool
BT.5.3.1.2. Explains the basic concepts of computer networks and types of computer networks.	Written examination
BT.5.5.1.7. Gives examples of operators that can be used in problem solving.	Oral examination
BT.5.2.3.2. Distinguishes between information that must remain confidential and information that can be shared.	Multiple choice test
BT.6.3.2.4. Provides access to different content via EBA.	Performance evaluation
BT.6.5.2.15. It creates an original project that includes all programming structures.	Project

### **Additional questions**

#### ***Does the program you use have the potential to meet the needs and expectations of society?***

The curriculum includes the following statements about the needs and expectations of the individual and society under the title "ministry of national education curricula" (MONE, 2018).

*"Rapid changes in science and technology have directly affected the changes in the needs of society and individuals. These changes have also changed the roles expected from individuals. Now, qualities such as knowledge generation, practical use, problem solving, critical thinking, entrepreneurship, determination, communication skills, empathy, and contribution to society and culture have gained importance. The curricula that will enable individuals with these qualities to grow up have an understandable and simple structure that takes into account individual differences, focuses on gaining values and skills, instead of merely transferring knowledge." (p. 3).*

As can be understood from these statements, the curriculum of the Information Technologies and Software course was prepared in line with the needs of the individual and society. Individuals and society are expected to adapt to the ever-changing technology.

#### ***Does the program you use have the potential to meet students' interests and needs?***

In the curriculum, under the heading "ministry of national education curricula", the following statements regarding the interests and needs of students are included (MONE, 2018).

*"The learning objectives and explanations in both groups reflect current and effective knowledge of the relevant field, aiming to make connections with practical applications in the educational process.*

*These objectives and boundary-setting descriptions ensure that values, skills and competencies are aligned in a holistic perspective across grade levels and stages of education. This approach encourages students to use higher-order thinking skills, ensures meaningful and lasting learning, and provides a solid foundation for a curriculum that is integrated with prior learning, values, skills, and competencies that are integrated with other disciplines and daily life" (p. 3).*

As can be understood from these statements, the curriculum of the Information Technologies and Software course has the potential to meet the interests and needs of students. The curriculum aims to educate students in the light of science and technology; as an individual who directs students to use metacognitive skills, establishes a connection between what they have learned and life, and transfers what they have learned to other disciplines.

***Does the program you use include innovations in information and technology?***

Information Technologies and Software curriculum includes innovations in information and communication technologies in terms of its content. The course is taught with current ICT. The following statements under the title "competencies" in the curriculum support these ideas (MONE, 2018).

*"Competence in technology refers to the use of knowledge and methods to meet the perceived wants and needs of people. Competence in science and technology includes individuals' understanding of the changes that occur as a result of their activities and the capacity to understand the responsibilities of every citizen." (p. 5).*

***Do the objectives cover the skills in the curriculum?***

Outcomes cover the skills included in the curriculum. Table 3 below gives examples of some of the skills in the program and some of the outcomes that cover these skills (MONE, 2018).

**Table 3** Examples of skills and outcomes

Skill	Outcomes
... developing an understanding of how different systems and individuals communicate with each other, accessing and sharing accurate information by using search methods effectively, communicating and collaborating effectively using communication technologies, and using and managing different social environments effectively.	BT.5.3.2.2. Explains the concept of web browser and uses the browser.
...presenting and visualizing information and ideas in formats that different target audiences can understand (e.g. text, audio, images and numbers), choosing and using the right tools and approaches in information structuring processes, designing products such as audio, video, animation and websites using different technological tools, develop, publish and deliver	BT.6.4.2.2. Uses software to edit audio and video files.
... developing understanding of algorithm design (searching, sorting, etc.); expressing verbally and visually, using variable, assignment, sequential logic, decision structure, loop and function structures to solve problems, choosing and applying the appropriate programming approach to solve problems	BT.6.5.2.14. It produces solutions to complex problems using different programming structures.

***Do the achievements cover the values given in the program?***

The values in the curriculum are mentioned under the title "our values" with the following statements (MONE, 2018).

*"The "root values" in the curriculum are justice, friendship, honesty, self-control, patience, respect, love, responsibility, patriotism, and benevolence. These values will be put into practice in the learning and teaching process, both on their own and together with the sub-values they are related to." (p. 4).*

The root values in these statements are not directly related to the objectives in the program. However, it can be inferred that some of the outcomes examined can be associated with the root values mentioned in the curriculum. For example, in the outcome "BT.6.3.3.3. Lists forum and chat tools.", the teacher can emphasize the root value of "love". A teacher who says the sentence "We can chat with the people we love in a forum environment." will have associated this root value with the outcome. Again, in the outcome "BT.5.3.2.3. Conducts simple research using search engines", the teacher will associate the root value "patriotism" with the outcome by saying the sentence "Children, now we will do research about the emergence of the Turkish flag." Table 4 shows the analysis of the root value and the outcome.

**Table 4** Examples of root value and outcome

Root value	Outcomes
Justice	BT.5.2.1.2. Explains the importance of complying with ethical principles in the process of using and managing information technologies and the Internet.
Friendship	BT.6.4.3.5. He shares the video file he creates collaboratively online.
Integrity	BT.5.2.2.2. He realizes that digital identities may not reflect reality.
Self-review	BT.6.4.2.3. It carries out editing operations on audio files.
Patience	BT.6.5.2.15. It creates an original project that includes all programming structures.
Respect	BT.5.2.1.3. Respects the rights of others online.
Love	BT.6.3.3.3. Lists forum and chat tools.
Responsibility	BT.6.3.2.4. Provides access to different content via EBA.
Patriotism	BT.5.3.2.3. Conducts simple research using search engines.
Charity	BT.5.4.3.6. Shares the presentation he created collaboratively.

## Discussion and discussion

In this study, the 2018 Middle School 5th and 6th grade Information Technologies and Software Curriculum was evaluated within the framework of Demirel's Analytical Program Evaluation Model (DAPDEM). In the evaluation process, the philosophical foundations, content, objectives, process and evaluation dimensions of the curriculum were examined, and the extent to which the curriculum responds to the needs of society and students was questioned.

The 2018 curriculum is based on progressive educational philosophy and constructivist learning theory. The curriculum created in this context envisages that students take an active role in learning processes and are supported by practical applications (MONE, 2018). The use of project-based and problem-solving oriented teaching approaches aims to develop students' critical thinking and problem-solving skills. The curriculum allows students to manage their own learning processes and plays a major role in increasing their motivation to learn. According to the progressivist philosophy of education, education should be structured in a scientific way that will make it possible for the individual to develop and renew his/her own experiences as long as he/she continues to interact with his/her environment according to the changes and developments that constantly exist (Dewey, 1986).

The content has been prepared according to the objectives determined in accordance with the student's development in cognitive and affective areas. The organization of the content from simple to complex, from part to whole makes it easier for students to understand the subjects. However, the lack of activity examples for the achievements in the program is seen as an

important deficiency (MONE, 2018). It can be thought that this situation will cause teachers to face difficulties in planning and implementing their lessons. It is thought that if the curriculum provides sufficient guidance on technology, it will contribute to teachers' effective use of technology.

The curriculum contains statements that guide and guide teachers. The issues to be considered in the implementation of the program and teaching methods are clearly stated. In the evaluation process, the inclusion of methods for measuring student achievements in the program ensures effective monitoring of the process. The existence of continuous process evaluation and feedback mechanisms in the program allows teachers to monitor student development and make corrections by intervening when necessary (MONE, 2018).

DAPDEM implementation was effective in identifying the strengths and weaknesses of the curriculum. The fact that the curriculum is based on constructivist learning theory allows students to take an active role in their own learning processes. The active learning method proposed by Dewey in the constructivist approach is a functional dimension of the student-centered education practice shaped by the democratic education theory (Bakır, 2015). However, the fact that the program does not include examples of activities for the outcomes suggests that teachers will face difficulties in the course implementation process. Compared to similar studies in literature, the findings of this study offer a new and different perspective on the evaluation of the Information Technologies and Software course curriculum.

This study makes an important contribution to the literature by evaluating the Information Technologies and Software curriculum within the framework of DAPDEM.

### **Suggestions**

- Including examples of activities for learning outcomes in curricula will help teachers to be more effective in lesson planning and implementation processes. These activity examples will help students develop their practical skills and increase their interest in the lesson.
- Considering the rapid changes in information and communication technologies, the curriculum should be updated periodically as needed. This will ensure that the curriculum is appropriate to the needs of the age and will enable students to learn up-to-date information.
- Taking the opinions of teachers, students and parents in the curriculum development process can make the curriculum more comprehensive and effective. This feedback will enable the program to overcome the difficulties encountered in implementation and make the curriculum more applicable.
- Studies that will report to curriculum development experts and policy makers about the timeliness of the curriculum should be expanded and the curriculum should be updated in accordance with the requirements of the age.

As a result, this study revealed the strengths of the curriculum and the parts that need to be improved through the evaluation of the Information Technologies and Software course curriculum within the framework of DAPDEM. It is thought that these findings obtained from the research will guide future curriculum development studies.

### **Disclosure statement**

No potential conflict of interest was reported by the author(s).

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