

Comparison of Differentiation of 2018 and 2024 Middle School Mathematics Curriculums

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Abstract: *The aim of the study was to compare the differentiation of the 2018 and 2024 Middle School Mathematics Curriculums. In this study, the document review method in the qualitative research design was used. The data of this study consists of 2018 and 2024 Middle School Mathematics Curriculums. In the research process, documents were first accessed. The originality of the documents was checked and an attempt was made to understand the documents. In the data analysis, while comparing the differentiation in the curriculums, the unit of analysis was determined in accordance with the purpose of the research. In the study, sentences and paragraphs in the curriculums were used as the unit of analysis. As a result of the analysis, information was provided differentiation in both curriculums. Differentiation is handled quite well in the 2024 curriculum.*

Keywords: *Middle School, Mathematics Curriculum, Differentiation.*

1. INTRODUCTION

Teachers must develop various plans when organizing instruction. These plans focus on attracting students' attention at the beginning of the lesson, ensuring motivation, informing them of the objectives, and reminding them of prerequisite learning. Furthermore, there are plans for preparing activities, methods, techniques, and tools before entering the lesson. These plans must also take into account students' individual differences. Factors that contribute to individual differences are genetic and environmental. Students have a need to learn from these factors throughout their instruction. Therefore, knowledgeable and experienced teachers can organize a productive learning process for students starting with different levels and types of prior knowledge, assess what and how students are learning, and adapt instruction to different learning approaches (Darling-Hammond, L., 2000). It is undoubtedly accepted that teacher competence is at the forefront of improving instruction (Harris, Sass, 2011). Internal and

external factors also influence the success of teachers in order to improve performance (Kanya, N., , Fathoni, A., B. & Ramdani, Z., 2021). External factors include the curriculum.

The curriculum must be of high quality in every respect. The curriculum is the most important guide for teachers. The content of the curriculum is based on various principles. These include suitability for the objectives, suitability for teaching principles, and suitability for the student. There are individual differences within this suitability for the student, as what is desired is student participation in the educational process (Desai, Damewood, & Jones, 2001). Individual differences are one of the most important and comprehensive aspects. Therefore, the content of the curriculum, and therefore its quality, is one of the factors that influences it.

Individual differences were addressed as differentiation in the 2024 Middle School Mathematics curriculum (Ministry of National Education of the Republic of Turkey, Middle Mathematics Curriculum (5th, 6th, 7th and 8th grades), 2024). This study will discuss how much and to what extent students' individual differences were included.

2. METHODOLOGY

2.1. Model of the Research

Qualitative research is model of the research ; model of the method is document review method.

2.2. Research Process

The data of this study consists of the the Differentiation in the 2018 Middle School Mathematics5., 6., 7. and 8. grades and 2024 Middle School Mathematics Curriculum 5., 6., 7.

and 8. grades. The research data were taken from <https://mufredat.meb.gov.tr> and <https://tymm.meb.gov.tr>. Both curriculum examined are official curriculum used in Turkey.

The Differentiation statements in both mathematics curriculum were read and interpreted comparatively.

In the study, sentences and paragraphs included in Differentiation were used as the unit of analysis. Finally, findings and results based on the Differentiation in both curriculums in terms of similarities and differences were presented.

In the differentiation of the 2018 Middle school (5., 6., 7. and 8. grades) mathematics curriculum, there is no differentiation section for each subject. However, in the of the 2024 Middle School (5., 6., 7. and 8. grades) mathematics curriculum, there is a differentiation section for each subject. Differentiation enrichment ve supporting olmak üzere ikiye ayrılmıştır. For this reason, the differentiation section of one of the subjects was selected and included in the analysis. The subject selected for analysis is the subject “**THEME 2: ALGEBRAIC THINKING AND CHANGES WITH OPERATIONS**

in the 2024 Middle School Mathematics Course (6th Grade)

THEME 2: ALGEBRAIC THINKING AND CHANGES WITH OPERATIONS

In this theme, it is aimed that students can reason about the representation and meaning of unknown quantities in real-life situations, make inferences about the meaning of algebraic expressions, and interpret algorithms in situations involving algebraic expressions.

4.FINDINGS

Table 1 Differentiation in The 2018 Middle School Mathematics Curriculums

Curriculum is structured with sensitivity to individual differences in mind. Individual differences stemming from genetic, environmental, and cultural factors also manifest themselves in terms of interests, needs, and orientations. Furthermore, this also encompasses interpersonal and intrapersonal differences. Individuals differ both from others and from their own unique characteristics. For example, an individual's ability to think abstractly may be strong, while their drawing skills may be weak.

Table 2 Differentiation in The 2024 Middle School Mathematics Curriculums

While the expected knowledge and skills for students are similar in terms of learning outcomes, the pace of progress and the knowledge and skills needed for each process may differ from one student to another. This is addressed in the context of "differentiation" in the Middle School Mathematics Curriculum. "Enrichment," a dimension of differentiation, is designed for students who can more quickly understand more complex and abstract information and use the knowledge and skills targeted in the curriculum more effectively.

Enrichment activities provide explanations of the content, methods, and processes that will allow students to deepen their learning without straying from the content framework. In this context, enrichment activities prioritize interdisciplinary connections and real-life/daily life applications, as well as disciplinary connections. Suggestions for creating learning opportunities that enable students to effectively utilize technology and digital platforms to produce digital content in line with their performance tasks are also presented within the context of enrichment.

The other dimension of differentiation, "supporting" is designed for students who need more concrete examples, daily life contexts, concrete material support, and visualization to achieve the knowledge and skills targeted by the curriculum. Support activities emphasize the applications students need, the tools, equipment, and technology available, peer learning through group work in the classroom, and the role of teachers in the process, without compromising the knowledge and skills targeted by the curriculum. Furthermore, the support section offers suggestions to enable students to effectively utilize digital platforms.

Differentiation on THEME2: ALGEBRAIC THINKING AND CHANGES WITH OPERATIONS

Enrichment: Students may be asked to investigate the methods used by scholars such as al-Khwarizmi, Omar Khayyam, Abu Kamil, and Sharafeddin Tusi, who pioneered the historical development of algebra. They may be asked to identify the representations corresponding to variables and algebraic expressions throughout history. Furthermore, they may be expected to prepare a panel exploring the contributions of mathematicians such as Ali Yar, Kerim Erim, and Cahit Arf to the field of algebra during the Republican Period. To enable students to acquire new knowledge about the meanings of symbols, they may be given an assignment to conduct research on different symbols used in mathematics and other disciplines (such as physics) [e.g., phi (ϕ), Euler's constant (e), the speed of light (c), and the number i] and present them as posters. They may be asked to conduct research on topics such as the Fibonacci sequence

or the Collatz conjecture. Students may be presented with algorithms on these topics and asked to consider how these algorithms relate to their research topics. By presenting algorithms for problems appropriate for this grade level in basic curriculumming languages, students can be encouraged to examine patterns in these languages and make inferences about these languages.

Supporting: The number of assigned tasks can be determined according to students' needs. Concrete materials such as colored pattern blocks can be used when creating unknown quantities. To express the structure of the pattern algebraically, examples involving single operations can be used, progressing to more complex examples. Group work can be used to establish connections between real-life situations and algebraic expressions. Initially, students can work on algorithms with fewer steps. During this process, algorithms can be broken down into smaller pieces, and students can be asked to examine each piece individually. Visualization and digital tools can be used to support students' algorithm reading process.

According to the findings, both curriculums emphasized differentiation. Differentiation was included in the curriculums. However, it was more detailed in the 2024 curriculum. All topics in the curriculum were titled "enrichment and support" regarding differentiation. The topic "Algebraic Thinking and Changes with Operations" was taken as an example. Information on enrichment and support was presented under the umbrella of differentiation appropriate to this topic.

CONCLUSION

An attempt has been made to give sufficient space to individual differences in the curriculums (Ministry of National Education of Republic of Türkiye, “Primary mathematic Curriculum(1.,2., 3, 4. Grades)” ,2018, Ministry of National Education of Republic of Türkiye, “Middle School Mathematic Curriculum(5., 6.,7. and 8.. Grades)”, 2018 & Ministry of National Education of Republic of Türkiye, “High School Mathematic Curriculum(9., 10.,11. and 12.. Grades)”, 2018); (Ministry of National Education of Republic of Türkiye, “Primary mathematic Curriculum(1.,2., 3, 4. Grades)” ,2024, Ministry of National Education of Republic of Türkiye, “Middle School Mathematic Curriculum(5., 6.,7. and 8.. Grades)”, 2024 & Ministry of National Education of Republic of Türkiye, “High School Mathematic Curriculum(9., 10.,11. and 12.. Grades)”, 2024).

According to the findings of the study, the 2018 middle school mathematics curriculum included information on differentiation. The 2024 middle school mathematics curriculum, in addition to information on differentiation, provides in-depth, comprehensive, and rich information relevant to each subject. Both curriculums are invaluable. However, the 2024 middle school mathematics curriculum is more qualified than the 2018 middle school mathematics curriculum in terms of the information it provides on differentiation.

REFERENCES

Darling-Hammond, L., (2000). How Teacher Education Matters, *Journal of Teacher Education*, 51, (3), 166-173.

Desai, S., Damewood, E. & Jones, R. (2001). Be a Good Teacher and Be Seen as a Good Teacher, Journal of Marketing Education, 23, (2), 136-144.

Harris, D., N. & Sass, T., R. (2011). Teacher training, teacher quality and student achievement, *Journal of Public Economics* 95, (7–8), 798-812,

Kanya, N., , Fathoni, A., B. & Ramdani, Z. (2021). Factors affecting teacher performance, International, *Journal of Evaluation and Research in Education (IJERE)*, 10, (4), 1462~1468.

Ministry of National Education of Republic of Türkiye, “Primary mathematic Curriculum(1.,2., 3, 4. Grades)” (2018) <https://mufredat.meb.gov.tr/>

Ministry of National Education of Republic of Türkiye, “Primary mathematic Curriculum(1.,2., 3, 4. Grades)” (2024) <https://mufredat.meb.gov>

Ministry of National Education of Republic of Türkiye, “Secondary mathematicCurriculum(5., 6.,7. and 8.. Grades)” 2018, <https://mufredat.meb.gov.tr/>

Ministry of National Education of Republic of Türkiye, “Secondary mathematic Curriculum(5., 6.,7. and 8.. Grades)” 2024, <https://mufredat.meb.gov>

Ministry of National Education of Republic of Türkiye, “High School Mathematic Curriculum(9., 10.,11. and 12.. Grades)”, 2018, <https://mufredat.meb.gov.tr/>

Ministry of National Education of Republic of Türkiye, “High School Mathematic Curriculum(9., 10.,11. and 12.. Grades)” , 2024 <https://mufredat.meb.gov>