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Hacettepe Üniversitesi Eğitim Fakültesi Dergisi'nin 2025 yılı 40. cilt 4. sayısını heyecanla sizlerle paylaşıyoruz. Bu sayıda emeği geçen baş editör, alan editörü, hakem ve yazarlarımıza alanyazına sağladıkları değerli katkılar için teşekkür ediyorum. Yeni sayımızın ulusal ve uluslararası bağlamda eğitim alanyazınında bilimsel bilgi birikimine katkı sağlayacağını umuyorum.

Bir sonraki sayımıza kadar sevgi ve sağlıkla kalmanızı dilerim.

Prof. Dr. Şefika Şule Erçetin

Dear readers,

We are excitedly sharing the 40th volume (2025), 4th issue of the Hacettepe University Journal of Education. I would like to thank our Editor-in-Chief, field editors, reviewers and authors for their valuable contributions to the literature in this issue. I hope that our new issue will contribute to the scientific knowledge in the educational literature both in national and international contexts.

I wish you to stay with love and health until our next issue.

Prof. Dr. Şefika Şule Erçetin

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Artificial Intelligence as a New Paradigm: A Research on MoNE Artificial Intelligence Applications Course Curriculum

Ali YALÇIN*

Article Information	ABSTRACT
Received: 28.05.2025	The main purpose of this study is to comprehensively examine the 7 th and 8 th grade artificial intelligence applications course curriculum developed by the Ministry of National Education [MoNE] in 2023 in terms of its purpose, content, learning-teaching process (procedures), assessment, and philosophical foundations. The focus of the research is to understand the preparations and strategies of the education system for artificial intelligence by approaching the subject from various angles and to offer constructive suggestions in this sense. For this reason, the method of the study is based on document analysis used in qualitative research. The main data source of the study is the 2023 artificial intelligence applications course curriculum designed by MoNE. The descriptive analysis technique was used to analyse the data. In the evaluation, it was emphasised that the content of the curriculum adopts a comprehensive approach that aims to provide students with cognitive, practical, and social skills. The 2023 MoNE artificial intelligence applications curriculum is partially in line with Tyler's goal-oriented model and Bellon and Handler's curriculum development framework but lacks needs assessment, stakeholder engagement, and implementation planning. While the curriculum integrates life, science, and engineering skills, its interdisciplinary scope remains limited, and affective-psychomotor outcomes—especially emotional engagement in ethical dilemmas—are under-represented. Although cognitive outcomes are dominant, their developmental appropriateness should be ensured. Analysed through the developmental theories of Piaget, Vygotsky, and Erikson, the curriculum supports social interaction and identity formation but warns that the abstract nature of artificial intelligence concepts may lead to cognitive difficulties. The study emphasises that teacher competencies—particularly technological literacy, content knowledge, and digital teaching skills—are important for successful implementation and should be strengthened through intermittent professional development. While the curriculum commendably promotes ethical awareness and lifelong learning, its long-term effectiveness requires iterative revision, stakeholder collaboration, and adaptive strategies to meet the evolving demands of the artificial intelligence-driven education transformation.
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1. INTRODUCTION

The effectiveness of educational investments aimed at supporting national development largely depends on the quality of educational curriculum. These curriculums play a vital role in shaping both educational practices and research, influencing areas ranging from individual behavioural development to teaching and learning processes (Kerkez, Nasırcı, & Kandırmaz, 2023). Educational curriculum are structured frameworks designed to develop individuals' knowledge, skills, and competencies. They encompass objectives, content, instructional strategies, and assessment methods, often tailored to foster specialisation in a particular discipline or professional field (Ministry of National Education [MoNE], 2023; Fitzpatrick et al., 2022). More specifically, the term "curriculum" refers to a systematic plan that organises all educational activities—whether conducted inside or outside the classroom—with the aim of facilitating the acquisition of knowledge and competencies. Within this framework, the curriculum functions as a core component of the educational curriculum, structuring subject-specific content in a coherent and interdisciplinary manner (Fitzpatrick et al., 2022; Kerkez et al., 2023). Therefore, education systems offer an integrated structure within the framework of values, skills, and competencies, taking into account individual differences, supporting meaningful and lasting learning, and taking into account compatibility with daily life. In order for the curricula to be implemented effectively, it is important to realise the goals set for the course in addition to the general goals (Akyıldız, 2020; Halis, 2002; Gelen, 2017; MoNE, 2023). When designing curricula, some basic elements are taken into consideration. The

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information on these four basic elements while designing the curriculum in order to ground the conceptual basis of the subject and to make the subject comprehensible is explained in Figure 1.

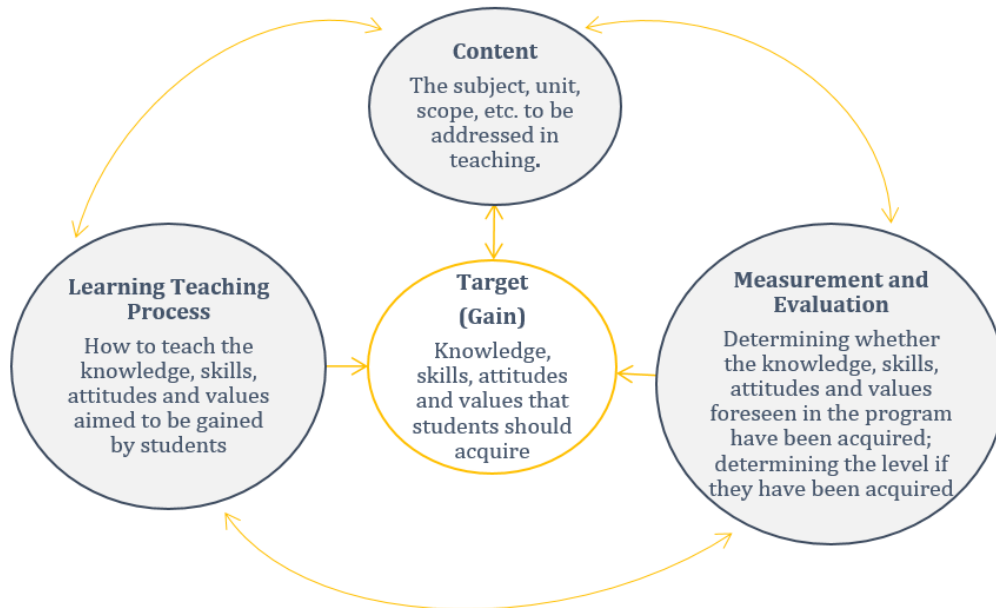


Figure 1. Course Curriculum Content

Curricula include information on how to follow a process to acquire certain knowledge, skills, dispositions, and behaviours and how much they are achieved during this process. These curriculums act as a guide and show what and how individuals will learn and provide a road map for teachers to evaluate learning processes (Dursun et al., 2023). In recent years, attention has been drawn to the structure and content of the 7th and 8th grade artificial intelligence applications course curriculum developed by the Ministry of National Education. To establish the theoretical basis of this study, it is therefore important to present a concise overview of the definition, historical development, application areas, and educational role of artificial intelligence.

Intelligence encompasses a wide range of human capabilities, including the ability to think, reason, learn, mentally visualise concepts and objects, comprehend objective realities, make judgements, draw conclusions, regulate physical movements, accurately perceive emotions, assess situations, and create or innovate (Türk Dil Kurumu [Turkish Language Association], 2023). Artificial intelligence, on the other hand, is a field within science and engineering that seeks to equip computer systems with the capacity to perform specific tasks. It is described as a collection of systems or machines designed to carry out complex functions—such as learning, problem-solving, understanding language, recognising images, and analysing sound—by emulating certain elements of human intelligence, with the added ability to enhance their performance over time through accumulated data (McCarthy & Hayes, 1981; Nilsson, 2012; Oracle, 2023). In fact, considering all these developments, the question arises as to whether this is a new paradigm (Damioli, et al., 2024).

1.1. Literature Review

The concept and study of artificial intelligence has a long history. People have been working on various methods and ideas to develop artificial intelligence for a long time. In 1642, the first mechanical computing machine appeared. In 1837, the first programmable machine was made, and in 1943, the foundations of artificial neural networks were laid. In 1950, the turing test was developed by Alan Turing. In 1956, John McCarthy and his colleagues used the term artificial intelligence for the first time at the Dartmouth Conference. Turkish scientist Cahit Arf published a study on this subject in 1959; the first artificially intelligent robots were built in 1972; an artificial intelligence named Deep Blue became the world chess champion in 1997; personal assistants emerged between 2011 and 2014; and by 2022, the artificial intelligence LaMDA was said to have gained consciousness. These are just some of the developments in the field of artificial intelligence (Altun et al., 2023). As can be understood from this brief history of artificial intelligence, artificial intelligence has been in a continuous process of development and has undergone significant progress with the advancement of technology. In particular, deep learning and powerful information processing capabilities have enabled various complex tasks to be performed more effectively. Nonetheless, it has been emphasised that artificial intelligence also raises certain concerns, particularly in relation to ethical considerations, security risks, and patterns of use (Yalçın, 2023). Ongoing debates persist regarding the future trajectory of artificial intelligence and its potential impacts on individuals and societies (Altun et al., 2023; Wang et al., 2023). Despite these concerns, it is evident that the scope of artificial intelligence applications is steadily expanding. In particular, recent developments suggest that artificial intelligence is poised to make significant contributions within the field of education. Recently, there have been a large number of studies expressing both positive and critical views on the relationship between artificial intelligence and curriculum (Karabatak & Karabatak, 2025; Ullah et al., 2025; Chu & Ashraf, 2025; Ruhsar Kavasoglu, 2025; Kayyali, 2025). In this context, Table 1 presents a summary of the various educational domains in which artificial intelligence technologies can be utilised.

Table 1.

Areas Where Artificial Intelligence can be used in Education

1. Virtual Reality (VR) and Augmented Reality (AR)	Interactive Learning Experiences	Real World Simulations	Increasing the Number of Students
2. Student Evaluation Process	Automatic exam assessment	Performance analysis	Personalized feedback
3. Learning Material Production	Intelligent content creation	Personalized lesson plans	Multimedia resources
4. Classroom Management	Student behaviour analysis	Time management tools	Communication and collaboration platforms
5. Creative Content Production	Game alternative learning	Art and design practices	Storytelling tools
6. Guiding the Student	Personal learning assistants	Career counseling	Motivation improvement methods
7. Trainer Training	Continuous professional development	Use of educational technologies	Teaching with data analysis
8. Learning a Language	Smart language apps	Audio feedback systems	List of cultural content
9. Robotics Training	Applied projects	STEM education	Solution of problem areas
10. Helping the teacher learn	Data analysis and reporting	Curriculum recommendations	Time-saving tools

Artificial intelligence has become integral to daily life and is increasingly influencing education. It helps students apply technology to real-world problems while fostering critical thinking, problem-solving, and communication skills (Roll & Wylie, 2016; Perez, 2023; McArthur, Lewis, & Bishary, 2005). This approach promotes active engagement with technology rather than passive use. Artificial intelligence's role in education is further strengthened by its growing investment value. With capabilities like learning, prediction, and adaptation, artificial intelligence supports personalised learning and assists educators in managing and delivering content effectively (Arslan, 2020; Ertel, 2018; Coşkun & Gülleroğlu, 2021; Korucu, 2022).

Despite the development of various artificial intelligence tools, studies highlight the need for a strategic roadmap to guide their effective use in education, as adoption rates remain limited (Meço & Coştı, 2022; Arslan, 2020; İşler & Kılıç, 2021; Timms, 2016). Discussions continue regarding AI's capacity to assume instructional roles traditionally held by teachers (Garcia, 2019). Globally, China and the U.S. lead in artificial intelligence-related educational investments (Presidency of the Republic of Turkey Digital Transformation Office, 2021). Reflecting these trends, Turkey's Ministry of National Education introduced an artificial intelligence applications course for 7th and 8th grades in 2023 to develop students' AI-related skills and values (MoNE, 2023). Similarly, other countries are increasingly integrating AI into their education systems (Ertel, 2018; Isotani et al., 2019).

In recent years, the use of artificial intelligence in education has expanded rapidly. The technological rivalry between China and the United States has significantly influenced global artificial intelligence trends, placing artificial intelligence at the centre of educational agendas, especially within the European Union (Johnson, 2021). Many countries have responded by developing artificial intelligence-integrated curricula (Annoni et al., 2018), anticipating its transformative impact across sectors, including education (Straus, 2021).

Following global trends, Turkey has initiated strategic efforts to incorporate artificial intelligence into education. Artificial intelligence-supported learning systems and tools for monitoring student progress have been adopted in some schools (Arslan, 2017; Dağ, 2022; İşler & Kılıç, 2021; Yalçın, 2023). In 2023, MoNE introduced an elective artificial intelligence applications course for 7th and 8th grades (MoNE, 2023). The course aims to foster technology-orientated thinking, digital literacy, and future workforce readiness. Its design reflects broader goals shaped by technological, economic, and social factors, focusing on curriculum structure, objectives, content, instructional methods, and assessment strategies (Akdeniz & Özdiñç, 2021; Aruğaslan & Çivril, 2021; CDD, 2021).

The limited number of studies on the artificial intelligence applications course is understandable, as the course has only recently been introduced. However, numerous analyses have been conducted on other curricula (Aslan & Özyurt, 2023; Bozkaya & Aydın, 2023; Ertel, 2018; Kaplan & Demir, 2023; McArthur et al., 2005; Özmantar et al., 2009; Yüksel et al., 2023). This study focuses on artificial intelligence applications in the curriculum due to their current importance, compatibility with the demands of the digital age, and potential to reflect Turkey's educational priorities. It also aims to provide insights and recommendations for curriculum developers and researchers. For a comprehensive evaluation, it has been analysed from the perspective of the qualities identified using the models of various theorists (Ralph W. Tyler, Bellon and Handler, Piaget, Vygotsky, Bloom, and Erikson).

Tyler's model offers a structured and linear framework grounded in clearly defined objectives, the selection of relevant content, the design of appropriate learning experiences, and systematic evaluation. This makes it particularly suitable for examining the curriculum's goal orientation, content structure, and intended learning outcomes (Flinders & Thornton, 2021; Tyler, 1950). Conversely, Bellon and Handler's model emphasises curriculum development as a dynamic, participatory, and process-orientated activity that integrates continuous feedback from various stakeholders, including teachers and learners. Given the

evolving and technology-driven nature of artificial intelligence education, this model provides a relevant framework for assessing how the curriculum accommodates ongoing development, classroom implementation, and real-world applicability. Thus, using both models in tandem enables a holistic evaluation that encompasses both traditional curriculum design principles and modern, flexible, and participatory approaches to curriculum development. In addition, the suitability of the curriculum to student characteristics in the context of developmental theories and teacher competencies was also included in the scope of the study. Constructivist approaches and theories based on developmental psychology suggest determining content and teaching methods appropriate to students' cognitive, affective, and psychomotor developmental levels (Piaget, 1972; Vygotsky, 1978). Considering that the abstract thinking abilities of middle school students are still in the developmental stage, it is important to use structured, age-appropriate, and practical teaching strategies in teaching a complex and abstract subject such as artificial intelligence (Bransford, Brown & Cocking, 2000). However, Bloom's Taxonomy is a widely used framework for categorising educational objectives into three domains: cognitive (knowledge and thinking skills), affective (attitudes and values), and psychomotor (physical and technical skills) (Bloom et al., 1956; Krathwohl, Bloom & Masia, 1964). This taxonomy allows us to systematically assess the depth and breadth of learning outcomes at different levels of complexity. The rationale for employing Bloom's Taxonomy in the analysis of the artificial intelligence applications course curriculum lies in its ability to provide a systematic and multidimensional evaluation of learning outcomes. Particularly in emerging fields such as artificial intelligence, where technical proficiency must be accompanied by ethical sensitivity and practical skill, it is essential to assess whether the curriculum fosters a balanced development across all three domains (Bloom, 1956; Krathwohl et al., 1964; Anderson & Krathwohl, 2001; Ornstein & Hunkins, 2017). In addition, teacher competencies are a critical factor for the effective implementation of an artificial intelligence applications course. In the literature, it is stated that teachers' technology literacy, IT pedagogy competencies, interdisciplinary integration skills, and access to continuous professional development opportunities directly affect the success of such innovative courses (Koehler & Mishra, 2009; Voogt et al., 2013). In Turkey, although various practices and needs analyses have been conducted to improve teachers' digital pedagogical competencies, there is a limited number of studies that systematically address teacher competencies specifically in the context of artificial intelligence education.

1.2. Purpose of the Study

Accordingly, the main purpose of this study is to conduct a comprehensive analysis of the 7th and 8th grade artificial intelligence applications course curriculum developed by the Ministry of National Education and to evaluate the curriculum's objectives, content, teaching methods, assessment and evaluation strategies, and underlying educational philosophy. By looking at this evaluation process from various perspectives, it is to understand the preparations and strategies of the education system on artificial intelligence and to offer constructive suggestions in this context. In addition, it is aimed to evaluate the curriculum in terms of its suitability for developmental characteristics and teacher competencies required for effective implementation. For this purpose, answers to the following questions were sought:

1.2.1. Sub-aims of the research

MoNE 7th and 8th grade artificial intelligence applications course curriculum:

- 1- What are the objectives?
- 2- What is the content?
- 3- What is the learning and teaching process (application processes)?
- 4- What is the measurement and evaluation process?
- 5- What is the philosophy of the curriculum?
- 6- In what ways does the teaching curriculum for the 7th and 8th grade artificial intelligence applications course overlap with and differ from Ralph W. Tyler's goal-based curriculum model?
- 7- In what ways does the teaching curriculum for the 7th and 8th grade artificial intelligence applications course overlap with and differ from Bellon and Handler's curriculum development and evaluation model?
- 8- In line with the views of developmental theorists, to what extent are the content and teaching approaches in the 2023 MoNE middle school 7th and 8th grade artificial intelligence applications course curriculum appropriate in terms of students' developmental characteristics?
- 9- What are the teacher competencies for the effective implementation of the 7th and 8th grade artificial intelligence applications course curriculum and what kind of practices are needed to develop these competencies.
- 10- How are the achievements of the 7th and 8th grade artificial intelligence applications course curriculum of secondary school generally classified according to Benjamin Bloom's taxonomy?

2. METHODOLOGY

2.1. Research Design

This research was designed utilising document analysis, a method commonly employed in qualitative studies. Document analysis involves the systematic examination and evaluation of written sources, including documents, reports, books, or articles. This method is generally used in academic research, literature reviews, written reports, and evaluation of other sources of

information. Document analysis is a useful tool for understanding, analysing, synthesising, and critically interpreting existing knowledge about a particular topic (Bowen, 2009; Bohnsack, 2014; Fitzgerald, 2012).

2.2. Data Collection

The data for this study were gathered through the document analysis method. This method entails the systematic review and interpretation of written, printed, or digital materials as part of the research process. These documents may include books, articles, curriculums, official reports, diaries, letters, newspaper articles, internet content, and other written materials. Document analysis is generally used as a qualitative research method and aims to provide researchers with in-depth information about a particular topic, event, situation, or phenomenon (McCulloch, 2004). The process of collecting the data for this research was carried out in line with the following stages (Yıldırım & Şimşek, 2021):

- a- Formulation of the research questions: The study was guided by questions developed around the key components of educational curriculum evaluation, including the purpose, content, instructional methods, and assessment and evaluation processes.
- b- Accessing/selecting the document: At this stage, it is the middle school 7th and 8th grade artificial intelligence applications course curriculum, which is available on the online site of the Council of Education affiliated with the Ministry of National Education in the teaching curriculums section within the primary education curriculums and was enacted by the Ministry of National Education (MoNE) in 2023.
- c- Collecting documents: The artificial intelligence applications course curriculum was downloaded to the computer as a written document in PDF form from the online site of the Board of Education affiliated with MoNE and then classified.
- d- Document comprehension/classification: The contents of the artificial intelligence applications course curriculum were classified based on the curriculum elements.
- e- Analysing and interpreting the document: The structure and content of the artificial intelligence applications course curriculum were analysed descriptively in line with the curriculum elements of purpose, content, learning-teaching process, and evaluation, and the coded information was presented in tables.

2.3. Data Analysis

The data in this study were analysed using the descriptive analysis technique. Descriptive analysis is a research approach that systematically examines a text or document to identify patterns, themes, concepts, and relationships within the content. This method can be used in both qualitative and quantitative research and has a wide range of applications. In this type of analysis, qualitative data are identified, defined, coded, and placed in the relevant theme or category in line with the determined themes or categories. These processes support the process of making sense by handling qualitative data in a systematic way. In this context, the researcher makes interpretations by determining the data, relationships, and meanings in the themes in light of the questions (Bowen, 2009; Sak et al., 2021). Based on the relevant literature, curriculum elements (goal/objective, content, learning-teaching process, assessment, and evaluation) were used as a framework for the descriptive analysis process in the study. In addition, the philosophical structure of the curriculum was one of the questions included in the study. This thematic framework was developed based on Ralph W. Tyler's goal-orientated curriculum model and Bellon and Handler's curriculum development and evaluation model, both of which are highly valid in both theoretical and practical contexts. Therefore, the analysis process of this research accepted the 7th and 8th grade artificial intelligence applications course curriculum, which came into effect in 2023, as the basic document and analysed it according to the curriculum evaluation elements headings.

In addition to the main curricular elements, the teacher competencies required for effective implementation of the curriculum were analysed in the context of literature on professional development, 21st-century teaching skills, and digital education. The analysis addressed the educational and technological knowledge required for teaching artificial intelligence at the secondary level, identified areas of competence development, and suggested practices. The learning outcomes of the curriculum were classified according to Bloom's Taxonomy into cognitive, affective, and psychomotor domains. This classification provides an overview of the distribution of objectives according to the type of knowledge and level of thinking skills, providing insight into the cognitive demands and teaching orientation of the curriculum. Finally, the findings were interpreted in tables, as they provided more explanatory and general information about the data. The process of descriptive analysis is briefly described in Table 2.

Table 2.

Descriptive Analysis Process

Stage	Descriptive Analysis Process	Application Description
1	Identification of the data set and determination of documents	The 2023 MoNE teaching curriculum was taken as the basic document, and the analysis unit was determined.
2	Creation of a thematic framework (purpose, content, process, measurement-evaluation, philosophy)	Analysis themes were structured based on the literature.
3	Coding of data and placement according to themes	Content was classified under each theme (e.g., "measurement and evaluation").
4	Identification and interpretation of meaningful patterns	The consistency between the content and the objectives has been checked.
5	Systematic presentation of findings (tabulation). Making comments and conclusions as a result.	Descriptive data, tables, and explanatory comments have been provided. The strengths and areas for improvement of the curriculum have been identified.
6	Alignment with Tyler's goal-oriented curriculum model	The general objectives and goals of the curriculum are determined. Content and learning experiences that will enable the achievement of goals are selected
7	Bellon and Handler curriculum development and evaluation model	The social, individual, and academic requirements on which the curriculum is based are analysed as input. Clarification of objectives and goals and evaluation of the measurability of these goals.
8	Analysis of curriculum in terms of developmental appropriateness	In line with the views of developmental theorists, the content and teaching strategies in the AI curriculum were evaluated for 7 th and 8 th grade students' developmental characteristics.
9	Evaluation of teacher competencies and development needs	Necessary teacher competencies for the AI course and practical strategies for their development were analysed.
10	Taxonomic classification of outcomes Learning outcomes were categorized according to Bloom's Taxonomy (cognitive, affective, psychomotor domains).	Grade 7 outcomes emphasized predominantly the cognitive domain, while grade 8 outcomes involved more psychomotor skills. Emotional goals were the least represented and often focused on ethical awareness.

2.4. Research Credibility and Transferability

In order to ensure the credibility and transferability of this research, the 2023 middle school 7th and 8th grade artificial intelligence applications course curriculum, which is accepted as the original document, was accepted as the basic data set. In the analysis process of this curriculum, quotations from the findings determined for the curriculum elements were presented, and both credibility and transferability were tried to be ensured by checking the curriculum -content-code compatibility. The author received support in the analysis process of the research by consulting with a field expert other than herself on the compatibility of curriculum elements, themes, and descriptive explanations. Curriculum evaluation elements were discussed, and an acceptable level was reached. Thus, the internal consistency of the research was confirmed, and credibility and transferability were tried to be increased. The agreement between coders was measured using the reliability formula proposed by Miles and Huberman (1994). Accordingly, the inter-coder reliability was calculated at 89%, which is considered an acceptable level for the purposes of this study.

3. FINDINGS

In this section, analyses were carried out in line with the questions of the research and explanations and comments were given as a result.

1. What are the objectives of the artificial intelligence applications course curriculum? An answer to the question was sought.

Table 3.

Objectives in the Artificial Intelligence Applications Course Curriculum

Themes Emerging in Line with The Objectives	The Objectives aimed to be Achieved in This Curriculum
Basic knowledge of artificial intelligence	- Understanding and grasping artificial intelligence - Knowing and understanding artificial intelligence applications
Problem solving and creative thinking	- Developing problem solving and thinking skills with artificial intelligence applications - Perform reasoning activities - Higher-level learning with web-based artificial intelligence tools - Algorithm design and visualization with artificial intelligence - Applying programming approach to problem solving in artificial intelligence - Using block-based curriculum development environment for problem-solving in artificial intelligence - Designing and managing products - To be innovative, original and consider individual differences
Ethics and responsibility	- Using AI in accordance with ethical principles
Learning and collaboration	- Working collaboratively, being social and sharing what they know - Lifelong learning

When the findings given in Table 3 are examined, the findings defined in the light of the objectives of the artificial intelligence applications course curriculum are presented together under four theme headings. Each of these objectives emphasises specific skills and competencies. This curriculum aims to provide students with an in-depth introduction to the field of artificial intelligence and a wide range of skills and abilities with a focus on applications. The main goal of the curriculum is to provide students with the ability to understand the basic concepts and principles of artificial intelligence. It also aims to help students translate theoretical knowledge into practical applications in order to teach them how to effectively use artificial intelligence technologies to achieve specific goals. In this case, students will not only learn the theoretical aspects of artificial intelligence but can also gain an understanding of real-world applications. This curriculum aims to give students the ability to solve real-world problems by having them use artificial intelligence tools. Thus, it allows students to develop critical thinking and problem-solving skills. Objectives in the theme of problem solving and creative thinking can offer students the opportunity to strengthen their cognitive skills. Accordingly, it supports students to develop a systematic approach to complex problems. The goal of gaining skills in web-based artificial intelligence tools and deep learning can be seen as a remarkable goal in terms of providing students with the opportunity to follow current technological developments and trends.

Problem-solving and creative thinking aim to provide students with practical skills in solving artificial intelligence problems. In this teaching process, it can contribute to students' understanding of the processes of designing and developing artificial intelligence applications. The aim of using block-based programming environments is to provide students with a basic introductory knowledge of programming, aiming for a broader engagement with artificial intelligence problems. The objective of gaining the ability to design and manage products aims to provide students with the skills to successfully manage artificial intelligence projects. Thus, it can allow students to develop the ability to plan and implement their projects effectively.

The aim of innovative thinking, developing original projects, and evaluating individual differences is to provide students with the ability to produce creative and original solutions. The aim of designing and using artificial intelligence applications in accordance with ethical principles is to provide students with the ability to evaluate the effects of technology on society. The goal of gaining the ability to collaborate, develop social skills, and share knowledge also provides students with the ability to work effectively in a team. Finally, the lifelong learning objective aims to provide students with the habit of adapting to the ever-changing nature of technology and constantly updating themselves. This evaluation shows that the curriculum in general adopts a comprehensive approach that aims to provide students with cognitive, practical, and social skills.

The 2023 curriculum for the artificial intelligence applications course developed by the Turkish Ministry of National Education for 7th and 8th grade students identifies "*ethics and responsibility*" as one of its foundational themes. However, for this theme to transcend its role as a theoretical concept and become a transformative component of student learning, it must be supported by robust instructional strategies that cultivate ethical awareness, critical thinking, and responsible digital behavior.

Teaching ethics in the context of artificial intelligence requires learners to engage in reflective practices that confront real-world dilemmas and moral uncertainties. One effective strategy involves the use of ethically charged case scenarios, where students are invited to analyse and discuss controversial artificial intelligence applications—such as surveillance technologies or algorithmic decision-making—in terms of fairness, bias, and privacy. These scenarios prompt learners to develop moral reasoning skills by evaluating complex situations through multiple ethical lenses. In addition to case-based instruction, dialogical methods such as Socratic questioning can be employed to foster deeper ethical inquiry. Through open-ended discussions on topics like whether artificial intelligence can replicate human values or how accountability should be assigned

in autonomous systems, students are encouraged to articulate and challenge their own assumptions, promoting intellectual humility and ethical deliberation (Bell, 2010).

Ethics can also be effectively internalised through experiential learning. Role-playing activities enable students to assume diverse positions—such as artificial intelligence developers, data subjects, or policy makers—allowing them to understand competing interests and the ethical tensions embedded in technological development. Similarly, project-based learning provides a platform for students to design basic artificial intelligence models (e.g., chatbots or recommendation systems) while critically reflecting on data ethics, inclusivity, and user impact throughout the design process. Moreover, introducing simplified ethical frameworks such as the UNESCO Recommendation on the Ethics of Artificial Intelligence or the European Commission's guidelines on Trustworthy artificial intelligence helps students contextualise their learning within global standards. When students analyse these principles and apply them to their own projects or classroom discussions, they begin to connect theoretical ideals with practical application (UNESCO, 2021; European Commission, 2019; Jobin, Ienca & Vayena, 2019).

Another valuable approach involves the use of digital storytelling, in which students create narratives that focus on ethical conflicts in the use of artificial intelligence. This method supports emotional engagement and empathy, enabling students to understand the human consequences of technical decisions. To ensure that ethics is meaningfully integrated and not treated as a supplementary topic, assessment mechanisms must be aligned with these teaching strategies. Open-ended reflective tasks that measure ethical reasoning and value-based decision-making processes, performance-based assessments, and graded rubrics can provide formative insights into students' development in this area (Holmes, Bialik & Fadel, 2019).

2. How is the content presentation in the artificial intelligence applications course curriculum? An answer was sought to the question.

Table 4.

Content in the Artificial Intelligence Applications Course Curriculum

Skills	a-Scientific process skills	Observing, measuring, classifying, recording data, hypothesizing, using data and building models, manipulating and controlling variables, experimenting, solving problems, exploring, questioning, making arguments, developing awareness, taking responsibility and designing products
	b-Life skills	Analytical thinking, problem solving, decision making, original thinking, communication, teamwork, social awareness, environmental awareness
	c-Engineering skills	Science, technology and engineering, interdisciplinary, invention and innovation

When the artificial intelligence applications course curriculum is examined in Table 4, it aims to provide students with scientific process skills. The curriculum aims to strengthen students' ability to observe phenomena accurately and apply the scientific method effectively by developing basic skills. Skills such as data analysis, model building, and experimentation provide students with the ability to analyse and represent information effectively. The curriculum aims to develop awareness, take responsibility, and design products. In addition, in this curriculum, it is important to increase students' capacity to direct scientific processes with a sense of social responsibility.

The artificial intelligence applications course curriculum embraces a holistic approach designed to cultivate skills in analytical thinking, problem-solving, and creative innovation. Life skills within the curriculum aim to equip students with essential competencies such as critical analysis, decision-making, original thought, communication, collaboration, social consciousness, and environmental responsibility. Meanwhile, engineering skills focus on fostering creativity and innovation through an interdisciplinary integration of science, technology, and engineering principles. Although the curriculum emphasises interdisciplinarity, it does not clearly specify how artificial intelligence should be linked to core subjects such as science and mathematics. However, artificial intelligence can be integrated into these fields both conceptually and practically. In mathematics, artificial intelligence relies on topics such as algebra, probability, and statistics, which form the basis of algorithms and data analysis.

In science, artificial intelligence can be used to simulate experiments, analyse data, or model natural phenomena. The use of artificial intelligence tools and project-based learning in science and mathematics courses enables students to apply their theoretical knowledge to real-world problems. This approach supports interdisciplinary learning and prepares students for a digital and data-driven world. Collectively, the curriculum promotes scientific reasoning, effective problem-solving, and inventive capabilities. Furthermore, the integration of analytical thinking and life skills alongside a sense of social responsibility enables students to engage with artificial intelligence applications from a broader perspective, encompassing not only technical expertise but also ethical and societal considerations.

Table 5.

Values

Values	Compassion, empathy, altruism, love, responsibility, environmental awareness, truthfulness, honesty, helpfulness
	Root values (justice, friendship, honesty, self-control, patience, respect, love, responsibility, patriotism, helpfulness)

An analysis of the data presented in Table 5 reveals that the artificial intelligence applications course curriculum places significant emphasis on core values designed to guide students toward ethical and human-centred technology use. These foundational principles serve to direct students throughout the development and application of artificial intelligence. By fostering values such as compassion, empathy, and altruism, the curriculum seeks to enhance students' understanding of AI's impact on society and encourage them to influence these effects positively. Additionally, the inclusion of values like responsibility and environmental consciousness aims to cultivate a strong sense of social accountability in students regarding the creation and utilisation of technological innovations. The curriculum also aims to provide students with an ethical perspective and promote transparency in the use of technology by emphasising values such as integrity, honesty, and benevolence. Imparting these values to students shows that artificial intelligence applications are not only about technical achievement but also about social impact and humanitarian values. This approach aims to make the use of technology more sustainable and socially acceptable by focusing on the ethical and social responsibilities of future artificial intelligence professionals.

Table 6.

Topics

Grade level	Unit Name	Number of gains	Lesson hours
7 th grade	Introduction to artificial intelligence	5	8
	Usage areas and sub-dimensions of artificial intelligence	6	12
	Artificial intelligence and ethics	7	12
	The importance of artificial intelligence	2	4
	Block-based development environments	6	18
	Block-based sample project development	12	18
	Total	38	72
8 th grade	Machine learning and pattern recognition	6	12
	Artificial neural networks	3	6
	Fuzzy logic	2	4
	Developing sample projects in a block-based environment	30	50
	Total	41	72

Table 6 outlines the goal of introducing students to the fundamental concepts of artificial intelligence within the 7th grade artificial intelligence applications course curriculum. Artificial intelligence is defined as a field that aims to emulate human-like intelligence and learning capabilities in computer systems. Furthermore, students are exposed to various real-world applications of artificial intelligence and its diverse subfields, enabling them to comprehend the influence of artificial intelligence on everyday life. The inclusion of the topic on artificial intelligence and ethics allows students to explore the moral considerations associated with artificial intelligence technologies and to critically assess their societal impacts. Additionally, through the use of block-based development platforms, students acquire foundational programming skills, with opportunities to enhance their coding abilities via block-based programming methods.

In the 7th grade artificial intelligence applications course curriculum, the total number of learning outcomes is 38. These outcomes are aimed to be taught in a total of 72 hours. However, considering the characteristics of the age and middle school periods of the students, the 18-hour course period determined for the subject of block-based sample project development may not be enough time to understand the subject. Because this subject is mainly abstract and application-based. While a project is aimed to be successful, a failed situation may also arise during the process. In this case, considering the time spent and the risk of creating or developing a new project based on the processes, some problems may arise in terms of time. In this context, lesson time should be used effectively by paying attention to the age and knowledge of children.

3. How is the learning and teaching process in the artificial intelligence applications course curriculum? An answer was sought to the question.

Table 7.

Learning-Teaching Process in Artificial Intelligence Applications Course Curriculum

Themes	Basic Principles
Student-centered learning	Students are responsible for their own learning. Emphasising active participation and problem-solving processes. Emphasising the principle of learning by doing. Practices that can be transferred to real life. Encouraging students' productivity
Project-based learning	Use of project-orientated approaches. Involvement of students in the product design process. Encouraging collaboration and group work. The importance of argumentation and sharing of ideas
Interactive teaching	Guidance role of the teacher. The use of various methods and techniques in the teaching of the lesson. Interactive use of teacher and course material. Integration of interactive board and simulation tools

Current events and research	Integration of current events into course content.
	Interesting current content to increase interest in the course
	Developing research and inquiry skills

In Table 7, it is seen that the artificial intelligence applications course curriculum is designed in accordance with the principles of constructivist education as understood from the findings regarding the learning and teaching process. The artificial intelligence applications course curriculum has several basic principles to ensure that students have an effective learning experience. At first, the curriculum aims to make students gain the awareness of being individually responsible for their own learning processes. This method can provide students with an active participation and allow them to progress personally in their learning process. Another important principle emphasised by the curriculum involves problem-solving and project-based learning. Students reinforce learning by solving theoretical knowledge through real-world problems and developing practical skills through projects.

In order to support an interactive learning environment, the curriculum emphasises interaction with the teacher and course material. It also envisages a more active participation of students in the learning process by making them use modern instructional technologies. Likewise, the use of simulation tools aims to concretise abstract concepts and provide students with visual experiences. Another feature of this curriculum is that it aims to increase interaction among students by emphasising collaboration and active participation. In particular, it aimed to benefit from different perspectives within the group and to increase information sharing. Furthermore, the focus on problem-based learning offers students the opportunity to internalise knowledge through hands-on experience. Beyond the practical components embedded in the curriculum, it is recommended that educators actively guide students, encouraging their active involvement in the product design process and thereby fostering creativity.

The artificial intelligence applications course curriculum appears to aim at equipping students with skills in argumentation, enhancing productivity, and facilitating the transfer of acquired knowledge to real-life contexts and research activities. Additionally, it is emphasised that instructors should employ a variety of methods and techniques to present diverse learning approaches throughout the course. Particularly, the integration of current events into the curriculum is intended to boost student engagement while promoting deeper understanding through inquiry-based learning. These principles collectively reflect an objective to provide students with a comprehensive and practical education in artificial intelligence. The overall design of the curriculum suggests that the learning and teaching processes within the curriculum should prioritise experiential and application-centred approaches.

4. How is measurement and evaluation in the artificial intelligence applications course curriculum? An answer was sought to the question.

Table 8.

Assessment and Evaluation in the Artificial Intelligence Applications Course Curriculum

Theme	Codes		
Flexible, holistic and process-oriented evaluation approach	Combining theory and practice, applied	Considering individual differences	Considering cognitive, affective and psychomotor skills
	Product design and process evaluation	Process-oriented	Multifocal assessment and evaluation
	Flexibility and diversity	Integrity (outcome, knowledge, skills, values)	

In Table 8, when the measurement and evaluation principles in the artificial intelligence applications course curriculum are examined in general, a theme named flexible, holistic, and process-orientated evaluation approach emerged in line with the principles determined in the curriculum. This curriculum aims to teach students basic theoretical knowledge as well as transfer this knowledge to real learning experiences. It can also allow students to develop their ability to successfully apply their theoretical knowledge to practical problems. It can be said that the assessment and evaluation process of the course has been carefully designed by recognising that students have different learning styles and speeds. Moreover, the artificial intelligence course focuses not only on cognitive skills but also on the development of affective and psychomotor skills.

It was stated that students should be provided with a variety of projects, assignments, and assessment methods to increase their ability to design and develop artificial intelligence applications. These assessments are product- and process-based and comprehensively evaluate students' creativity and problem-solving skills. The fact that the course is not only assessment-orientated but also includes tools to assess students' learning processes provides an important opportunity to monitor students' understanding and development of artificial intelligence concepts. By including a variety of assessment tools, the artificial intelligence course not only focuses on exams but also on projects, group work, and presentations, assessing students' different abilities in a variety of ways. Moreover, implementing flexible learning and assessment approaches tailored to accommodate the diverse needs and learning speeds of students enables the development of evaluation strategies that address a wide range of learner profiles. Ultimately, this course seeks to equip students not only with technical expertise but also to significantly

enhance their comprehension of the broader implications of artificial intelligence applications by integrating ethical considerations and societal impacts alongside the core competencies in the field.

5. What is the philosophical structure of the artificial intelligence applications course curriculum? An answer was sought to the question.

When the artificial intelligence applications course curriculum is examined in detail, it is seen that it has the characteristics of progressivism and reconstructionism as philosophical approaches. In addition, it is seen that it is designed according to the principles of constructivist learning theory as a teaching approach. As a matter of fact, the philosophical approach of the artificial intelligence applications course curriculum is based on an understanding that aims to provide students with scientific process skills, life skills, and engineering skills. The curriculum aims not only for students to learn knowledge but also to develop life skills such as using knowledge, problem-solving, analytical thinking, and communication. It is emphasised that students are responsible for their own learning, and interactive learning is prioritised. Approaches such as argumentation, research, inquiry, project, collaboration, and problem-based learning are adopted. It is stated that an environment where students interact with each other, work together, and share what they have learnt should be supported.

Among the basic principles of the constructivist learning approach, active participation, teacher guidance, structuring of knowledge by the student, applying critical and problem-solving skills, a democratic classroom environment, participatory individuals, active-based teaching, giving importance to social interaction, considering individual differences, gaining experience, group work and student interaction, and students connecting the information they learn with real life are just some of the basic principles. Constructivist learning theory offers an approach that allows students to learn more deeply, to understand knowledge, and to relate knowledge to their lives. This theory enables students to understand and evaluate information in its own context rather than just memorising it. Within this framework, it can be asserted that the 2023 artificial intelligence applications course curriculum was developed based on the principles of the constructivist learning theory, as evidenced by its objectives, content, instructional methods, and assessment practices. Additionally, the curriculum appears to demonstrate coherence and consistency across its evaluation components.

6. In what ways does the curriculum for the 7th and 8th grade artificial intelligence applications course overlap with Ralph W. Tyler's goal-oriented curriculum model, and in what ways does it differ?

6.1. Aims/objectives

Tyler argues that curricula should be based on clear and specific objectives. The objectives stated in the MoNE artificial intelligence curriculum are structured to develop students' cognitive, practical, and social skills and to enable them to understand artificial intelligence technologies. These goals answer Tyler's question, "*What is to be achieved?*" and are clearly defined in terms of specific outcomes. Tyler argues that goals should be expressed in behavioral terms. However, in the artificial intelligence curriculum, most of the objectives are skill- and value-based and not behavioral but rather competency-based and based on complex cognitive processes. In addition, some of the goals of the curriculum (ethical values, social responsibility, lifelong learning) seem to move away from Tyler's concrete and measurable goal approach and shift more towards attitudes and values.

6.2. Content

It is an important principle for Tyler to have content with the necessary learning experiences for students to reach the goals. In the MoNE artificial intelligence curriculum, student-centered, project-based, and interactive learning processes are emphasised. This should include experiences that support students' active participation and solving real-world problems. Tyler's question, "What learning experiences should be offered to achieve these goals?" has been approached appropriately. Tyler states that content should be selected in line with curriculum objectives. In the artificial intelligence curriculum, the content is clearly structured with areas such as introduction to artificial intelligence, block-based programming, ethics, machine learning, and pattern recognition in the 7th and 8th grades. For each grade level, the number of objectives and course hours was determined, and a systematic structure was presented. This is in line with Tyler's principle of "goal-appropriate content selection and organisation." Whereas in Tyler's model the content focused more on transferring knowledge and skills, in this curriculum the content is not limited to cognitive skills but also includes affective areas such as values education (e.g., compassion, empathy, and environmental awareness). In addition, some of the content is based on discovery, inquiry, and research and focuses on students' constructing their own learning. In this way, the content delivery is closer to constructivist philosophy, which is a departure from Tyler's more traditional and behaviourist content-based structure. Whereas in Tyler's model the content focused more on transferring knowledge and skills, in this curriculum the content is not limited to cognitive skills but also includes affective areas such as values education (e.g., compassion, empathy, and environmental awareness). In addition, some of the content is based on discovery, inquiry, and research and focuses on students' constructing their own learning. In this way, the content delivery is closer to constructivist philosophy, which is a departure from Tyler's more traditional and behaviourist content-based structure.

6.3. Educational background/experience

Tyler argues that learning experiences should be organised effectively. The curriculum is organised through themes and units. This organising information enables students to start with the basics and then move on to complex topics. This shows that the curriculum is suitable for a constructivist approach. The student-centred approach overlaps with Tyler's principle of "creating learning experiences in line with student interests and needs." Innovative learning environments such as the inclusion of current events in the curriculum, the use of technology, interaction with simulation tools, etc. represent a more advanced application of Tyler's classical model. The student-teacher relationship is guidance-based, which differs from Tyler's approach, which sees the teacher in a more directive role.

6.4. Evaluation process in the curriculum

Tyler emphasised that assessment processes are important for determining the extent to which students achieve their goals. In the MoNE artificial intelligence curriculum, process- and product-based assessment methods are proposed. The assessment process aims to consider flexibility, diversity, and individual differences, which answers Tyler's question, "How will we know if these goals have been achieved?" The curriculum adopts a flexible and process-orientated approach to assessment. In terms of Tyler's principle of "assessment of objectives," it can be said that this approach allows for the assessment of both cognitive and psychomotor objectives. However, it is important to emphasise the diversity of assessment methods and the impact of measurement tools.

In general, the MoNE artificial intelligence curriculum includes a curriculum evaluation process that is largely in line with Tyler's principles. The philosophy (progressivism and reconstructionism) and constructivist approach of the curriculum show differences as well as overlaps with Tyler's principles for curriculum design. In the implementation process of the curriculum, it is foreseen that regular evaluation and revisions and comparison with modern curriculum evaluation approaches will be better in terms of today's world requirements.

7. In what ways does the teaching curriculum for the 7th and 8th grade artificial intelligence applications course overlap with and differ from Bellon and Handler's curriculum development and evaluation model?

7.1. The aims

In both structures, the curriculum's goals are clear, multidimensional, and learner-centred. In the artificial intelligence curriculum, the objectives are defined in a multifaceted manner with themes such as basic artificial intelligence knowledge, problem solving, ethical responsibility, collaboration, and lifelong learning. In the Bellon and Handler model, it is essential that the objectives are clearly defined with stakeholder participation. In the MoNE curriculum, the objectives, which are determined in line with student needs, the requirements of the age, and technological transformations, are in line with this model. The Bellon and Handler model bases the first step of curriculum development on systematic needs assessment. However, in the MoNE's artificial intelligence course curriculum, needs analysis has not been clearly documented, and stakeholder analysis or field data-based needs assessment has not been reported. This is an area where the model has weak coverage in its first phase.

7.2. Content organisation

The content is structured according to scientific processes, engineering, and life skills, which aligns with the model. The artificial intelligence course offers content based on scientific and social foundations, organised according to grade level (e.g., block-based programming, artificial neural networks, ethics, etc.). This structure is directly in line with Bellon and Handler's principle of organising content in a systematic and developmentally appropriate manner. Bellon and Handler emphasise the participation of teachers, parents, students, and other educational stakeholders in the process. Although the MoNE curriculum includes instructional design, no clear data is provided regarding stakeholder participation. This suggests that the curriculum lacks a democratic and participatory approach.

7.3. Teaching-learning process

Both structures prioritise constructivist, student-centered, collaborative, and active learning in the teaching-learning process. The MoNE curriculum has adopted principles such as project-based learning, interactive teaching, and research based on current events. This corresponds directly to Bellon and Handler's principle of "conducting application processes in an active learning environment under the guidance of teachers."

7.4. Assessment dimension

The curriculum's assessment approach is multidimensional and process-oriented. In the MoNE curriculum, both product and process assessment are defined to cover cognitive, psychomotor, and affective dimensions. This is consistent with Bellon and Handler's view of assessment as a continuous and developmental tool. The model envisages providing support to teachers in the field during the implementation phase and monitoring the implementation. However, the MoNE curriculum does not

systematically provide implementation conditions such as teacher training, implementation guidelines, material support, etc. It is stated that priority in ensuring the effectiveness of measurement and evaluation practices is expected from teachers and education practitioners rather than from the teaching curriculum. This deficiency does not correspond with the application design phase of the model.

The 2023 middle school 7th and 8th grade artificial intelligence applications course curriculum largely overlaps with Bellon and Handler's model. In particular, it is consistent with the contemporary dimensions of the model in terms of goal setting, content organisation, the constructivist basis of learning-teaching processes, and a multifaceted approach to assessment. However, there are shortcomings in terms of the lack of a systematic needs analysis, the absence of guidance on the design of the implementation process, and the limited participation of stakeholders. Additionally, when evaluating the teaching curriculum for the 7th and 8th grade artificial intelligence applications course in middle school according to Bellon and Handler's curriculum evaluation and development model, the following problems may arise: Effective participation of all stakeholders in the process may not always be easy in practice. Continuous evaluation and feedback may create challenges in terms of time and resources. The model's flexible structure may lead to uncertainty in institutions that lack a clear implementation protocol.

8. In line with the views of developmental theorists, to what extent are the content and teaching approaches in the 2023 MoNE Middle School 7th and 8th grade artificial intelligence applications course curriculum appropriate in terms of students' developmental characteristics?

8.1. Evaluation in terms of Jean Piaget's theory of cognitive development

According to Jean Piaget's theory of cognitive development, individuals aged 12 and above generally enter the "abstract operations period." In this period, students tend to acquire high-level mental skills such as hypothesising, understanding abstract concepts, systematic problem solving (Kopec, Pileggi, Ungar & Shetty, 2016), and developing cognitive flexibility (Piaget, 1972). However, Piaget (1952) and subsequent studies (Inhelder & Piaget, 1958; Woolfolk, 2021) emphasise that this transition does not occur at the same age and at the same level in every individual, and that many students still carry the characteristics of the "concrete operations" period in this age range. In this context, content such as block-based programming, algorithmic thinking, modelling, and data-driven inference in the 2023 artificial intelligence applications course curriculum may create conceptual difficulties for students whose cognitive development has not yet reached this level, as it requires high levels of abstraction and causal relationship skills. In particular, topics such as artificial neural networks, machine learning, and fuzzy logic are challenging for middle school students with high levels of abstraction and underdeveloped abstract processing skills in terms of cognitive development. Therefore, in order for students in this age group to be able to make sense of these concepts effectively, concretising tools (visuals, simulations, practical examples) should be included in the teaching process. Otherwise, cognitive load may increase in students, which may lead to both loss of motivation and superficial learning.

8.2. Evaluation in terms of Lev Vygotsky's socio-cultural development theory

The artificial intelligence applications course curriculum is designed on the basis of constructivist learning theory and envisages the adoption of student-centered, project- and inquiry-based teaching methods. Practices such as cooperative learning, ethical scenario discussions, Socratic questioning, and project development processes overlap with the principles of social interaction and learning through language emphasised in Vygotsky's socio-cultural learning theory (Vygotsky, 1978; Bransford et al., 2000). Especially in the context of the zone of proximal development (ZPD), such teaching strategies support students' cognitive development.

The block-based coding environments proposed in the program (e.g., Scratch, Blockly) make developmental sense as tools that facilitate students' transition from concrete to abstract processing levels. However, the fact that artificial intelligence concepts will be experienced for the first time by most students may make it difficult to understand, especially abstract and technical content. Therefore, supporting the teaching process with visual materials, simulations, and application-based activities will facilitate learning by reducing cognitive load. In addition, it is important to simplify abstract concepts in an age-appropriate manner and structure them at an earlier age in order to meet the readiness level of students. In this context, in order to make the content more educationally functional, it is necessary to use stepped narratives, to introduce differentiated teaching strategies, and to increase the time allocated to the practices. Otherwise, students may experience cognitive difficulties, and their motivation may decrease.

On the other hand, the effective implementation of interactive and student-centered methods in the classroom depends on teachers' digital education competencies, time management skills, and access to instructional materials. It may not be realistic to assume that all teachers can apply these methods in accordance with the theoretical foundations. Therefore, it is an important requirement to provide professional development opportunities related to artificial intelligence education in teacher training processes.

8. 3. Evaluation in terms of Erik Erikson's psychosocial development theory

According to Erikson's psychosocial development theory, individuals in middle school are in the stage of "identity versus role confusion", which is a critical stage of identity development (Erikson, 1968). In this period, individuals need to establish contact with social roles, develop belonging, and assume meaningful responsibilities in the process of structuring their personal identities. In the 2023 artificial intelligence applications course curriculum, components such as ethics, responsibility, empathy, social awareness, and collaborative project management support these developmental needs of students. Opportunities to make individual contributions and create original products, especially through group work, contribute to the development of self-awareness and self-efficacy perception. However, the inclusion of ethical values in the curriculum alone is not enough; these values need to be integrated into practice-based learning environments in order to be meaningfully internalised by students. Otherwise, ethical gains may remain only at the superficial knowledge level, and students' process of developing value-based behaviours may be limited. Therefore, concretising ethical principles through project-based tasks, case studies, and discussion-based activities is an educational imperative for students to develop moral reasoning and social responsibility skills.

9. What are the teacher competencies for the effective implementation of the 7th and 8th grade artificial intelligence applications course curriculum, and what kind of practices are needed to develop these competencies?

9.1. Teacher competencies

The 21st-century digital transformation process has forced education systems to adapt to artificial intelligence based learning and teaching approaches. In this context, the artificial intelligence applications course developed for 7th and 8th grades in Turkey aims to develop students' skills such as algorithmic thinking, data literacy, and ethical awareness. However, the effective realisation of these goals in the field depends primarily on the field competencies, pedagogical equipment, and digital skills of the teachers who will teach this course (Dede, 2010; Holmes et al., 2021).

The competencies that teachers should have in order to effectively conduct the "*artificial intelligence applications*" course in 7th and 8th grades of secondary school can be categorised under three main headings: technological knowledge, pedagogical competence, and digital pedagogy skills. First of all, teachers should be able to comprehend the basic functioning of artificial intelligence systems. In this context, they are expected to be familiar with basic concepts such as machine learning, data analytics, and algorithms; they are also expected to understand hardware tools such as sensors, microcontrollers (e.g., Arduino), and the software dimension of these systems. Knowledge and skills on how to integrate web-based artificial intelligence tools (e.g., ChatGPT, Teachable Machine, Scratch, artificial intelligence plugins) into the educational environment are an important part of this technological competence (MoNE, 2024).

However, it is important for teachers to be able to present this technical information with pedagogical methods appropriate to the age level. They should be able to convey artificial intelligence topics to students with contemporary teaching approaches such as gamification and project-based learning; at the same time, they should be able to raise ethical awareness (privacy, justice, discrimination, etc.) regarding the social effects of using artificial intelligence. Considering the interdisciplinary nature of artificial intelligence, teachers are expected to have a holistic perspective that can relate these topics to courses such as mathematics, science, and social studies.

Finally, digital pedagogical competencies are also very important. Teachers need to be able to effectively use digital learning platforms such as the Education Information Network (Eğitim Bilişim Ağı), produce digital content, and utilise learning management systems. In addition, being able to analyse student data and plan the teaching process according to this data stands out as an important skill in personalising learning.

9. 2. Recommendations and examples for the implementation of the competencies

MoNE has provided various applications and resources to improve teachers' artificial intelligence literacy in order to effectively conduct the "artificial intelligence applications" course at the secondary school level. In this context, the artificial intelligence in the education course, organised in December 2024 through MoNE's Teacher Information Network (Öğretmen Bilişim Ağı), aimed to raise teachers' awareness about the role of artificial intelligence in education, plan lessons with digital tools, and develop artificial intelligence based projects. In addition, some exams were held at the end of this practice-based course.

In addition, in the teacher's handbook published by the General Directorate of Innovation and Educational Technologies (GDIE) under the slogan of artificial intelligence tools in education, it is seen that web-based artificial intelligence tools cover topics related to different subject areas (Turkish, mathematics, science, etc.), such as students with special needs. This book has been prepared to guide teachers to realise the integration of artificial intelligence technology within the framework of education and cultural values. Digital skills development seminars focusing on topics such as safe internet, data analysis and digital ethics are also organised to increase teachers' digital literacy levels (MoNE, 2025).

10. How are the achievements of the 7th and 8th grade artificial intelligence applications course curriculum of secondary school generally classified according to Benjamin Bloom's taxonomy?

The objectives of the artificial intelligence applications course curriculum aim to provide an introduction to artificial intelligence for secondary school students in Turkey. When analysed through the lens of Benjamin Bloom's Taxonomy, the curriculum shows a clear emphasis on cognitive objectives and a more limited attention to affective and psychomotor domains. In addition, while the 7th grade outcomes in the artificial intelligence applications course curriculum are mostly related to the cognitive domain steps, the 8th grade outcome is the weight of the psychomotor domain step. It was determined that the achievements of the affective domain step were generally within the scope of *"ethics, recognising, and indicating the importance."* This imbalance reflects both strengths and important limitations in the design of the curriculum. In Table 9, a general taxonomic classification is presented in proportional terms.

Table 9.

General Proportional Distribution of Achievements According to Bloom Taxonomy

Domain	Number of Outcomes	Percentage (%)
Cognitive	45	57%
Psychomotor	25	32%
Affective	9	11%
	79	100

Most of the learning outcomes seem to belong to the cognitive domain. Students are expected to define concepts (e.g., artificial intelligence, machine learning, and neural networks), explain processes, compare systems, and understand technical distinctions. These tasks are primarily aligned with the lower and middle levels of Bloom's cognitive hierarchy, i.e., remembering, understanding, and applying. The following examples can be given regarding the cognitive outcomes in the artificial intelligence applications course curriculum: "Defines artificial intelligence" (an acquisition at the knowledge level), and "Explains the historical development of artificial intelligence" (an outcome at the comprehension level), "Explains the results of different artificial intelligence applications through examples" (a learning outcome at the analysis level) (MoNE, 2023, p. 10). Some outcomes take analytical thinking further, such as explaining the implications of the artificial intelligence applications or assessing ethical violations related to data. However, the curriculum lacks consistent engagement with the higher levels of cognitive learning: synthesis and evaluation. Students are rarely asked to design original solutions to the artificial intelligence-related problems, critique the artificial intelligence technologies from multiple perspectives, or evaluate the societal trade-offs inherent in the artificial intelligence development. As a result, the cognitive outcomes offered by the curriculum are largely descriptive and explanatory rather than critical or transformative.

The curriculum is moderately strong in the psychomotor domain. A large number of objectives in the unit on the use of block-based development environments are related to this domain. Students are required to engage in hands-on activities such as creating speech and image processing projects, testing real-time applications, and debugging code. It is possible to give the following examples related to psychomotor outcomes: "Provides access to online block-based environments" (achievement related to application level), "Sets up an offline block-based development environment" (application level). These activities support digital literacy and are aligned with psychomotor objectives such as manipulating tools, applying procedures, and improving results. However, these tasks tend to focus on procedural repetition rather than innovation or invention. There is little emphasis on creative problem-solving, interdisciplinary prototyping, or adapting tools for new and unique challenges. To strengthen the psychomotor dimension, students should be reinforced with hands-on training.

The emotional domain is the least emphasised in the curriculum but is briefly addressed in the outcomes and descriptions on empathy, ethics, and social responsibility. An example from the program related to the affective domain can be given as follows: "Recognises the limitations of artificial intelligence" (It is ensured that emotions specific to humans (compassion, empathy, altruism, love, etc.) are not present in artificial intelligence, and the possible consequences of this are discussed). Some outcomes ask students to reflect on the absence of human emotions in the artificial intelligence or to consider how the artificial intelligence can support vulnerable populations. But these emotional goals are often framed as passive "awareness" or recognition, not active internalisation or value formation. There is a conspicuous lack of gains for students to engage deeply in discussions about ethical dilemmas, moral complexity, or the emotional consequences of the artificial intelligence-driven decisions. A richer emotional dimension could empower students to consider not only how the artificial intelligence works but also why it matters and for whom it matters.

The overall structure of the curriculum is that the outcomes reflect a cognitively oriented paradigm. While it includes modern tools and technologies, it frames artificial intelligence largely as a set of skills and concepts to be learned, rather than as a field of inquiry requiring ethical judgment, cultural sensitivity, and emotional intelligence. This orientation risks producing technically competent but ethically passive artificial intelligence users. A more progressive curriculum would intertwine cognitive, affective, and psychomotor learning in a more holistic way, enabling students to develop both the ability to use the artificial intelligence and to think about its impacts in a more applied way.

Moreover, it can be argued that the curriculum does not adequately represent interdisciplinary approaches. Artificial intelligence is not only a technical field; it is also relevant to disciplines such as social, political, artistic, and psychological. Including perspectives from the humanities and social sciences, such as literature, philosophy, history, or sociology, can enrich the curriculum and provide a more comprehensive understanding of artificial intelligence's role in shaping the future of

humanity. Care should be taken in the distribution of these outcomes; otherwise, the curriculum risks producing students who understand the artificial intelligence in isolation, as a machine that does not act outside of certain codes, disconnected from broader ethical and societal questions.

In conclusion, while the artificial intelligence applications curriculum provides a commendable foundation in terms of cognitive outcomes, it lacks a balanced integration of affective and psychomotor elements, especially at the higher levels. While it is designed to prepare students for successful entry into the world of artificial intelligence, it may have some shortcomings in cultivating the thoughtful, critical, and ethically grounded practitioners that the future will need. This will depend entirely on the capacity of both the teachers who implement the curriculum and the students. To truly empower the next generation, the curriculum needs to evolve into a more holistic, interdisciplinary, and reflective curriculum that teaches not how artificial intelligence works, but how it should be used, for whom, and for what purpose. It may also be better if the curriculum is taught in a spiral approach from primary school onwards.

4. RESULTS, DISCUSSION, AND RECOMMENDATIONS

The emergence of artificial intelligence as an educational paradigm reflects a profound epistemological and technological shift in curriculum design and delivery. While the MoNE curriculum for artificial intelligence applications has an innovative intention, it is important to constructively and critically evaluate it within existing theoretical frameworks and empirical approaches to ensure its effectiveness and continuity.

A comprehensive evaluation of the objectives, content, instructional strategies, and assessment methods of the Artificial Intelligence Applications course curriculum reveals that it adopts a holistic approach aimed at equipping students with cognitive, practical, and social competencies, as reflected in the curriculum's overall structure. The primary objective of the curriculum is to enable students to grasp fundamental concepts within the field of artificial intelligence. This foundational knowledge is intended to prepare students for further engagement with more advanced topics in the discipline. A notable finding of this study is that the 2023 artificial intelligence applications curriculum emphasises the application of theoretical knowledge through practical implementation, aiming to develop students' proficiency in effectively utilising artificial intelligence technologies. This approach not only teaches students theoretical knowledge but also provides them with the opportunity to understand and experience real-life applications. The findings of the study, based on a multidimensional curriculum analysis, reveal that the 2023 MoNE artificial intelligence applications course curriculum for 7th and 8th grades is largely aligned with progressive, constructivist, and competency-based educational paradigms. The curriculum, when analysed through Tyler's goal-based model, Bellon and Handler's curriculum development model, and major developmental theories (Piaget, Vygotsky, and Erikson), exhibits both significant alignment and critical divergences.

The artificial intelligence applications curriculum places a strong emphasis on the cognitive domain while giving limited attention to the affective and psychomotor domains. Although this supports students' acquisition of knowledge, it restricts the development of critical thinking, ethical awareness, and creative application skills. The concentration of cognitive outcomes at the lower and middle levels indicates insufficient engagement with higher-order thinking. Adopting a more balanced, interdisciplinary, and value-oriented approach would help students not only to use artificial intelligence effectively but also to interpret and guide its role in society more thoughtfully.

As a result of comparison with Bellon and Handler's model, the curriculum aligns well with principles of systematic content development, constructivist pedagogy, and multi-faceted assessment. Nonetheless, notable gaps exist in the areas of stakeholder engagement, needs analysis, and implementation design, marking a divergence from Bellon and Handler's holistic, participatory framework. When the 7th and 8th grade artificial intelligence applications course curriculum is evaluated according to developmental theories, based on Piaget's theory, it points to potential cognitive overload for students in the early stages of abstract reasoning, especially when they encounter technical artificial intelligence concepts such as neural networks and fuzzy logic. Vygotsky's ZPD framework supports the curriculum's constructivist and collaborative learning orientation but also highlights the need for differentiated instruction and sufficient scaffolding. Erikson's psychosocial theory confirms the curriculum's potential to support identity formation through ethically engaged, socially meaningful learning tasks. Effective implementation of the curriculum depends on teachers' technological, pedagogical, and digital literacy. Existing professional development initiatives (e.g., MoNE's artificial intelligence literacy courses, GDIET's teacher guidebooks) offer a promising infrastructure, but there is a lack of comprehensive and controlled ongoing implementation in all contexts.

The 2023 artificial intelligence applications curriculum aims to equip students with practical competencies such as algorithmic thinking, programming, and the use of web-based artificial intelligence tools. These skills are designed to prepare students for technological developments and support adaptability in a competitive digital environment. In addition to technical proficiency, the curriculum emphasises creative problem-solving and ethical awareness by encouraging the development of original projects and the critical evaluation of artificial intelligence's societal impacts. This approach supports not only knowledge acquisition but also the cultivation of responsible and innovative thinking (Mohamed & Lamia, 2018; Kara, 2016). Moreover, effective alignment between goals, content, and instructional strategies is essential for achieving intended learning outcomes. However, as highlighted in the literature, curriculum design and implementation are distinct phases, and the effectiveness of such curriculum can only be fully assessed through long-term application and evaluation (Ataş & Bümen, 2023).

Tyler's linear and behaviorist model offers limited utility in addressing the complex, value-oriented goals of artificial intelligence education. While the MoNE curriculum reflects his structural principles—such as clear objectives and content alignment—it goes beyond them by integrating ethical, emotional, and lifelong learning components aligned with humanistic paradigms (Pinar et al., 2004; Beetham & Sharpe, 2013). The curriculum also aligns with Bellon and Handler's outcome-based and constructivist framework. However, the lack of systematic needs assessment and limited stakeholder input reduce its contextual relevance, while gaps in teacher support and implementation tools highlight the challenge of translating curriculum into practice (Fullan, 2007; Zawacki-Richter et al., 2019). From a developmental perspective, Piaget's theory cautions against introducing highly abstract AI concepts without adequate scaffolding. Visual tools, gamified content, and experiential learning can support comprehension (Sweller et al., 2011). Vygotsky's emphasis on guided social interaction and Erikson's focus on identity formation affirm the curriculum's potential, provided instruction is active and student-centered (Narvaez, 2006).

A key finding of this study is the central role of teacher competencies in the effective implementation of the artificial intelligence curriculum. While recent digital transformation initiatives have expanded professional development opportunities, disparities in teachers' digital pedagogical skills remain a significant barrier. As emphasised in the literature, artificial intelligence education requires not only technical expertise but also a deep understanding of its ethical, cultural, and societal implications (Holmes et al., 2021; Floridi et al., 2018). Therefore, sustaining the MoNE curriculum necessitates a multi-tiered professional development model that fosters continuous learning, interdisciplinary collaboration, and alignment with teacher education programs.

The curriculum should familiarise students with the social and cultural dimensions of artificial intelligence, rather than a technical education, and develop a holistic and responsible perspective. This is particularly important given the curriculum's emphasis on lifelong learning, as it suggests the ability to adapt to rapid technological change. By integrating cognitive, practical, and social competencies, the curriculum aims to provide a balanced education that prepares students for both digital and real-world challenges. However, it is important to note that curriculum outcomes should be designed to develop students' cognitive, affective, and psychomotor skills through meaningful, real-life learning experiences (Alak, 2011; Atik & Aykaç, 2019; Erdem & Demirel, 2002; Adom, Yeboah & Ankrah, 2016; Von Glasersfeld, 2012). The 2023 MoNE middle school 7th and 8th grade artificial intelligence applications curriculum is an important step towards adapting education to the digital age. Its alignment with constructivist, humanistic, and developmental frameworks emphasises its pedagogical potential. However, its long-term success will depend on closing implementation gaps, enriching teachers' competencies, and institutionalising continuous feedback mechanisms based on empirical evaluation. As artificial intelligence reshapes both the epistemic and ethical boundaries of school education, curriculum design should be flexible, inclusive, and critically reflective.

4.1. Recommendations

Based on the findings of this study, several recommendations can be offered: First of all, it is crucial to strengthen the competencies of teachers, as the successful implementation of the curriculum is highly dependent on the technological, field education, and ethical competencies of educators. Teachers should not only be equipped with basic knowledge of AI concepts such as algorithmic thinking, machine learning, and data literacy, but also have the ability to translate these complex topics into age-appropriate and educationally sound learning experiences. They should also have strong digital education skills to personalise teaching, including the effective use of artificial intelligence tools, online learning platforms, and student data.

To achieve this, a comprehensive and ongoing professional development curriculum must be created. These should go beyond one-time trainings and be designed as multi-layered learning experiences that include mentoring, interdisciplinary collaboration, and partnerships between universities and schools. Teachers should also be supported in developing their capacity to engage students with the ethical, cultural, and societal implications of artificial intelligence, which are critical to fostering responsible and informed digital citizens. Given that the curriculum emphasises the transformation of theoretical knowledge into practical skills, it is crucial to integrate experiential and project-based learning approaches into classroom practice. Activities such as real-world case studies, simulations, and student-led projects can help learners contextualise their knowledge, enhance their problem-solving abilities, and foster innovation. These experiences should also include ethical dimensions, allowing students to critically evaluate issues such as privacy, bias, and the social impact of artificial intelligence technologies.

Since the curriculum was introduced for the first time in 2023, collecting systematic feedback from teachers and students will be vital to evaluating its real-world applicability. Pilot applications and experimental studies in selected schools can provide valuable information for improving both content and educational experiences. Such data-driven assessments will enable policymakers and curriculum developers to make informed revisions that reflect classroom realities. Finally, in line with the principle of lifelong learning, the curriculum should develop students' ability to adapt to technological change. The content should be periodically updated to reflect current developments in the field of artificial intelligence and remain consistent with emerging global education priorities. This dynamic approach will not only keep the curriculum up-to-date but also foster habits of self-renewal and critical inquiry in students—qualities essential for shaping an artificial intelligence-driven future.

4.2. Limitations

This study is limited because it is based on a document analysis of the 2023 artificial intelligence applications curriculum developed by the Ministry of National Education. Since it does not include empirical data such as classroom observations, teacher practices, or student feedback, the findings are based solely on the content and structure of the written curriculum. Therefore, conclusions regarding the implementation and effectiveness of the curriculum in real educational settings are speculative. Additionally, since the curriculum is newly introduced and still in development, the analysis reflects only the first version.

Research and Publication Ethics Statement

Ethics committee approval is not required for this study.

Contribution Rates of Authors to the Article

This article is single authored.

Statement of Interest

There is no conflict of interest.

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The Role of Family in Primary School Students' Acquisition of Reading Habits*

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Article Information	ABSTRACT
<i>Received:</i> 26.05.2025	The present study aims to investigate the role of the family in shaping children's reading habits. In this context, the research method was determined to be correlational research. The participants of the study consisted of 252 4th grade students and 252 parents. The data collection tools of the study are "Reading habit scale" and "Scale of family competence in creating reading culture". According to the normality test results, the data were analyzed with parametric tests, and the SPSS 25.0 tool was used in the analysis process. In line with the analysis, it was seen that there was a significant positive relationship between children's reading habits and family competence in creating a reading culture. In addition, it was concluded that the family's modeling and participation in reading are more effective in children's acquisition of reading habits than only having positive attitudes and beliefs toward reading.
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1. INTRODUCTION

Reading is one of the most basic skills that a person should acquire. For this purpose, reading is one of the first skills that educational institutions aim to develop academically. Reading skill is defined as the process of communicating effectively with the text, in other words, with the author of the text, and creating meaning by using one's prior knowledge in line with a certain purpose and method (Akyol, 2011). Based on this definition, reading is a very effective method in terms of learning and a basic skill to be successful academically in fields such as mathematics, science, and social studies (Akyol, 2008; Aksaçoğlu & Yılmaz, 2007). Therefore, children must acquire this skill at an early age and maintain it at later ages. For this, children should be given the habit of reading.

Reading habit can be defined as the perception of reading as a necessity by the individual and the regular, conscious, and continuous practice of reading (Bayram, 1990; Şahin, 2012). Building on this definition, İnan (2005) emphasizes that individuals should transform reading into a regular activity to achieve their academic, personal, and social goals after acquiring basic literacy skills. In light of these points, it can be said that the defining elements of reading habits are the concepts of continuity and regularity. Indeed, Yılmaz and Ertem (2020) state that reading can become a habit when it is done regularly and continuously. In line with this perspective, Dökmen (1994) outlined several criteria for defining reading habits, including (i) the types of publications read, (ii) the frequency of reading, (iii) the duration of uninterrupted reading sessions, (iv) the temporal intervals between reading (e.g., annually, monthly, or daily), (v) how and where reading materials are acquired and read, (vi) the use of specific reading strategies, and (vii) whether reading is accompanied by other activities, such as listening to music. These criteria lead to the conclusion that a key variable in identifying reading habits is the reader's chosen genre, method of book acquisition, location, timing, and frequency of reading, as well as whether or not the reader consciously employs techniques when reading. However, it is helpful to clarify why it is crucial to develop reading habits.

According to Aksaçoğlu and Yılmaz (2007), reading habits contribute to various aspects of personal development by supporting continuous mental growth, enhancing proficiency in the mother tongue, expanding vocabulary, improving academic

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performance, and fostering more effective communication skills. Research has indicated that children's academic achievement is positively impacted by reading habits (Aksoy, 2018; Yıldız & Akyol, 2011). Even though reading helps children develop many abilities and is beneficial to them in many ways, it is important to consider how much of a habit we as a society have made of reading. Studies conducted in Türkiye on reading habits have found that most individuals read only textbooks, while those who read other types of books typically read between one and five books per year, or less than one book per month (Library and Publication Directorate, 2017; Reading Culture Promotion Platform [OKUYAY], 2019). A notable reason participants cited for not reading was simply that they did not enjoy it. By comparison, studies from developed countries report higher average annual reading rates for example, 17 books in France and 12 in the United States (World Population Review, 2022). These findings raise important questions about whether the limited reading habits observed in Türkiye stem from a lack of social encouragement and insufficient early development of this behavior. Considering these findings, it becomes essential to prioritize the family as the primary environment in which reading habits can be nurtured. Indeed, existing research underscores the pivotal role of the family in fostering reading habits among children (Nag et al., 2024; Niklas & Schneider, 2017).

The family is the first institution where children receive education and plays an important role in their development process. Language development is an area where the family has a significant influence. Indeed, studies show that providing children with rich language input and creating interactive environments during their early years contributes significantly to their language development (Huttenlocher et al., 1991; Malmeier & Assadi, 2013; Breeze, & Halbach, 2024; Dahl-Leonard, 2025). To deliver the kind of rich language exposure outlined earlier, it is stated that families should provide their children with access to books and sing songs, lullabies, and nursery rhymes (Saracho, 2002). It is suggested that these practices alone are not sufficient and that families should also engage in activities that will help them develop the habit of reading, which will provide their children with language input throughout their lives (Taylor, 1998; Baker, 2013; Kuo, 2016). Reading books with their children, discussing the books they read, or chatting about them are some examples of such activities. Indeed, when looking at the literature, it is clear that for families to instill a habit of reading in their children, their attitudes and beliefs toward reading, their participation in their children's reading process, and their role modeling are key factors (Cipielewski & Stanovich, 1992; Mullis & Martin, 2015; McElvany & Artelt, 2009; Mora-Figueroa et al., 2016; Stangeland et al., 2023). This parental involvement highlights the role of the family in creating internal motivation for children to reading books. Research emphasizes that internal motivation must be supported for reading to become a habit (Yıldız ve Akyol, 2011; Yusof, 2010).

Overall, reading habits are a fundamental skill that develops at an early age, and individuals who have developed this habit tend to be more successful in academic, cognitive, and language areas (Kana, 2014; Aygün, 2021). The benefits of reading habits are not limited to childhood; it is also a fact that they positively affect individuals' cognitive functions and well-being in adulthood (Sun et al., 2024). Therefore, it is undeniable that children should develop reading habits at an early age and that the family's role in this process cannot be overlooked. A significant portion of the literature on reading habits targets educators and teacher candidates (Kılıç et al., 2023; Öztürk & Kardaş, 2023; Yılmaz, 2006) or offers strategies for developing reading habits (Karatay, Külah, & Kara, 2020; Avcı, Yüksel, & Akıncı, 2010). However, there are limited studies that comprehensively examine the connection between children's reading habits and parents' ability to promote a culture of reading (Çakmak & Yılmaz, 2009; Gökçe et al., 2013; Yıldız, 2016; Yusof, 2010). Building on prior research, the present study aims to reveal the relationship between families' competencies in fostering a reading culture and children's reading habits, thereby addressing a significant gap in the literature. Answers to the following queries were requested for this purpose:

1. What is the level of family competence in the formation of reading culture?
 - a. Does family competence in the formation of reading culture differ according to gender?
 - b. Does family competence in the formation of reading culture differ according to the educational level of the mother and father?
2. What is the reading habits level of 4th grade students?
 - a. Do 4th-grade students' reading habits differ according to gender?
3. Is there a relationship between the reading habits of 4th-grade students and their parents' family competence in the formation of reading culture?
4. What is the level of explanation of parents' beliefs and attitudes towards reading, their modeling of reading and their participation in reading activities on their children's reading habits?

2. METHODOLOGY

The purpose of this study was to investigate the association between fourth-grade primary school students' reading habits and their parent's ability to foster a reading culture. The current study's methodology, a correlational model, was chosen for this reason. Without using any kind of intervention, correlational studies are a technique for analyzing the correlations between variables (Büyüköztürk, 2007). The reading habits, and parental competence in creating a reading culture of fourth-graders were all assessed in this study in the absence of any outside intervention. The correlation between these variables was also looked at.

2.1. Participants

In a primary school located in Istanbul's Bağcılar District, 252 fourth-grade pupils and their parents participated in the study during the 2023–2024 school year. Bağcılar district is one of the most populous districts of Istanbul and the majority of the population living in the region has a low-middle income level (Dikçınar Sel & Yazgan, 2023). The region has a population of 713,594 and is served by 28 libraries. Convenience sampling, one of the purposive sampling techniques, was chosen for this investigation. Yıldırım & Şimşek (2016) state that the convenience sampling method enables the research to be completed expeditiously and practically. The sample is readily accessible to the researcher, which is the primary justification for using this approach. Table 1 displays basic statistical information about the participants' demographics.

Table 1.

Demographic Information about the Participants

		Frequency	Percentage
Student Gender	Girl	119	47,2
	Boy	133	52,8
Parent Gender	Woman	219	86,9
	Man	33	13,1
Mother Graduation	Primary school	107	42,5
	Secondary School	51	20,2
	High School	73	29,0
	Bachelor's Degree and Above	21	8,3
Father Graduation	Primary school	79	31,3
	Secondary School	62	24,6
	High School	84	33,3
	Bachelor's Degree and Above	27	10,7

According to the data in Table 1, 119 female students (47.2%) and 133 male students (52.8%) participated in the study. Likewise, 219 of the parents who participated in the study were female (86.9%), and, 33 were male (13.1%). When the education levels of the students' mothers were examined, 107 of them were primary school graduates (42.5%), 51 were middle school graduates (20.2%), 73 were high school graduates (20.0%), and 21 were undergraduate and above (8.3%). When the education levels of the fathers were examined, it was found that 79 had graduated from primary school (31.3%), 62 from secondary school (24.6%), 84 from high school (33.3%), and 27 from undergraduate and above (10.7%).

2.2. Data Collection Tools

In this section, the data collection tools used in the research are explained.

2.2.1. Family Competency Scale in Creating Reading Culture [FCSCRC]: It was developed by Çiğdemir and Akyol (2020). The scale consists of four dimensions: belief, modeling, participation, and attitude, and has 19 items in total. The Cronbach's alpha value of the scale was determined as .86. In the current study, Cronbach's alpha value was calculated as .80. The scale is a five-point Likert-type. Participants' statements were coded between 1 and 5. Code 5 is expressed as "Completely Matching" and code 1 is expressed as "Not Matching at all". The scale comprised four sub-dimensions: attitude, belief, participation, and modeling. Examples of items related to the scale are as follows (Çiğdemir, & Akyol, 2020, pp. 9-10):

- *I want my child to love reading (Belief).*
- *My child sees me reading books (Model).*
- *I read audiobooks to my child using dramatizations (Participation).*
- *Reading books with my child is a challenging activity for me (Attitude).*

2.2.2.. Reading Habit Scale [RHS]: The "Reading Habit Scale" developed by Esen Aygün (2019) was used to determine the reading habits of primary school students. It consists of 21 items and four sub-dimensions. The sub-dimensions were determined as "Individual Attitude, Reading Experience, Family Attitude, and Reading Type". Cronbach's alpha value was found to be 0.95. In the current study, Cronbach's alpha value was calculated as .85. The measurement tool is a five-point Likert scale. Examples of items related to the scale are as follows (Esen Aygün, 2019, p. 696)

- *I read short stories and stories.*
- *I often go to the library.*
- *There is always a book by my bedside.*

2.3. Data Collection

After obtaining the necessary permissions for the implementation of the study, the implementation was carried out in January and February during the 2023-2024 academic year. The study was conducted with 252 fourth-grade students and their parents who voluntarily participated in the study.

The researcher explained to the classroom teachers who would be administering the scales who he was, the purpose of the study, the data collection tools, and what needed to be done to administer the scales to the designated classes. The Reading Habit Scale was administered by the teachers during regular class hours.

Family Competency Scale in Creating Reading Culture was sent to the parents of the students through their children. Parents were asked to answer the questionnaire at home and send it back through the students. The parent questionnaire was collected from the students through the classroom teachers.

2.4. Data Analysis

In the study, SPSS statistical program was used for data analysis. The data sets were checked before the analysis, missing data were identified, and inverted items in the scales were corrected. All data sets were examined before analysis. Then, a normality test was performed to determine whether the data were normally distributed. The kurtosis and skewness coefficients of the variables were examined to determine whether the data were normally distributed. According to Tabachnick and Fidell (2013), data are considered normal when the skewness and kurtosis coefficients are between -1.5 and +1.5. The kurtosis and skewness coefficients of the variables are presented in Table 2.

Table 2.

Skewness and Kurtosis Coefficients

Scale	Skewness	Kurtosis
FCSCRC	-.440	-.040
RHS	-.498	.199

Upon examining Table 2, it becomes evident that the FCSCRC scale's skewness and kurtosis values (-.440 and -.040) and the RHS scale's skewness and kurtosis values (-.498 - .199) fall within the range of -1.5 to +1.5. Thus, the study employed parametric tests, as the data were found to be normally distributed. Initially, descriptive analyses were conducted. To examine family effectiveness in fostering a reading culture, a t-test was used for the gender variable, while an ANOVA was applied to assess differences based on the educational levels of mothers and fathers, followed by a Tukey post hoc test. Another t-test was conducted to analyze students' reading habits to gender. Additionally, Pearson correlation analysis was carried out to explore the relationship between students' reading habits and family competence in establishing a reading culture. Finally, hierarchical regression analysis was used to determine the predictive power of the sub-dimensions of the family competence scale on children's reading habits.

3. FINDINGS

The research findings are presented in this part in accordance with the research questions.

3.1. Descriptive statistics

The descriptive statistics obtained in the study are presented in Table 3.

Table 3.

Descriptive Statistics

	N	Min.	Max.	Mean	Standard Deviation
FCSCRC	252	38	94	71.45	11.07
RHS	252	26	102	69.55	15.28

Upon examining Table 3, it is evident that the parents' average FESRC scale total score is 71.45. Conversely, it can be observed that the average score on the RHS, which was used to ascertain the students' reading habits, was 69.55.

3.1. Family Competence in Creating Reading Culture

Family competence in creating a reading culture was examined in terms of the gender variable, and the findings are presented in Table 4.

Table 4.

Investigation of Family Competence in Creating Reading Culture According to Gender Variable

	Parent Gender	N	Mean	ss	F	P
FCSCRC	Woman	219	70.2603	.647	250	.518
	Man	33	69.0303			

There was no discernible difference in the findings of the t-test on family competence in the development of reading culture between parents of fourth-grade pupils based on their gender. This demonstrates that family competence in the development of reading culture is unaffected by gender. Table 5 presents the findings about how a mother's educational attainment affects the development of a reading culture.

Table 5.

Investigation of Family Competence in Creating Reading Culture According to Mother's Education Level

	Education level	N	$\bar{x}$	SS		KT	Sd	KO	F	P
FCSCRC	Primary school	107	67.83	10.45	Between group	3205.98	3	2.330	9.605	.000
	Secondary School	51	71.74	9.96		27592.53	248	.262		
	High School	73	74.46	11.26		30798.52	251			
	Bachelor's Degree and Above	21	78.80	9.74						
	Total	252	71.45	11.077	Within group					

A significant difference was found in participants' FCSCRC scores according to their mothers' educational level ($F = 9.61$, $p < .05$, $\eta^2 = .10$). This result shows that mothers' educational level has a moderate effect on FCSCRC scores (Cohen, 1988). The results of the Tukey HSD test show that FCSCRC scores differ according to the educational level of mothers. The scores of mothers with a bachelor's degree or higher ($M = 78.80$, $SD = 9.74$) elementary school ($M = 67.83$, $SD = 10.45$), middle school ($M = 71.74$, $SD = 9.96$), and high school graduates ($M = 74.46$, $SD = 11.26$) at a significant level ($p < .05$). The results of the analysis on the effect of fathers' education levels on creating a reading culture are presented in Table 6.

Table 6.

Investigation of Family Competence in Creating Reading Culture According to Father's Education Level

		N	$\bar{x}$	ss		KT	Sd	KO	F	P
FCSCRC	Primary school	79	68.34	11.04	Between group	3359.44	3	1119.81	10.12	.000
	Secondary School	62	69.67	11.28		27439.07	248	110.641		
	High School	84	72.76	9.95		30798.52	251			
	Bachelor's Degree and Higher	27	80.59	8.59						
	Total	252	71.45	11.07	Within group					

A significant difference was found in participants' FCSCRC scores based on fathers' educational level ($F = 10.12$, $p < .05$, $\eta^2 = .11$). This result indicates that fathers' educational level has a moderate effect on FCSCRC scores (Cohen, 1988). The results of the Tukey HSD test show that FCSCRC scores differ according to the educational level of fathers. The scores of fathers with a bachelor's degree or higher ($M = 80.59$, $SD = 8.59$) elementary school ($M = 68.34$, $SD = 11.04$), middle school ($M = 69.67$, $SD = 11.28$), and high school graduates ($M = 72.76$, $SD = 9.95$) at a significant level ($p < .05$).

3.2. Reading Habits of Students

The results of the analysis on whether reading habits differ according to the gender of the students are presented in Table 7.

Table 7.

Investigation of Reading Habits According to Gender

Groups		N	$\bar{x}$	ss	t Test		
					t	Sd	p
RHS	Girl	119	72.42	13.86	2.891	249.68	.004
	Boy	133	66.97	16.06			

When Table 7 is examined, as a result of the analysis made to determine whether the reading habits of the students differ significantly according to gender, the difference between the arithmetic averages of the groups was found statistically significant ($t = 2.891$; $p < .05$). It is seen that this difference is in favor of female students ($\bar{x} = 72.42$).

3.3. The Relationship between Students' Reading Habits and Families' Competence in Creating a Reading Culture

The results of the analysis conducted to determine the relationship between the reading habits of the students in the study and their parents' competencies in creating a reading culture are presented in Table 8.

Table 8.

Correlation Results

		FCSCRC	Participation	Attitude	Model	Belief
RHS	Pearson Correlation	.568	.526	.264	.514	.393
	Sig. (2-tailed).	.000	.000	.000	.000	.000
	N.	252	252	252	252	252

There is a statistically significant positive relationship between students' reading habits and their parents' competence in fostering a reading culture ($r = 0.568$, $p < 0.01$). This relationship is further supported by effect sizes observed across various sub-dimensions: participation ($r = 0.526$), modeling ($r = 0.514$), belief ($r = 0.393$), and attitude ($r = 0.264$). These findings indicate that as parents demonstrate greater competence in cultivating a reading culture, students' reading habits tend to improve accordingly. The results of the hierarchical regression analysis examining the relationship between reading habits and the sub-dimensions of the Family Competence Scale for Reading Culture (FCSCRC) are presented in Table 9.

Table 9.

Results on Hierarchical Regression

Model	Predictor	B	SH_B	β	ΔR²
1	Attitude	1.18	.27	.26*	.07**
2	Attitude	.902	.26	.20*	.187**
	Belief	2.075	.34	.36*	
3	Attitude	.219	.25	.05*	.331**
	Belief	.971	.34	.17*	
	Participation	.674	.22	.23*	
	Model	1.313	.35	.28*	

* $p < .05$ ** $p < .01$

Families' contributions to children's reading habits were examined across three hierarchical levels (see Table 9). In the first step, families' attitudes toward reading emerged as a significant predictor, accounting for 7% of the variance. The belief sub-dimension, added in the second step, increased the explained variance by 11%, bringing the total to 18%. Finally, the inclusion of participation and modeling variables contributed an additional 14%, resulting in a total explained variance of 33%. According to these findings, it can be said that the family's participation in reading activities and their modeling in terms of reading are effective variables for children to acquire reading habits.

4. RESULTS, DISCUSSION, AND RECOMMENDATIONS

The purpose of the current study was to investigate how families foster students' reading habits. This part presents the findings that align with the study topics and provides a literature review. One of the primary findings indicates that parents' competence in promoting a culture of reading is moderate. This result may indicate that families are not completely passive or inadequate in creating a reading culture for their children, but that they have shortcomings in terms of creating a sustainable and strong reading culture. Indeed, a review of the literature shows that families are not adequate in creating a reading culture (Çiğdemir ve Akyol, 2020; Yıldız, 2016). Families prefer activities such as watching movies together rather than creating libraries and reading books regularly to instill a habit of reading in their children (Yıldız, 2016). Studies have shown that the lack or absence of reading activities has a negative impact on children's literacy. In addition, it reveals that active family literacy activities play a significant role in helping children develop reading habits and language skills compared to passive family literacy activities (Dong, Wu, Dong, & Tang, 2020).

Another finding of the study is that parents' ability to create a culture of reading increases as their level of education increases. There are studies in the literature that support this finding. For example, Baş (2012) found that parents have a positive influence on their children's attitudes toward reading and that as parents' educational level increases, children's attitudes toward reading also increase. Similarly, there are studies showing that parents' educational level also has a positive effect on motivation to read books (Katrancı, 2015; Ülper, 2011). On the contrary, some studies in the literature claim that parents' educational level has no effect on reading habits (Balci, 2009; Yılmaz & Ertem, 2020). These differing results regarding parents' educational status may be related to indirect factors such as the number of books in the home and the family's role model behavior. The quality of activities is paramount in the development of children's literacy skills. Studies on home literacy have shown that parents with higher levels of education read more books to their children, provide more support in terms of vocabulary, and structure the reading environment more effectively (Silinskas, Torppa, Lerkkanen, & Nurmi, 2020; Esmaeeli, 2023). That said, although parental education status is an important variable in creating a culture of reading, it cannot be said to be sufficient on its own.

Secondly, the reading habits of the students were analyzed. As a result of the analysis, it was determined that the students had moderate reading habits. When the related literature is examined, similar to this study, there are studies indicating that children's reading habits are at a medium level (Duran & Sezgin, 2012; Karaaslan, 2016), as well as studies that found that students' reading habits are high (Calp, 2018; Yurtbakan & Erdoğan, 2020). Another conclusion reached in this context is that female students have higher reading habits than male students. Boys read less than females, read different genres, and read in different ways, according to linked literature analysis (Balci, 2009; Cherland, 1994; Karademir, 2018; Millard, 1997; Sadioğlu & Bilgin, 2008). There are also studies stating that this situation is the opposite, that is, boys have higher reading habits than girls (Deniz, 2015). Therefore, although there are studies showing reading habits in favor of female students, more studies need to be conducted in order to reveal a clear situation.

The analyses conducted revealed that families are an important variable in children's acquisition of reading habits. Families are not the only variable in children's acquisition of reading habits, but it is known that families are the most influential non-school variable (Lonigan & Whitehurst, 1989). Furthermore, the literature emphasizes that families are an important variable in both the development of children's literacy skills and the acquisition of reading habits (Nag et al., 2024; Sénéchal & LeFevre, 2014). Parents' positive attitudes toward reading and engaging in reading activities with their children increase children's interest in reading (Matvichuck, 2015). Similarly, Bowen (2006) emphasized that children who read with their families develop better reading habits. A particularly noteworthy finding of the study is that modeling reading habits for children and engaging in reading activities with them is more effective than simply having a positive attitude and belief toward reading. In other words, it can be said that parents' relationship with reading and reading with their children are important variables for children to develop reading habits. Indeed, it has been pointed out that simply creating a library at home is not enough to instill a habit of reading in children, and that it is important for parents to actively participate in the process through practices such as interactive reading (de Bondt, Willenberg & Bus, 2020; Harvey, 2016).

Overall, it is not only the responsibility of teachers but also of parents to ensure that children enjoy reading and develop a lifelong habit of reading. However, considering that even teachers frequently use rewards in the process of instilling a habit of reading in children (Bozan, 2024), it is more likely that parents will choose these methods because they are not educators. However, variables that support external motivation, such as rewards, can have short-term and superficial effects and do not create internal motivation for reading (Deci, Koestner, & Ryan, 1999; Wehe, Rhodes, & Seger, 2015). Indeed, it should not be forgotten that intrinsic motivation forms the basis of long-term behavioral habits (Deci & Ryan, 2000). Research shows that increasing children's intrinsic motivation helps them develop positive emotional bonds with books and increases their reading frequency (Becker, McElvany, & Kortenbruck, 2010; Ma & Zhao, 2025). This suggests that it is considered important to inform families about the right strategies for instilling a habit of reading books in children. Indeed, Tompkins (2006) emphasizes that teachers should guide families on which books children should read and how they should engage in reading and writing activities with their children in order to support families in this regard.

Based on the results obtained in the study, a number of recommendations are presented. Classroom teachers should provide guidance on topics such as family-child reading activities and children's literature. Classroom teachers should design activities that guide families, particularly in terms of role modeling and participating in the reading process. The Ministry of National Education can create family support programs that include seminars, digital content, and guidebooks to promote a culture of reading. While the findings of this study provide valuable insights, they are derived from quantitative data and constrained by the study's scope. Future research employing qualitative methods is recommended to explore the role of the family in children's reading habits in greater depth. Another limitation of the current study is its cross-sectional nature. This means that the variables examined are studied within a specific time frame. Therefore, it is recommended that future studies be designed longitudinally in order to examine the developmental aspects of the variables.

Research and Publication Ethics Statement

This study is based on the first author's master's degree thesis. This study was ethically approved by the Istanbul Aydın University Ethics Committee with its decision dated 21.03.2024 and numbered 2024/2

Contribution Rates of Authors to the Article

This research was derived from the master's thesis conducted by the first author under the supervision of the second author.

Statement of Interest

The authors declare that there is no conflict of interest between them.

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Metacognitive Awareness and Critical Thinking Disposition of Pre-Service Teachers: A Structural Equation Modeling*

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Article Information	ABSTRACT
Received: 25.05.2025	Metacognition supports pre-service teachers' critical thinking (CT) processes because higher levels of metacognitive awareness of pre-service teachers increase their disposition to CT. This research aims to examine pre-service teachers' metacognitive awareness in terms of self-, organizational, and judgmental dimensions, to measure their CT disposition in engagement, cognitive maturity, and innovativeness, and to qualify the relationship between metacognitive awareness and disposition to CT of pre-service teachers. In the quantitatively designed study, the “Metacognitive Awareness Scale” and the adapted version of the “Critical Thinking Disposition Scale” were conducted on 305 pre-service teachers studying in the faculty of education in different universities in Türkiye. According to the results of descriptive analyses, the overall level of the pre-service teachers’ self-perceived metacognitive awareness was found high; the organizational awareness of the pre-service teachers was at the highest level whereas their level of judgmental awareness was the lowest, and the overall level of their self-perceived disposition to CT was calculated as high. The results of structural equation modeling analyses indicated that as the level of metacognitive awareness of pre-service teachers increases, their disposition to CT increases. Self- and organizational awareness exerted no significant influence on engagement, cognitive maturity, or innovativeness, while judgmental awareness had a significant positive effect on engagement but not on cognitive maturity or innovativeness.
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1. INTRODUCTION

As a 21st-century skill, critical thinking (CT) is one of the key areas that policymakers and researchers have focused on for its development in teacher education. Abrami et al. (2008) defined CT as a metacognitive process providing "the ability to engage in purposeful, [and] self-regulatory judgment" (p. 1102). Because of its role in judgment, Ku (2009) emphasized the importance of CT in decision-making and problem-solving processes frequently required in a democratic society. Prior research supports that CT is a significant factor in making decisions (Heidari & Ebrahimi, 2016) and solving problems (Lismayani et al., 2017). Therefore, it is obvious that critical thinkers are able to make more appropriate decisions to solve problems. Similarly, as Williams (2005) noted, the concept of CT includes obtaining and generating valid information for a specified problem and using it to create solutions. Accordingly, finding effective solutions to problems encountered in societies can be provided by the development of critical thinkers. In educational settings, developing students' CT skills requires teachers who can think critically; therefore, teacher education must explicitly cultivate teachers' CT. As Rivas et al. (2022) indicated, metacognitive regulation and CT can be taught and improved in higher education contexts, which can justify a systematic attention to CT in teacher preparation.

The development of CT skills is one of the main objectives in higher education as well as teacher education, but it is questionable if the teaching system includes relevant activities to achieve it, which is a constant challenge for educators, practitioners, and researchers (Gul et al., 2010). In this respect, it is significant to clarify the distinction between CT and disposition to CT as proposed by Facione (1990) in a Delphi study. According to Ennis (2015), CT "is reasonable reflective thinking focused on deciding what to believe or do" (p.32). Judge et al. (2009) defined CT as "a questioning, challenging approach to knowledge and perceived wisdom" including "ideas and information from an objective position and then questioning this information in the light of [one's] own values, attitudes and personal philosophy" (p. 1-2). This kind of metacognitive approach requires certain

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skills to enhance thinking critically. Knight and Robinson (2019) listed these skills as “observation, analysis, interpretation, reflection, evaluation, inference, explanation, problem solving, and decision-making” (p. 14). However, disposition to CT represents “a tendency” to think critically in “given certain conditions” (Ennis, 1996, p. 166). Facione et al. (2000) described disposition to CT as the “consistent internal motivation” to solve problems by making decisions with the use of CT skills (p. 61). Therefore, the development of disposition to CT is as important as the development of CT skills in teacher education, and pre-service teachers should be equipped with CT skills in their field and display a stable tendency to use these skills.

Grounded in a consensus-based conceptual approach, Facione et al. (1995) described the aspects of disposition to CT as “truth-seeking, open-mindedness, analyticity, systematicity, CT-confidence, inquisitiveness, and cognitive maturity” (p.1), whereas Irani et al. (2007) categorized dispositional characteristics of CT as engagement, cognitive maturity, and innovativeness to assess disposition to CT. Engagement refers to the willingness to make use of the opportunities “to use reasoning, anticipating situations that require reasoning, and confidence in reasoning ability” (Ricketts & Rudd, 2005, p. 33). In an educational context, engagement corresponds to pre-service teachers’ tendency to reason and seek an opportunity to use their reasoning ability. Cognitive maturity represents “the disposition to be judicious (prudent) in one’s decision making” (Boonsathirakul & Kerdsomboon, 2021, p. 227), which is directly related to the “awareness of the complexity of real problems, being open to other points of view, and being aware of [one’s] own and others’ biases and predispositions” (Ricketts & Rudd, 2005, p. 33). Cognitive maturity refers to pre-service teachers’ ability to identify a problem in all its aspects with a variety of perspectives. Innovativeness corresponds to the “disposition to be intellectually curious” about the truth and to constantly seek new information (Ertas Kilic & Sen, 2014; Ricketts & Rudd, 2005). Innovativeness can be exemplified in such an educational setting that pre-service teachers are willing to acquire new knowledge in making decisions and solving problems.

Disposition to CT is affected by a variety of factors, one of which is metacognitive awareness (MCA). CT requires the metacognitive function of “what one is doing and why” as highlighted by Facione and Facione (1996, p. 133). Papeontiou-Louca (2003) elaborated that metacognition refers to “thoughts about thoughts, [...] knowledge of one’s knowledge, processes, and cognitive and affective states, and the ability to consciously and deliberately monitor and regulate one’s knowledge, processes, and cognitive and affective states” (pp. 10-11). Therefore, MCA, which is a critical topic in teacher education, involves one’s understanding of thinking processes with the help of metacognitive knowledge. Borkowski and Muthukishna (1992) pointed out that metacognitive approaches enable teachers to evaluate classroom environments by strategically providing flexible as well as creative learning opportunities to students. At the same time, over-proceduralized planning or monitoring can reduce exploratory behavior and autonomy; hence, organizational aspects of metacognition may not consistently strengthen dispositions to CT such as engagement and innovativeness.

MCA supports student learning and provides an improvement in academic achievement (Beccaria et al., 2014; Vosniadou et al., 2021). Because of its positive reflections on education, MCA has been a center of research interest in teacher education. With high-level MCA, pre-service teachers can improve their own learning and analyze learning environments more effectively in their classes. After examining the prior literature on the subdimensions of MCA, Firat Durdukoca and Aribas (2019) identified three dimensions for MCA of pre-service teachers to measure it in the Turkish cultural and educational context: self-, organizational, and judgmental awareness. Self-awareness is related to one’s own understanding of thinking and learning processes, which is similar to “procedural knowledge (knowing how)” specified by Schraw et al. (2006). Organizational awareness corresponds to the awareness of planning and implementation of a problem-solving process, which is indicated as the “planning and monitoring” function of metacognition (Schraw et al., 2006). Judgmental awareness represents the evaluation step of a completed problem-solving process. Schraw et al. (2006) similarly identified this step as the evaluation of the acts and the results of the work.

Within the current context of teacher education in Türkiye, it is significant to reconsider the MCA and disposition to CT of pre-service teachers because of the changing trends in learning and teaching tasks resulting from various factors such as digitalization in the post-pandemic era. Therefore, this research aims to examine pre-service teachers’ MCA in terms of self-, organizational, and judgmental dimensions, to measure their disposition to CT in engagement, cognitive maturity, and innovativeness, and to qualify the relationship between MCA and disposition to CT of pre-service teachers. The results of the present study contribute to providing significant findings for the associations among the dimensions of MCA and disposition to CT of pre-service teachers studying in the faculty of education by recommending practical implications for teacher education in Türkiye to policymakers, educational administrators, and researchers. Internationally, the study contributes to comparative teacher education by modeling dimension-level relationships between MCA and disposition to CT with SEM in a non-Western context.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

CT has been defined as a purposeful, self-regulatory form of judgment that involves interpretation, analysis, evaluation, and inference guided by evidence and standards (e.g., Ennis, 1996, 2015; Facione, 1990; Halpern, 2003). Disposition toward CT reflects a stable tendency or internal motivation to use such skills when situations necessitate (Facione et al., 2000). In parallel, metacognition concerns one’s knowledge of and regulation over cognition, such as planning, monitoring, and evaluating one’s thinking and learning (Schraw et al., 2006, Papeontiou-Louca, 2003). Thus, metacognitive processes provide the regulatory “control system” that enables individuals to deploy CT skills consistently and intentionally. In teacher education, MCA is

particularly consequential because pre-service teachers must monitor their own learning while making instructional decisions that require sound judgment (Borkowski & Muthukrishna, 1992; Knight & Robinson, 2019). Empirical work in higher education and teacher education supports associations between metacognition and CT (e.g., Cakici, 2018; Fahim & Eslamdoost, 2014; Kozikoglu, 2019), which suggests that MCA may scaffold dispositions to CT such as engagement, cognitive maturity, and innovativeness (Ertas Kilic & Sen, 2014; Irani et al., 2007).

The function of MCA is to enable pre-service teachers to develop CT skills, which may increase their disposition to CT. The complexity of these concepts in the Turkish context was investigated in some studies with different variables. For example, Karasakaloglu et al. (2012) explored 388 pre-service “teachers’ metacognitive reading strategies, CT attitudes and motivational-cognitive and metacognitive competencies” (p. 207). Semerci and Elaldi (2014) examined the types of metacognitive beliefs of 663 pre-service teachers and the impacts of these beliefs on disposition to CT. Akyuz et al. (2015) studied the impact of metacognitive guidance in an online learning environment on the pre-service teachers’ CT competency and reported that metacognitive guidance favorably affects pre-service teachers’ disposition to CT. Cakici (2018) revealed a strong relationship between MCA and CT skills of 218 pre-service teachers in the context of foreign language teaching. Regarding the relationship between MCA and disposition to CT, Kozikoglu (2019) detected, in a study with 229 pre-service teachers, “a positive, moderate-level, significant relationship between prospective teachers’ critical thinking tendencies and metacognitive skills” (p. 111). Obviously, prior research is limited in specifically investigating the relationship between the dimensions of MCA and disposition to CT of pre-service teachers in the Turkish educational context. This leads to the investigation of H₁, as stated below:

H₁: MCA positively predicts disposition to CT.

Following Firat Durdukoca and Aribas (2019), MCA comprises three dimensions: self-awareness, which is about the awareness of one’s strategies and conditions of use; organizational awareness, which is related to planning and monitoring during task engagement; and judgmental awareness, described as an evaluation of outcomes and strategy effectiveness. These map onto classic phases of regulation; namely, planning, monitoring, and evaluation, which are emphasized in teacher preparation. In the Turkish educational context, a number of studies investigated pre-service teachers’ MCA (Ekici et al., 2019; Oz, 2016; Sendurur et al., 2011; Yuce et al., 2023). Ekici et al. (2019) found the level of MCA of 367 pre-service teachers at the mid-level. However, Sendurur et al. (2011) detected low scores of MCA among 49 pre-service teachers in their first year. Unlike Ekici et al. (2019) and Sendurur et al. (2011), Oz (2016) reported, in a study with 104 pre-service teachers studying in the department of language learning and teaching, that a very high level of MCA was detected in knowledge for cognition and regulation of cognition. Similarly, Yuce et al. (2023) revealed that pre-service teachers had moderate levels of metacognitive knowledge in a study with 606 participants.

In line with the University of Florida Engagement, Maturity, and Innovativeness Critical Thinking Disposition framework (Ertas Kilic & Sen, 2014; Irani et al., 2007), disposition to CT is represented by engagement, which is the willingness and confidence to reason; cognitive maturity representing prudence and openness to multiple perspectives in addition to the awareness of bias; and innovativeness, which is about the intellectual curiosity and search for new information. Previous studies on pre-service teachers’ disposition to CT revealed different levels of tendencies to think critically in the Turkish educational context. Accordingly, some research proved low-level (Acisli, 2016; Akgun & Duruk, 2016; Arsal, 2015; Cakmak Gulec, 2010; Ekici, 2017; Oguz & Saricam, 2016), medium-level (Celik et al., 2018; Sendag et al., 2015; Turan, 2016; Yorganci, 2016), and high-level (Aybek, 2018; Aybek & Aslan, 2017; Cinici & Ergin, 2019; Fettahlioglu & Kaleci, 2018) disposition to CT among pre-service teachers in Türkiye. Obviously, the level of dispositions to CT of pre-service teachers in the Turkish educational context may vary depending on different factors.

Conceptually, MCA should promote dispositions to CT through controlled and reflective processing. Within a metacognitive account of CT, self-awareness, knowledge of one’s own strategies and conditions of use, supports reflective practice and persistence, which thereby encourages engagement; recognition of personal limits and potential biases grounds cognitive maturity; and awareness of one’s strategy background aligns with innovativeness (Schraw et al., 2006). Consistently, engagement is defined as willingness and confidence to use reasoning, cognitive maturity as prudence and openness to alternative viewpoints, and innovativeness as intellectual curiosity and the active search for new information (Boonsathirakul & Kerdsoomboon, 2021; Ertas Kilic & Sen, 2014; Ricketts & Rudd, 2005). Accordingly, H₂ was formulated with its sub-hypotheses, as indicated below:

H₂: Self-awareness positively predicts engagement (H_{2.1}), cognitive maturity (H_{2.2}), and innovativeness (H_{2.3}) in disposition to CT.

Building on this, organizational awareness about planning and monitoring should foster goal-directed reasoning that sustains engagement and cognitive maturity, while structuring exploration associated with innovativeness. This makes the investigation of H₃ meaningful, as stated with its sub-hypotheses below:

H₃: Organizational awareness positively predicts engagement (H_{3.1}), cognitive maturity (H_{3.2}), and innovativeness (H_{3.3}) in disposition to CT.

Likewise, judgmental awareness, evaluation of outcomes against criteria, strengthens cognitive maturity, feeds back to sustain engagement via informed self-regulation and guides adaptive changes, which is a characteristic of innovativeness. This leads to the formulation of H₄ with its sub-hypotheses, as listed below:

H₄: Judgmental awareness positively predicts engagement (H_{4.1}), cognitive maturity (H_{4.2}), and innovativeness (H_{4.3}) in disposition to CT.

Overall, prior work in teacher education reports positive associations between metacognition and CT. For example, metacognitive guidance has been shown to improve pre-service teachers' disposition to CT (Akyuz et al., 2015); MCA relates positively to CT skills in teacher candidates (Cakici, 2018); and metacognitive skills correlate moderately and positively with prospective teachers' CT tendencies (Kozikoglu, 2019). Evidently, there is a link between metacognitive beliefs or competencies with CT attitudes and skills in samples (Karasakaloglu et al., 2012; Ossa et al., 2023; Semerci & Elaldi, 2014). Therefore, these findings justify testing a structural model in the Turkish context in which overall MCA predicts overall disposition to CT (H₁), and the dimension-level paths are specified from self-, organizational-, and judgmental awareness to engagement, cognitive maturity, and innovativeness (H₂, H₃, and H₄).

3. METHODOLOGY

3.1. Research Design

This study is quantitatively designed to examine pre-service teachers' MCA, including self-awareness (MCA-SA), organizational awareness (MCA-OA), and judgmental awareness (MCA-JA), to measure their CT disposition (CTD) in engagement (CTD-E), cognitive maturity (CTD-CM), and innovativeness (CTD-I), and to qualify the relationship between MCA and CTD of pre-service teachers. In this context, the following research questions (RQs) were investigated to fulfill the research objectives:

- RQ1: What is the level of pre-service teachers' self-perceived MCA?
 - RQ1.1: What is the level of pre-service teachers' MCA-SA?
 - RQ1.2: What is the level of pre-service teachers' MCA-OA?
 - RQ1.3: What is the level of pre-service teachers' MCA-JA?
- RQ2: What is the level of pre-service teachers' self-perceived CTD?
 - RQ2.1: What is the level of pre-service teachers' CTD-E?
 - RQ2.2: What is the level of pre-service teachers' CTD-CM?
 - RQ2.3: What is the level of pre-service teachers' CTD-I?
- RQ3: What is the relationship between MCA and CTD of pre-service teachers?

To investigate RQ3, the following hypotheses were formulated in the study to measure and explicitly identify the relationship between MCA and CTD, as illustrated in Figure 1:

- H₁: MCA positively predicts CTD.
- H₂: MCA-SA positively predicts CTD.
 - H_{2.1}: MCA-SA positively predicts CTD-E.
 - H_{2.2}: MCA-SA positively predicts CTD-CM.
 - H_{2.3}: MCA-SA positively predicts CTD-I.
- H₃: MCA-OA positively predicts CTD.
 - H_{3.1}: MCA-OA positively predicts CTD-E.
 - H_{3.2}: MCA-OA positively predicts CTD-CM.
 - H_{3.3}: MCA-OA positively predicts CTD-I.
- H₄: MCA-JA positively predicts CTD.
 - H_{4.1}: MCA-JA positively predicts CTD-E.
 - H_{4.2}: MCA-JA positively predicts CTD-CM.
 - H_{4.3}: MCA-JA positively predicts CTD-I.

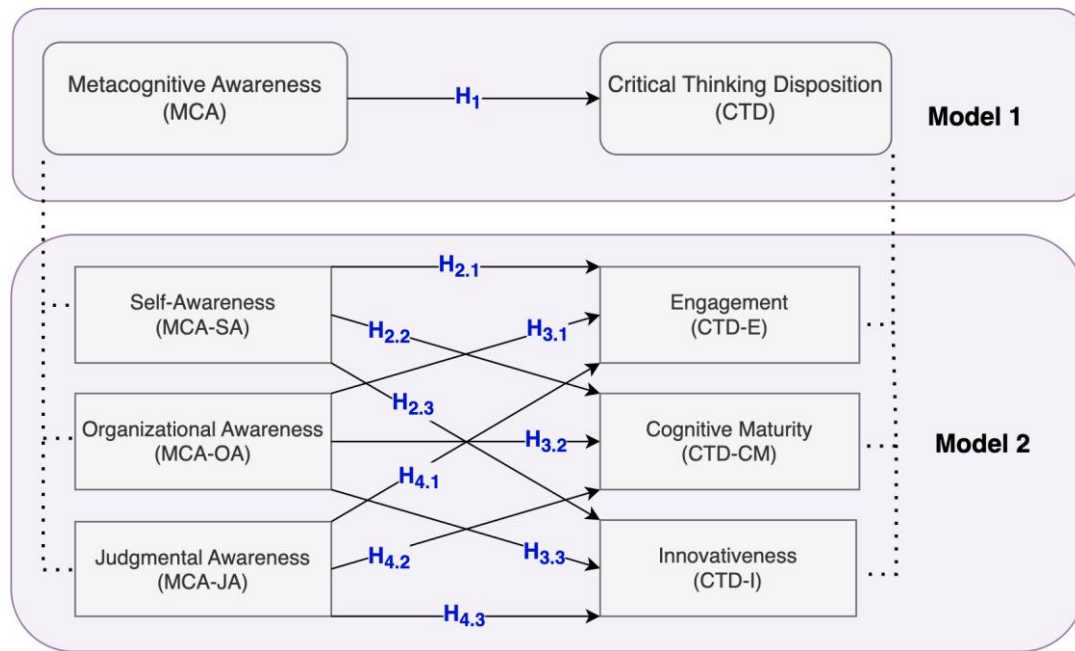


Figure 1. Research model

As depicted in Figure 1, H_1 was formulated for Model 1, whereas H_2 , H_3 , and H_4 were designed for Model 2 to conduct the analyses in the research model. A structural equation model (SEM) was employed in two stages. In Model 1, MCA and CTD were used, and a single structural path was estimated (H_1 : MCA $\rightarrow$ CTD). In Model 2, the MCA dimensions, including MCA-SA, MCA-OA, and MCA-JA, were examined as predictors for the CTD dimensions of CTD-E, CTD-CM, and CTD-I (H_2 : MCA-SA $\rightarrow$ CTD-E, CTD-CM, CTD-I; H_3 : MCA-OA $\rightarrow$ CTD-E, CTD-CM, CTD-I; H_4 : MCA-JA $\rightarrow$ CTD-E, CTD-CM, CTD-I).

3.2. Participants

The target population of this study consisted of pre-service teachers studying in the faculties of education at universities in Türkiye at the time of data collection. In line with the study purpose, the universe included undergraduate students who were actively registered in mainstream teacher education programs, such as mathematics teaching, primary education, psychological guidance and counseling, preschool teaching, Turkish and English language teaching. Convenience sampling was used to select participants from multiple universities located in different regions of Türkiye, which enabled heterogeneity in institution type and program area but limits probabilistic generalization. The sample of this study was determined as 305 pre-service teachers enrolled in faculties of education at different universities. The demographic characteristics of the sample are presented in Table 1.

Table 1.

Participant Profile

Gender	n	%
Male	61	20.0
Female	244	80.0
Age	$\bar{X}$	SD
18< $\bar{X}$ <32	21.23	2.188
The geographic region of universities	n	%
Black Sea Region	71	23.3
Central Anatolia Region	65	21.3
Eastern Anatolia Region	49	16.1
Aegean Region	36	11.8
Marmara Region	35	11.5
Southeastern Anatolia Region	25	8.2
Mediterranean Region	24	7.9
Department	n	%
Mathematics teaching	48	15.7
Primary education	47	15.4
Psychological guidance and counseling	39	12.8
Preschool teaching	35	11.5
Turkish language teaching	31	10.2
English language teaching	30	9.8

Department	n	%
Science teaching	24	7.9
Social studies teaching	22	7.2
Special education teaching	16	5.2
Physical education teaching	7	2.3
Art teaching	5	1.6
German language teaching	1	0.3
Year of Study	n	%
1st Year	102	33.4
2nd Year	86	28.2
3rd Year	54	17.7
4th Year	61	20.0
5+ Years	2	0.7
Total	305	100.0

As indicated in Table 1, 80.0% of the participants (n=244) were female, and 20.0% (n=61) were male, with an average age of 21.23. Regarding the distribution of the geographic regions of universities, 71 (23.3%) pre-service teachers were studying in Black Sea Region, 65 (21.3%) in Central Anatolia Region, 49 (16.1%) in Eastern Anatolia Region, 36 (11.8%) in Aegean Region, 35 (11.5%) in Marmara Region, 25 (8.2%) in Southeastern Anatolia Region, and 24 (7.9%) in Mediterranean Region. As for the departments, 15.7% of the participants (n=48) were studying in mathematics teaching and 15.4% (n=47) in primary education. These two departments are followed by psychological guidance and counseling (12.8%), preschool teaching (11.5%), and Turkish language teaching (10.2%), respectively. With regard to the year of study, 33.4% (n=102) of the respondents were in their first year, 28.2% (n=86) in the second year, 17.7% (n=54) in the third year, and 20.0% (n=61) in the fourth year. Only 2 participants (0.7%) had been studying for more than 5 years.

3.3. Research Instruments

Three sections were included in the questionnaire used in this research: demographics, “Metacognitive Awareness Scale (MCAS)” (Firat Durdukoca & Aribas, 2019), and “The University of Florida Engagement, Maturity, and Innovativeness Critical Thinking Disposition Instrument (UF/EMI)” (Irani et al., 2007). The section of demographic information included questions asking for gender, age, geographic region of universities where the participants were currently studying, teaching department, and year of study.

In the second section, the MCAS developed by Firat Durdukoca and Aribas (2019) was configured to measure the MCA of pre-service teachers with a five-point Likert-type scale (1-never, 2-rarely, 3-sometimes, 4-frequently, and 5-always). The MCAS is comprised of 18 items measuring MCA with three dimensions: MCA-SA in 8 items, MCA-OA in 6 items, and MCA-JA in 4 items. The Cronbach’s alpha values for the MCAS were calculated for the reliability of the scale ($\alpha_{MCA-SA}=0.769$; $\alpha_{MCA-OA}=0.780$; $\alpha_{MCA-JA}=0.763$). Accordingly, the data obtained from the MCAS was found reliable ($\alpha>0.700$).

In the final section of the questionnaire, the UF/EMI developed by Irani et al. (2007) and adapted to the Turkish language by Ertas Kilic and Sen (2014) was administered to pre-service teachers to identify their CTD. Although the original scale consists of 26 items, 25 items were adapted in the Turkish version, abbreviated as CTDS, standing for “Critical Thinking Disposition Scale”. The CTDS includes a five-point Likert-type measure (1-strongly disagree, 2-disagree, 3-neutral, 4-agree, and 5-strongly agree). The adapted instrument with 25 items includes three dimensions measuring CTD-E in 11 items, CTD-CM in 7 items, and CTD-I in 7 items. The Cronbach’s alpha values for the CTDS were calculated to confirm the reliability of the scale ($\alpha_{CTD-E}=0.863$; $\alpha_{CTD-CM}=0.762$; $\alpha_{CTD-I}=0.736$). Hereunder, it can be claimed that the data obtained from the CTDS was accepted as reliable ($\alpha>0.700$).

3.4. Data Collection Procedures and Ethical Considerations

The permission for scientific and ethical compliance was received from the Istanbul Technical University Board of Ethics for Human Studies in Social Sciences and Humanities to conduct the study before the data was collected (documented on 06.09.2021; project no: 192). The questionnaire, including three sections with its approved version, was configured on an online data collection tool. The necessary information about the scope and aim of the research was included at the beginning of the questionnaire with the consent form and the contact details of the researcher. It was also underlined that the results of the study would be used only for academic purposes, anonymously. The link to the questionnaire was shared with the prospective sample in the 2021-2022 academic year. The collected data were organized for analysis and reported in accordance with the guidelines announced by the Committee on Publication Ethics (COPE).

3.5. Data Analysis

In the study, IBM SPSS for Windows v26 and IBM AMOS v24 were used to perform the analyses of the collected data. Before the analyses, outliers within the dataset were identified and removed to ensure data integrity and enhance the rigor of the results.

After that, frequency analyses were carried out via IBM SPSS for Windows v26 to reveal the characteristics of the participants based on each demographic variable. The reliability analyses were performed on IBM SPSS for Windows v26 in order to calculate the Cronbach's alpha values for the subdimensions of the MCAS and CTDS. Then, confirmatory factor analysis (CFA) was conducted via IBM AMOS v24 for the subdimensions of the scales. To address RQ1 and RQ2, the five-point Likert-type responses depending on the weighted mean scores were interpreted as very low ($\bar{x}=1.00-1.80$), low ($\bar{x}=1.81-2.60$), moderate ($\bar{x}=2.61-3.40$), high ($\bar{x}=3.41-4.20$), and very high ($\bar{x}=4.21-5.00$). At the final stage, the research model was tested to investigate RQ3, including H₁, H₂, H₃, and H₄, through the SEM, which is a multivariate data analysis method to analyze "complex relationships among constructs and indicators" and "to empirically test hypothesized relationships between variables of interest" (Hair et al., 2021, p. 1, 3). Keith (2019) pointed out that the most crucial aspect of SEM is that the resulting model is founded on a sound theory using the two-step method to determine if the data support the model; first, the measurement model is initially examined to determine whether the measurements of the model's structures accurately represent the relevant structures; second, the structural model analysis is conducted. In this direction, MCAS, with its three subdimensions of MCA-SA, MCA-OA, and MCA-JA and CTDS, with its three subdimensions of CTD-E, CTD-CM, and CTD-I, were modeled using SEM analysis via IBM AMOS v24.

4. FINDINGS

In accordance with the RQs, the findings are reported sequentially: (1) levels of pre-service teachers' self-perceived MCA (RQ1), (2) levels of their self-perceived CTD (RQ2), and (3) associations between MCA and CTD (RQ3), with estimates reported for Model 1 (overall MCA→CTD) and Model 2 (dimension-level paths between MCA and CTD).

4.1. Pre-Service Teachers' Metacognitive Awareness

To explore RQ1, the MCAS scores obtained from 305 pre-service teachers were descriptively analyzed for an overall evaluation and across subdimensions (MCA-SA, MCA-OA, and MCA-JA). Higher scores indicated greater perceived MCA among the pre-service teachers. The results of descriptive analyses for the MCAS are presented in Table 2.

Table 2.
Descriptive Statistics of the MCAS

	$\bar{X} \pm SD$	Skewness	Kurtosis
Metacognitive Awareness (MCA)	3.906±0.534	-0.143	-0.345
MCA-SA	3.921±0.543	-0.233	-0.368
MCA-OA	3.963±0.622	-0.284	-0.544
MCA-JA	3.798±0.715	-0.223	-0.537

As observed in Table 2, the overall level of the pre-service teachers' self-perceived MCA was found to be high ($\bar{X}=3.906$; $3.41 < \bar{X}_{MCA} < 4.20$). According to the mean scores of the subdimensions of the MCAS, it was revealed that the MCA-OA of the pre-service teachers was at the highest level ($\bar{X}_{MCA-OA}=3.963$), whereas their level of MCA-JA was identified as the lowest ($\bar{X}_{MCA-JA}=3.798$).

4.2. Pre-Service Teachers' Critical Thinking Disposition

To address RQ2, the scores of CTDS were descriptively analyzed for an overall evaluation and across subdimensions (CTD-E, CTD-CM, and CTD-I). Higher values reflected a stronger disposition toward CT among pre-service teachers. The results of descriptive analyses for the CTDS are displayed in Table 3.

Table 3.
Descriptive Statistics of the CTD Scale

	$\bar{X} \pm SD$	Skewness	Kurtosis
Critical Thinking Disposition (CTD)	4.088±0.491	-0.304	-0.361
CTD-E	4.053±0.533	-0.286	-0.408
CTD-CM	4.140±0.531	-0.297	-0.468
CTD-I	4.092±0.534	-0.352	-0.470

According to Table 3, the overall level of the pre-service teachers' self-perceived CTD was calculated as high ($\bar{x}=4.088$; $3.41 < \bar{X}_{CTD} < 4.20$). According to the mean scores of the subdimensions of the CTDS, it was observed that the mean scores for CTD-E, CTD-CM, and CTD-I, interpreted as high, were detected very close to each other ($\bar{X}_{CTD-E}=4.053$; $\bar{X}_{CTD-CM}=4.140$; $\bar{X}_{CTD-I}=4.092$; $3.41 < \bar{X}_{CTD} < 4.20$).

4.3. Relationship Between Metacognitive Awareness and Critical Thinking Disposition

To examine the relationship between pre-service teachers' self-perceived MCA and their CTD (RQ3), correlation and multicollinearity analyses were conducted between the subdimensions of the MCAS (MCA-SA, MCA-OA, and MCA-JA) and the subdimensions of the CTDS (CTD-E, CTD-CM, and CTD-I). The results are listed in Table 4.

Table 4.
Verification of Assumptions

<i>CTDS</i>	<i>MCAS</i>	<i>Correlation (r)</i>	<i>Tolerance</i>	<i>VIF</i>	<i>Kolmogorov-Smirnov (p)*</i>
CTD-E	MCA-SA	.586**	.454	2.201	0.050(0.067)
	MCA-OA	.600**	.404	2.478	
	MCA-JA	.570**	.562	1.779	
CTD-CM	MCA-SA	.485**	.454	2.201	0.041(0.200)
	MCA-OA	.536**	.404	2.478	
	MCA-JA	.486**	.562	1.779	
CTD-I	MCA-SA	.529**	.454	2.201	0.046(0.200)
	MCA-OA	.568**	.404	2.478	
	MCA-JA	.542**	.562	1.779	

*Normality tests for standardized residuals.

According to the findings of the correlation analysis, a moderate and positive relationship was detected between the variables. Additionally, the multicollinearity statistics demonstrated that the VIF values ranged between 1.779 and 2.478, and the tolerance values ranged between .404 and .562, all of which are within the acceptable thresholds ($VIF < 10$; $Tolerance > .20$) (Hooper et al., 2008; Lomax, 2004). These results demonstrated that there were no multicollinearity issues among the MCA predictors when estimating the CTD subdimensions. Therefore, the variables were considered suitable for further analyses. Moreover, the normality of the standardized residuals was examined using the Kolmogorov-Smirnov test, which must be statistically insignificant (Hooper et al., 2008; Lomax, 2004). The p-values for the residuals of the models predicting CTD-E (.067), CTD-CM (.200), and CTD-I (.200) were all greater than the .05 threshold, which indicates that the assumption of normally distributed residuals was met. Therefore, the variables were considered suitable for further analyses.

To investigate the relationship between pre-service teachers' self-perceived MCA and their CTD, a CFA model was first performed on the MCAS. The model fit indices for the CFA of the MCAS are presented in Table 5, along with the results of the CFA of the MCAS as illustrated in Figure 2.

Table 5.
Fit Indices for CFA of the MCAS

<i>Indices</i>	<i>Calculated</i>	<i>Acceptable</i>	<i>Good / Very Good</i>
X^2/sd	1.397	$0 < X^2/sd < 5$	$0 < X^2/sd < 3$
RMSEA	0.036	$0.00 \leq RMSEA \leq 0.10$	$0.00 \leq RMSEA \leq 0.05$
NFI	0.907	$0.90 \leq NFI \leq 1.0$	$0.95 \leq NFI \leq 1.0$
CFI	0.971	$0.90 \leq CFI \leq 1.0$	$0.95 \leq CFI \leq 1.0$

Statistical measures used to evaluate model fit in SEM determine the degree to which the model is consistent with the observed data. Due to the sensitivity of the chi-square statistic to sample size and number of variables, the χ^2/df (CMIN/DF) value, obtained by dividing the chi-square value by the degrees of freedom, is used to reduce this effect. A value between 0 and 3 for this ratio indicates a good fit for the model (Hooper et al., 2008; Hu & Bentler, 1999). The basic comparison fit indices are based on comparing the variance-covariance matrix of the measurement model with the true variance-covariance matrix of the collected data. In this context, indicators such as the Normed Fit Index (NFI) and Comparative Fit Index (CFI) take values between 0 (no fit) and 1 (perfect fit), and values of 0.90 or above generally indicate that the model has an acceptable fit; among these indices, CFI has a more widespread use than others (Hu & Bentler, 1999; Hooper et al., 2008). The Root Mean Square Error of Approximation (RMSEA), unlike other indicators, takes values between 0 (perfect fit) and 1 (no fit) and shows how well the model fits the variance-covariance matrix of the collected data. An RMSEA value below 0.10 indicates model fit, while for large sample sizes, this value is expected to be below 0.05, and generally, values between 0.08 and 0.06 or lower are considered acceptable (Hooper et al., 2008; Hu & Bentler, 1999; Lomax, 2004).

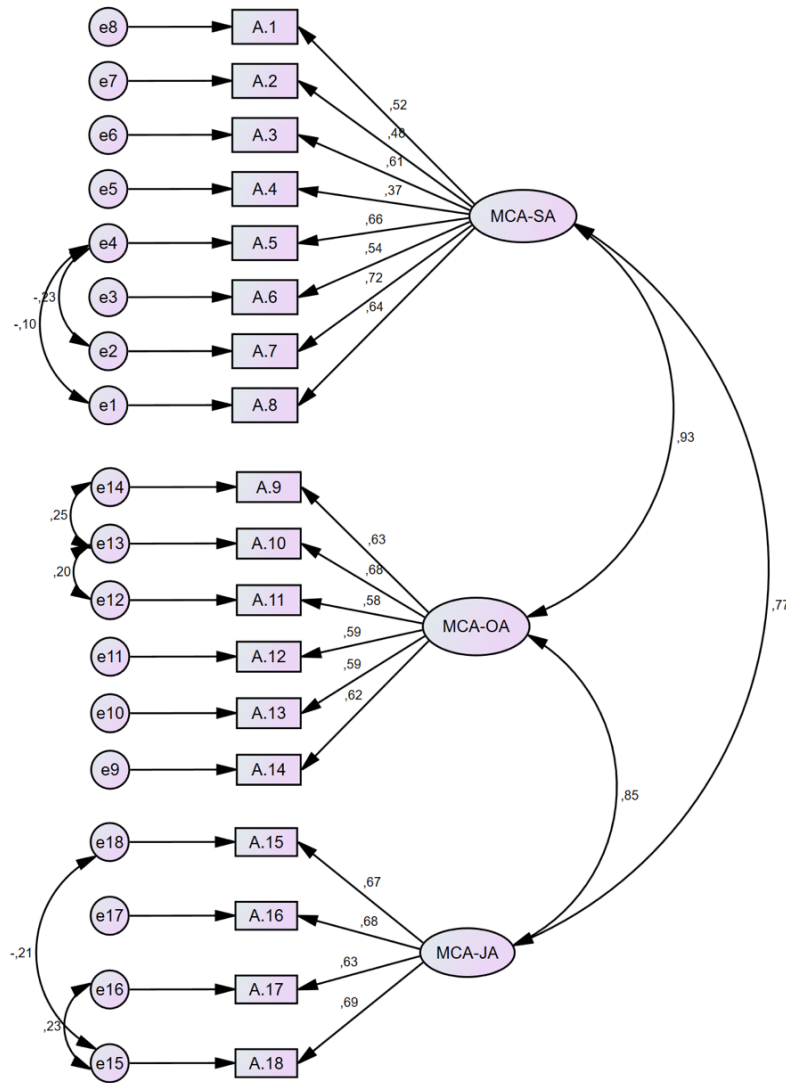


Figure 2. CFA results of the MCAS

Of the four fit indices examined (X^2/sd , RMSEA, NFI, CFI), it was determined that the Chi-square/Degree of Freedom value (1.397) was found below 3.00, which indicates a very good fit; the RMSEA value (0.036) was detected below 0.05, which also demonstrates a very good fit; the NFI value (0.907) exceeded the acceptable threshold of 0.90, which indicates an acceptable fit; and the CFI value (0.971) exceeded 0.95, which shows a very good fit. These results demonstrated that the factor structure of the MCAS provides an acceptable to very good fit across the examined indices, thereby confirming the factor structure of the scale.

Secondly, CFA was performed for the CTDS. The model fit indices for the CFA of the CTDS are listed in Table 6, with the CFA results of the CTDS as depicted in Figure 3.

Table 6.

Fit Indices for CFA of the CTDS

<i>Indices</i>	<i>Calculated</i>	<i>Acceptable</i>	<i>Good / Very Good</i>
X^2/sd	1.682	$0 < X^2/sd < 5$	$0 < X^2/sd < 3$
RMSEA	0.047	$0.00 \leq RMSEA \leq 0.10$	$0.00 \leq RMSEA \leq 0.05$
NFI	0.913	$0.90 \leq NFI \leq 1.0$	$0.95 \leq NFI \leq 1.0$
CFI	0.941	$0.90 \leq CFI \leq 1.0$	$0.95 \leq CFI \leq 1.0$

Of the four fit indices examined (X^2/sd , RMSEA, NFI, CFI), it was determined that the Chi-square/Degree of Freedom value (1.682) was found below 3.00, which indicates a very good fit; the RMSEA value (0.047) was detected below 0.05, which also shows a very good fit; the NFI value (0.913) exceeded the acceptable threshold of 0.90, regarded as an acceptable fit; and the CFI value (0.941) was above 0.90 but slightly below 0.95, indicating a fit close to good. These results demonstrated that the factor structure of the CTDS provides an acceptable to very good fit across the examined indices, thereby confirming the factor structure of the scale.

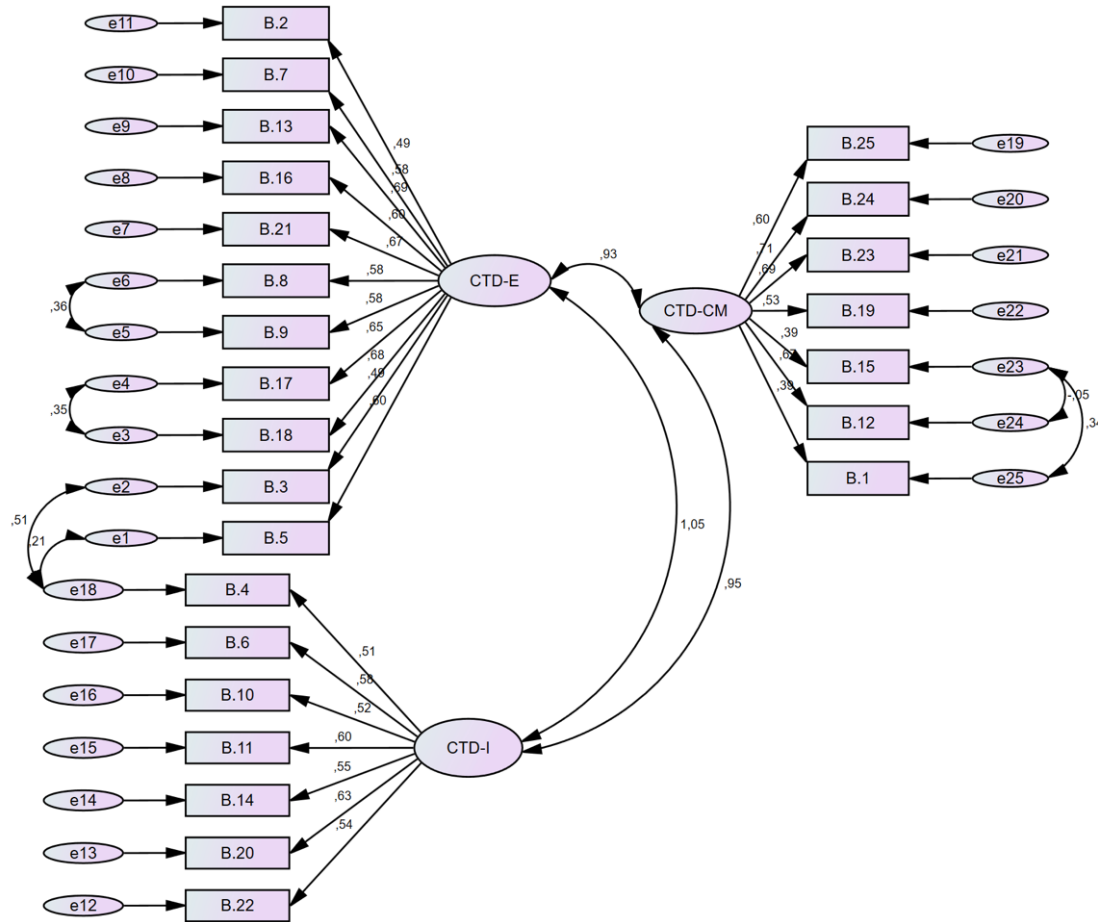


Figure 3. CFA results of the CTDS

After confirming the subdimensions of the MCAS and CTDS, the formulated hypotheses were tested for Model 1 (H_1) and Model 2 (H_2 , H_3 , and H_4). Table 7 presents the model fit indices for Model 1, and Figure 4 shows the path diagram of Model 1.

Table 7.
Fit Indices of Model 1

Indices	Calculated	Acceptable	Good / Very Good
X^2/sd	1.473	$0 < X^2/sd < 5$	$0 < X^2/sd < 3$
RMSEA	0.039	$0.00 \leq RMSEA \leq 0.10$	$0.00 \leq RMSEA \leq 0.05$
NFI	0.906	$0.90 \leq NFI \leq 1.0$	$0.95 \leq NFI \leq 1.0$
CFI	0.968	$0.90 \leq CFI \leq 1.0$	$0.95 \leq CFI \leq 1.0$

Of the four fit indices examined for Model 1 (X^2/sd , RMSEA, NFI, CFI), it was determined that the Chi-square/Degree of Freedom value (1.473) was below 3.00, which indicates a very good fit; the RMSEA value (0.039) was found below 0.05, which also demonstrates a very good fit; the NFI value (0.906) exceeded the acceptable threshold of 0.90, which shows an acceptable fit; and the CFI value (0.968) exceeded 0.95, which confirms a very good fit. These results demonstrated that Model 1 provides an acceptable to very good fit across the examined indices.

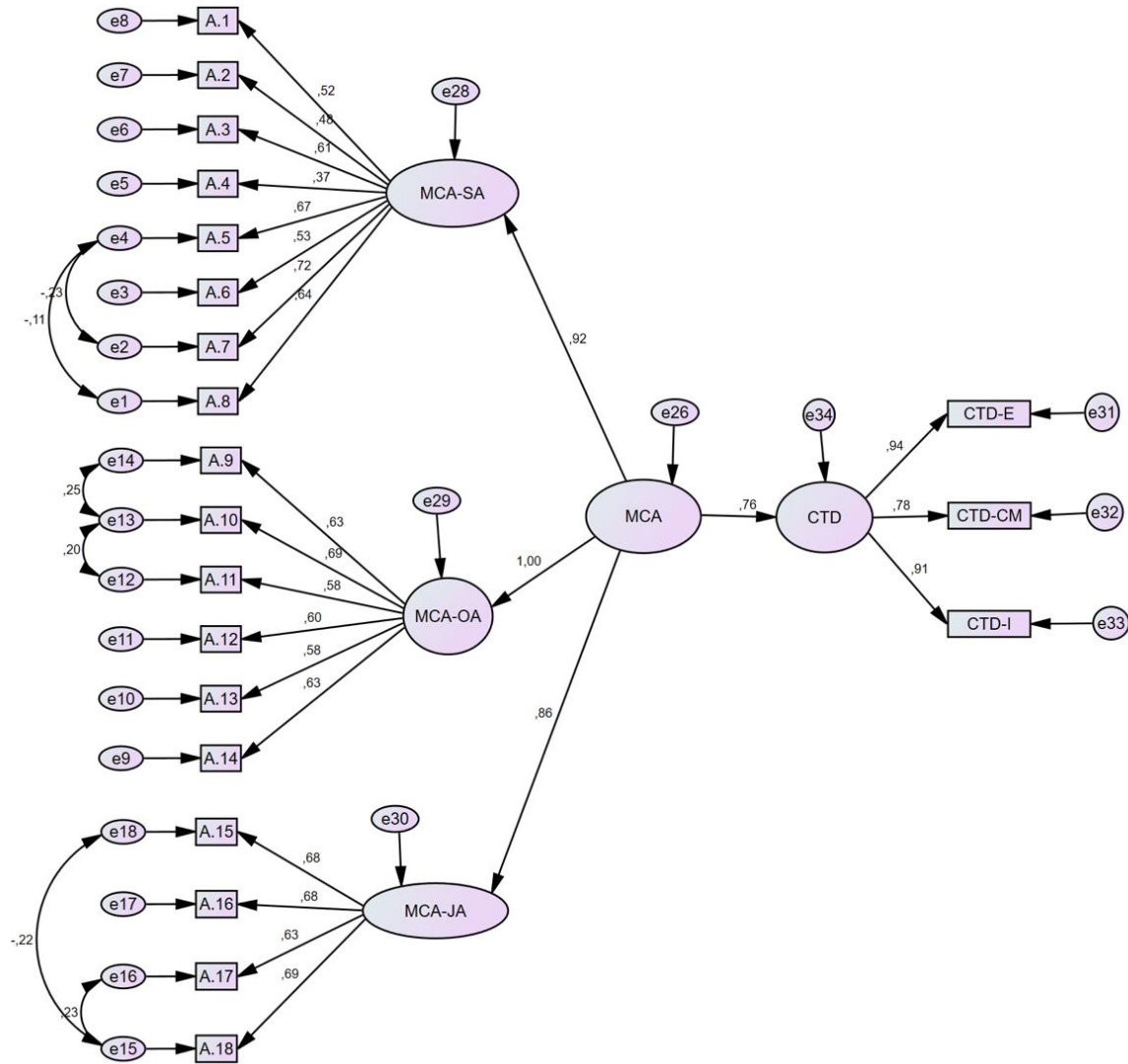


Figure 4. The path diagram of Model 1

In the next step, standardized estimates of the structural model (Model 1) were calculated as presented in Table 8. According to the results, the estimated coefficient of the effect of MCA on CTD was identified as 0.760 and statistically significant ($p < .001$), which indicates that MCA positively predicted CTD. Specifically, a 1.00 standard deviation increase in MCA led to a 0.760 standard deviation increase in CTD. Therefore, it can be concluded that as the level of MCA of pre-service teachers increased, their disposition to CT also increased. Accordingly, H_1 proposed in Model 1 was supported.

Table 8.

Standardized Coefficients of Model 1

			<i>Estimate</i>	<i>p</i>
CTD	<---	MCA	0.760	***
MCA-SA	<---	MCA	0.922	
MCA-OA	<---	MCA	0.997	***
MCA-JA	<---	MCA	0.861	***
CTD-E	<---	CTD	0.938	
CTD-CM	<---	CTD	0.782	***
CTD-I	<---	CTD	0.907	***

Finally, the formulated hypotheses (H_2 , H_3 , and H_4) were tested for Model 2. Table 9 presents the model fit indices of Model 2, and Figure 5 depicts the path diagram of Model 2.

Table 9.

Fit Indices of Model 2

Indices	Calculated	Acceptable	Good / Very Good
X^2/sd	1.459	$0 < X^2/sd < 5$	$0 < X^2/sd < 3$
RMSEA	0.039	$0.00 \leq RMSEA \leq 0.10$	$0.00 \leq RMSEA \leq 0.05$
NFI	0.911	$0.90 \leq NFI \leq 1.0$	$0.95 \leq NFI \leq 1.0$
CFI	0.970	$0.90 \leq CFI \leq 1.0$	$0.95 \leq CFI \leq 1.0$

Of the four fit indices examined for Model 2 (X^2/sd , RMSEA, NFI, CFI), it was determined that the Chi-square/Degree of Freedom value (1.459) was detected below 3.00, which demonstrates a very good fit; the RMSEA value (0.039) was below 0.05, which also indicates a very good fit; the NFI value (0.911) exceeded the acceptable threshold of 0.90, regarded as an acceptable fit; and the CFI value (0.970) exceeded 0.95, which demonstrates a very good fit. These results confirmed that Model 2 provided an acceptable to very good fit across the examined indices.

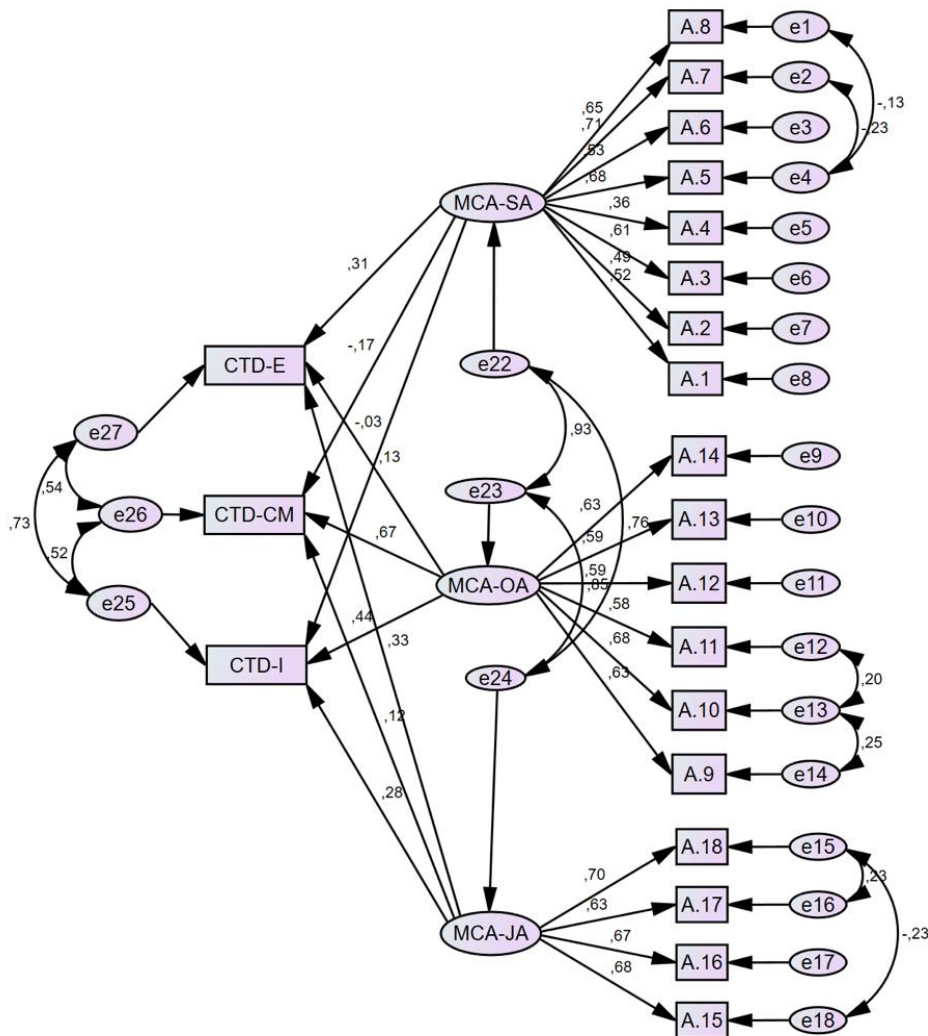


Figure 5. The path diagram of Model 2

Then, standardized estimates of the structural model (Model 2) were calculated as illustrated in Table 10. According to the results, it was revealed that the estimated coefficients of the effects of the subdimensions of MCA on the subdimensions of CTD were not mostly statistically significant. MCA-SA did not have a significant effect on CTD-E, CTD-CM, or CTD-I. MCA-OA also did not exert a significant influence on these subdimensions. However, MCA-JA demonstrated a significant positive effect on CTD-E ($\beta=0.325$, $p=0.043$), while its effects on CTD-CM and CTD-I were positive but not significant. Accordingly, only $H_{4.1}$ was accepted, whereas H_2 and H_3 were rejected.

Table 10.

Standardized Coefficients of Model 2

			<i>Estimate</i>	<i>p</i>
CTD-E	<---	MCA-SA	0.306	0.271
CTD-CM	<---	MCA-SA	-0.165	0.638
CTD-I	<---	MCA-SA	-0.028	0.927
CTD-E	<---	MCA-OA	0.125	0.738
CTD-CM	<---	MCA-OA	0.666	0.163
CTD-I	<---	MCA-OA	0.437	0.293
CTD-E	<---	MCA-JA	0.325	0.043*
CTD-CM	<---	MCA-JA	0.124	0.514
CTD-I	<---	MCA-JA	0.284	0.099

* $p < 0.05$

To conclude, pre-service teachers reported high MCA, with MCA-OA highest and MCA-JA lowest (RQ1). CTD was likewise found to be high, and CTD-E, CTD-CM, and CTD-I were comparable in magnitude (RQ2). Correlations between MCA and CTD were investigated (RQ3). Structurally, Model 1 supported H_1 , which indicates a strong positive effect of overall MCA on overall CTD. In Model 2, only the path from MCA-JA to CTD-E ($H_{4.1}$) was found to be significant, and all the other cross-paths were not significant. These results revealed that, although overall MCA was a strong predictor of CTD, dimension-level effects were limited and appeared in the MCA-JA on CTD-E, and MCA-SA and MCA-OA did not positively predict CTD-E, CTD-CM, and CTD-I. In other words, H_2 and H_3 were not supported, whereas H_4 received partial support.

5. DISCUSSION

In this study, pre-service teachers' levels of MCA and CTD were investigated, and associations between MCA and CTD were examined structurally. Accordingly, the level of pre-service teachers' MCA was found to be high. Consistently, Oz (2016) also reported a very high level of MCA among pre-service teachers. However, Ekici et al. (2019) detected a moderate level while Sendurur et al. (2011) found a low level of MCA among Turkish pre-service teachers. As Schraw and Moshman (1995) noted, this pattern is consistent with metacognitive theory, which posits that metacognitive activities help control one's thinking or learning, and regulatory skills, such as planning, monitoring, and evaluation, are accompanied by metacognitive knowledge, which can be strengthened through instruction and practice. Therefore, sustainable engagement in metacognitive activities in teacher education builds metacognitive knowledge and metacognitive regulation, which in turn increases self-perceived awareness (Papleontiou-Louca, 2003; Schraw et al., 2006). Therefore, differences across studies may reflect variations in the emphasis on metacognitive routines in the curricula of teacher education programs, as well as cohort and measurement differences.

Of the subdimensions of MCA, it was also detected that the organizational awareness of the pre-service teachers is at the highest level, while their level of judgmental awareness is the lowest. Similarly, Altun et al. (2021), in a study with 101 graduate students in the department of mathematics education, reported that their level of overall MCA was high, and the lowest mean score belonged to judgmental awareness; however, self-awareness was inconsistently the highest. Possible reasons for these findings can result from curricular emphases on mostly planning and monitoring tasks rather than explicit evaluative routines in the curricula of teacher education (Hawe et al., 2021). In metacognitive models, planning and monitoring are often taught earlier and are more observable, which can contribute to organizational awareness (Schraw et al., 2006; Schraw & Moshman, 1995). By contrast, judgmental awareness depends on reflective practices that tend to be less frequently scaffolded and that require greater domain experience (Diseth, 2025).

Regarding pre-service teachers' level of self-perceived CTD, the overall CTD was found to be high, with close mean scores in its subdimensions of engagement, cognitive maturity, and innovativeness. Prior research consistently supports this high-level CTD of Turkish pre-service teachers (Aybek, 2018; Aybek & Aslan, 2017; Cinici & Ergin, 2019; Fettahlioglu & Kaleci, 2018). However, several studies detected a low level of CTD among pre-service teachers (Acisli, 2016; Akgun & Duruk, 2016; Arsal, 2015; Cakmak Gulec, 2010; Ekici, 2017; Oguz & Saricam, 2016). Moreover, unlike the results of the present research, some other studies (Celik et al., 2018; Sendag et al., 2015; Turan, 2016; Yorganci, 2016) proved a moderate level of CTD. As clarified in the literature, CT refers to a set of skills for judgment reasoned through interpretation, analysis, evaluation, and inference (Ennis, 2015; Facione, 1990), whereas CTD represents the tendency or motivation to employ these skills when appropriate, with the help of engagement, cognitive maturity, and innovativeness (Facione et al., 2000; Irani et al., 2007; Ricketts & Rudd, 2005). Consequently, high CT skills do not necessarily imply high CTD, and variation in CTD across studies can arise from differences in measurement instruments, sample characteristics, curricular and pedagogical approaches in teacher education programs. These factors can lead to the different CTD levels reported by pre-service teachers.

Finally, the associations among the subdimensions of MCA and CTD of pre-service teachers were investigated with the tested Model 1 and Model 2. According to the tested findings for Model 1, it was evident that MCA was significantly related to the CTD of pre-service teachers. The results proved that as the MCA of pre-service teachers increases, their disposition to CT increases. Consistently, Kozikoglu (2019) also reported a significant relationship between pre-service teachers' CT tendencies and

metacognitive skills. Similarly, prior literature highlights that CT is directly related to metacognition (Cakici, 2018; Fahim & Eslamdoost, 2014; Halpern, 2003; Kuhn, 1999). Notably, metacognition is conceptualized as the regulatory “control system” for cognition, which comprises planning, monitoring, and evaluation, as supported by metacognitive knowledge (Papleontiou-Louca, 2003; Schraw et al., 2006). Such regulation can make the implementation of CT skills more consistent; therefore, it contributes to strengthening the dispositions to use them through engagement, cognitive maturity, and innovativeness, as highlighted in disposition frameworks (Facione et al., 2000; Irani et al., 2007; Ricketts & Rudd, 2005).

As for the tested results for Model 2, the effects of the subdimensions of MCA on the subdimensions of CTD were mostly not statistically significant. Among these, only judgmental awareness was found to have a significant positive effect on engagement, while the effects of self-awareness and organizational awareness on engagement, cognitive maturity, and innovativeness were not significant. In metacognitive models, evaluation against criteria is the final phase of the self-regulatory cycle, following planning and monitoring, and influences subsequent performance (Papleontiou-Louca, 2003; Schraw et al., 2006). Engagement, in turn, is defined as the willingness and confidence to use reasoning (Irani et al., 2007; Ricketts & Rudd, 2005). It is therefore reasonable that evaluative routines, such as checking outcomes against standards, identifying errors, and adjusting strategy, can directly sustain the disposition to engage in reasoning. In contrast, self-awareness, which is the knowledge of strategies and when to use them, and organizational awareness, which concerns planning and monitoring, may not uniquely predict CTD when judgmental awareness is included, because these subdimensions of CTD are strongly correlated as parts of the same regulatory system (Schraw et al., 2006). Moreover, planning and monitoring emphasize procedural appropriateness and control, which do not necessarily turn into the dispositional aspects that require openness to alternative viewpoints, as described in cognitive maturity, or curiosity and exploration, represented in innovativeness (Boonsathirakul & Kerdsoomboon, 2021; Facione et al., 2000; Ricketts & Rudd, 2005). These results suggest that evaluative practices are the metacognitive component closely aligned with a readiness to reason, whereas planning, monitoring, and strategy knowledge, which are critical for CT skills, may not directly, by themselves, contribute to the disposition to use those skills. Consequently, the three phases of regulation should be scaffolded with explicit criteria, feedback, and reflective practices to enhance judgmental awareness in teacher education programs.

5.1. Recommendations and Practical Implications

This study contributes to the existing literature due to its significant results, providing a detailed map of the associations among the subdimensions of MCA and CTD. Based on the research results, pre-service teachers demonstrated a high level of MCA and CTD, which indicates that the teaching system for pre-service teachers provides a learning environment where they can develop insights and practices in metacognition and CT skills. However, it should be emphasized that the highest level of MCA corresponded to organizational awareness, which proves a higher emphasis on planning and monitoring in the teaching system. Organizational awareness, no doubt, is a significant component in metacognition as long as it does not block pre-service teachers’ dispositions to CT in terms of engagement, cognitive maturity, and innovativeness. Practically, this finding revealed that overemphasizing the planning and monitoring processes hinders pre-service teachers’ tendencies to use their CT skills or to be critical thinkers, particularly in evaluation.

Moreover, judgmental awareness was found to be the lowest level of MCA, which implies that pre-service teachers need more direction and practice that can enable them to evaluate their thinking and cognitive regulation. Accordingly, the teaching system should be reconstructed by offering a variety of activities that facilitate students’ evaluation skills. In designing programs, evaluation should be constructed as a routine feature of learning and teaching. Especially, within teaching courses, practitioners and instructors can make evaluative criteria visible and used through analytic rubrics with annotations and reflective implementations. In this respect, pre-service teachers can acquire the ability to judge quality against standards. Besides, the self-regulatory cycle of planning, monitoring, and evaluating should be employed in teaching approaches to develop engagement and cognitive maturity. Teaching activities should involve problem-based learning tasks to improve pre-service teachers’ abilities to justify choices and revise strategies.

At the dimensional level, it was found that judgmental awareness positively predicted engagement, whereas self- and organizational awareness did not exhibit significant associations with engagement, cognitive maturity, or innovativeness. Therefore, programs in teacher education should retain necessary attention to planning and monitoring while systematically strengthening evaluative practices across coursework and practicum. To develop a more effective disposition to CT, bureaucratic procedures for planning and monitoring should be minimized, and the significance of engagement and innovativeness in CT should be highlighted in teacher education. Therefore, policymakers and educational administrators in the faculty of education should reconsider the teaching system, and organizational awareness should be decreased in metacognitive aspects. The use of CT skills should be regarded as more important than the procedures of planning and monitoring, and evaluation-based approaches can be adopted for judgmental awareness to engage pre-service teachers in using their CT skills.

5.2. Limitations and Future Directions

This study has several limitations that qualify the interpretation and generalizability of the findings. First, the design is cross-sectional and relies on self-report scales of MCA and CTD. Thus, the results may be affected by methodological variance and social desirability bias. Future studies should combine surveys with performance-based measures of CT and observations or

interviews to triangulate the constructs and investigate changes over time through longitudinal or intervention-based designs. Moreover, the sample was obtained by convenience sampling from faculties of education and was not intended to be nationally representative. In particular, the gender distribution is highly unbalanced in the sample, which reflects enrollment patterns in teacher education but limits the generalizability of the results to study groups with different gender compositions. Because gender may relate to self-perceptions of metacognition and CTD, future studies should focus on more balanced groups and test measurement invariance and structural equivalence by gender. Finally, demographic characteristics (e.g., teaching department, year of study, and university region) were used descriptively but not modeled as covariates or moderators in the research design. Further research should incorporate these factors and apply multilevel models to account for clustering within institutions, as program structures and local assessment cultures may shape both metacognitive routines and dispositions. To conclude, addressing these limitations would provide a more precise account of how specific metacognitive practices cultivate dispositions to think critically in teacher education.

6. CONCLUSION

The development of CT skills in teacher education is an indispensable policy planned and supported by national and international policymakers. This present study proved that metacognition is a significant variable for pre-service teachers' disposition to CT. Structural modeling showed a strong overall association between MCA and CTD (Model 1), while judgmental awareness positively predicted engagement, whereas self- and organizational awareness demonstrated no significant relations with engagement, cognitive maturity, or innovativeness (Model 2). Therefore, the associations among the subdimensions of MCA and CTD should be re-evaluated in teacher education programs. These results clarify which aspect of metacognition is closely aligned with a readiness to reason and point to the value of embedding evaluative routines within courses and practices. Consequently, this present study contributes to providing a route for educational administrators and practitioners in the faculty of education to create an environment where pre-service teachers can use their CT skills more effectively.

Research and Publication Ethics Statement

This study was conducted in accordance with research and publication ethics.

Contribution Rates of Authors to the Article

The author was solely responsible for study design, data collection, analysis and interpretation, and manuscript preparation.

Statement of Interest

The author declares no financial or personal competing interests.

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An Exploration of Primary Stress in *If*-Conditionals in English Language Education Majors in Türkiye*

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Article Information	ABSTRACT
Received: 25.05.2025	It is well-established that suprasegmental pronunciation features are essential to effective communication. Given the assumed significance of primary stress as one suprasegmental aspect (Ghosh and Levis, 2021), the perceived difficulty of <i>If</i> -conditionals (Norris 2003), the professional requirement for language teachers to attain a good command of pronunciation (e.g., knowledge, skills, and competences) (Topal & Altay, 2022), and the causal connection between teacher cognition (e.g., knowledge), learning, and practice (Farrell and Tomenson-Filion, 2014), this study examined the perception and production levels of teacher trainees in relation to primary stress of <i>If</i> -conditionals. Employing a one-group pretest-posttest design (Cranmer, 2017), the study collected data from teacher trainees (<i>n</i> = 61) in a Turkish state-research university through tests of perception and production. Participants received suprasegmental pronunciation training between the pretest and posttest. Findings indicated moderate improvement in perceiving and producing the primary stress of <i>If</i> -conditionals. A linear relationship between the perceived difficulty of types of conditional sentences and degrees of improvement was also determined. The study is expected to contribute to our perceptions of language teacher cognition in language teacher education settings, notwithstanding the limitations.
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1. INTRODUCTION

Pronunciation is a crucial component of English language teaching, as it is essential for effective communication (Levis, 2021; Topal, 2022). Among the various aspects of pronunciation, stress patterns play a significant role in conveying meaning and emphasis (Gluhareva & Prieta, 2017). In English, primary stress is the strongest stress in a word and is important for determining sentential meaning. *If*-conditionals are a common structure in English, and the placement of primary stress in *If*-conditionals might significantly impact their meaning (Topal, 2017). For example, in the sentence "If you study hard, you will pass the exam," the stress is on "study" and "pass," which are the most important words in the sentence. This stress pattern helps to emphasize the condition (studying hard) and the consequence (passing the exam). Misplacement of stress on the wrong word or syllable might result in unclear or ambiguous sentential meanings. For example, if the stress is placed on "you" instead of "study" in the sentence above, the meaning could be interpreted as "If someone studies hard, you will pass the exam," which is a very different meaning than the intended "If you study hard, you will pass the exam."

Also known as conditional sentences, *If*-conditionals express hypothetical situations and are fundamental elements of English grammar (Ferguson, 2001). They are salient as they allow speakers and writers to communicate complex ideas and hypothetical situations clearly and concisely. Commonly used in conversation, writing, and formal settings such as academic papers and business presentations (Reyes, 2011), *If*-conditionals comprise two clauses: the *If*-clause and the main clause. The *If*-clause introduces the hypothetical situation, and the main clause expresses the consequence. In English, the primary stress in *If*-conditionals mainly falls on the content words (e.g., verbs, nouns, adjectives, and adverbs) in the main clause. Since misplaced stress in utterances relatively cause intelligibility problems (Hahn 2004; Ghosh & Levis 2021; Luchini & Paz, 2022), teaching the primary stress in *If*-conditionals is crucial for accurate and clear communication.

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Despite the importance of primary stress in *If*-conditionals, research on EFL teacher training in Türkiye suggests that pronunciation teaching is commonly overlooked in language teaching programs (Topal, 2022). Previous research in non-Turkish contexts on primary stress revealed its impact on recall (Hahn, 2004) intelligibility and comprehensibility (Lewis & Deterding, 2018; Ghosh & Levis, 2021), word recognition (Tremblay, 2008), and communication (Liu, 2017). Studies on *If*-conditionals, on the other hand, focused on medical discourse (Ferguson, 2001), the acquisition of *If*-conditionals by Korean and Spanish learners of English (Ko, 2013), modality in conditional and non-conditionals (Gabrielatos, 2019), corpus-based frequency of *If*-conditionals (Gabrielatos, 2021), and its comparison in EFL textbooks (Winter and Le Foll, 2022). On the other hand, previous research in Turkish contexts on primary stress indicated problems with stress placement for Turkish EFL learners and teacher trainees (Hismanoglu, 2012; Taş & Khan 2022), advantages of remedial training for learning outcomes (Arslan, 2013; Evis & Kılıç, 2020; Karaazmak, 2015; Topal, 2017), whereas studies on *If*-conditionals demonstrated that common conditional constructions were not included in ministerial textbooks (Şahinkayaş & Büyükaşık, 2012), remedial training enhanced the intonation patterns of *If*-conditionals among teacher trainees (Topal, 2017), the pitch phonemes of teacher trainees improved after the treatment (Topal, 2018a) and the perception and production of juncture phonemes advanced among teacher trainees (Topal, 2018b). To the researcher's best knowledge, no studies primarily tackled the pitch phonemes of *If*-conditionals in English in the Turkish context.

All things considered, this study investigated the perception and production competence of the primary stress patterns of *If*-conditionals among Turkish EFL teacher trainees. The following research questions were addressed within the scope of the study:

- (1) How well did the participants perform in Type 1, Type 2, and Type 3 conditionals in the tests of perception and production?
- (2) Did the participants' perception and production of primary stress of *If*-conditionals improve following the treatment?

1.1. Pronunciation Instruction in Türkiye: A Succinct Background

Occupying a geopolitically special place in the world, Türkiye is one of the countries in Kachru's (1985) Expanding Circle, where English is spoken as a foreign language. In addition to its long-established language teaching history, Türkiye has conformed to the internally recognized, European-origin framework for language learning, teaching, and assessment (the CEFR, Council of Europe, 2001) for more than two decades (Hazar, 2021). The country has also undergone several curriculum revisions and updates to modernize foreign language education (Kirkgoz, 2007). The latest one mandates English language instruction from the second to the twelfth grade (Ayaz, Ozkardas & Ozturan, 2019). Following the overall and compulsory twenty-hour-long language education at the primary and secondary levels, Turkish students receive a compulsory one-year-long English education at the preparatory schools of university departments where English is the medium of instruction (Topal, 2024). ELT majors are offered two courses (i.e., Listening and Pronunciation I/II) in their first year (Topal & Altay, 2024). No specific attention is given to pronunciation at any education levels, except for the two undergraduate courses ELT majors receive.

Relevant curricula analyses strongly emphasize productive and receptive skills in primary and marginal pronunciation focus in secondary education (Ministry of Education 2018a, 2018b). Previous research also confirms this from several aspects. For instance, the analysis of ministerial and collegial coursebooks revealed complete abandonment of pronunciation at the primary and insignificant attention at the secondary education levels (Demirezen, 2001, 2022). Studies with EFL teachers showed exclusion of pronunciation from the curriculum, a lack of teaching confidence and knowledge, and some other institutional or curricular limitations (Çam, 2024; Hismanoglu & Hismanoglu, 2013; Topal & Altay, 2022). Similarly, diagnostic and interventional studies manifested problems with segmental and suprasegmental pronunciation features among Turkish EFL teacher trainees (Aksakalli & Yagiz, 2020; Arıkan & Yılmaz, 2019; Topal & Altay, 2022; Demirezen, 2009, 2010, 2016, 2022). Overall, despite the contextual, individual, and institutional dynamics and variations, pronunciation instruction is underemphasized in the Turkish context, with calls for teacher training in this language skill (Topal & Altay, 2022, 2024).

1.2. Language Teacher Cognition

Despite its rooted history yet popularization by Simon Borg in 2003, teacher cognition (Figure 1) refers to the mental lives of teachers (e.g., assumptions, beliefs, knowledge, and thoughts) that inform their teaching practice (Borg, 2003). Although previous research concentrated on teacher cognition in general, Borg (2003) specialized in "language teacher cognitions." After Borg's (2003) seminal work, relevant research has expanded into beliefs about specific language skills (e.g., grammar, vocabulary, and pronunciation) (e.g., Macalister, 2012; Zhang & Sun, 2022), cognition in specific contexts (e.g., EFL/ESL, CLIL, and online teaching) (e.g., Shiu, 2024; Sun, Wei, & Young, 2022), experienced and novice teachers (e.g., Karimi & Asadnia, 2023), and teacher learning and cognition in teacher education (e.g., Golombek & Doran, 2014). Researchers have also investigated the interaction between teacher cognitions and classroom practices, which usually results in tensions and mismatches (Li, 2025). Borg (2018) himself revisited this in later publications, emphasizing contextual and experiential factors mediating the cognition-practice link.

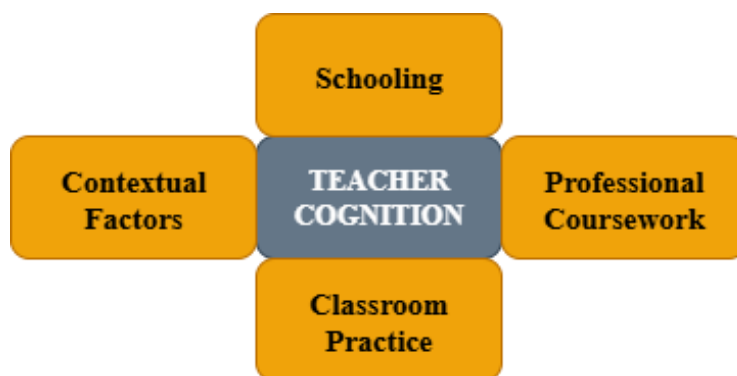


Figure 1. The schematic conceptualization of teacher cognition (adapted from Borg, 2003)

Conceptually, Borg (2003) cites teacher cognition as “what teachers know, believe, and think” (p.81). In our study, we refer to teacher trainees’ knowledge (of the stress in *If*-conditionals) regarding teacher cognition. We believe that teacher trainees’ previous schooling and professional coursework (the courses they have taken regarding pronunciation) may affect their cognitions about pronunciation instruction in their prospective teaching experiences. In that regard, teacher trainees with good pronunciation knowledge may be well-equipped content-wise to teach pronunciation. The knowledge aspect of teacher cognition also aligns well with Shulman’s (1987) teacher knowledge (content knowledge and pedagogical content knowledge), suggesting that language teachers should have the content knowledge (pronunciation features) and pedagogical content knowledge (how to teach pronunciation). It also concurs with Baker and Murphy’s (2011) framework for teachers’ knowledge base of pronunciation teaching. Building on Shulman’s (1987) teacher knowledge, Baker and Murphy (2011) posit that more research is needed to understand teachers’ knowledge, beliefs, and thoughts about pronunciation to reveal what pronunciation features teachers must know, their awareness of potential student problems, and pedagogical priorities (e.g., which pronunciation features to teach).

Previous research on LTE about pronunciation showed a predominant reliance on controlled techniques, limited use of guided methods, and shared beliefs about the importance of listening perception, kinesthetic practice, and the potential dullness of pronunciation instruction (Baker, 2014), gaps in phonological training, uncertainty in instructional content and methods, and a tendency toward reactive teaching, and highlighted the need for more research and better integration of current findings into teacher education and practice (Couper, 2017), perceiving pronunciation less important by older teachers than younger ones, while all groups facing similar obstacles (e.g., time constraints and insufficient training) (Georgiou, 2019), a complex, reciprocal relationship in which identity construction profoundly influences and is influenced by the development of pedagogical cognition (Burri, Chen, & Baker, 2017), corrective feedback being largely ad hoc and focused on phonemes and words, typically delivered via recasts and repetition, with teachers valuing learner autonomy but showing gaps in training and a need for clearer understanding of effective CF practices (Couper, 2019), and a shift from a segmental-focused to a more balanced approach that values suprasegmentals, with growth influenced by self-awareness, perceived improvement, and native/non-native collaboration (Burri, 2015).

In the Turkish EFL teacher education context, Yagiz (2018) revealed moderate self-confidence and recognition of pronunciation’s importance, yet limited knowledge focused mainly on segments and transcription, with notable neglect of suprasegmentals and a clear need for further support in pronunciation teaching and assessment. Uzun (2022) found that EFL teacher trainees feel inadequately trained to teach pronunciation while they view it as essential and aspire to native-like pronunciation, highlighting the need to rethink pronunciation instruction within ELT teacher education programs. Topal and Altay (2024) examined pronunciation knowledge, perception, and production of 80 first-year Turkish EFL teacher trainees over a 16-week course, found modest gains in knowledge, slight improvements in perception, and substantial progress in production, though persistent gaps remained in segmental and suprasegmental features, highlighting areas for pedagogical focus and further research.

Overall, research in Turkish and non-Turkish contexts indicates variations in pronunciation cognitions due to contextual factors. One issue emphasized in previous work, however, is the urgent need for pronunciation training of language teachers and teacher trainees. This supports the findings of previous research discussed earlier, regarding the lack of attention paid to pronunciation in both contexts.

1.3. Stress as a Salient Component of Intonation

Stress is closely related to intonation, a fundamental prosodic feature essential for language learners and teachers (Brown, Currie, & Kenworthy, 2015; Tench, 2015). Intonation has linguistic and paralinguistic dimensions, organizing information, expressing attitudes, distinguishing sentence types, and establishing textual structure (Levis & Wichmann, 2015; Tench, 2015). It operates through tonality—the division of speech into meaningful chunks; tonicity—the placement of the primary focal word; and tone—the use of pitch patterns such as rise, fall, fall-rise, or rise-fall to convey meaning (Halliday, 1970; Tench, 2015). Intonation can communicate emotions and attitudes beyond words (e.g., surprise or certainty), and differentiate questions from

statements (Goodman, 2014; Reed & Michaud, 2015). Emphasizing words through intonation highlights their importance, aiding listener comprehension and enhancing natural, fluent spoken English (Carter, 2011; Gilbert, 2014; Smiljanic, 2021). Overall, understanding and appropriately using intonation is vital for effective communication in English (Pickering, 2018; Reed & Michaud, 2015; Brown, 2017).

1.4. Primary Stress in English: Instruction and Significance

Intonation and stress are closely interconnected, though often confused with accent, which refers to a speaker's distinctive pronunciation (Roach, 2012; Crystal, 2008; Czap & Pintér, 2014). English, a stress-timed language with free stress, relies heavily on stress to create rhythm and meaning, distinguishing between word (lexical) stress and sentence (prosodic) stress, with primary stress typically on content words and serving to emphasize semantic importance (Lee & Song, 2019; Halliday, 1970; Lee et al., 2017). Misplacement of primary or nuclear stress can lead to misunderstanding and communication breakdowns, particularly for nonnative speakers whose native languages have different stress patterns, such as Turkish, which is syllable-timed and features fixed stress, complicating perception and production of English stress patterns (Jenkins, 2000; Clennell, 1997; Celce-Murcia, Brinton, & Goodwin, 2010; Demirezen, 2009). Despite its significance for intelligibility and naturalness, teaching intonation and stress is often neglected due to its complexity, teacher cognition, and typological differences between languages, highlighting the need for targeted training to raise phonological awareness and improve suprasegmental instruction among nonnative English teachers, especially for structures like *If*-conditionals (Couper, 2019; Mitrofanova, 2012; Topal & Altay, 2022; Topal, 2017; Wong, 1994). However, previous research indicated the possibility of teaching intonation successfully (Sonsaat-Hegelheimer & Levis, 2025).

1.5. Models and Methods of Intonation

Two models cited in the study will be mentioned here. The Grammar/Intonation Model (GIM) (Cauldwell & Hewings, 1996; Gussenhoven & Jacobs, 2017) is a theoretical framework that seeks to understand the interaction between intonation and grammar in spoken language. According to Gussenhoven and Jacobs (2017), this model proposes that intonation is not just an ancillary feature of language, but is instead an integral part of the grammar itself. This means that intonation patterns can convey important information about the structure and meaning of a sentence, including information about word order, focus, and emphasis. For example, in English, the placement of the nuclear pitch accent can change the meaning of a sentence (Gussenhoven & Jacobs, 2017), as in the difference between "He's going to Paris" and "He's going to Paris?" Furthermore, the GIM suggests that intonation and grammar are tightly linked, such that changes in one can have cascading effects on the other. This model has been influential in shaping our understanding of the complex interplay between prosody and grammar in spoken language (Ladd, 2014).

The Audio-Articulation Model (AAM, Demirezen, 2003, 2010), on the other hand, is used as a model to teach, correct, and address the core sound pronunciation problems of non-native English teachers. This model begins with raising awareness of fossilized pronunciation mistakes in the target language, followed by focused listening and oral practice exercises. To effectively correct the pronunciation mistakes and address L2 core sounds, it is important to take a comprehensive approach that includes both micro and macro-level perspectives. The AAM principles for teaching pronunciation involve extensive and customized aural and spoken activities that use natural language processing tools. Exclusive activities, which involve recognizing and distinguishing L2 sound patterns within speech streams, are central to teaching accurate pronunciation. Tools such as corpora, minimal pairs and sentences, and sentential cues are also critical for the AAM in designing practice procedures and constructing listening texts (Demirezen, 2010).

1.6. If-Conditionals in English

Conditionals are one of the most advantageous structures for expressing assumptions regarding events or circumstances that are not in accordance with reality. (Hall & Azar, 2010). In the speaker's perspective, conditional statements carry a type of truth value. The *If*-clause provides a condition which, in the speaker's judgment, may or may not result in the intended result. The speaker's forecast of an event might be stated in the result clause (Hall & Azar, 2010). There are three types of conditional sentences (Mead & Stevenson, 1996; Wu, 2012). Type 1 or real conditionals are used to talk about future situations and their consequences (Clare and Wilson 2015a), wherein *If* is used for likely and *when* is used for certain situations. Type 2 or hypothetical present conditions are utilized to talk about present or future imaginary situations and their consequences (Clare & Wilson, 2015). Type 3 or hypothetical past conditions are employed to talk about past hypothetical or imaginary situations, describing unreal or impossible situations (Clare & Wilson, 2015b). In addition to these three types of conditionals which are the primary focus of this study, there is another conditional called Type 0 or zero conditional used to talk about general situations or facts (Clare & Wilson, 2015b). The four types of conditionals might be exemplified as follows:

- If it snows, we get our skis out (Type 0)
- If the weather improves, we'll go for a walk (Type 1)
- If we had more students, we would run the course (Type 2)
- If the rent had been lower, I would have taken the flat (Type 3)

There are very natural connections between *If*-clauses and their intonation just because *If*-clauses inherently house the stress patterns of intonation pertaining to conditional mood. It must be borne in mind that each clause in an *If*-clause has its own intonation pattern. Generally speaking, when the main clause begins a conditional sentence, the sentence has a single intonation pattern as exemplified in the following sentences:

- I can lend you money if you **NÉED** some.
- I can lend you money if **YÓU** need some.
- I can lend you money if you need **SÓME**.

On the other hand, if the subordinate clause initiates a conditional sentence, then each clause possesses a distinct intonation structure whereby the pitch drops toward clause ends. A comma is utilized to separate an *If*-clause when it precedes in a sentence. (Swan, 2002). Thus, there is always a possibility of placing primary stress on one of the components of the independent and dependent clauses:

- If you **NÉED** money, I can **LÉND** you some
- If you need **MÓ**ney, I **CÁN** lend you some.
- If **YÓU** need money, I can lend you some.
- If you need money, I can lend **YÓU** some.
- If you need **MÓ**ney, I can lend **YÓU SÓME**.

In fact, in connected speech there are more possibilities of placing a primary stress on the other components of the words of dependent and independent clauses. Furthermore, connected speech is distinguished by uninterrupted modifications in intonation, stress, phonemic durations, lexical items, and whole sentences (Small, 2020).

2. METHODOLOGY

This study employed a one-group pretest-posttest design to examine changes in participants' performance before and after the intervention (Cranmer, 2017; Shadish, Phillips, & Clark, 2003). While this design lacks a control group and therefore limits internal validity, it was chosen due to practical constraints: random assignment was not feasible given the use of intact class sections and ethical concerns about instructional equity (Knapp, 2016). To mitigate threats to internal validity, several precautions were taken. The short time frame between pretest and posttest (less than two weeks) minimized history and maturation effects (Campbell & Stanley, 1963). To address the Hawthorne effect, the intervention was embedded in regular instruction, and participants were not informed that these activities were part of a study intervention; they were told only that the study concerned general learning outcomes (Dornyei, 2007). Although this design has limitations, it remains a pragmatic and widely accepted approach in educational research where experimental control is not always possible (Gao, Qin, & Gu, 2016; Koller & Stuart, 2016).

2.1. Context and Participants

The research was conducted at the English Language Teaching department of one of the state-research universities in Ankara, Türkiye. The university has been cultivating teacher trainees through undergraduate and graduate education since 1985. Candidates are required to receive an adequate score in the university entrance exam for program admission. They further take the proficiency exam to be exempt from one-year compulsory English preparatory school. Majors of this department are offered compulsory (75%) and elective (25%) courses in field knowledge, professional knowledge, and general knowledge. Those who complete courses that equal to 180 ECTS credits in eight semesters (in seven years at the latest) can graduate with a BA degree. Listening and Pronunciation I (L&P I) course offered in the first semester was within the scope of this research. The division majors learn the activities of bodily organs that are necessary for the right production of vowels and consonants to become skilled at effective listening and perfect pronunciation in the target language within the scope of the L&P I course.

The participants were 61 freshmen (13 males, 48 females) aged between 18-21 (M= 19.5 years). They all took the L&P I course and were assumed to possess similar levels of knowledge pertaining to primary stress. In addition, they took the same university entrance exam (min.= 395,45929; max.= 466,35997 out of 500,00) and proficiency exam (min.=65/100). Accordingly, it was assumed they were an academically homogenous sample. Out of the three sections available at the department, 61 participants were selected according to the convenience sampling method, "in which the participants were chosen based on their convenience and availability." (Creswell & Creswell, 2017, p. 212).

2.2. Ethics Committee Approval

The authors' ethics commission letter dated 15.12.2016 and numbered 2866 was reviewed and deemed ethically appropriate by the Hacettepe University Senate Ethics Commission in its meeting numbered 35853172/43B-169 held on January 2, 2017.

2.3. Instrumentation

To assess the participants' competence levels in perceiving and producing the primary stress *If*-conditionals, two diagnostic tests (i.e., test of perception and test of production) were designed by the present researchers. Prior to test design, a sample corpus comprising 12 *If*-conditional sentences was collected using Apowersoft online audio recorder from paper-based and online dictionaries (e.g., Longman Dictionary of Contemporary English and Longman Dictionary of American English) and English textbooks (e.g., American English File and Face to Face). A similar data collection approach was previously adopted (Swan & Walter, 2011; Wells, 2014). The sentences were selected according to length, sound quality, prevalence, expert opinion, and equal distribution of conditional sentence types. Simply put, 12 target sentences and the position of *If*-clauses were distributed equally among Type 1, Type 2, and Type 3 conditionals. The corpus was provided in Table 1.

Table 1.

The corpus of sentences utilized in the diagnostic tests

Conditional Type	Sentence
Type 1	(1) If I start teaching again, I'll be exhausted after a year.
	(2) If you break the rules, you will be punished accordingly.
	(3) Kim will be disappointed if she figures it out.
	(4) It's hard to teach students if they lack interest in the subject.
Type 2	(5) If anything happened to the kids, I'd never forgive myself.
	(6) If I told them my real feelings, they would just laugh at me.
	(7) Investigators would be remiss if they didn't pursue every possible lead.
	(8) It would mean a lot to your father if you offered to help.
Type 3	(9) If I hadn't read the safety information, I wouldn't have acted so quickly.
	(10) If I'd known it was you on the phone, I would have answered it.
	(11) I would have organized the party for you if I'd known you were coming.
	(12) I would have been terrified if I'd been in that situation.

A test of perception (ToPer) comprising multiple-choice questions was developed by the present researchers. The ToPer was pilot-tested before administration, and was found to have a perfect correlation coefficient ($\alpha=.997$) (DeVellis, 2016). The test of production (ToPro) comprised second language (L2) sentence productions, wherein the same set of sentences as in the ToPer were provided to the participants.

2.4. Treatment

After administering the diagnostic tests as pretests, the participants were given a six-hour remedial training to familiarize themselves with the perception and production of intonation, especially primary stress in *If*-conditionals. The remedial sessions consisted of PowerPoint presentations, including various mechanical and contextual exercises about the target structure. The drills were prepared in light of the AAM (Demirezen, 2003;2010) and the GIM (Cauldwell & Hewings, 1996; Gussenhoven & Jacobs, 2017) models. During these sessions, the participants were introduced to the rules of intonation patterns in *If*-conditionals and given perception and production exercises. The PowerPoint presentations were also shared with the participants for further use.

2.5. Data Collection and Analysis

The data for the research came from two diagnostic tests: ToPer and ToPro. Before the intervention, the participants were first given the ToPer in paper-based format and asked to select the best answer after listening to each sentence three times at five-second intervals. The internal consistency of the ToPer was found to be adequate (Cronbach's $\alpha=.76$ for the pretest and Cronbach's $\alpha=.71$ for the posttest), suggesting inter-item reliability ($>.70$ Taber, 2018). After the completion of ToPer, the participants were asked to read aloud the 12 sentences in the ToPro. Their productions were recorded by Sony Icd-px440 voice recorder. Due to the dichotomous nature of the ToPer, Kuder-Richardson-20 (KR-20) formula was computed and found to be .79 for the pretest and .85 for the posttest), implying strong internal consistency (Tan, 2009; DeVellis, 2016). Also, a high degree of reliability (DeVellis, 2016) was found between the ratings for ToPro pretest ($\alpha=.93$ with a 95% confidence interval from .905 to .961, ($F=60, 120$) =16.211, $p=.000$) and ToPro posttest ($\alpha=.92$ with a 95% confidence interval from .888 to .954, ($F=60, 120$) =13.636, $p=.000$). Participants received remedial training following the test results. Post-tests were administered two weeks after the treatment. The same procedures were followed in their administration. Participant responses from the ToPer and ToPro were computed through IBM SPSS version 25 for descriptive and inferential analyses.

3. FINDINGS AND DISCUSSION

3.1. Quantitative Distribution of Participant Scores across Conditional Types

The first research question aimed to examine how well the participants performed in perceiving and producing the primary stress across conditional types in the pretest and posttest. The corpus ($n=12$) had equally distributed statements in Type 1, 2, and 3. Descriptive analyses were displayed in Figure 2 (ToPer) and Figure 3 (ToPro).

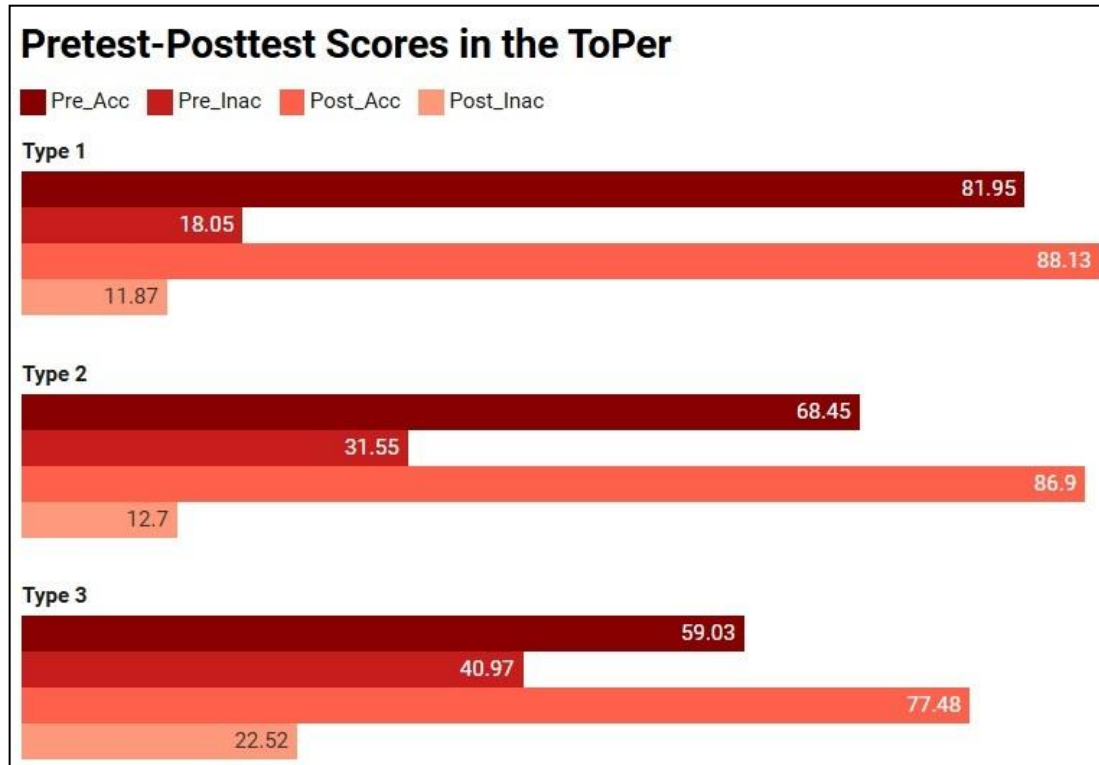


Figure 2. Descriptive Statistics of the ToPer

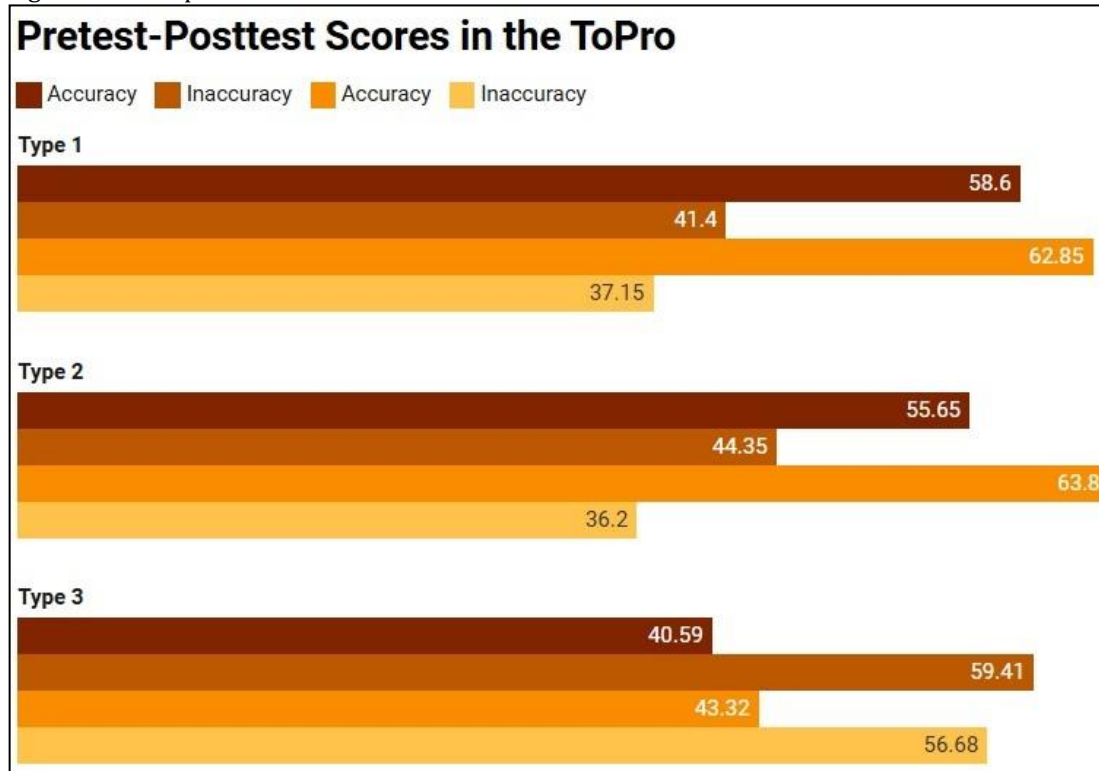


Figure 3. Descriptive Statistics for the ToPro

Teacher trainees were found to perform better in perceiving and producing Type 1 conditionals, followed respectively by Type 2 and Type 3. In a study, Maule (1988) found that Type 0 and 1 conditional forms were more prevalent in actual usage than other types. This might suggest the potential frequent exposure to this conditional type, hence better perception and production.

Winter and Le Foll (2022) revealed that French-speaking English learners produced first and second conditionals more, concurring with the current findings. Römer (2007) asserted that "conditionals" are an example of where the teaching of English as a foreign language clashes with the actual usage norm in various ways. In our case, however, the sentences in the corpus were gleaned from online dictionaries and textbooks, diverging from Römer's (2007) finding. Additionally, online dictionaries were found to present authentic sentence examples (McAlpine & Myles, 2003), conceivably implying that exposure to authentic language usage might foster the perception and production of *If*-conditionals. The low percentage of Type 3 conditionals might be justified by Covitt's (1976) finding, demonstrating that conditionals were the fifth most problematic teaching issue teachers encountered, following the articles, prepositions, phrasal verbs, and verbals. A similar finding was reported by Tuan (2012), revealing that more than 50% of learners could not recognize conditional types. The main difficulties for learning conditional types, according to Norris (2003), were "form, meaning, oversimplified explanations, and time-tense relationships" (Čeljo, Bećirović, & Bureković, 2018). Overall, findings showed that accurate perception and production of the primary stress of *If*-conditionals converged with conditional complexity (easy to difficult - Type 1-Type 3). However, a careful examination of the participant scores indicated that the biggest percental improvement in perception took place in Type 3 (31.25%), followed respectively by Type 2 (26.95%), and Type 1 (7.54%). The largest percental progress in production, on the other hand, occurred subsequently in Type 2 (14.64%), Type 1 (7.25%), and Type 3 (6.72%).

3.2. Impact of the Treatment on Perception and Production

The second research question aimed to find out whether participant scores in the pretests and posttests (ToPer and ToPro) differed significantly after the treatment. A paired sample t-test was conducted to evaluate the impact of the treatment on teacher trainees' scores in the ToPer and ToPro. A statistically significant increase was observed in the test scores from Time 1 (Pre-intervention) ($M = -.144$, $SD = .167$) to Time 2 (Post-intervention) ($M = -.063$, $SD = .164$), $t(60) = -3.07$, $p < .0005$ (two-tailed). The negative mean scores reflect data coding (i.e., data computed as pre-treatment and post-treatment, not the vice versa), not the participants' performance. The mean increase in ToPer and ToPro scores was .22 with a 95% confidence interval ranging from -.105 to -.021 (negative scores indicating the mean difference). The eta squared statistic (.49) indicated a medium effect size (Cohen, 1988).

In other words, the t-test results indicated that the treatment helped participants to moderately improve their perception and production of primary stress in *If*-conditionals. Notwithstanding the short treatment period, it was demonstrated that remedial training might assist with suprasegmental improvement. This finding coincided with that of previous studies proving the fundamental impact of remedial training in prosodic improvement. For instance, Baills, Alazard-Guiu, and Prieto (2022) indicated the positive impact of embodied prosodic training on improving accentedness and suprasegmental accuracy. In another study, Derwing, Munro and Wiebe (1997) found that 12-week training helped improve learners' intelligibility. In addition, Martin (2020) also supported the current finding, revealing that homework-based pronunciation training resulted in enhanced comprehensibility. By the same token, Gordon and Darcy (2022) reported that fluency enhanced after explicit pronunciation training. Similarly, Sonsaat-Hegelheimer and Levis (2025) examined the impact of explicit teaching on the perception and production of three final intonation contours (falling, rising, falling-rising) among Turkish learners of English as a foreign language, finding that perception of all three contours improved after instruction, while production improved for falling-rising and rising contours. Overall, the current study's findings were supported by previous research. It might therefore be concluded that prosodic training might yield pedagogically beneficial outcomes for language learners.

4. RESULTS AND RECOMMENDATIONS

Investigating the perception and production competence levels of Turkish English teacher trainees in the primary stress of *If*-conditionals, this study revealed perceptual and productive improvement at varying degrees. Descriptive statistics showed that participants accurately perceived and produced the primary stress in Type 1, Type 2, and Type 3 conditionals consecutively. Concerning percental changes, Type 3 conditionals were improved most (31.25%), while Type 1 conditionals were improved least (7.54%) in the ToPer following the treatment. On the other hand, Type 2 conditionals were enhanced most (14.64%), whereas Type 3 conditionals were enhanced least (6.72%) in the ToPro after remedial training. Descriptive findings suggested that the degree of accurate perception and production of primary in *If*-conditionals was congruent with the perceived difficulty/complexity of conditional types. To find out whether this finding was statistically significant, a paired samples t-test was administered, the findings of which indicated a moderate effect of the treatment ($\eta^2 = .49$, $p < .005$). This implies the remedial training, albeit conceivably inadequate in duration, seems to have contributed moderately to perceptual and productive improvement in the primary stress of *If*-conditionals. Overall, findings showed convergence with (Maule, 1988; Norris, 2003; Tuan, 2012) and divergence from (Römer 2007) previous scholarly work. It was concluded that remedial suprasegmental training might promote the perception and production of primary stress in conditional sentences, as reported in previous studies (Derwing, Munro, & Wiebe, 1997; Martin, 2020; Baills, Alazard-Guiu, & Prieto, 2022; Gordon & Darcy, 2022).

The findings contribute to the language teacher cognition research in relation to teacher trainees' awareness of suprasegmental features. The observed improvement in both perception and production of primary stress in *If*-conditionals implies that targeted training reinforced participants' cognitive representations of stress patterns. Notably, the larger perceptual gains in Type 3 conditionals and the greater productive gains in Type 2 conditionals indicate a dissociation between receptive and productive competence, highlighting that teacher trainees may internalize stress rules differently when recognizing versus

articulating them. The results suggest that explicit suprasegmental training can recalibrate teachers' mental models of English pronunciation, equipping them to both perceive and teach prosodic features more effectively. However, the moderate effect size also indicates that teacher trainees may require longer and sustained exposure to suprasegmental training to integrate this knowledge into their teaching practice. Thus, teacher educators should view such training not as a peripheral component but as a central aspect of professional preparation. Given that perception was more sensitive to training than production, it can be argued that trainees may overestimate their ability to model stress patterns in the classroom. The gap between recognition and performance highlights teachers' theoretical knowledge about stress patterns, but their struggle to embody it in practice. Such findings underline the need for teacher education programs to provide both explicit theoretical input and ample opportunities for embodied practice.

The study acknowledges some limitations. First, delayed posttests could not have been carried out since test administration overlapped with participants' exam week. Further studies might take this into account in the future. Another limitation was a methodological one (i.e., one-group pretest-posttest design). Although the adopted design lacks a control group and therefore limits internal validity, it was chosen due to practical constraints: random assignment was not feasible given the use of intact class sections and ethical concerns about instructional equity (Knapp, 2016). Prospective researchers might recruit two groups (i.e., control and treatment) and prolong the duration of remedial training. A third limitation was the lack of qualitative data to corroborate the experimental findings. Future research might employ mixed-method designs for enriched data. Despite the limitations, the study is expected to contribute theoretically and practically to our understanding of teacher cognition in teacher education contexts.

Research and Publication Ethics Statement

The authors' ethics commission letter dated 15.12.2016 and numbered 2866 was reviewed and deemed ethically appropriate by the Hacettepe University Senate Ethics Commission in its meeting numbered 35853172/43B-169 held on January 2, 2017.

Contribution Rates of Authors to the Article

Both authors contributed equally to the study.

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Statement of Interest

The authors declare no conflicts of interests.

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Perceptions of Arabic Language Teaching Students Regarding Modern Standard Arabic and Arabic Dialects: A Metaphor Analysis*

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Article Information	ABSTRACT
Received: 23.05.2025	This study provides a comprehensive evaluation of metaphor analysis to understand the perspectives of students in Arabic Language Education regarding Modern Standard Arabic (MSA) and Arabic dialects. The study included 49 students enrolled in the Arabic language instruction program at Adiyaman University, employing the phenomenological method, a qualitative research strategy. Participants were directed to construct metaphors that depict MSA and Arabic dialects, and the justification for these metaphors was meticulously analyzed. The content analysis revealed that students perceived MSA as pure, orderly, universal, and challenging, while they linked Arabic dialects with diversity, complexity, socio-cultural connections, and profound meaning. The metaphors produced for MSA, such as "clean water," "mathematics," and "book," indicate that students perceive MSA as a structured, methodical, and academic language. In contrast, dialects were defined by metaphors such as "tree branches," "mosaic," and "soup," emphasizing their organic, multidimensional, and diverse nature. These metaphorical representations indicate that students regard MSA more formal but less practical for everyday use, while dialects are perceived as intimately connected to local and cultural settings, despite their lack of precise norms and greater learning challenges. The findings indicate that students of Arabic Language Education regard MSA as a more formal, structured, and universal means of communication; nonetheless, they encounter difficulties in understanding it. Conversely, although dialects are perceived as more adaptable, contextually pertinent, and practical for daily communication, their absence of established regulations and regional discrepancies renders them a tough domain for students to master. This study highlights the necessity for diverse teaching methods in the instruction of both MSA and Arabic dialects in the realm of Arabic Language Education. Educators are recommended to include students' ideas about these two language varieties into instructional activities to develop a more balanced and comprehensive educational framework. Keywords: Metaphor, metaphor analysis, modern standard Arabic, Arabic dialects
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1. INTRODUCTION

Arabic is a rich language with various dialects spoken by millions of people all around the world. The difference between Modern Standard Arabic (MSA) and Arabic dialects emerges as an important research topic in terms of language education and communication. While MSA is widely used in official correspondence, education, and the media, dialects are prominent in everyday speech and local communication. This situation causes Arabic Language Education students to develop various perceptions and attitudes in the context of language learning and teaching. Within this context, Modern Standard Arabic (MSA) is the official language across Arab countries and one of the six official languages of the United Nations. The majority of printed materials such as books, newspapers, magazines, official documents, and children's books published in Arab countries are written in MSA.

Dialects, on the other hand, refer to differences in the language spoken by individuals within the same linguistic community in various countries and regions (Aksan, 1987). Çıkar and Timurtaş (2009) stated that individuals living in different regions within the same culture develop different linguistic characteristics, especially in terms of the sound system, depending on their unique

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conditions, and that these different uses, which are subject to the official language, are called dialects used in daily communication.

Metaphor enables us to comprehend an object or phenomenon by associating it with concepts from a different semantic field; thus, it offers new perspectives and emphasises previously unnoticed features (Taylor, 1984). Therefore, it can be said that metaphors facilitate the understanding of complex objects, ideas, or phenomena. Lakoff and Johnson (2003) define metaphor as not only a linguistic expression but also an integral part of cognitive processes and a basic cognitive tool for human understanding. According to Ekici (2016), metaphors are commonly used in the learning process to explain concepts by associating them with unrelated concepts that hold personal significance. This facilitates new learning by allowing individuals to associate newly acquired concepts with those constructed in their minds through personal experiences. Merriam-Webster (2011) defines metaphor as the act of transforming a word, expression, or concept into a different but similar object or action. Moreover, it can be stated that metaphors are a significant outcome of individuals' creativity, observations, experiences, knowledge and cultural values (Ekici, 2016).

When relevant literature is reviewed, it becomes evident that studies on metaphors within the scope of MSA and/or Arabic dialects are extremely limited. Research on MSA focuses on its declining use in comparison to various dialects (Muhammed, 2016; Uysal, 2016). Research on Arabic dialects covers a range of areas, including the linguistic analysis of a dialect, identification of its core features, analysis of its influence on MSA, investigation of Arabic teachers' and learners' attitudes toward dialects, and the design of materials for teaching dialects (Ağbaht & Suçin, 2024; Alan & Güler, 2007; Suçin, 2016; Şayır, 2023; Timurtaş & Çıkar, 2012).

This study aims to examine the perceptions of Arabic Language Education students regarding MSA and Arabic dialects through the method of metaphor analysis. Metaphors are regarded as powerful tools for understanding individuals' mental models and perceptions. Therefore, students' metaphorical expressions regarding these two forms of the language will provide valuable insights into their thoughts on language learning process and language policies.

2. METHODOLOGY

2.1. Research Design

The study was conducted using a phenomenological design, which is a qualitative research approach. This approach provides a basis for examining familiar phenomena whose meanings are not fully understood. The study is based on the investigation of phenomena that we are aware of but do not fully comprehend (Annells, 2006; Creswell, 2013; Yıldırım & Şimşek, 2018). Phenomenological studies reveal the perspectives, judgments, experiences, and assumptions of individuals directly involved in this situation. The aim is to understand the meaning behind individuals' experiences and to uncover their essential nature (Ceylan Çapar & Ceylan, 2022; Edmonds & Kennedy, 2017). Metaphor forms were used to understand students' perceptions of "Modern Standard Arabic" and "Arabic dialects". The research was conducted with students enrolled in the Arabic language teaching program at the Faculty of Education in Adıyaman University. The data were analysed using the content analysis method.

2.2. Study Group

The study was conducted during the spring semester of the 2024-2025 academic year with 54 students enrolled in the Arabic Language Teaching program at the Faculty of Education in Adıyaman University. The study group consisted of students from the second, third, and the fourth years of the program. The study group was determined using criterion sampling, which is one of the purposive sampling methods. The fundamental concept of this sampling method is the selection of individuals who meet a predetermined set of criteria. The criteria may be determined by the researcher (Coyne, 1997; Yıldırım & Şimşek, 2018). In this context, it was preferred to select students from the second, third, and fourth years to ensure they had a deeper understanding of MSA and Arabic dialects. Based on these criteria, a total of 54 students were included in the study; 11 from the second year, 17 from the third year, and 26 from the fourth year. The data of five students who did not complete the forms correctly were excluded from the analysis. Thus, the analyses were conducted based on the data of 49 students.

2.3. Data Collection Instrument

The research data were collected through a metaphor form consisting of semi-structured questions prepared by the researcher. Semi-structured questions are a commonly preferred data collection method in metaphor research (Döş, 2010; Linn, Sherman & Gill, 2007).

Metaphors are one of the tools that educators can use to achieve various goals in all areas of education (Inbar, 1996; Arslan & Bayrakçı, 2006; Parks, 2010; Saban, 2008). Therefore, it is recommended that metaphor studies be used in research to reveal students' comprehension and perceptions in the educational process (Botha, 2009). Indeed, metaphor studies are considered a valuable qualitative data collection method for in-depth analysis of phenomena or events (Güneş & Fırat, 2016). The metaphor form applied to the students includes guidelines that covert basic explanations. In research, when metaphors are used as a data

collection technique, it is important to establish a clear connection between the metaphor's topic and source by using terms like "like/as". The conjunction "because" is used to reveal the reason behind the metaphor (Ekici, 2016). One of the sentences students were asked to compete was: "Modern Standard Arabic is like _____ because _____," while others was: "Arabic dialects are like _____ because _____". Each participant was asked to compare the given concepts to something else and provide a rationale for their comparison.

2.4. Data Collection Process

In the context of the research, the data collection process was conducted in accordance with a qualitative research design. The data were collected from students enrolled in the Arabic Language Teaching program at the Faculty of Education in Adiyaman University. A metaphor form was used in the study to understand the participants' perceptions of MSA and Arabic dialects. These forms consist of semi-structured questions aimed at gaining an in-depth understanding of the students' comprehension and perceptions. The sentences in the metaphor forms allowed students to express and justify their comparisons of specific concepts.

The first step of the data collection was determining the appropriate study group. A criterion sampling method, one of the purposive sampling techniques, was used, and a total of 54 students from the second, third, and fourth years were selected. However, five students who did not complete the form properly were excluded from the analysis, and thus the data of 49 participants were used in the analyses. The data collection process was carried out after obtaining permission from the responsible faculty members before the class session began. The use of terms such as "like/as" and "because" in the instructions and metaphor forms enabled participants to structure their comparisons logically.

2.5. Data Analysis

The data collected for the research were analysed using the content analysis method. Content analysis is considered one of the most fundamental and widely used analysis techniques in the social sciences (Litchman, 2010; Stemler, 2001; Weber, 1990; Wimmer & Dominick, 2000). According to Büyüközyurt et al. (2016), content analysis involves the systematic and objective extraction of certain characteristics of a given message based on predetermined principles. The core of this approach consists of the stages of category formation, classification and labelling of data and transforming them into a more theoretical form (Bogdan & Biklen, 2007; Cohen, Manion & Morrison, 2007; Leblebici & Kılıç, 2004; Merriam, 2008).

Stage 1: Identification, Elimination and Coding of Metaphors

In this stage, the metaphorical expressions produced by the participants regarding MSA and Arabic dialects were systematically collected and organized in alphabetical order. Before being included in the analysis process, the justifications provided by the participants for their metaphorical expressions were examined. Metaphors that lacked a logical basis or were not supported by a justification were excluded from the analysis, as they were considered incomplete in terms of semantic coherence.

After completing the data cleaning process, a frequency analysis was conducted based on the valid metaphors to identify which metaphors were most commonly produced. In this way, the conceptual frameworks emphasised by the participants were determined. In this study, the analyses were carried out on a total of 49 metaphor for MSA and 49 metaphors for Arabic dialects that met the validity criteria.

Stage 2: Development of Categories

In this stage, the metaphors produced by the participants were analysed using the content analysis method, and those with similar themes were grouped together under specific categories. The 49 metaphors related to MSA were grouped based on conceptual similarities, and highly representative examples from each group were directly quoted and presented in tables. The same process was applied to the 49 metaphors concerning Arabic dialects. Similar metaphors were classified within the defined categories, and the metaphorical expressions that best represented each category were elaborated in tables.

In this stage, the grouping process was carried out not only based on lexical similarities, but also by considering the conceptual framework, semantic domain, and cognitive associations presented by the metaphors. In this way, a more comprehensive evaluation was made regarding how the metaphors reflect the structural features of the language and the perceptions of its users.

Stage 3: Classification of Core Metaphors within a Conceptual Framework

In the second stage, a detailed analysis process was carried out in order to divide the groups into broader conceptual categories, while Arabic dialect metaphors are divided into four basic conceptual categories.

This process of analysis aims to develop a deeper understanding of how MSA and Arabic dialects are conceptualised, revealing how language shapes the cultural and cognitive world of individuals beyond just being a means of communication.

2.6. Reliability and Validity

In order to determine the reliability and validity of qualitative research, field experts should conduct an examination. Yıldırım and Şimşek (2018) drew attention to the importance of including direct quotes from individuals to ensure validity. In this direction, the metaphors of the study were examined and evaluated through interviews with field experts.

In the reliability calculation process, Miles and Huberman's reliability formula was used. According to this formula, a consensus of at least 80% among coders is expected (Miles & Huberman, 1994; Patton, 2002). To calculate the reliability coefficient, the number of consensus was divided by the sum of consensus and disagreement and multiplied by 100: $[\text{Consensus} / (\text{Consensus} + \text{Disagreement}) \times 100]$. In this process, after consulting experts, the number of metaphors with consensus and disagreement was calculated. The reliability coefficient was found to be 98.18% $[90 / (90 + 2) \times 100 = 98.18\%]$.

The study revealed that the students developed a total of 98 metaphors, 49 for MSA and 49 for Arabic dialects. Among these metaphors, there was a disagreement about whether the metaphor "Istanbul Gentleman" should be written as a separate metaphor code or it should be included in "Istanbul Turkish", but experts agreed that this metaphor should be written as a separate code. In addition, as a result of the disagreement about whether the metaphor "River" should be included in the metaphor of "Water", it was decided to consider this metaphor as a separate metaphor. Apart from these two metaphors, a consensus was reached on the remaining 96 metaphors.

3. FINDINGS

In this section, based on the analysis of the data obtained within the scope of the research, the findings reflecting the students' perceptions of MSA Arabic and Arabic dialects are presented. The themes and categories that emerged as a result of metaphor analysis were examined in detail and students' language perceptions were systematically evaluated.

During the study, the students who participated in the research produced a total of 98 different metaphors, 49 for MSA and 49 for Arabic dialects. The findings of the metaphors developed by the students for each idea were reported separately.

3.1. Findings Related to MSA

The metaphors and categories that students produce to describe the idea of "Modern Standard Arabic" are presented in Table 1.

Table 1.
Modern standard Arabic

Category	Metaphor	F	Student code
Purity	Water	7	S 3, S 5, S 17, S 26, S 31, S 37, S 40
	River	1	S 43
Difficulty	Sea	3	S 27, S 34, S 35
	Mathematics	2	S 7, S 19
	Ashura	2	S 9, S 47
	Thorny Rose	1	S 39
	A Grain of Sand in the Sea	1	S 29
	Chinese	1	S 6
Universality	Tree	2	S 13, S 44
	River	1	S 4
	Ocean	1	S 14
	Sun	1	S 23
	Threshing floor	1	S 22
	Plain chocolate	1	S 36
	Honey	1	S 41
Order	Teacher	2	S 46, S 49
	Straight road	1	S 8
	Main dish	1	S 10
	Book	1	S 24
	Government	1	S 30
	Building column	1	S 21
	The key piece of the puzzle	1	S 1
	Literature	1	S 11
	Family	1	S 15
	Qur'an	1	S 28
	A clean and tidy house	1	S 12
	Capital	1	S 25

Social and Cultural Structure	Istanbul Turkish	4	S 2, S 18, S 32, S 38
	Istanbul Gentleman	1	S 20
	Flag	1	S 16
Richness	Treasure	1	S 42
	Pomegranate	1	S 45
	Tulip	1	S 48
	The salt in the food	1	S 33
Total		49	

Table 1 provides an example of the process of categorising students' metaphors. It shows the concept provided in the study, the metaphor created for the concept, the category it belongs to, and the justification sentence. The categorisation process involves analysing the definitions of the written metaphors and the justifications provided by the students. Additionally, the table also shows the metaphors used by students to define the concept of "Modern Standard Arabic" along with their frequency values. It was understood that the students created a total of 49 metaphors. Moreover, the students produced a total of 33 different metaphors related to the concept of "Modern Standard Arabic".

Students were asked to develop metaphors to define MSA and explain these metaphors along with their justifications. The data were analysed using content analysis.

The findings obtained from the analysis of the metaphors are presented below:

Metaphor Categories and Examples

1. Purity

River: It is pure and clear.

Water: It has its own unique flavour and benefits, it is in the language of the Qur'an, and it is used as the official language in 25 Arab countries. (S 3)

- It is clear and straightforward; it gives you exactly what you seek. (S 26)
- It is pure and simple. (S 17)
- Classical Arabic is exactly what you see on the surface, the meanings of words do not change as you go deeper. Just like water, the surface and the depths are the same. Classical Arabic is just like that. (S 31)

2. Difficulty

Chinese: Writing it, reading it, and translating it are each a separate headache :) (S 6)

Mathematics: For me, Arabic is like a set of problems that need to be solved. It involves many steps, takes time, but it is enjoyable. (S 7)

Sea: It is so vast that once you enter it, you can never get out. (S 27)

Thorny Rose: It has a beautiful scent and appearance, but it is hard to touch. Similarly, Modern Standard Arabic looks beautiful from the outside, but when you try to learn it, you face many difficulties. (S 39)

3. Universality

River: It is the language of the Qur'an, the Sunnah, and prayer. (S 4)

Tree: Arabic is emerging as an increasingly widespread language across the world, but each region and area has its own way of speaking it. Amidst this rich variety, it is essential to find the most understandable form of speech and that role belongs to MSA. It is necessary for people to understand each other at a single point and for the world to learn Arabic more easily. :) (S 13)

Ocean: It has no bounds or shores. :) (S 14)

Sun: Unlike the colloquial Arabic, it is clear, explicit, and understandable, like the sun, bright and illuminating. (S 23)

4. Order

Straight road: When used according to its rules, the meaning becomes clear. (S 8)

Main Dish: Everything is organised and delicious, it has its rules. (S 10)

Book: It requires proper spelling. (S 24)

Government: It contains a serious and equally systematic structure. (S 30)

The column of a building: It is the backbone of Arabic, its essential element. (S 21)

The most defining and complementary piece of a puzzle: It is a common ground where dialects meet. (S 1)

Literature: I think Standard Arabic is clearer and more organized compared to dialects. (S 11)

Teacher: It is clear and understandable, teachers train people from all professions. From the politician in a country to the lowest-level government employee, every type of profession is shaped by the teacher, and everyone trusts them. With infinite trust and comfort, they surrender themselves to the teacher and feed from them. (S 46)

5. Social and Cultural Structure

Istanbul Turkish: It is the type that everyone can understand but cannot pronounce. (S 18)

Istanbul Gentleman: His grammar is very heavy, his speech is fluent, and in every aspect, he requires attention, but he looks incredibly beautiful to the eye. (S 20)

Family: It is the common point where all siblings come together, even if they have different temperaments and characters. (S 15)

Flag: Each country has its own flag, but it is unique to its nation. (S 16)

6. Richness

Treasure: All kinds of wealth are present and dazzling. (S 42)

Pomegranate: When you look at a word from the outside, only one thing is visible, but in eloquent Arabic, it has many meanings. (S 45)

Tulip: Even though it has a root, the thing we would call a branch is just one, and it is the tulip itself. (S 48)

The salt in the food: Without it, speech is incomprehensible. (S 33)

The metaphors derived from the above data reveal students' various perceptions and understandings of MSA. For instance, metaphors such as "Pure water" and "Water" emphasise the cleanliness and purity characteristics of MSA, while metaphors like "Chinese" and "Mathematics" express the complexity and difficulty of the language. Metaphors related to universality reflect the cultural and social ties of MSA, while those related to order and structure highlight the systematic and rule-based nature of language. Additionally, some participants have used the "Qur'an" as a metaphor or referred to it in their explanations of metaphors, which also reflects the perception of MSA as having a religious and sacred quality. Therefore, it is possible to say that students perceive MSA not only as a communicative tool but also as a religious heritage.

3.2. Findings on the Concept of Arabic Dialects

The metaphors and categories produced by students to define the concept of "Arabic Dialects" are presented in Table 2

Table 2.

Arabic dialects

Category	Metaphor	F	Student code
Diversity	Branches of the tree	8	S 4, S 26, S 35, S 37, S 43, S 44, S 46, S 49
	Salad	3	S 8, S 9, S 39
	Soup	3	S 3, S 10, S 11
	Ashura	3	S 5, S 22, S 34
	Garden	3	S 6, S 13, S 31
	Compote	2	S 21, S 15
	Puzzle	1	S 1
	Pomegranate	1	S 18
	Sea	1	S 28
	Menemen	1	S 36
	Pizza	1	S 38
	Clouds	1	S 40
	Limbs that make up the body	1	S 42
	Aquarium	1	S 47
	Mosaic	1	S 14
	Types of food	1	S 17
	Colour tone	1	S 20
	All five fingers	1	S 19
Sophistication	Maze	4	S 7, S 25, S 33, S 48
	Kumpir	1	S 41
	A messy house	1	S 12
	Blend	1	S 23
Social and Cultural Structure	Siblings	1	S 16
	Public	1	S 29
	Life	1	S 30
	My mother's knitting	1	S 4
Depth of Meaning	Chocolate	1	S 24
	Snowflakes	1	S 32
	Greeting	1	S 27
	Human structure	1	S 2
Total		49	

Table 2 presents in detail the metaphors developed by students regarding the concept of "Arabic Dialects" and the frequency values of these metaphors. According to the data, a total of 49 metaphors were produced, with 30 different types identified among them. This indicates that students have developed a diverse and unique perspective in understanding the concept of

“Arabic Dialects”. The variety of the metaphors reflects the students’ perceptions of Arabic dialects and their ways of comprehending the cultural, regional, and linguistic dynamics of these dialects.

Below, the findings obtained from the analysis of metaphors are detailed, providing insights into the depth and breadth of students’ perceptions of dialects. These finding also include students’ personal, cultural, and linguistic perspectives on the concept of “Arabic Dialects”.

3.3. Metaphor Categories and Examples

1. Diversity

Puzzle: Similar to how different pieces come together to form a whole. Each piece is a dialect; the whole is Standard Arabic. (S 1)

Soup: A beautiful whole is created by mixing various ingredients. (S 3)

Ashura: A native language differs in terms of sound, structure, and word order due to historical, regional, and political reasons. (S5)

A large garden: It contains many dialects. (S 6)

Mosaic: It takes on different colours depending on the geography. (S 14)

Salad: There are many different and mixed Arabic dialects. (S 8)

2. Sophistication

Maze: It has many complex rooms, and it may take a while to find your way. (S 7)

Menemen (A Turkish dish with eggs and vegetables): It contains a lot of things. (S 36)

Kumpir (Baked potato with fillings inside): Each tribe and community has created its own dialect over time due to various factors. The number of dialects is as mixed and diverse as kumpir. :) (S 41)

A messy house: When it comes to Arabic dialects, the lifestyles of Arabs come to my mind. (S 12)

3. Social and Cultural Structure

Siblings: Although they have the same parents, each one has different temperaments, physical characteristics, and personalities. (S 16)

Public: Like the people, it contains a piece of different cultures, traditions, and histories in each. (S 29)

Life: As Arabic dialects encompass the languages used by all tribes, and the language of each tribe is different from the others, just as in life, there are different cultures among people, there are also cultural variations in dialects. (S 30)

4. Depth of Meaning

Chocolate: It has many varieties, and although it may seem like it has no concrete benefit to social life, it releases happiness hormones for those who know it, just like learning triggers this hormone. (S 24)

Aquarium: Each Arabic dialect can be said to represent a different fish in the variety of an aquarium. (S 47)

Snowflakes: They are similar to each other, but they are not the same. (S 32)

Greeting: “Selam” is a greeting commonly used in Arabic dialects. This word may have various variations in different Arabic dialects. For example, in Egyptian Arabic, it is “ahilan”, and in Levantine Arabic, it is “merhaba”. These dialects differences can reflect regional speaking styles and may cause some variations in communication among Arabic-speaking communities. (S 27)

The metaphors derived from the above data reveal the diversity and depth of students’ perceptions of Arabic dialects. For example, metaphors such as “Soup” and “Maze” highlight the complex and multifaced nature of Arabic dialects, emphasising that these dialects have a structure that poses challenges in understanding and learning them. On the other hand, metaphors like “Branches of a tree” and “Rose garden” imply that dialects go through a natural formation process and branch out while preserving their roots. These types of metaphors indicate that students’ perceptions of the structural and aesthetic aspects of Arabic dialects emphasise a sense of naturalness and diversity.

Additionally, the social and cultural metaphors used for Arabic dialects reflect the cultural richness and social significance of Arab societies. Through these metaphors, it can be understood that students grasp the importance and diversity that dialects carry in cultural contexts. The diverse structure of Arabic dialects across a wide geographical area and their social meanings are among the critical factors that need to be considered in the language learning process. As a result, the complexity and diversity of Arabic dialects should be evaluated as an important parameter in students’ language learning processes.

3.4. Student Opinions Regarding the Findings

In the study conducted, semi-structured interviews were held with 49 students to learn their perceptions of MSA and Arabic dialects. Later, a second interview was conducted with 10 students to analyse these data, and their comments were requested regarding why they might hold such views. Below the prominent options and findings based on these students’ evaluations are summarised.

According to students' evaluations, MSA is perceived as a difficult language to learn due to its intense grammar rules and complex grammatical structure. The highly systematic and rule-based nature of the language makes it a structure that operates within logic and order, but these rigid rules create a challenging learning process for students. MSA is described as a language that is rarely used in daily life and is preferred more in written texts and formal settings. Students view MSA not only as a means of communication but also as a carrier of cultural and religious heritage. As the language is based on Qur'anic Arabic and is the language of the Qur'an, MSA is attributed with sacred value. Therefore, the purity and aesthetics of the language are emphasised, and learning the language involves not only grammar rules but also cultural and religious dimensions.

Some students compare MSA to a vast sea without boundaries or an ocean that is difficult to explore. Each newly learned word or grammatical structure reveals once again how deep and expansive the language is. This reflects the enchanting nature of the language while also highlighting the difficulty of the learning process. The aesthetic and poetic aspects of the language indicates that it carries artistic and cultural value beyond being merely a means of communication. The strict rules and complex structure of the language lead some students to compare MSA to challenging and intricate fields such as Chinese or mathematics. However, this difficulty also reveals the logical and orderly nature of the language. Students state that MSA functions as a coherent system governed by order and structure, and is therefore learnable. The universality and cultural connections of the language make it significant not only in the Arab world but also globally.

According to students' evaluations, Arabic dialects are perceived as natural, aesthetic, and dynamic structures. The absence of a specific set of rules, curriculum, or dictionary for the dialects makes them difficult to learn and understand. The fact that each region, even each city, has its own unique dialect leads to a multifaced and complex puzzle. Dialects represent the living and ever-evolving aspect of language. Students are aware of the social and cultural significance of dialects and describe them as a festival or a vast universe reflecting the region's cultural richness, social life, and emotions. Each dialect embodies the character, experiences, and cultural heritage of the society to which it belongs.

The difficulty in learning dialects stems from the fact that they have emerged through an aesthetic and natural formation process. This diversity, which arises as a result of the natural evolution of language, enhances its richness and beauty. However, the lack of a standardised curriculum or resources makes learning and understanding dialects more challenging. Students believe that dialects are indispensable in practice due to their frequent use in daily life and their crucial role in communication. The complex and multifaceted nature of dialects leads students to view them as both fascinating and intellectually stimulating challenges. As reflections of regional differences and cultural diversity, dialects address the aesthetic and natural aspect of language in a balanced manner. Students point out that dialects are more than just tools of communication. They are essential elements that shape cultural identity and strengthen social bonds.

4. DISCUSSION AND CONCLUSION

4.1. Comparative Analysis of Findings on MSA and Arabic Dialects

In this study, participants described MSA using metaphors such as "pure water", "clear water", and simply "water", indicating cleanliness and purity. These metaphors accentuate that MSA is associated with cleanliness, purity, order, universality, and difficulty. Within this context, MSA is perceived as a formal, rule-governed, and universal language; however, it is also emphasised that it is difficult to learn. In contrast, in Yeşilyurt's (2017) study, MSA is highlighted for its unifying role and is portrayed as a clear language that brings the Arab world together. It is described as a guiding and beautiful language that enables mutual understanding among Arabs. Stadlbauer (2010), on the other hand, notes that in the Egyptian context, MSA and Classical Arabic are associated with social status and symbolic value. Therefore, the participants' association of MSA with elements of order reflects this symbolic perception as well.

Additionally, in this study, the fact that some participants associated MSA with the "Qur'an" reveals that they view it not only as a means of communication but also as a religious heritage. This indicates that MSA is perceived as a language bearing sacred and spiritual value. This perception parallels the view expressed in the studies of Stadlbauer (2010), Yeşilyurt (2017), and Haeri (2000), which state that MSA is associated with religious heritage and that both MSA and Classical Arabic are considered cultural and spiritual symbols linked to Arab nationalism.

For dialects, in this study, metaphors such as "puzzle", "soup", and "ashura" were used, expressing complexity and diversity. These metaphors reflect the more diverse, flexible, and complex structure of dialects. In Yeşilyurt's (2017) study, however, the depiction of dialects with dynamic elements such as "high-speed train" and "smartphone" does not quite align with this perception of diversity. In el-Hakami's (2023) study, attitudes toward Saudi dialects are seen to be associated with regional and social contexts. This is consistent with the finding from this study that dialects are perceived as a structure reflecting social and cultural connections.

Additionally, this study highlights that Arabic dialects are defined by complexity, diversity, naturalness, and social-cultural connections. Therefore, it is stated that Arabic dialects have a functional structure in daily life and reflect regional differences. In Yeşilyurt's (2017) study, however, it is emphasised that Arabic dialects contribute to speed and diversity. Dialects are seen

as a value that accelerates communication and adds richness and beauty to the language, although it is also stated that they may partially hinder communication.

In this study, metaphors such as “Chinese”, “mathematics”, and “sea” were used to express the complexity of MSA. This shows that students perceive learning and using MSA as a difficult process. However, in the studies of Yeşilyurt (2017) and el-Hakami (2023), MSA is evaluated as a regular language, with no indication of difficulty found. In Haeri’s (2000) study, while the complex structure of Classical Arabic and MSA and their reflection of traditional teachings are highlighted, it is stated that dialects are more easily accessible in daily communication. In this context, it is understood that dialects are perceived as less formal and more flexible; this aligns with the expression of their complexity through metaphors such as “maze” or “a messy house”, as well as their flexible structures in social interaction in this study.

The unifying role of MSA in wide geographical and cultural contexts is reflected in this study through metaphors such as “river”, “ocean”, and “sun”. This indicates that MSA is perceived as a language that is widely used in different cultures and facilitates cultural integration. In the studies of Stadlbauer (2010) and el-Hakami (2023), however, it is stressed that MSA has a pan-Arab unifying power and is seen as a modern language used in international context. On the other hand, the use of metaphors such as “branches of a tree” or “rose garden” to express the local and regional diversities of dialects reveals that dialects are perceived as a structure reflecting local identity and social connections. Furthermore, the perception of Arabic dialects as a complex structure in this study, compared with the view in Yeşilyurt’s (2017) study that Arabic dialects are seen as a factor that partially hinders communication, also suggests that native Turkish speakers may hold a negative perspective toward Arabic dialects.

In conclusion, the perceptions of MSA and dialects in this study show a significant difference. While MSA is perceived as a more formal, rule-governed, and structured language, dialects stand out as more dynamic and flexible communication tools that represent social and cultural diversity. A comparison with the studies of el-Hakami (2023), Haeri (2000), Stadlbauer (2010), and Yeşilyurt (2017) reveals the different functions of MSA and dialects in both educational and social contexts. It is concluded that both forms of the language are indispensable in different contexts and enrich language learning with both their spiritual and social dimensions. Additionally, based on the data obtained from Suçin’s study, both students and faculty members have indicated that learning Arabic dialects, provided that priority is given to MSA, would be beneficial.

4.2. Limitations and Suggestions

These results suggest that different approaches should be adopted in teaching MSA and Arabic dialects within the scope of Arabic Language Education. The more formal and rule-based structure of MSA indicates that a more systematic and structured method could be beneficial in teaching processes. In contrast, the natural, diverse, and cultural characteristics of dialects require the adoption of a more flexible and culture-centered approach. In particular, activities that support students in understanding dialects in a sociocultural context are believed to contribute to the language education process.

One limitation of this study is the participants consist solely of students enrolled in an Arabic Language Teaching program. Future research could expand to include students from departments such as Arabic Language and Literature, Arabic Translation and Interpretation, and Theology. Additionally, studies that include teachers working in the Ministry of National Education and academics working in related fields could offer a broader perspective.

The metaphor analysis method used in this study provides a valuable perspective in understanding the participants’ perceptions of MSA and dialects. However, due to its subjective nature, it may not fully reflect the participants’ perceptions of MSA and Arabic dialects. This limitation could be addressed by research design supported by different methods to reach more comprehensive results.

Research and Publication Ethics Statement

This research was conducted in accordance with the ethical standards required for scientific studies. The study was based on voluntary participation, and the principles of confidentiality and anonymity were strictly adhered to. The participants in the research were provided with detailed information about the purpose, process, and use of the data and their consent was obtained.

Within the framework of ethical principles, the participants’ personal information was kept private, and the data were used solely for research purposes. During the process of data collection, analysis, and reporting, the principles of honesty and transparency were strictly observed. Prior to the commencement of the research, an application was submitted to the Ethics Committee of the relevant university, and Ethic Committee Approval was obtained following the necessary evaluations. The ethic approval number was stated during the application and included in the research report.

This research was approved by the Social and Human Sciences Ethics Committee of Adıyaman University, with the decision 166 and dated 23.12.2024.

Contribution Rates of Authors to the Article

Researchers contributed equally at all stages of the research.

Statement of Interest

The authors declare no conflict of interest.

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YAYIN İLKELERİ VE YAZIM KURALLARI

1. YAYIN İLKELERİ

Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, yılda dört kez (Ocak, Nisan, Temmuz, Ekim) yayınlanan uluslararası hakemli bir dergidir ve aşağıda belirtilen ilkeler doğrultusunda yayın yapmaktadır:

1. Dergimiz, yayın politikası gereğince, eğitimin tüm alanlarıyla ilgili nicel ve nitel özgün araştırma makaleleri ile derlemelere yer vermektedir.

2. Derginin yayın dili İngilizce'dir.

3. Dergiye gönderilen makalelerin başka bir yerde yayınlanmamış veya yayınlanmak üzere eş zamanlı olarak başka bir dergiye gönderilmemiş olması gerekmektedir. Hacettepe Üniversitesi Eğitim Fakültesi Dergisi yayınlanmak üzere kabul edilen makalelerin tüm yayın haklarına sahiptir.

4. Dergiye gönderilecek makalelerin <https://dergipark.org.tr/> adresinden yüklenmesi gerekmektedir. Baş Editöre, Yayın Kurulu üyelerine veya dergi iletişim e-posta adresine gönderilen makaleler resmi başvuru olarak kabul edilmemektedir.

5. Dergiye gönderilen makaleler ilk olarak şekil incelemesinden geçirilir. Dergi şablonuna uygun olarak hazırlanan makaleler daha sonra Baş Editöre gönderilir. Baş Editör ve Yayın Kurulu tarafından derginin yayın ilkelerine uygunluğu incelenir ve uygun görülen makaleler alan editörlerine atanır. Alan editörleri makaleleri alanın var olan bilgi birikimine katkısı yönünden inceler ve uygun görürlerse makaleyi hakemlere gönderirler. Ön inceleme aşamalarında aşağıdaki noktalar göz önünde bulundurulur:

- a) Yayın etiğine uygunluğu
- b) Dergi yayın ilkelerine uygunluğu
- c) Çalışmanın konusunun bilimsel açıdan özgünlüğü ve güncelliği
- d) Çalışma konusunun eğitime katkısı
- e) Yazım kurallarına ve makale yazım şablonuna uygunluğu

6. Ön incelemeler sonucunda uygun olduğuna karar verilen çalışmalar bilimsel açıdan değerlendirilmesi için hakemlere gönderilir. Hakem raporlarına dayalı olarak makalelerin yayınlanıp yayınlanmayacağına Baş Editör ve alan editörleri karar verir. Gerek duyulması durumunda çalışmalar, hakemlerden gelen eleştiri ve öneriler doğrultusunda, gözden geçirilmesi veya önerilen düzeltmelerin yapılması için yazarlara geri gönderilir.

7. Yazar(lar)la hakemler arasındaki iletişimi sadece Baş Editör ve alan editörleri sağlar. Dergide makalelerin değerlendirilmesi sürecinde çift taraflı kör hakemlik sistemi uygulanmaktadır.

8. Yayına kabul edilen makalelerin basılması için, yazar(lar) tarafından yükümlülük formunun imzalanması ve dergiye iletilmesi gerekmektedir. Ayrıca, yazar(lar)dan makaleyi bir intihal kontrol programı ile taramaları ve intihal kontrol programının ürettiği en çok % 10 benzerlik oranının olduğunu belgeleyen bir program çıktısını, garanti ve yükümlülük formuyla beraber göndermeleri istenir.

9. Hakemlerden gelen dönütler ve Baş Editör ile alan editörlerin kararına bağlı olarak dergiye gönderilen makalelerin ilk tur hakem değerlendirme süreçlerinin yaklaşık olarak 6-8 hafta sürmesi öngörülmektedir. Ancak bu süre alandan alana değişebilir. Değerlendirme yapmayı kabul etmeyen hakem olması durumunda süre uzayabilmektedir.

10. Yayına kabul edilen ve son biçimi verilen makaleler üzerinde yazar(lar) değişiklik yapamaz.

11. Yayınlanan makalenin içeriğinden (kaynakların ve alıntılarının doğruluğundan, ileri sürülen görüşlerden ve telif hakkı olan çizelge, resim ve diğer görsellerden) yazar(lar) sorumludur.

12. Gelecek sayılarda basılmak üzere doi numarası verilen makaleler, **doi numarası sırasına veya kabul tarihine göre değil** makalelerin konuları ve alanları temel alınarak basılmaktadır. Her bir sayıda basılacak olan makaleler eğitimin farklı alanları dikkate alınarak Baş Editör tarafından belirlenmektedir.

13. Yayına kabul edilen makaleler için yazar(lar)a ve hakemlere ücret ödenmez.

14. Açık erişim politikası gereğince, dergi sayıları ve makaleler derginin web sayfasında yer alır ve makalelerin tam metinlerine pdf dosyası olarak erişilebilir.

15. ULAKBİM TR Dizin kuralları gereği makalelerde yer alan tüm yazarların ORCID numaralarının makalenin son şekline eklenerek gönderilmesi gerekmektedir. ORCID numarası eksik yazarlara ait makalelere doi numarası verilmez ve erken görünüm olarak yayına açılmaz.

2. YAZIM KURALLARI

2.1. BAŞLIK VE DİPNOTLAR

Makale başlığı iki yana yaslı, 12 punto, koyu ve Cambria yazı tipinde, en çok 15 sözcük, bağlaçlar hariç her sözcüğün ilk harfi büyük olarak yazılmalıdır. Türkçe yazılmış makalelerde makalenin İngilizce başlığına da aynı biçim kullanılarak yer verilmelidir. Makale ile ilgili olarak, tezden üretilme, bir konferansta sunulma veya proje kapsamında yapılma gibi özel durumlar varsa (*) ile başlayan bir dipnot ile yazılmalıdır. Bu ekleme makale kabul edildikten sonra gerçekleştirilecektir. Yazar kimliklerinin tahmin edilmesine neden olabileceği için, yazarların makale gönderimi sırasında böyle bir dipnota yer vermemeleri gerekmektedir. Makale geliş, kabul, erken görünüm ve basım tarihlerinin eklenmesi ve makalenin APA 7 referans verme stiline göre Türkçe ve İngilizce kaynak gösterimleri, kabul süreci sonrasında editörlerce yapılacaktır. Bu nedenle ilk aşamada bu alanların şablondaki gibi bırakılması gerekmektedir.

Çalışma kabul edildikten sonra çalışmanın yazar(lar)ının adı soyadı ortalı, koyu, 11 punto, Cambria yazı tipinde, soyadı büyük harflerle ve ortalanmış olarak, yazar sayısı birden fazla ise yazarlar tarafından belirlenen sırayla yazılacaktır. Yazar(lar)ın unvanıyla birlikte, çalıştığı yerin açık adı, şehir-ülke bilgisi, e-posta adresi ve ORCID numarası, başlığın altındaki yazar ismi ya da isimleriyle eşleştirilmiş dipnotlarla (*) belirtmeli ve makalenin ilk sayfasının altındaki dipnotta yer almalıdır. Bu ekleme makale kabul edildikten sonra gerçekleştirilecektir. Yazar kimliklerinin tahmin edilmesine neden olabileceği için, yazarların makale gönderimi sırasında böyle bir dipnota yer vermemeleri gerekmektedir.

Dipnotlar için ek açıklama: Çalışma herhangi bir bilimsel etkinlikte bildiri olarak sunulmuş ise, makalenin başlığına dipnot simgesi (*) konularak, makalenin ilk sayfasının altında etkinliğin adı, yeri ve tarihi belirtilmelidir. Çalışma herhangi bir araştırma kurumu ya da fonu tarafından desteklenmiş ise, makalenin başlığına dipnot simgesi (*) konularak, desteği sağlayan kuruluşun adı, projenin numarası ve tamamlandığı tarih ilk sayfanın altında belirtilmelidir. Çalışma lisansüstü tezlerden üretilmiş ise, makalenin başlığına dipnot simgesi (*) konularak, tezin adı, danışmanın adı ve tamamlandığı tarih ilk sayfanın altında belirtilmelidir. Dipnotlardaki tüm bilgiler Palatino Linotype yazı tipinde, girintisiz ve 10 punto olmalıdır.

2.2. MAKALE DİLİ VE ÖZET

Makaleler İngilizce dilinde hazırlanıp gönderilecektir. İngilizce kısa özet, Cambria yazı tipinde, 9 punto ve 300 sözcüğü geçmeyecek şekilde tek sütun ve iki yana yaslı olarak şablonda belirtilen alana yazılmalıdır. Kısa özet içinde kaynak verilmemelidir. Her kısa özeti altında, çalışmayı betimleyen 2-5 anahtar sözcük bulunmalıdır.

3. BÖLÜMLER VE ALT BÖLÜMLER

Çalışmalarda ana bölüm başlıkları (birinci düzey başlıklar) Arabik rakamlarla numaralandırılarak Cambria yazı tipinde, 11 punto, koyu, sola yaslı ve tümü büyük harf biçiminde yazılmalıdır. Alt bölüm başlıkları (ikinci düzey başlıklar) Cambria yazı tipinde, 11 punto, koyu, sola yaslı, her sözcüğün ilk harfi büyük olarak yazılmalıdır. Üçüncü

düzey başlıklar ise Cambria, 11 punto, koyu, italik, sola yaslı, yalnızca ilk sözcüğün ilk harfi büyük olacak biçimde yazılmalıdır.

Metin içindeki paragraflar en az üç cümleden oluşmalı ve paragraflar arasında bir satır boşluğu bırakılmalıdır. Aynı şekilde başlıkların öncesinde ve sonrasında da bir satır boşluk verilmelidir. Makalenin tamamında girintiye yer verilmemeli, paragraflar arasında önce ve sonra aralık değerleri 0 olmalıdır. Metin içi atıfların yazımında, tablolarda, şekillerde ve kaynakça yazımında APA 7 yazım stili kullanılmalıdır.

Çalışmalarda ana bölümler sırasıyla;

- GİRİŞ
- YÖNTEM
 - Evren ve örneklem/Çalışma Grubu/Katılımcılar/Denekler (bunlardan sadece biri)
 - Veri toplama yöntem(ler)i/teknikleri/araçları
 - Verilerin analizi
- BULGULAR
- TARTIŞMA, SONUÇ VE ÖNERİLER
- KAYNAKLAR

gibi temel bölümlerinden oluşmalıdır. Bununla birlikte çalışmalarda kullanılan yönetime göre yazarlar ilave bölüm veya alt bölümler oluşturabilirler.

Ana metine “1. GİRİŞ” alt başlığı yazılarak başlanmalıdır. YÖNTEM, BULGULAR ve TARTIŞMA, SONUÇ VE ÖNERİLER bölümlerine yeni sayfadan başlanmamalı, bir bölüm bittikten sonra, aynı sayfada diğeri onu izlemelidir. Sıklıkla kullanılan istatistiksel tekniklerin sunulmasında APA 7 yazım stili temel alınarak, istatistiksel değerlere cümleler içerisinde yer verilmelidir. Bununla birlikte, uygun yerlerde yazar(lar) tablolar ve şekillerden faydalanabilirler. Makale metninin tamamının yazımında APA 7 yazım stili kullanılmalıdır.

4. ŞEKİLLER

Şekiller yazım alanından taşmayacak şekilde makale içinde uygun görülen yerlere ortalı olacak şekilde yerleştirilebilir. Ana metinden şekle atıfta bulunulmalı ve mümkünse şekil açıklamalıdır. Her bir şeklin altında Arabik rakamlarla numaralandırılmış bir şekil başlığı yerleştirilmeli, makale boyunca aynı numaralandırma devam etmeli ve APA 7 yazım stiline uygun olarak yazılmalıdır. Şekil başlıkları biçim olarak Cambria yazı tipinde, 10 punto, sola yaslı, yalnızca ilk sözcüğün ilk harfi büyük olacak şekilde yazılmalıdır. Şekil başlığında kaynak kullanılmış ise parantez içinde kaynak bilgisi eklenmelidir. Eğer şekil içinde yazılar varsa, 9veya 10 punto olacak şekilde Cambria yazı tipiyle yazılabilir.

5. TABLOLAR

Tablolar sola dayalı olacak şekilde ve tamamında Cambria yazı tipi kullanılarak hazırlanmalıdır. Tablo başlığı, 10 punto ile yazılmalı, başlığın her kelimesinin sadece ilk harfi büyük olmalı ve başlık, tablo sayısının altında verilmelidir. Tablolarda APA 7 yazım stili kullanılmalıdır. Tablolara metin içinde tablo sayısı belirtilerek atıfta bulunulmalı ve tablo bittikten sonra yorumlanmalıdır. Tablolar, metin içinde kullanıldıkları yerde veya izleyen sayfada yer almalıdır. İlgili not ve kaynaklar, tablonun altında, “Not:” veya “Kaynak:” ifadelerinden sonra belirtilebilir.

6. KAYNAKLARIN BELİRTİLMESİ

Makalenin sonunda, varsa ek(ler)den önce kaynaklar, APA 7 yazım stiline uygun olarak verilmelidir. Kaynakların tamamı, 10 punto ile ve her bir kaynağın arasında 1 satır boşluk verilerek, Cambria yazı tipinde ve iki yana yaslı, tek satır aralığında, önce ve sonra paragraf değerleri 0 olacak şekilde, girintiye yer vermeden yazılmalıdır. Kaynakçada yer alan her kaynağa metin içinden atıfta bulunulduğundan, yine aynı şekilde metin içinde kullanılan her bir kaynağa da kaynakçada yer verildiğinden emin olunmalıdır.

7. EKLER

Yazar(lar) ihtiyaç duyarlarsa kaynakçadan sonra ve geniş özetten önce, Ekler bölümü oluşturabilirler. Bu kısımda verilecek eklere makale içinden mutlaka atıfta bulunulmalıdır. Birden fazla ek kullanılacaksa numaralandırılabilir.

Yazarların eklere koyacakları eklentilerin makale içinde verilmesi durumunda bütünlüğü bozacak biçimde olması gerekmektedir. Makale içinde tablo veya şekil ile verilebilecek unsurlara Ekler’de yer verilmemelidir.

8. MAKALE ŞABLONU

Bir makale çalışmasıyla ilgili bütün ayrıntılara “Yazım Kuralları”nda burada belirtilmemiş olabilir. Biçimlendirmeye ilgili daha ayrıntılı bilgi, dergiye yollanacak çalışmalar için kullanılması gereken şablon dosyada bulunmaktadır. Burada verilen bilgilerle şablon dosyadaki bilgilerin çelişmesi durumunda şablon dosyası temel alınmalıdır.

Çalışmaların derginin yazım kurallarına uygun hazırlanabilmesi için şablon dosyanın kullanılması gerekmektedir. Eğer yazım işlemi başka bir dosyada yapılmışsa ilgili dosyanın içeriğinin şablon dosyaya aktarılması önerilmektedir. Şablona uygun olarak hazırlanmayan makaleler şekil kontrolü aşamasında yazarlara iade edilecektir.

9. DÜZELTME ÇİZELGESİ

Makaleye ilişkin düzeltme önerileri almış olan yazar(lar), “Düzeltilme Çizelgesi” üzerinde, her hakemin istemiş olduğu düzeltme/değişiklik önerilerine dayalı olarak yapılan işlemi sayfa numarası belirterek çizelgede belirtmelidir.

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PUBLICATION POLICIES AND AUTHOR GUIDELINES

1. PUBLICATION POLICIES

Hacettepe University Journal of Education is an international, peer-reviewed journal that is published four times a year (January, April, July, October) and publishes in accordance with the following principles:

1. In accordance with its publication policy, our journal includes original quantitative and qualitative research articles and reviews in all areas of education.

2. The language of the journal is English.

3. Articles that are submitted to the journal should not have been published elsewhere or submitted to another journal for review. Hacettepe University Journal of Education claims all the rights of the articles that are accepted for publication.

4. Articles to be submitted to the journal should only be uploaded at <https://dergipark.org.tr/>. Articles sent to Editor-in-Chief, Editorial Board members or journal contact e-mail addresses are not considered as official submissions.

5. Articles submitted to the journal are first subjected to formal review. Then, the articles prepared according to the journal template are sent to the Editor-in-Chief. Editor-in-Chief and the Editorial Board examine the compliance with the journal's publication principles and appropriate articles are assigned to field editors. Field editors examine articles in terms of their contribution to the existing knowledge of the field and, if they deem appropriate, they initiate the blind review process. The following points are taken into account during the preliminary examination:

- a) Compliance with publication ethics
- b) Compliance with publication principles
- c) Scientific originality and significance of the subject of the study
- d) Contribution of the subject study to the field of education
- e) Compliance with spelling rules and journal manuscript template

6. The studies that are found to be suitable as result of preliminary examinations are sent to the referees for scientific evaluation through blind review. Editor-in-Chief and field editors decide whether the articles will be published based on the reviewer reports. If deemed necessary, the works are sent back to the authors for review or for proposed corrections in accordance with the criticisms and suggestions from the referees.

7. Only Editor-in-Chief and field editors provide communication between the author(s) and the referees. In the evaluation of the articles in the journal, a double-blind review system is strictly applied.

8. In order to publish accepted articles, author responsibilities form must be signed by the author(s) and submitted to the journal. In addition, the author(s) are required to scan the article with a plagiarism control program and submit the program output documenting that the plagiarism control program has a maximum similarity rate of 10%, together with the guarantee and liability form.

9. Depending on the feedback from the reviewers and the decisions of the Editor-in-Chief and field editors, the first round of peer review process of the articles is expected to take approximately 6-8 weeks. However, this period may vary from field to field. The period may be extended if a need to replace a reviewer emerges.

10. The author (s) cannot make any changes on the accepted and finalized articles.

11. The author(s) is responsible for the content of the published article (the accuracy of the references and citations, the arguments and copyrighted tables, pictures and other images).

12. Articles that are given a doi number to be published in future issues are printed on the basis of the subjects and fields of the articles, **not on the order of the doi number or the date of acceptance**. The articles to be published in each issue are determined by the Editor-in-Chief considering the different fields of education.

13. No fee is paid to the author(s) and reviewers for the articles accepted for publication.

14. In accordance with the open access policy, the number of journals and articles are available on the journal's web page and full texts can be accessed as a pdf file.

15. According to the index rules of ULAKBİM TR, the ORCID numbers of all the authors in the articles must be submitted with the final form of the article. Authors whose ORCID number is missing are not given a doi number and the article is not published as online first.

2. AUTHOR GUIDELINES

2.1. TITLE AND FOOTNOTES

The title of the article should be justified, 12 point, bold, Cambria font, maximum 15 words, and the first letter of each word should be capitalized except for the conjunctions. In the articles written in Turkish, the English title of the article should be written in the same format. If there are special cases related to the article, such as being produced from the thesis, presented at a conference or produced within the scope of a project, it should be written with a footnote starting with (*). This will be done after the article is accepted. Authors should not include such a footnote at the time of submission, as this may lead to an estimate of their identity. Article arrival, acceptance, online first and publication dates will be added and Turkish and English references will be revised according to the APA 7 conventions by the editors after the acceptance process. Therefore, in the first stage, these fields should be left empty in the template.

After the acceptance of the study, the author (s) name of the study should be written in centered, bold, 11 point, Cambria font, surname in capital letters and centered. If the number of authors is more than one, they will be written in the order specified by the authors. Along with the title (s) of the author (s), full name of the place of work, city-country information, e-mail address and ORCID number, should be indicated with footnotes (*) paired with the author's name or names under the title and should be included in the footnote at the bottom of the first page of the article. This addition will be done after the article is accepted. Authors should not include such a footnote at the time of submission, as this may lead to an estimate of their identity.

Annotations for footnotes: If the study has been presented as a paper in any scientific activity, the footnote icon (*) should be placed in the title of the article, and the name, place and date of the activity should be indicated at the bottom of the first page of the article. If the study has been supported by any research institution or fund, the footnote symbol (*) should be placed in the title of the article, and the name of the sponsor, the number of the project and the date of completion should be indicated at the bottom of the first page. If the study has been produced from graduate theses, then the title of the thesis, the name of the supervisor and the date of the completion should be placed at the bottom of the first page by placing a footnote symbol (*) in the title of the article. All information in the footnotes should be in Palatino Linotype font, non-typed and 10 font size.

2.2. ARTICLE LANGUAGE AND ABSTRACT

Studies should be prepared and sent in English. Abstract should be written in Cambria font, 9 font size and written in single column and justified in the field specified in the template, not exceeding 300 words. References should not be included in the abstract. Below each abstract, there should be 2-5 keywords that describe the study.

3. SECTIONS AND SUBSECTIONS

Main section titles (first level titles) should be numbered with Arabic numerals and written in Cambria font, 11 font size, bold, left justified and all must be in capital letters. Subheadings (second level headings) should be written in Cambria font, 11 font size, bold, left justified, and the first letter of each word should be capitalized. The third level

headings should be written in Cambria, 11 font size, bold, italic, left justified and only the first letter of the first word should be capitalized.

The paragraphs in the text should include at least three sentences and one line space should be left between the paragraphs. Likewise, one line space should be given before and after the headings. There should be no indentation throughout the article, and the spacing values before and after the paragraphs should be 0. APA 7 writing style should be used for in-text citations, tables, figures and bibliography.

The main sections in the manuscript should be:

- INTRODUCTION
- METHOD
 - Universe and sample / Working Group / Participants / Subjects (only one of them)
 - Data collection method (s) / techniques / tools
 - Analysis of data
- RESULTS
- DISCUSSION, CONCLUSIONS AND SUGGESTIONS
- REFERENCES

However, according to the methodology used in the studies, authors can create additional sections or sub-sections.

Main text should start with "1. INTRODUCTION". METHOD, FINDINGS AND DISCUSSION, CONCLUSION AND SUGGESTION parts should not be started on a new page, but should be the subsequent part of the main text. In presenting frequently used statistical techniques, statistical values should be included in the sentences based on APA 7 guidelines. Additionally, author (s) may make use of the tables and figures where appropriate. The whole manuscript should be written according to APA 7 writing style.

4. FIGURES

Figures can be placed as centered, where appropriate, and they should not exceed the margins for written parts. In-text references should be made to the figure and, where possible, the figure should be explained. A figure title with Arabic numerals should be placed under each figure; the same numbering should continue throughout the article and be written in accordance with the APA 7 writing style. Figure captions should be written in Cambria font style, 10 font size, left-aligned, and the first letter of the first word should be capitalized. If a source is used in figure title, the source information should be added in parentheses. If the figure includes text, it can be written in Cambria font style and 9/10 font size.

5. TABLES

Tables should be left aligned and all the text in the tables should be written in Cambria font style. The title of the table should be in 10 font size and below the table number; and only the first letter of every word should be capitalized. APA 7 writing style should be used for the tables. Tables should be cited by specifying the number of tables in the text and they should be interpreted after the table. Tables should be placed in the text where they are used or on the following page. Related notes and references can be indicated at the bottom of the table after the "Note:" or "Source:" indicators.

6. REFERENCING

At the end of the article, references should be given according to APA 7 writing style before any appendices. All references should be written by using Cambria font style, 10 font size, before and after the paragraph values of "0", justified, single line spacing, with no indentation. There should be a single line spacing between each reference. It should be ensured that each reference in the references part is referred from the text, and that every reference used in the text is also included in the reference part.

7. APPENDICES

If the author(s) need it, they can create an appendices section after the bibliography and before the extended abstract. The appendices to be given in this section must be cited within the article. If more than one appendix is used, it can be numbered. The attachments to be included in the appendices should be in a way not to disrupt the integrity if they are given in the article. The elements that can be given in tables or figures should not be included in the Appendices.

8. ARTICLE TEMPLATE

Not all details about an article work are specified here in the “Author Guidelines”. More information about formatting is included in the template file, which should be used for studies to be submitted to the journal. If the information given here contradicts the information in the template file, it should be based on the template file.

In order to prepare the works according to the spelling rules of the journal, the template file should be used. If writing is completed in another file, it is recommended to transfer the contents of the file to the template file. Manuscripts that are not prepared in accordance with the template will be returned to the authors during the stylistic control stage.

9. REVISION CHECKLIST

The author(s) who have received reviewer comments for the article should state the page number on the “Revision Checklist” sent together with the reviewer reports, specifying the page number based on the change requested by each reviewer.

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