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Teachers' Perspectives on the Science Curriculum According to Tyler's Program Evaluation Approach

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Abstract

This research aimed to evaluate the 6th-grade science curriculum (SC) based on Tyler's objective-based evaluation model according to teacher opinions. The study was designed as basic qualitative research, and 30 science teachers (ST) working in schools affiliated to the Ministry of National Education (MoNE) and determined according to the convenience sampling method participated in the study. The data were collected through a semi-structured interview form consisting of open-ended questions and subjected to descriptive data analysis. According to the findings, within the scope of the objective dimension of Tyler's model, teachers think that the SC outcomes are clear and understandable and contribute to students becoming science literate individuals. They expressed partially differentiated opinions about the relationship of SC with other curricula and the appropriateness of the outcomes to the level of the students. In the learning experiences dimension, the majority of teachers think that inquiry-based and student-centered teaching methods and techniques are adopted in the SC. On the other hand, they have partially differentiated opinions about the use of these methods and techniques in the lessons and their level of achievement of the outcomes. In the evaluation dimension, teachers presented differentiated views on whether the measurement and evaluation approach in the SC provides the quality of probe-assessment, the aspect of supporting learning, and whether it provides opportunities for process evaluations. Considering these findings, suggestions were presented for teachers and new SC studies.

Keywords: Science Curriculum, Tyler's Program Evaluation Model, Science Teacher

About the Article

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Introduction

The innovative skills and contents that curricula aim to provide are very important for increasing the educational qualifications of countries and societies. Because the manpower with the skills and competencies that will develop societies in every field in the future will consist of individuals trained according to these curricula. Therefore, by examining the curricula of countries, positive or negative inferences can be made about the quality of education in that country. Erden (1996) stated that the main goal of this process is to increase the quality of education and emphasized the importance of curriculum development and evaluation. Thus, with curriculum evaluation studies based on effective scientific research, curricula can be created as a guide resource for the 21st-century skills aimed to be gained by students (Ahn, 2018; Aslan & Sağlam, 2017; Ibeh, 2022).

Referring to the dynamic structure in the development and evaluation processes of curricula, Özdemir (2009) underscored the importance of this structure in determining the effectiveness and success of the implemented programs. Erdoğan (2019), on the other hand, emphasized that curriculum evaluation studies are conducted to identify deficiencies in educational processes and the measures that need to be taken, thereby potentially elevating the educational level of countries. Balıkçı et. al. (2021) note that, especially in the last 20 years, all disciplines have been influenced by this dynamic curriculum development/evaluation understanding. They stress that emerging technologies, contemporary learning theories, new-generation skills, competencies, and modes of thinking require the updating/renewal processes of curriculums.

Understanding the types, designs, ideologies, and philosophies of curriculum evaluations is crucial and necessary for teachers (Aygören & Er, 2018). It is of great importance to examine all dimensions (goal, content, educational situations/learning experiences, and assessment evaluation) comprehensively in order to identify any possible flaws and deficiencies of the programs. Elaborating on this matter, Ünal (2011) stated that a curriculum with poorly defined objectives/outcomes would fail to serve its purposes through its content and learning experiences, and the assessment tools within the program would not possess the appropriate qualities, which could have a negative impact on other dimensions of the program. Especially in the last 25 years, numerous curriculum evaluation studies have been conducted, and scientific data have been provided for the new curricula planned to be developed by presenting the advantages and disadvantages, positive and negative outputs, and deficiencies of the curriculums implemented in the past (Balıkçı et al., 2021; Ercan, 2007; Gedik, 2017; Karaman & Karaman, 2016).

One of the curricula that has undergone radical innovations and revisions is the Science Curriculum in Türkiye. Particularly, the sciences, which are directly related to many disciplines such as technology, engineering, informatics, art, etc., have been among the most active branches in terms of program innovations/updates due to rapid changes occurring in these disciplines and the influence of many new contemporary learning

theories/approaches. Değirmenci (2007), asserting that the early 2000s could be considered the onset of a new era for science curricula, whose fundamental vision is to educate individuals as scientifically literate regardless of individual differences, emphasized the importance of nurturing responsible and capable individuals who are aware of phenomena in the natural environment, can ask logical questions, collect data through observation and experiment, and analyse these data. This objective, which is directly articulated in the contemporary SC, has been incorporated with various terminologies that convey similar content, such as 'science and technology literacy' in the 2005 Science and Technology Curriculum and 'science literacy' in the 2013 and 2018 Science Curriculum (Ministry of National Education (MoNE), 2013; 2018). When evaluation studies specific to these curricula are examined according to the historical process, it is observed that studies were conducted for the 2005 science and technology course curriculum (Battal, 2008; Ercan, 2007), followed by the 2013 SC (Toraman & Alcı, 2013; Yıldırım & Güngör Akgün, 2015), and, albeit fewer, the 2018 SC (Balıkçı et al., 2021; Çevik, 2020; Gürdal, 2021).

Tyler's Objective-Based Program Evaluation Model and Science Curriculum

Demirel (2007), addressing the curriculum evaluation processes on a scientific foundation, emphasized the stages of data collection, analysis, and the interpretation and reporting of results. Depending on the diversity of these data collection processes, different program evaluation models have been identified in the literature. These are objective-based evaluation approaches, management-oriented evaluation approaches, customer-oriented evaluation approaches, expert-oriented evaluation approaches, and participant-oriented evaluation approaches (Fitzpatrick et al., 2010; Sönmez & Alacapınar, 2015; Uşun, 2016; Yüksel, 2010). Based on these specified models, Balıkçı et al. (2021) highlighted that there are few evaluation studies in the literature specifically related to the current SC, noting that researchers in these studies tended to collect data with superficial questions of similar nature. In one of these studies conducted with different models, Yıldırım (2018) evaluated the 5th-grade SC based on the context-input-process-product (CIPP) model according to teacher opinions. According to the results obtained, it was determined that the planning and predictions made for the SC have a moderate potential to meet the needs in practice. Similarly, in the study where Balıkçı et al. (2021) evaluated the 3rd-grade SC based on the CIPP model according to teacher opinions, the majority of teachers agreed that the achievements in the SC are appropriate for the students' interests, needs, and learning levels, and contribute to their development as scientifically literate individuals. However, a few teachers pointed out the lack of technological infrastructure and equipment in schools. In this study, a different model, Tyler's objective-based evaluation model, was used. This model is fundamentally about identifying educational objectives that need to be achieved. It is built/based on the determination of the extent to which the objectives set for the relevant instructional program are achieved as a result of its implementation (Tyler, 1981; cited by Aslan & Erden, 2018). When making decisions about the effectiveness of the program, the extent to which the objectives could be achieved is examined. If there are objectives that could not be reached, the learning experiences are scrutinized for reasons (Ahn, 2018; Chen

et al., 2005). The educational outcomes are compared with the objectives, and it is determined to what extent these objectives are reached. During this process, along with evaluation tools like tests, surveys, and school records, qualitative data collection tools can also be used (Kotluk & Yayla, 2016; Stufflebeam et al., 2014). In the literature, many program evaluation studies have been conducted for different branches based on this model. Among these studies, Tyler's objective-based evaluation model was adopted in the evaluation of mathematics curriculum (Aslan & Çakır, 2017), physiotherapy curriculum (Mobit et al., 2024), biology curriculum, (Aydın & Aslan, 2021), health and physical education (Cruickshank, 2018) and physics curriculum (Kotluk & Yayla, 2016). Only one study has been found where the SC, which is the subject of this research, was evaluated according to Tyler's model. In this study, Aslan and Erden (2018) evaluated the curriculum of the fifth-grade science course and stated that while the program was effective in terms of student achievement, the majority of students could not reach the objectives, citing physical infrastructure, teacher, student, and family-related reasons as the cause.

Considering the limited number of studies based on Tyler's objective-based evaluation model for the current SC, it is believed that the findings obtained from this research provide comparative and significant contributions to the literature on SC. Moreover, we believe that more in-depth results were obtained by obtaining open-ended data during the data collection process. At the same time, it is considered that previous studies on the evaluation of SC were diversified, especially in terms of the data collection process, and that integrative findings were obtained. This in-depth data collection process was also considered in terms of class level, and instead of a superficial evaluation of all class levels where the SC is implemented, a single class level was examined in detail. Thus, new areas for program evaluation studies in the literature for the SC curriculum based on the Tyler model (class level, data collection process, etc.) are expected to emerge. Highlighting this gap, Ekinci and Eroğlu Doğan (2020) conducted a thematic analysis of curriculum evaluation studies for the SC curriculum and stated that very few evaluation studies were conducted for the SC curriculum updated in 2018. However, considering the dynamic nature of the new curriculum (The Turkish Century Education Model), which was gradually implemented in 2024 and is still being implemented in the lower grades, it is expected to make significant contributions (MoNe, 2024). This process, which can also be considered as a process of improvement, feedback, and taking measures for curricula, will also provide longitudinal comparative opportunities for new research. In this context, the research aimed to evaluate the 6th-grade SC implemented in Türkiye based on Tyler's objective-based evaluation model according to teacher opinions.

Method

Research Model

In this study, which aims to evaluate the SC according to teachers' views, a basic qualitative research design was adopted. Basic qualitative research, one of the most common types of qualitative research in educational sciences, aims to reach information by focusing on how participants interpret their lives and how they perceive the world (Merriam & Tisdel, 2015). Since this study was carried out to reveal how teachers, who are the implementers and stakeholders of the SC, perceive this curriculum and what their own experiences are, the basic qualitative research method was preferred. In this context, opinions on the SC, which is a fundamental document serving as a guide for teachers, were elicited through a semi-structured interview form without any intervention. The semi-structured form, organized according to Tyler's objective-based evaluation model, was applied to ST who made up the study group within a defined timeframe. Within the framework of this model, it was aimed to evaluate dimensions such as the role and effect of the SC during the implementation process, teachers' level of understanding and use, and the appropriateness of subject areas, activities, and evaluation situations to the students' levels.

Study Group

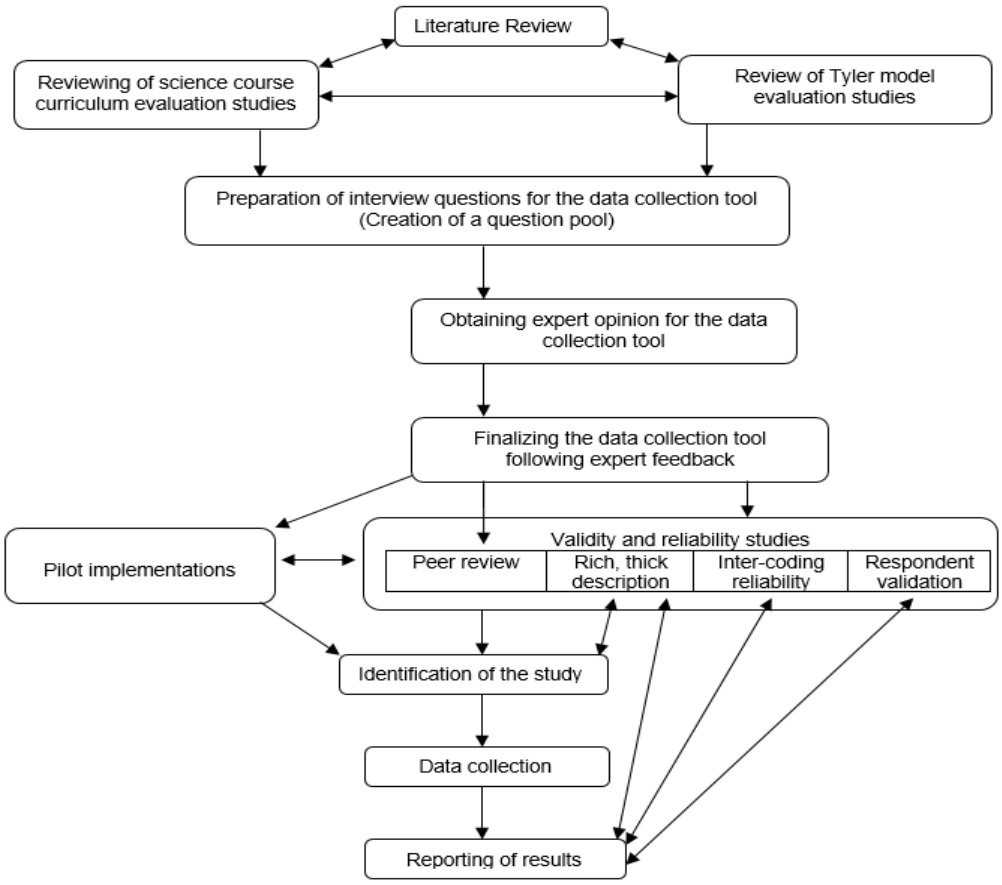
The study group, selected through the convenience sampling method, one of the non-random sampling methods, consists of 30 teachers who taught science at the 6th-grade level. In this method, which is preferred due to time, money and labor limitations, the sample should be selected from easily accessible and applicable units (Büyüköztürk et al., 2009). Accordingly, in the province of Uşak in Türkiye where the study was conducted, teachers in schools that the researchers considered convenient for data collection in terms of time, labor, accessibility, and the possibility of quick feedback constituted the study group. Within this scope, data were collected through interviews conducted with 30 volunteer STs who participated in the study.

Role of the Researchers

According to Creswell (2021), researchers conducting qualitative studies should disclose any potential biases, assumptions, experiences, and prejudices prior to their investigations. This is crucial as the possible initial positions and biases of researchers can influence the study. The first author of the research has previously conducted various program evaluation studies (Balıkçı et al., 2021). In these studies, the researcher participated in data collection processes through interviews and played an active role in the analysis phases. Therefore, he possesses extensive experience in both program evaluation and the analysis of qualitative data. The second author is currently pursuing doctoral studies. During her doctoral education, she has taken courses on qualitative research methods and the analysis of qualitative data. Moreover, she has gained significant experience by analyzing qualitative data through interviews and document analyses for her master's thesis. The third author has conducted SC evaluation studies in

his contributions to other works and in the theses he supervised. Accordingly, it is believed that the authors have the knowledge and experience to enhance the quality of the research. The process of the study, including the roles of the authors, is presented in the flowchart below. (See Fig. 1)

Figure 1. Data Collection and Analysis Process



Data Collection Process

A semi-structured interview form developed by researchers was used to determine the opinions of ST regarding the SC. In the preparation of the semi-structured interview form, the literature was reviewed, and the opinions of 3 experts were obtained for the draft form. These experts comprise a doctorate holder in science education who undertook curriculum evaluation studies across various grade levels within the context of the SC, an Associate Professor in science education with experience in conducting evaluations grounded in diverse theoretical models, and a seasoned science educator engaged in doctoral studies, possessing prior experience in qualitative research methodologies. After gathering the expert opinions, the final version of the form consisted of questions that reflected the three dimensions of Tyler's program evaluation approach, namely objectives, learning experiences, and evaluation. Four questions were determined for each dimension, and the form was prepared with a total of 12 open-ended questions.

A table indicating which dimension each question probes is presented below (see Table 1).

Table 1. Questions about the dimensions of Tyler's model

Dimensions of the Model	Questions	Generated Categories
Objective	1. Do you think the SC is written clearly and understandably? Please explain.	Clear-Understandable
		Not Clear-Understandable
	2. To what extent do you believe the 6th-grade SC is related to the 6th-grade Mathematics curriculum?	Related
		Partially Related
		Unrelated
		No Idea
	3. What are your thoughts on the appropriateness of the curriculum outcomes to your students' levels?	Suitable for Student Level
		Partially Suitable for Student Level
		Not Suitable for Student Level
	4. To what extent do the units and learning areas in the 6th-grade SC contribute to students becoming scientifically literate individuals?	Contributes
		Partially Contributes
		Does Not Contribute
Learning Experiences	5. How are the educational situations (methods and techniques, pedagogical approaches) presented in the 6th-grade SC organized?	Student-Centered
		Partially Student-Centered
		Teacher-Centered
		No idea
	6. What are your views on the teaching methods and techniques used by teachers during the implementation of the SC?	Inquiry Based
		Partially Inquiry Based
		Traditional
	7. To what extent do the teaching methods and techniques used in class achieve the outcomes anticipated in the SC?	Advanced Level
		Partial Level
		Inadequate
		No idea
	8. How much emphasis do you believe is placed on activities related to the teaching process in the SC?	Sufficient
		Partially Sufficient
		Insufficient
Evaluation	9. Based on the exams you administer, to what level have students achieved the anticipated outcomes in the 6th-grade SC?	Achieved
		Partially Achieved
		Not Achieved
		No Response
	10. What are your thoughts on the assessment tools included in the SC?	Appropriate
		Partially Appropriate
		Inappropriate
	11. To what extent do the assessment and measurement tools used in exams prepared by teachers measure the outcomes in the SC?	Sufficient
		Partially Sufficient
		Insufficient
	12. How supportive are the measurement and assessment activities conducted in enhancing students' understanding of science concepts?	Supportive
		Partially Supportive
		Not Supportive

Data Analysis

In the study, the qualitative data obtained were subjected to descriptive analysis. According to this method, codes and categories were generated from the responses to the questions on the interview form. The responses, organized according to writing rules, were reflected in tables without the addition of the researchers' interpretation, representing each category of teacher opinions. During this process, the answers to each question were separately coded by three researchers, and the emerging codes were compared to examine their consistency and reliability values. For each question, the formula proposed by Miles and Huberman (1994), [Consensus / (Consensus + Disagreement)], was considered, and the conformity rate of the codes was identified as 0.90. Based on this inter-coder, it was concluded that the analysis process was reliable.

Validity, Reliability, and Ethical Considerations

Since the data collection process was conducted through qualitative interviews, the criteria for validity and reliability were implemented in accordance with a qualitative research approach. Within this scope, peer review and respondent validation were obtained to ensure the credibility of the research. At least three experts were consulted both in the design of the data collection tool and in the analysis of the data. These experts are comprised of an associate professor, a doctoral-level educator, and a specialist teacher, each with a background in science education and prior experience in both evaluating SC and conducting qualitative data analysis. For respondent validation, some of the teachers involved in the interviews were presented with the generated categories and sample teacher statements. Their opinions were sought on whether the relevant statements accurately represented the categories. The teachers affirmed the categories created by the researchers, reaching a consensus. They were asked whether the responses reflected in the tables were indeed their own and whether they wished to add any new statements, subsequently incorporating raw data into the tables. To ensure the transferability of the research, rich, thick description was carried out. For this, teacher statements representing the categories put forward by the researchers were separately included in the tables for each question, and the number of these statements was increased. This descriptive process was also taken into account during the formation of the research group, reaching out not only to schools in urban centers but also to some schools in rural areas. Additionally, it was ensured that all teachers had taught 6th-grade science classes within the previous year; hence the provision of more accurate data regarding the 6th-grade SC's topics and outcomes was facilitated. To ensure the research's consistency, inter-coding reliability was conducted. For this, all three researchers coordinated, particularly in the creation of categories and conducting analyses in unison. The resulting categories were compared, and those that reached a consensus were included in the analysis and tabulated. Categories with differing opinions were reviewed again, and a separate conformity percentage was calculated for each question. Accordingly, the lowest conformity percentage for interview questions was calculated as 83% (for the 3rd, 6th, and 10th questions), and the highest was 100% (for the 1st question).

Within the scope of the research's ethical procedures, data were collected through interviews with ST who voluntarily participated in the study, in accordance with the decision of the …… University Social and Humanities Scientific Research and Publication Ethics Board, dated July 5, 2023, and numbered 2023-146.

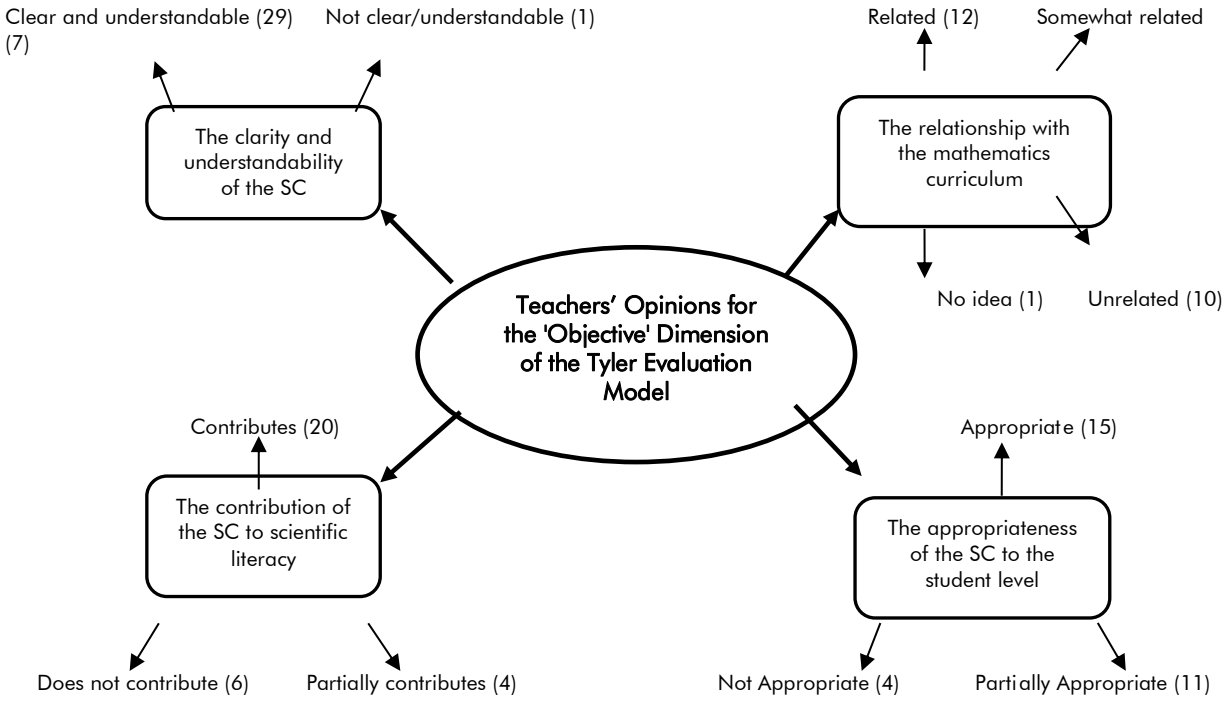
Findings

In this section, the categories formed and the teacher statements representing each category are included. Findings for each dimension of Tyler's objective-based program evaluation model are tabulated separately.

Teachers' Opinions on the SC for the 'Objective' Dimension of the Tyler Program Evaluation Model

Four questions were asked to ST for the objective dimension. The answers reflecting the teachers' opinions are shown in the concept network below according to the analyzed categories **(see Figure-2).**

Figure-2. 'Teachers' Opinions on the SC for the 'Objective' Dimension



The teacher opinions reflecting the created categories are presented below in order according to the interview questions in Table 1.

Table 2. Teachers' Opinions on the Clarity and Understandability of the 6th Grade SC (Question 1)

Code	Clear-Understandable	Not Clear-Understandable
f	29	1
Sample Teacher Statements	T21: *'The teaching program clearly explaining the objectives and how many hours per week these objectives should be taught indicates that it is understandable.'* T4: *'Yes, the competencies that need to be given and the topics that should not be touched upon are clearly stated.'* T17: *'I think the curriculum is clear and understandable because the fundamental 21st-century skills that students need are clearly and explicitly provided in the curriculum.'*	T27: *'No. I do not find it understandable.'*

According to Table 2, 29 teachers indicated that the SC is written clearly and understandably. Teacher T21 substantiated this view with the distribution of weekly lesson hours. Teacher T4 articulated his opinion through the learning outcomes and delimited subject contents, while Teacher T17 explained his perspective with the 21st-century skills emphasized in the SC. However, one teacher stated that the SC is not clear and understandable.

Table 3. Teachers' Opinions on the Extent to which the 6th Grade SC is integrated with the 6th Grade Mathematics Curriculum (Question 2)

Code	Related	Partially Related	Unrelated	No idea
f	12	7	10	1
Sample Teacher Statements	T17: *'I believe that the outcomes required to be imparted to students in the science curriculum and the mathematics curriculum are interconnected. In science, especially in the force and motion unit, we rely extensively on numerical data. I also think it's related to how units are used in the mathematics curriculum.'* T21: *'The presence of mathematical operations required for the 6th grade in science, in both courses' curricula, highlights the importance of the program's interdisciplinary approach. The program is adequate in this respect.'*	T5: *"If we consider interdisciplinary interaction, we can say there is a partial relationship between the two courses because the Science curriculum includes some basic mathematical concepts, but this relationship is not very strong.'* T29: *'In the 4th Unit, the Force and Motion, the topic of speed is related to mathematics. So, if our students have not seen or learned the topic of simple arithmetic operations, ratio-proportion, graph reading, and interpretation in mathematics, we face difficulties.'*	T1: *'I think it's not adequately integrated. The Science and Mathematics curricula are not in coordination. We see that the skills needed in the Science curriculum are taught in later units in the Mathematics curriculum compared to the Science curriculum. This situation causes difficulties.'* T24: *'I don't think they follow each other in terms of topics. When the operations that need to be applied in science are not seen by the students in mathematics, problems can arise.'*	T27: *'I have no idea.'*

According to Table 3, 12 teachers indicated that the SC is related to the mathematics teaching curriculum. T17, who clarified this situation with the example of the force-motion unit, noted that numerical data are utilized in this unit and related it to the

manner units that are used in the mathematics teaching curriculum. Seven teachers found both curriculums to be partially related. T5 stated that although the SC includes some mathematical concepts, this relationship remains at a partial level and is not very strong. Ten teachers reported that the SC and the mathematics curriculum are not related. T1 and T24 justified their views with the lack of coordination in the units and topics of both curriculums. One teacher did not express an opinion.

Table 4. Teachers' Opinions on the Suitability of the SC Outcomes to Students' Levels (3rd question)

Code	Suitable for Student Level	Partially Suitable for Student Level	Not Suitable for Student Level
f	15	11	4
Sample Teacher Statements	T25: *'The outcomes are given in line with the students' levels.'* T4: *'They are suitable for the students' levels. They do not exceed their levels.'* T23: *'It was observed that the outcomes positively enhanced students' cognitive levels.'*	T21: *'Two units where we heavily use mathematics (force and motion, matter and heat topics) slightly challenged my students' levels.'* T29: *'Outcomes are suitable for student levels, but because the systems topic is thrust upon the students all at once, lasting learning does not occur. We also face problems with the speed topic every year.'*	T5: *'Considering the developmental stage and age of the children, I believe that the curriculum outcomes are not suitable for the students. The curriculum is very intensive and has been prepared in detail.'* T27: *'Topics are quite lengthy and comprehensive. I think it's above the student's level. Also, because the topics are long, there is limited time available.'*

According to Table 4, 15 teachers stated that the outcomes of the SC are suitable for the students' level. T23 justified this view by emphasizing that the outcomes support the cognitive levels of the students. 11 teachers stated that the outcomes are partially suitable for the students' level. Elaborating on this view with some specific topics and units, T21 highlighted that students struggled a bit in the force and motion and matter and heat topics where mathematical operations are heavily utilized. 4 teachers expressed negative opinions about the suitability of the outcomes to the student level. T5, who linked this view with children's developmental periods, also noted that the curriculum is intense and detailed.

Table 5. Teachers' Opinions on the Contribution of the SC to Students Becoming Scientifically Literate Individuals (4th question)

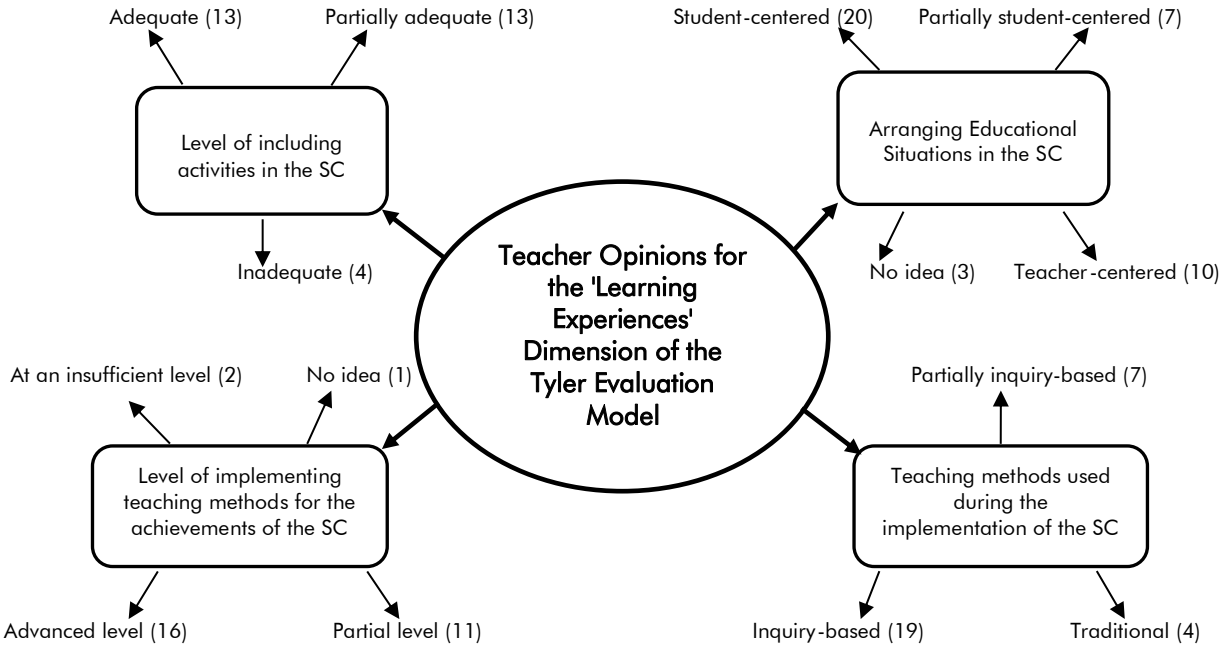
Code	Contributing	Partially Contributing	Not Contributing
f	20	4	6
Sample Teacher Statements	T21: *'The curriculum is set up to offer the chance to acquire characteristics of being science literate, such as problem-solving and researching.'* T15: *'Presenting students with daily life examples related to the topic makes the subject more understandable. Increasing these examples will enhance science literacy.'* T3: *'Topics related to their daily lives arouse curiosity, and since it captures their interest, it encourages them to research. They contribute by exploring, reflecting on their thoughts, and presenting their projects.'*	T26: *'Of course, it contributes to a certain level, but I don't find this level sufficient. I believe that the unit contents are overly restricted and that this limitation constrains the level of science literacy.'* T18: *'It's at a medium level, not advanced.'* T7: *'It should be further supported in terms of numerical readiness.'* T28: *It contributes to becoming science literate, but not all units contribute equally.'*	T9: *'I can't say there's a profound level of science literacy. Because the primary concern at the end of middle school is the high school entrance exam (LGS), the main thing in the minds of most parents, students, and teachers is aimed at achieving the best score in this exam. In such an environment, the student profile that learns through deep research, discussions, and other methods is hindered.'* T1: *'I don't think the achievements that increase students' science literacy in the science curriculum are adequately integrated within the units. I am not sure that the existing outcomes are sufficiently implemented in the classroom for various reasons. Even though there is a unit named "Applied Science" in the program, this unit, which comes towards the end of the second term, is mostly dealt with superficially.'*

According to Table 5, while 20 teachers expressed that the SC contributes to students becoming scientifically literate individuals, T21 emphasized the problem-solving and inquiry dimensions of science literacy, and T15 and T3 highlighted the relation to daily life events. 4 teachers indicated that the SC partially contributes to students becoming scientifically literate. T26 based this view on the limitation of topic contents. 6 teachers stated the opposite opinion. T9 explained this opposing view due to the influence of centralized exams (LGS), while T1 emphasized the superficial treatment of the "Applied Science" lessons in particular.

Teachers' Opinions on the SC for the Learning Experiences Dimension of the Tyler Program Evaluation Model

For the dimension of learning experiences, four questions were posed to ST. The answers reflecting the opinions of the teachers, as analyzed by categories, are shown in the concept network below **(see Figure-3).**

Figure 3. Teachers' Opinions on the SC for the Dimension of 'Learning Experiences'



The teacher views reflecting the created categories are presented below in order according to the interview questions in Table 1.

Table 6. Teachers' Opinions on the Arrangement of Educational Situations in SC (Question 5)

Code	Student-Centered	Partially Student-Centered	Teacher-Centered	I have no idea
f	20	5	2	3
Sample Teacher Statements	*T17: 'The curriculum aims for students to produce knowledge by experimenting and designing. Therefore, many activities have been included in the curriculum. A student-centered approach is exhibited. The methods and techniques used are suitable for the development level of the students.'* T22: *'Experimental methods and techniques, that is, those that center on the student and allow the student to produce outputs and experience the joy of achievement, provide more permanent learning experiences. In general, there are no problems in planning and implementing these methods and techniques.'*	*T14: 'The methods and techniques are related to the course objectives, but pedagogically, I believe some objectives should be in different grade levels.'* T19: *'Experiment design is a bit lacking. No problem with the methods.'* T15: *'Adjustments should be made according to each region and school. Teachers should be able to adapt pedagogical approaches and practices according to the needs of the students.'*	*T1: 'The educational situations in the curriculum are insufficient. There should be a diversification of methods and techniques that can be used, and alternative activities should be included where methods and techniques are used according to the facilities and capabilities of the school. Also, teachers should be guided on the implementation of these methods and techniques, and necessary materials should be provided.'* T5: *'Educational situations have been arranged according to the current period and readiness levels of the students, but I think it's inadequate.'*	T26: *'I cannot express an opinion on this matter.'*

According to Table 6, the majority of teachers stated that the SC is structured in a student-centered manner. T17 explained this view by pointing out that students produce knowledge by experimenting and designing, while T22 emphasized an understanding that centers on students and allows them to produce outputs. Five teachers mentioned partially student-centered situations. Accordingly, T14 stated that although teaching methods and techniques are related to course objectives, some objectives are not appropriate for the grade levels. T19 pointed out that while there's no problem with teaching methods, the experiment design process is a bit lacking. Two teachers indicated that the SC is not student-centered. In this context, T1 expressed that teaching methods and techniques need diversification, and there should be alternative methods and techniques suitable for the facilities and capabilities of the school. Three teachers did not express any opinion on this matter.

Table 7. Teachers' Views on Teaching Methods and Techniques Used in the Implementation of the SC (Question 6)

Code	Inquiry	Partially Inquiry	Traditional
f	19	7	4
Sample Teacher Statements	T14: *'In some topics, students are enabled to relate with STEM (like in thermally insulated houses) and in some learning outcomes, they have the opportunity for coding (like in the electricity unit with a rheostat)'* T29: *'Since we prioritize a constructivist educational approach, we aim to create a classroom environment where students actively learn by doing, experiencing, and experimenting, striving for lasting knowledge.'* T5: *'We mostly prefer modern methods like research-investigation, discovery strategies combined with brainstorming, and creative drama.'*	T1: *'In schools, teachers often hesitate to research and apply different methods and techniques, mainly due to exam pressures and anxieties. Therefore, the variety and number of methods and techniques used in schools are quite limited.'* T22: *'It varies from teacher to teacher, unfortunately. However, teachers who actively involve their students in the learning process both achieve academic success and become very popular among their students. Because when students see their thoughts and themselves being valued, they feel more esteemed and experience the joy of success firsthand.'*	T30: *'I think many of us use verbal instruction due to the program's intensity.'* T15: *'The curriculum mostly requires narration, and observation techniques. Due to the physical environment's insufficiency, each student's varying interests and needs, and most importantly, the limited time, I think some methods and techniques cannot be used.'*

According to Table 7, for teaching methods and techniques used during the implementation of the SC, 19 teachers stated that they could use research-inquiry-based methods. In this regard, T14 highlighted current teaching approaches like STEM and coding and mentioned topics like thermally insulated houses where students could relate to STEM, and in certain topics like electricity where they were allowed to code. 7 teachers indicated that they could adopt partial research-inquiry processes during the implementation of SC. In this context, T1 mentioned hesitations in applying research and practice-oriented methods and techniques due to reasons such as exam anxieties. 4 teachers pointed out that they used traditional teaching methods and techniques. T30 emphasized the intensity of the teaching program, while T15 mentioned reasons such

as lack of physical resources and time constraints that lead them to adopt a traditional teaching approach.

Table 8. Teachers' Views on the Level of Achievement of 6th Grade SC Outcomes by the Teaching Methods and Techniques Used in Science Lessons (Question 7)

Code	Advanced Level	Partial Level	Inadequate Level	No Opinion
f	16	11	2	1
Sample Teacher Statements	T4: *'The methods and techniques used fully achieve the intended curriculum.'* T5: *'With the correct use of teaching methods and techniques, outcomes can be achieved at the desired optimal level.'* T24: *'If applied correctly, the outcomes are significantly achieved for the students.'*	T17: *'I don't think that the methods and techniques used in lessons fully convey the outcomes to the students because I believe the outcomes are a bit challenging for the students' level.'* T29: *'Of course, when there is an active learning environment, the time given for lesson outcomes is not sufficient. So, it's at a medium level.'* T1: *'In my opinion, it happens at the level of knowledge, comprehension, and application. Advancing beyond the application is quite challenging.'*	T2:*' Superficial'* T8: *'Little'*	*T30: 'None'*

According to Table 8, 16 teachers stated that the SC outcomes can be achieved with the teaching methods and techniques used in science lessons. In this context, T5 and T24 indicated that if teaching methods are used correctly, the outcomes of the SC can be achieved at an advanced level. 11 teachers expressed their views at a partial level. T29 stated that the outcomes can be achieved when there is an active learning environment, but due to the limited lesson durations, they are achieved at a medium level. 2 teachers shared opinions contrary to these views, while 1 teacher did not provide any opinion.

Table 9. Teachers' Views on the Inclusion of Activities in the 6th Grade SC During the Process of Teaching Science Lessons (Question 8)

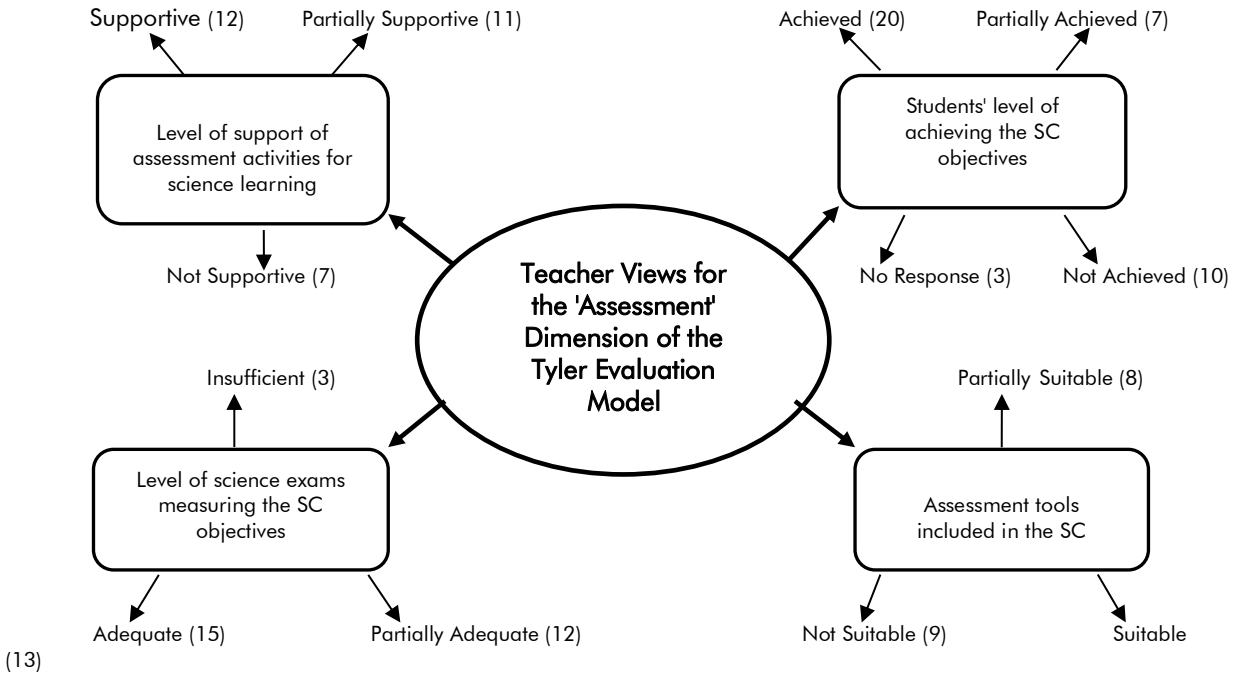
Code	Sufficient	Partially Sufficient	Inadequate
f	13	13	4
Sample Teacher Statements	*T17: 'I think activities are used quite extensively throughout the teaching process. The outcomes given in the curriculum are based on activities. For instance, activities are frequently incorporated in textbooks and resources in the density unit or the matter and heat unit.'* T25: *'In the new curriculum, activities have been provided adequately for in-class and out-of-class reinforcement.'* T4: *'They have been incorporated adequately and are suitable for the student level.'*	*T15: 'Materials in the activities are easily accessible, so every student can easily perform them. However, more activities that spark curiosity for research and experimentation should be included.'* T14: *'If you only have the science course, then almost none. Because the outcomes match almost exactly with the lesson hours. But if you have a science application course, you are lucky. Then activities progress beautifully.'* *T24: 'Sometimes, sufficient lesson time is not provided. Abstract topics require longer lesson hours, yet the curriculum demands topics to be covered in 4 hours.'*	T26: *'Most of our teachers allocate very little time to activities. Teachers generally adopt an exam-focused and test-focused teaching process.'* T13: *'Activities are inadequately incorporated due to the exam-focused system.'* T5: *'I don't think most activities are conducted due to the intensity of the topics.'*

According to Table 9, 13 teachers indicated that they include the activities found in the SC to their science lessons. T17, who substantiated this view with topics such as density, matter, and heat, stated that the outcomes in the SC are activity-based and that many activities are used throughout the teaching process. Another 13 teachers partially agreed with this view. Accordingly, T24 and T15 explained their views on the lack of time. Four teachers expressed opposing views. In this context, T13 and T26 mentioned the exam-focused system, and T5 pointed out the topic intensity as a reason for not including the activities in the SC in his science lessons.

Teachers' Views Regarding the Dimension of 'Evaluation' of Tyler's Program Evaluation Model for the SC

For the dimension of evaluation, four questions were asked to the ST. The answers reflecting the teachers' opinions are shown in the concept network below (see **Figure 4**).

Figure-4. Teachers' Views on the Dimension of 'Evaluation' for the SC



The teacher views reflecting the formed categories are presented below in order according to the interview questions in Table 1.

Table 10. Teachers' Views Regarding the Achievement Level of Students in the Exams Conducted for Science Lessons towards the 6th Grade SC Objectives (Question 9)

Code	Achieved	Partially Achieved	Not Achieved	No Response
f	17	11	1	1
Sample Teacher Statements	T15: *'Based on the exam results, it's observed that students who have reached a certain level have achieved all objectives, with the majority accomplishing them, except for a few students.'* T21: *'I think they generally achieved the levels of knowledge, understanding, and application.'* T28: *'I observed that they reached the majority of the objectives, based on the students' answers.'*	T4: *'While not all 6th graders have reached the same level, they have generally achieved the expected level.'* T16: *'Individual learning situations vary, but in general, it's above average.'* T7: *'Excluding extraordinary conditions, the majority are at an appropriate level, but it was difficult to assess and receive feedback in hybrid education.'*	T17: *'Based on the exams we conducted, I think our students haven't fully grasped the objectives. A reason for this might be the emphasis on activities in the lessons, which doesn't allow students to practice solving questions or taking tests.'*	T1: *'Due to the institution I work at, I don't conduct exams that quantitatively measure academic achievement. Therefore, I can't answer this question.'*

According to Table 10, 17 teachers believed that based on the exams they conducted, students were able to achieve the SC objectives. T21 explained this thought using Bloom's taxonomy, stating that students could reach the application level. 11 teachers stated that, according to the conducted exams, students were able to partially achieve the SC objectives. T4 emphasized that, in general, students were able to achieve the objectives, but particularly at the 6th-grade level, not all students were at the same level. One teacher expressed an opposing view, and one teacher did not express any opinion.

Table 11. Teachers' Views on Assessment and Evaluation Tools in the 6th Grade SC (Question 10)

Code	Suitable	Partially Suitable	Not Suitable
f	13	8	9
Sample Teacher Statements	T23: *'The tools and inventories used facilitate assessment and have contributed well to learning outcomes.'* T25: *'Assessments are not only based on exams but also consider the student's participation in class and activities outside of class, evaluating the overall success of the student.'*	T12: *'It's good, but I believe it needs to be supplemented with next-generation questions.'* T28: *'It only measures at the knowledge level and doesn't address the application area.'*	T21: *'I think the assessment tools are too simplistic for the topics.'* T19: *'The questions in the textbooks are simple compared to what students learn in the program, but different characteristics are expected in the LGS format.'*

According to Table 11, 13 teachers indicated that the assessment and evaluation tools in the SC are suitable for science lessons. T25, considering the support for students' in-class and out-of-class participation, stated that there's a holistic evaluation approach, not just an exam-focused assessment. 8 teachers somewhat agreed with this view, with T12 specifically emphasizing the need for next-generation questions. 9 teachers expressed opposing views. Among them, T21 commented that assessment tools are too simple, while T19 pointed out the different format of the central examinations (LGS).

Table 12. Teachers' Views on How the Assessment and Evaluation Tools Used in Science Exams Measure the Objectives in the 6th Grade SC (Question 11)

Code	Sufficient	Partially Sufficient	Insufficient
f	15	12	3
Sample Teacher Statements	T9: *'I believe that in recent years, with the diversity and creativity in question-asking techniques, objectives are largely measured. Especially in recent years, with next-generation science questions, objectives are measured more accurately.'*	T21: *'In the science application course exam, it measures more at the analysis and synthesis levels, while science exams usually stay at the knowledge and understanding levels.'*	T13: *'I don't think a conscious assessment and evaluation tool has been prepared to measure the objectives.'*
	T17: *'I think the exams prepared by our teachers fully measure the objectives.'*	T22: *'It's predominantly focused on knowledge and understanding levels.'*	T19: *'The experiential learning stage is always missing. For instance, if we're doing an exam on pressure, there should be a simple, practical, and group-based assessment.'*
	T24: *'I believe it measures at a high level. Objectives are fairly evaluated and assessed.'*	T25: *'The assessment and evaluation tools used in exams prepared by teachers measure at the knowledge level.'*	

According to Table 12, 15 teachers stated that the assessment and evaluation tools they used in science lessons measure the objectives sufficiently. T9 highlighted the recent diversity and creative questions in these tools. 12 teachers partially agreed with this viewpoint, with T25 explaining this perspective by pointing out that questions mainly measure at the lowest level of Bloom's taxonomy, the knowledge level. Meanwhile, 3 teachers expressed opposing views, with T19 emphasizing the lack of practical and group-based assessments.

Table 13. Teachers' Views on the Extent to Which Assessment and Evaluation Activities in Science Lessons Support Students' Understanding of Concepts in the 6th Grade SC (Question 12)

Code	Supportive	Partially Supportive	Not Supportive
f	12	11	7
Sample Teacher Statements	T5: *'Students achieve more lasting learnings with more concrete learnings. The evaluations conducted largely support learning related to science concepts.'* T23: *'It is very successful in determining students' levels of learning, and it has been a successful tool in understanding and evaluating the subject.'*	T9: *'It's fifty-fifty. I don't believe every assessment and evaluation activity affects learning science concepts. Mostly because the purpose is to measure, the supporting feature of the activities is overlooked.'* T14: *'It supports at the knowledge level but doesn't support at the analysis and synthesis levels.'*	T7: *'It's very low; there is some relevance at the cognitive level in 8th grade, but we are not sufficient in other grades.'* T15: *'The conducted assessments and evaluations are mostly in the form of multiple-choice tests focused on exams. It doesn't foster creativity and is inadequate in solving complex problems, so it can't teach science concepts permanently.'*

According to Table 13, 12 teachers indicated that the assessment and evaluation activities in science lessons also support the learning processes. T5 based this view on the context of making learnings more concrete. 11 teachers indicated that activities partially support, with T9 clarifying that even if they supported half and half, it wouldn't be applicable to all assessment tools. 7 teachers expressed opposing views. Among them, T15 anchored this perspective to exam-focused multiple-choice tests and especially explained it in terms of their ineffectiveness in enhancing creativity.

Results and Discussion

In this study, 6th-grade SC was evaluated according to Tyler's objective-based evaluation model based on teachers' opinions. The results obtained were discussed by considering the sub-dimensions of Tyler's model separately. For this purpose, the results of the research on current SCs were taken into consideration. Ekinci and Eroğlu Doğan (2020), who provided a rationale for this in their thematic analysis study, found that most of the SC evaluation studies were related to the 2005 SC and the 2013 SC. They emphasized that there were very few evaluation studies conducted for the SC updated in 2018, which is currently in practice. Upon reviewing these evaluation studies, it was observed that there were evaluations that addressed the curriculum as a whole, and no specific studies focusing on the 6th grade were included. Accordingly, in this study evaluating the 6th grade SC based on Tyler's program evaluation approach, the sub-dimensions of the model, namely Objectives, Learning Experiences, and Evaluation, were discussed separately. Each element was primarily discussed by comparing it with the results of evaluation studies targeting the 2018 SC. Additionally, the 2013 SC, which shares many similarities, was considered, and discussions were also provided in the context of the common features of both curriculums.

Results Related to the Objective Dimension of the 6th Grade SC

For the 6th grade SC, almost all teachers reported that it was written clearly and understandably. Gürdal (2021) found similar results, identifying that teachers perceived the strongest aspect of the SC to be its clarity and comprehensibility. Similarly, in Polat Tan's (2019) study, the majority of teachers stated that the objectives of the SC were clear and understandable, and in Ulu's (2016) study, they noted that the objectives were clear and explicit. Based on this, it can be said that the aspect of the SC most strongly appreciated by teachers is its clear and understandable writing. Especially in the last 20 years, SCs have been addressed dynamically in light of contemporary approaches, and in this context, significant experiences and expertise have emerged with frequent updates. The reason teachers find the SC clear and understandable may be the reflection of this experience and expertise in the curriculum development processes. Regarding the appropriateness of the SC to the student level, half of the teachers expressed positive views while the other half expressed somewhat positive and negative views. In Gürdal's (2021) findings, while there were teachers who stated that the SC was appropriate for the student level, there were also teacher opinions that indicated the opposite. Similarly, Polat Tan (2019) mentioned that some teachers were undecided, while others expressed positive views about the suitability of the SC for the student level. Conversely, in Ulu's (2016) study, a large majority of teachers expressed positive views, reaching slightly different conclusions. A possible reason for this slight difference may be that most of the data in the relevant studies were collected using scaled measurements, resulting in limited expressions, while this study was based on more detailed open-ended data. Detailed open-ended data allow teachers to touch on limitations and restrictions regarding specific topics, units, and themes, even if they generally use positive language. This highlights a discussion on how curriculum evaluation studies should be approached, especially in terms of data collection processes. While the majority of teachers expressed positive views about the SC's contribution to students becoming scientifically literate individuals, some also expressed somewhat positive and negative views. Ulu (2016) reached similar findings, identifying teachers' views suggesting that the objectives of the SC contribute to fostering scientific literacy, with some teachers being undecided as in this study. Balıkçı et al. (2021) provided more detailed findings, especially grounding the aspect of the SC that supports scientific literacy in its connection with real-life situations, in line with the results of this study. Yolcu (2019), however, found that more teachers were undecided about whether the SC enabled students to become scientifically literate. Although the concept of scientific literacy is presented as a fundamental vision in recent science course curricula, various definitions and content can be found in resources on science education. The teachers participating in this study might have been exposed to different resources and have varying pedagogical readiness, which could be the reasons for the somewhat different results. Supporting this, some teachers defined scientific literacy in the context of research, inquiry, and problem-solving skills, while others tried to explain it in the context of its relationship with everyday life. This could be a significant result, indicating the necessity to address the dimension of scientific literacy more comprehensively and deeply in SC evaluations. Since scientific literacy, with many sub-

dimensions defined in the literature, is not directly revealed by teachers in data collection processes without specifying which dimensions are perceived, partially different views and results, as in this study, are possible.

Results Related to the Learning Experiences Dimension of the 6th Grade SC

The majority of teachers stated that the 6th-grade SC is prepared in a student-centered manner. A few teachers indicated that it is partially student-centered or not student-centered at all. Polat Tan (2019), reaching similar conclusions, identified teachers' views suggesting that student-centered teaching strategies are adopted in the SC. However, the study also included a few undecided and opposing views. Koca et al. (2021) also highlighted teacher views indicating that student-centered learning-teaching processes are adopted in the SC. In another study where the majority of teachers expressed that the SC is student-centered, Çevik (2020) identified a few undecided views. Karataş (2022), reaching partially similar results, found out that the majority of teachers are undecided about the student-centeredness of the program, and some expressed positive views. The possible reason for this partial difference could be that the study was conducted with teachers who taught at the 3rd and 4th grade levels. Since primary teachers teach science courses at the 3rd and 4th grade levels, their perspective on student-centered educational practices in the SC may differ somewhat from STs who teach at the 6th-grade level covered in this study. In addition, especially in the 2013 SC, it is recommended that science teaching practices at the 3rd and 4th-grade levels are approached with a structured research-inquiry approach rather than being open-ended (MEB, 2013). The fact that the participants of this study received their pre-service teacher training according to the 2013 SC could be another possible reason for the partial differences observed.

Views suggesting that the SC is prepared in a student-centered manner were quite similar to another finding that indicated that the teaching methods and techniques in the curriculum are based on inquiry. 19 teachers stated that the teaching methods and techniques in the SC are based on research-inquiry, 7 teachers mentioned that they are partially based on research-inquiry, while 4 teachers stated they are traditional. Çevik (2020), reaching very similar findings, identified teachers' views indicating that there are activities in the SC that encourage students to research and inquire. The study also identified a few undecided and opposing teacher views. Saraç and Yıldırım (2019) detected teacher views emphasizing that adopting a research and inquiry-based teaching approach is one of the positive features of the SC. In another study with similar findings, Yolcu (2019) identified teacher views emphasizing that there is a significant inclusion of activities like experiments and projects, which are practices of the research-inquiry-based approach, in the SC, and students actively participate in these activities. Based on these results, it can be said that ST largely see the teaching methods and techniques in the SC as student-centered and based on research-inquiry. This situation, which is quite compatible with the character of science education, may be an important and positive indicator of the shift from traditional science teaching processes, which have been greatly emphasized in Türkiye for many years, to contemporary science teaching

processes. The constructivist learning theory, which forms the basis of the 2005 Science and Technology Curriculum, and the research-inquiry-based learning approach, which underpins the 2013 and 2018 Science Curriculums, have been strongly emphasized in textbooks, curricula, and pre-service and in-service teacher training programs over the past 20 years in our country. This emphasis appears to be a significant factor contributing to these outcomes.

16 ST indicated that the implemented teaching methods and techniques can achieve the goals of the SC, while 11 teachers partially agreed with this view. Ulu (2016), reaching a similar finding, identified teacher views suggesting that the learning-teaching process of the SC contributes to the realization of its goals. Similarly, Yıldırım (2018) detected teacher views indicating that the learning-teaching process of the SC largely supports students' learning. Yolcu (2019), reaching partially different findings, identified teacher views suggesting that although certain sub-objectives of the SC, such as scientific process skills, problem-solving skills, and environmental awareness, are developed, teachers are undecided about whether student achievement has improved or not. These partially different results highlight the discussion, especially in curriculum evaluation studies, on how to address the dimension of teaching methods and techniques and which learning outcomes they are effective for. It will enable the comparison and discussion of rich and varied results regarding whether the teaching methods and techniques achieve the learning outcomes for the specific learning areas and skills in the SC. However, another reason could be that even if each teaching method is recommended in the SC, teachers, especially those with different seniorities and experiences, may not possess the same competence in applying current teaching approaches effectively. Concerning the extent to which these recommended activities in the SC are implemented in the learning-teaching processes, 13 teachers responded that the activities are implemented adequately, 13 teachers indicated they are somewhat adequate, and 4 teachers expressed opposing views by saying they are insufficient. Ulu (2016), reaching similar results, identified teacher views suggesting that the activities in the SC are both applicable in-class activities and flexible enough to create different activities outside of class.

Results Related to the Assessment Dimension of the 6th Grade SC

The majority of the teachers stated that as a result of the exams they conducted in science courses, students achieved the objectives in the 6th grade SC. 11 teachers believed that students partially reached the curriculum's objectives, while 1 teacher expressed the opposite view, and 1 teacher did not respond. Reaching similar findings, Yıldırım (2018) included teacher views suggesting that students either fully or partially achieved the objectives. Although teachers largely believe that students achieved the objectives, one interesting finding from this study is the diverse teacher views regarding the assessment tools in the SC. Accordingly, 13 teachers stated that appropriate assessment tools are provided, while 8 teachers indicated that partially appropriate assessment tools are in place. Conversely, 9 teachers who participated in the study stated that the assessment tools in the SC are not suitable for science courses. These varying teacher views on assessment are also reflected in the literature. For instance, Çevik (2020) identified

mostly positive teacher views on whether the assessment techniques recommended in the SC can measure the objectives but also found a significant number of teachers who were uncertain. Similarly, Ulu (2016) included varying teacher opinions on whether there was adequate time for assessment activities and if they genuinely measured the student's actual performance. However, in general, he presented positive teacher views on whether the curriculum could measure objectives. The reasons for these varying teacher views on the SC's assessment understanding might be the differences between the exam format applied in centralized exams (LGS) and the exams applied within the SC. Additionally, some studies (Yıldırım, 2018) might primarily focus on collecting data for an assessment understanding that test objectives, while others (Ulu, 2016) may focus on collecting data for an assessment understanding that test different skills.

The balanced distribution of teacher views regarding the assessment understanding of the SC also revealed the level to which these practices support learning. Accordingly, 12 teachers stated that the related assessment activities support learning, 11 teachers indicated they partially support it and 7 teachers expressed that they do not support learning. Polat Tan (2019), reaching partially similar findings, emphasized implicitly that assessments should be process-oriented and identified that while the majority of teachers largely agreed there's a learning-supportive, process-focused assessment understanding, a significant number held undecided views. Similarly, Çevik (2020) identified teacher views indicating that there's a substantial emphasis on a process assessment understanding in the SC that supports the learning process through observation forms, rubrics, and peer assessments. However, the research also revealed a significant number of undecided teacher opinions. Besides the positive views, a significant reason for the emergence of undecided and negative teacher opinions might be the different perceptions about what learning outcomes should be measured. Due to the mostly different learning outcomes of exams conducted during the term, centralized exams, and traditionally assigned homework compared to alternative assessments, teachers might have struggled to integrate these forms of evaluation into the learning process.

Recommendations

Based on Tyler's program evaluation approach, in this research where the 6th-grade SC was evaluated according to teachers' opinions, the following suggestions have been made for new researchers and teachers:

Recommendations for Researchers

When comparing the results obtained from SC evaluation studies with the results of this study, it is observed that the data collection tool used has been a factor, albeit partially, influencing teachers' opinions. Therefore, studies can be conducted where holistic analyses are done using not only quantitative data collection tools like surveys and scales but also qualitative interviews.

One of the frequently examined situations in SC evaluation studies is scientific literacy. In the literature, where very comprehensive and broad definitions are made for scientific literacy, specific questions probing learning areas aimed to be imparted in the SC, such as the nature of science, socioscientific issues, and scientific process skills, can be included in the data collection process. The same can be said for teaching methods and techniques. Alongside general teaching methods and techniques, specific data collection processes regarding the research and inquiry-based teaching approach adopted in the SC can be adopted.

Different teacher opinions emerging in relation to Tyler's model's evaluation dimension highlight the emphasis on centralized exams (LGS). Considering this result, which reveals a situation where the entire assessment understanding of the SC is compared with a single exam, studies can be conducted that have specific data collection processes regarding alternative (complementary) assessment techniques recommended in the SC (like rubrics, concept maps, performance tasks, etc.).

This study was conducted specifically for the 6th grade SC. It is recommended to carry out similar studies based on the Tyler model for different grade levels (5th, 7th, and 8th grades), allowing for longitudinal comparisons based on grade levels. Furthermore, for the same grade level, evaluations of the SC can be conducted using different models (like CIPP, Stufflebeam, etc.) aiming to obtain multidimensional and in-depth data specific to that grade level.

Recommendations for Teachers

The most evident dimension where STs expressed different opinions has emerged concerning assessment and evaluation processes. The main reason for this situation is often shown as the structure of centralized exams. It can be recommended that ST follow seminars, courses, and training on both the assessment and evaluation approach adopted in the SC and on how they can conduct processes that will prepare students for centralized exams.

Without a doubt, teachers are one of the most crucial stakeholders in data collection for program evaluation studies related to the SC and in the processes of preparing and updating new programs. Considering the dynamic nature of program evaluation-development processes, it is suggested that they provide opinions reflecting their experiences for scientific studies in this context.

Although ST believe that research-inquiry-based and student-centered teaching methods and techniques are adopted in the SC, they have somewhat varied opinions about the implementation of these methods and techniques in lessons and the level of achieving the learning outcomes. In this context, current approaches directly related to the teaching of specific science topics, outcomes, and themes, and modern and effective teaching methods and techniques can be followed. Especially after the Covid-19 pandemic, professional development courses conducted remotely and online can be used for this purpose.

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Genişletilmiş Türkçe Özet

Bu çalışmada Tyler'ın hedefe dayalı değerlendirme modeli kullanılmıştır. Modelin temelinde eğitimde ulaşılması gereken hedefler yer alır. İlgili öğretim programının belirlenen hedeflerinin uygulama sonucunda ne düzeyde gerçekleştiğinin belirlenmesi üzerine kurulmuştur (Tyler, 1981; aktaran Aslan ve Erden, 2018). Programın etkililiği hakkında karar verilirken hedeflerin ne düzeyde gerçekleştirilebildiğine bakılır. Ulaşıl(a)mayan hedefler var ise nedenleri için öğrenme yaşantıları irdelenir. Programın değerlendirilme sürecinde, ortaya çıkan eğitsel sonuçlarla amaçlar karşılaştırılır ve bu amaçlara ne ölçüde ulaşıldığı tespit edilir(Ahn, 2018). Bu süreçte testler, anketler, okul kayıtları gibi değerlendirme araçlarının yanı sıra nitel veri toplama araçları da kullanılabilir (Kotluk ve Yayla, 2016). Alanyazında bu modele dayalı olarak farklı branşlara yönelik bazı program değerlendirme çalışması gerçekleştirilmiştir (Aslan ve Çakır, 2017; Kotluk ve Yayla, 2016; Ünal, 2011). Güncel fen bilgisi dersi öğretim programına (FBDÖP) yönelik ise Tyler'ın hedefe dayalı değerlendirme modeli temelinde çok az sayıda çalışma yer almaktadır. Buna göre araştırmadan elde edilen sonuçların FBDÖP değerlendirme alanyazınına karşılaştırmalı ve önemli katkılar sunduğu düşünülmektedir. Bununla birlikte, veri toplama sürecinde açık uçlu yapıda verilerin elde edilmesiyle daha derinlikli sonuçlara ulaşılmıştır. Bu derinlikli veri toplama süreci sınıf düzeyi açısından da dikkate alınmış ve FBDÖP'ün uygulandığı tüm sınıf düzeylerinin yüzeysel değerlendirilmesi yerine tek bir sınıf düzeyi ayrıntılı olarak irdelenmiştir. Bu kapsamda araştırmada, ortaokul 6. FBDÖP'ün Tyler'ın hedefe dayalı değerlendirme modeli temelinde öğretmen görüşlerine göre değerlendirilmesi amaçlanmıştır.

Yöntem

Araştırma Modeli

Fen bilgisi öğretmenlerinin görüşlerine göre, 6. FBDÖP'ü değerlendirmeyi amaçlayan bu araştırmada temel nitel araştırma yöntemi benimsenmiştir. Temel nitel araştırma deseni, katılımcıların yaşamlarını nasıl yorumladıkları, dünyayı nasıl algıladıkları ve deneyimlerine ne anlam kattıkları üzerinde yoğunlaşır ve bu alandaki bilgilere ulaşmayı amaçlar (Merriam and Tisdel, 2015). Bu çalışma, FBDÖP'ün uygulayıcıları ve paydaşı olan öğretmenlerin bu öğretim programını nasıl algıladıklarını ve kendi deneyimlerinin neler olduğunu ortaya koymak amacıyla gerçekleştirildiği için temel nitel araştırma yöntemi tercih edilmiştir.

Çalışma Grubu

Tesadüfî olmayan örnekleme yöntemlerinden uygun örnekleme yöntemiyle seçilen çalışma grubu, 6. sınıf düzeyinde fen bilimleri dersi vermiş olan 30 öğretmenden oluşmaktadır. Zaman, para ve işgücü açısından var olan sınırlılıklar nedeniyle tercih edilen uygun örnekleme yöntemi Büyüköztürk ve diğ., (2009) göre, örneklemin kolay ulaşılabilir ve uygulama yapılabilir birimlerden seçilmesi gerekir. Buna göre, çalışmanın gerçekleştirildiği Uşak ilinde zaman, işgücü, ulaşılabilirlik ve hızlı dönüt alabilme

imkanları açısından araştırmacıların kolay veri toplayabileceğine inandığı okullardaki öğretmenler çalışma grubunu oluşturmuştur.

Veri Toplama Süreci

Fen bilgisi öğretmenlerinin 6. sınıf FBDÖP'e yönelik görüşlerini belirlemek için araştırmacılar tarafından geliştirilen 12 açık uçlu sorudan oluşan yarı yapılandırılmış görüşme formu kullanılmıştır. Yarı yapılandırılmış görüşme formunun hazırlanma sürecinde ilgili alanyazın incelenmiş ve form taslağına yönelik 3 alan uzmanının görüşleri alınmıştır. Uzman görüşleri sonrası son hali verilen form, Tyler'ın hedefe dayalı program değerlendirme yaklaşımındaki hedef, öğrenme yaşantıları ve değerlendirme olmak üzere üç boyutu yansıtan sorulardan oluşmaktadır.

Verilerin Analizi

Çalışmada elde edilen veriler betimsel analize tabi tutulmuştur. Bu yönteme göre, görüşme formundaki sorulara verilen cevaplardan kod ve kategoriler oluşturulmuştur. Bu süreçte her bir soruya verilen cevaplar üç araştırmacı tarafından da ayrı ayrı kodlanmış ortaya çıkan kodlar karşılaştırılarak aralarındaki uyuma ve güvenirlik değerlerine bakılmıştır. Her bir soru için Miles ve Huberman (1994)'ın ortaya koyduğu [Görüş birliği/(Görüş birliği+Görüş ayrılığı)] formülü dikkate alınmış ve kodların uyum oranı 0,90 olarak tespit edilmiştir.

Bulgular

Tyler Program Değerlendirme Modelinin 'Hedef' Boyutu için FBDÖP'e Yönelik Öğretmen Görüşleri

29 öğretmen FBDÖP'ün açık ve anlaşılır olarak yazıldığını belirtmiştir. 1 öğretmen ise FBDÖP'ün açık ve anlaşılır olmadığını belirtmiştir.

12 öğretmen FBDÖP'ün matematik öğretim dersi öğretim programıyla ilişkili olduğunu belirtmiştir. 7 öğretmen her iki öğretim programını kısmen ilişkili bulmuştur. 10 öğretmen ise FBDÖP ile, Matematik Öğretim Dersi Öğretim Programının ilişkili olmadığını belirtmiştir. 1 öğretmen ise fikir beyan etmemiştir.

15 öğretmen FBDÖP kazanımlarının öğrenci seviyesine uygun olduğunu belirtmişlerdir. 11 öğretmen ise kazanımların öğrenci seviyesine kısmen uygun olduğunu belirtmiştir. 4 öğretmen ise kazanımların öğrenci seviyesine uygunluğu hakkında olumsuz görüş bildirmiştir.

20 öğretmen FBDÖP'ün öğrencilerin fen okuryazarı birey olmasına katkı sağladığı yönünde görüş belirtirmiştir. 4 öğretmen FBDÖP'ün öğrencilerin fen okuryazarı birey olmasına kısmen katkı sağladığını belirtirken 6 öğretmen ise aksi yönde görüş belirtmiştir.

Tyler Program Değerlendirme Modelinin Öğrenme Yaşantıları Boyutu için FBDÖP'e Yönelik Öğretmen Görüşleri

Öğretmenlerin çoğunluğu FBDÖP'ün öğrenciyi merkeze alan bir yapıda düzenlendiğini belirtmiştir. 5 öğretmen kısmi öğrenci merkezli durumlara değinmiştir. 2 öğretmen FBDÖP'ün öğrenciyi merkeze almayan yapıda olduğunu belirtmiştir. 3 öğretmen ise bu konuda herhangi bir görüş beyan etmemiştir.

FBDÖP'ün uygulanması sürecinde kullanılan öğretim yöntem ve teknikleri için 19 öğretmen, araştırma-sorgulamaya dayalı yöntemleri kullanmaya imkan sağladığını belirtmiştir. 7 öğretmen FBDÖP'ün uygulanması sürecinde kısmi araştırma-sorgulama süreçleri benimseyebildiklerini belirtmişlerdir. 4 öğretmen ise geleneksel öğretim yöntem ve tekniklerini kullandıklarını belirtmişlerdir.

16 öğretmen fen bilgisi derslerinde kullanılan öğretim yöntem ve teknikleri ile FBDÖP kazanımlarının gerçekleştirilebileceğini belirtmiştir. 11 öğretmen ise kısmi düzeyde bu görüşleri beyan etmişlerlerdir. 2 öğretmen bu görüşlerin aksi yönünde düşüncelerini belirtirken 1 öğretmen ise fikir beyan etmemiştir.

13 öğretmen fen bilgisi derslerinde FBDÖP'te yer alan etkinliklere yer verdiklerini belirtmişlerdir. 13 öğretmen ise bu görüşe kısmen katıldıklarını beyan etmişlerdir. 4 öğretmen ise aksi yönde görüş belirtmişlerdir.

Tyler Program Değerlendirme Modelinin 'Değerlendirme' Boyutu için FBDÖP'e Yönelik Öğretmen Görüşleri

17 öğretmen yaptıkları sınavlar sonucunda öğrencilerin FBDÖP kazanımlarına ulaşabildiğini düşünmektedir. 11 öğretmen, yapılan sınavlara göre FBDÖP kazanımlarına öğrencilerin kısmen ulaşabildiğini belirtmişlerdir. 1 öğretmen bu düşüncelerin aksi yönünde düşünce belirtirken, 1 öğretmen ise herhangi bir kanaat belirtmemiştir.

FBDÖP'te yer alan ölçme değerlendirme araçları için, 13 öğretmen fen bilgisi dersleri için uygun olduğunu belirtmiştir. 8 öğretmen bu görüşe kısmen katılırken 9 öğretmen ise aksi yönde görüş belirtmiştir.

Fen bilgisi derslerinde kullandıkları ölçme değerlendirme araçları için 15 öğretmen kazanımları yeterli düzeyde ölçtüğünü belirtmişlerdir. 12 öğretmen bu görüşe kısmi düzeyde katıldıklarını beyan etmiştir. 3 öğretmen ise aksi yönde görüş belirtmiştir.

12 öğretmen fen bilgisi derslerindeki ölçme değerlendirme etkinliklerinin öğrenme süreçlerini de desteklediğini belirtmiştir. 11 öğretmen ise kısmen desteklediğini belirtmiştir. 7 öğretmen ise aksi yönde görüş belirtmiştir.

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