

The perception scale for curriculum leadership: Validity and reliability study

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Abstract: The purpose of this study was to create a measurement instrument that would be both valid and reliable for assessing middle school branch teachers' perceptions of curriculum leadership. A straightforward random sample technique was used to choose the participants. 343 middle school branch teachers made up the study's sample. The researchers created the "Curriculum Leadership Perception Scale," with 21 items to collect quantitative data. The scale's reliability was investigated utilizing McDonald's omega coefficient, item discrimination, and split-half reliability analyses, while its validity was evaluated through face, content, and construct validity. For face and content validity, expert opinion and a pilot study were carried out; EFA and CFA were used for construct validity. While the 213 participants' data were used for EFA, the 130 participants' data were used for CFA. Eighteen items were eliminated following the EFA, and a CFA was carried out. The following fit indices were obtained for the scale by the analysis: RMSEA =.062, GF =.982, NNFI/TL =.929, CFI=.940, and IFI=.941. The reliability coefficient for McDonald's omega was .932. Based on the analyses, a valid and reliable scale with 21 items and four components was created to determine middle school branch teachers' perception of curriculum leadership.

1. INTRODUCTION

The curriculum plays a fundamental role in shaping the educational experience, serving as the foundation for the teaching and learning process. It outlines the knowledge, skills, and values learners must acquire. Beyond merely organizing content, curricula reflect the goals of education systems, societies' priorities, and learners' needs. A well-designed curriculum conveys academic knowledge and nurtures critical thinking, creativity, and ethical awareness, empowering individuals to navigate and contribute to an ever-evolving world. In this context, curricula are important in education as a concept that changes and expands over time in the historical process.

Although curriculum began to be used in education as "the path followed," it has had many different definitions up to the present day. Until the 20th century, the definition and scope of the curriculum, regarded as a list of subjects, have changed over time (Demirel, 2021). This transformation in the definition of curriculum parallels the change in educational philosophies. In particular, the prominence of teaching approaches and individual learning processes has led

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to the reshaping of the curriculum. It is not only limited to course content but also covers students' entire school experience. In this context, different views have enriched the definition and scope of the curriculum. Ertürk (2013) defined curriculum as “the totality of planned learning experiences designed to educate a specific cohort of students within a defined temporal framework.” According to Taba (1962, p.11), the curriculum consists of goals, objective behaviors, content selection and organization, the learning-teaching process, and the evaluation of goals. Pinar *et al.* (1995), who view curriculum as school experiences, state that the curriculum includes not only course subjects but also all other activities in the school, such as meals, games, and social interactions. Curriculum is the general and most important framework that guides teachers and includes the knowledge, skills, and attitudes students need to acquire (Ministry of Education [MEB], 2017). According to definitions and literature, the curriculum is one of the main components of the educational system. The school's education and teaching processes demonstrate how students, teachers, and the curriculum interact. The effectiveness of the interaction between the curriculum and its stakeholders significantly impacts the overall efficiency of the educational system. Therefore, curriculum is among the first concepts addressed to solve problems related to education (Akpınar, 2017). Many factors, such as teachers, students, equipment, school facilities, and environmental conditions, play a role in adequately implementing the curriculum and achieving its objectives. Among these, the teacher, who plays a key role in implementing the curriculum, is more prominent than others.

In this context, teachers who are curriculum implementers have significant responsibilities. An official curriculum loses meaning unless teachers translate it into their own curriculum. Posner (1995) compares a teacher giving life to a curriculum to a director bringing a script to life and states that there are many factors a teacher must consider when implementing the curriculum. Dewey asserts that all teachers must recognize the dignity of their responsibilities and understand their role as social servants in upholding social order and promoting proper social growth (Dewey, 1897, cited in Akbaş & Keskin, 2021, p.302). Teachers should actively lead change rather than passively receive it (Harris *et al.*, 2020). Many studies in the field of leadership and management suggest that teachers should transition from their traditional role as curriculum implementers to curriculum leaders (Ho, 2010). As curriculum implementers, teachers can only accompany these dynamic processes as curriculum leaders in the changing and transforming world (Wiles, 2016).

Curriculum leadership is a perspective on using problem-solving applications involving curriculum, teaching, and leadership issues (Akbaş & Keskin, 2021, p. 310). According to Henderson *et al.* (2018), educators should consider the following ten fundamental principles on their path to becoming curriculum leaders:

Professional Responsibility. Measurability and accountability in schools often confuse responsibility, a crucial concept for the teaching profession. Measurability emphasizes test results, and accountability highlights the vertical hierarchical structure in schools. Accountability causes teachers to focus on their weaknesses rather than students, considering rewards or punishments. True professional responsibility can be described as a teacher carefully directing their caregiving skills and competencies toward students (Noddings, 2013).

Critical Pragmatism. Curriculum leadership is considered a problem-solving process, requiring teachers to act as critical thinkers. Critical pragmatism is based on visions of what is beautiful, good, and right rather than fixed, structured moral or objective certainties (Cherryholmes, 1988). Teachers with a critical perspective actively participate in solving problems in education rather than ignoring them. The critical perspective greatly contributes to the development of both the teacher and the school (Henderson *et al.*, 2018).

Continuous Valuation of Values. Valuing values enables the implementation of critical pragmatism. People need to question and review their values in decision-making processes, as it is impossible to think of them separately from their values. Teachers who guide society should

continuously review their values and curriculum values. Teachers should work by integrating democratic values and realities into solving daily problems (Henderson *et al.*, 2018).

Awareness. Awareness begins with the individual's search for self-affirmation. It is argued that teachers, as curriculum leaders, should be historically conscious representatives of democratic values, free of narrow-mindedness and fanaticism. Only in this way can it be known that each student has their learning process; individual differences can be respected and it can be accepted that all individuals are unique and indispensable by prioritizing the individual (Henderson *et al.*, 2018).

Non-Linear Process. Multi-Stage Interaction: Curriculum leadership is not a linear process that achieves results through strict adherence to rules. On the contrary, it encompasses a multi-stage and broad interaction framework. Curriculum leadership requires being dynamic rather than routine (Akbaş & Keskin, 2021; Wiles, 2016).

Integrating Curriculum, Teaching, and Leadership Eclectically. According to Schwab (1971), the eclectic approach is a fundamental feature of dynamic curriculum studies because curriculum is a practical field. The connection between curriculum, teaching, and leadership should be well understood and integrated into practice for a holistic educational understanding. To integrate curriculum, teaching, and leadership, academic, political, and managerial problems must be resolved, and teachers should be supported in this regard (Giroux, 1991; Henderson *et al.*, 2018).

The Ethics of Practical Wisdom. According to Aristotle, virtues are ethical ways of knowing that inspire actions. He asserts that only virtuous wisdom can bring about pleasure and happiness. Practical wisdom means people perform their actions by filtering them through reason, morality, virtue, and value rather than following their impulses. Schools need teachers who want to do what is right with their moral will (Henderson *et al.*, 2018).

Defense Against Crude Pragmatism. The four-stage process is a disciplined, open-minded inquiry focused on continuous learning. The first stage, professional awakening, questions whether you are experiencing a challenging professional awakening. In the second stage, holistic teaching, it is important to experience the art of interactive teaching that accepts the democratic self and social learning in students. The third stage, productive leadership, involves reorganizing a unique culture that fosters capacity development in teaching. Participatory evaluation, the final stage, aims to answer how this pedagogical journey's outcomes and social impacts can be democratically reviewed (Henderson *et al.*, 2018).

Democratic Learning Leadership. This structure, which expresses leading learning, is collaborative and community-based. The leader integrates the organization's core values, vision, mission, and philosophy. Transforming schools into learning structures requires fundamental changes in school culture and philosophy. Learning leaders' lifelong learning responsibility is one of their most important strengths (Çelik, 2012).

Inspiring Professional Development. Learning leaders should inspire those who follow them (Akbaş & Keskin, 2021). Curriculum leaders need to understand the change process in schools clearly. The power of a curriculum leader comes not from their title but from their ability to direct and persuade those who follow them to seek help (Wiles, 2016). In addition to Henderson *et al.*'s (2018) ten points, Wiles states that school curriculum leadership consists of four basic tasks. These tasks are defined as follows: defining the school's curriculum, fostering collaboration among all members, providing a working method or path that others can follow, and coordinating activities to achieve the desired curriculum (Wiles, 2016, p. 22).

Defining the curriculum for the school: The curriculum leader's first task is to define the curriculum by identifying the school's goals. The first step in the curriculum definition process is to identify the common views supported by stakeholders such as teachers, parents, administrators, and students. The aim here is to help all stakeholders discover how they want

the curriculum to be (Jacobs, 2004). Once the curriculum leader identifies standard views, they will provide criteria to guide the change, clarify goals, define all school members' roles, and select classroom strategies and tactics (Wiles, 2016).

Fostering collaboration among all school members: Stakeholders must be involved in the planning process to guarantee the successful adoption of the defined curriculum by all. In this context, to develop collaboration among stakeholders, it is necessary to avoid professional jargon and educational clichés that everyone cannot understand; use different tools such as email, written messages, newsletters, and face-to-face meetings to communicate; conduct group work to overcome individuality and ensure partnership; prepare appropriate environments for exchanging ideas and collaboration; and value the diversity (gender, race, language, religion, ability, etc.) that emerges in collaborative work.

Providing a working method or path others can follow: The curriculum leader should envision how the process will progress. Additionally, all stakeholders should understand and follow this vision. Accordingly, the curriculum leader should clarify their ideas, be predictable, regularize all processes, set goals and standards, and continuously receive stakeholder feedback. Coordinating activities to achieve the desired curriculum: At every stage, the curriculum leader should plan, organize, and prepare. They should report every development in the process in a way that all participants can understand using visual tools such as charts and graphs, and develop effective strategies to ensure change in the school. They should relate all actions taken and efforts made in the process to the goals of the curriculum and outline the path to achieving the goal. Given all the principles and tasks emphasized, Henderson *et al.* (2018) and Wiles (2016) present four key dimensions of curriculum leadership. These dimensions include being receptive to the role of a curriculum leader, mastering the curriculum, structuring the curriculum to align with the needs and values of all stakeholders, and advising colleagues on curriculum-related matters while persuading them to collaborate.

Curriculum leadership requires meticulous handling of the content, progression, evaluation, and pedagogy, which are the essence of teaching. This underscores the importance and necessity of curriculum leadership in school and system improvement (Harris *et al.*, 2020). Curriculum leadership plays a pivotal role in shaping educational practices and ensuring the effective implementation of curricula. At this point, determining teachers' perceptions and competencies about curriculum leadership is essential. While several scales exist to measure curriculum leadership perception, their applicability and relevance to the Turkish educational context and teachers remain questionable. Four primary scales have been identified in the literature that measure various aspects of curriculum leadership: (1) the School Principals' Curriculum Leadership Scale (SPCLS) developed by Bayirli and Balcı (2021), (2) the Curriculum Leadership Indicators Scale for Elementary School Deans by Chuan-Hsing and Mei-Ju (2016), (3) the Curriculum Leadership Competency Scale by Bolat and Baş (2023), and (4) the Teacher Curriculum Leadership Scale by Chen *et al.* (2021).

The SPCLS developed by Bayirli and Balcı (2021) targets school principals, emphasizing their instructional leadership role rather than assessing teachers' perceptions and competencies in curriculum leadership. Similarly, Chuan-Hsing and Mei-Ju (2016) designed a scale that focuses on the curriculum leadership role of elementary school deans. This administrative-centric approach does not adequately reflect the distributed leadership model that modern educational frameworks advocate. This is because teachers directly responsible for implementing and adapting the curriculum are overlooked. Therefore, a teacher-focused scale is needed to assess how educators perceive and enact curriculum leadership within their professional practice. The other two scales in the literature are geared towards teachers rather than administrators. However, their appropriateness also needs to be discussed.

Bolat and Baş (2023) consider curriculum leadership a sub-dimension, along with organizational leadership, instructional leadership, and assessment and evaluation leadership.

However, curriculum leadership should be considered a main topic, not a sub-dimension. While this perspective provides valuable insights into teachers' understanding of curriculum content, it does not comprehensively capture leadership behaviors, strategies, and decision-making processes. The scale developed by Chen *et al.* (2021) was based on data collected from teachers in China, analyzing curriculum leadership through the lens of field dynamic theory. While informative, this study does not account for the Turkish education system's unique sociopolitical, educational, and cultural dynamics. Türkiye's policies, teacher training programs, and curriculum implementation practices differ significantly from those in China, necessitating a scale that reflects the local educational context.

The existing curriculum leadership scales provide valuable insights into various aspects of leadership in educational settings. However, their focus on administrative roles, their treatment of curriculum leadership as a secondary construct, and their lack of cultural adaptability highlight the need for a new scale tailored to Türkiye. By addressing these gaps, the proposed new Curriculum Leadership Perception Scale (CLPS) will offer a more precise and contextually relevant measurement tool to assess teachers' curriculum leadership perceptions and competencies, ultimately contributing to educational improvement in Türkiye.

This study aims to create a reliable and valid measurement tool to determine middle school branch teachers' perceptions of curriculum leadership by referencing existing literature. The following questions were sought to achieve this aim:

- a. Is the scale developed to measure middle school branch teachers' perceptions of curriculum leadership valid?
- b. Is the scale developed to measure middle school branch teachers' perceptions of curriculum leadership reliable?
- c. Based on a solid theoretical foundation and empirical evidence, what are the dimensions of a reliable and valid curriculum leadership perception scale for middle school branch teachers?

2. METHOD

2.1. Research Design

A mixed-method exploratory sequential design was employed to develop the CLS for middle school branch teachers. Qualitative and quantitative data collection and analyses were conducted (Creswell & Guetterman, 2018). The scale development process (DeVellis & Thorpe, 2021) was administered to develop CLS for middle school branch teachers in its development phase. In the validation phase, Exploratory Factor Analyses (EFA) were performed using data obtained from Sample 1. Confirmatory Factor Analysis (CFA) was performed using data obtained from Sample 2 to test the validity and reliability characteristics of the scores obtained from CLS.

2.2. Development of the CLS for High School Students

2.2.1. Determine clearly what it is you want to measure

This study aims to develop a scale to measure middle school branch teachers' perceptions of curriculum leadership. CLS was constructed in four dimensions: curriculum organization, mastery, collaboration with colleagues, and openness to being a curriculum leader. However, these dimensions were determined not at the beginning of the study but by considering the items under the factors as a result of exploratory and confirmatory factor analysis.

2.2.2. Generate an item pool

Each item used in the scale should be related to curriculum structure and the concept of curriculum leadership and be directed toward teachers (DeVellis & Thorpe, 2021). For this reason, an item pool was created by considering the relevant literature (Akbaş & Keskin, 2021; Akbaş *et al.*, 2021; Glatthorn *et al.*, 2005; Harris *et al.*, 2020; Henderson *et al.*, 2018; Ho, 2010;

Wiles, 2016) and the items in the scale and sub-dimensions used in studies measuring curriculum leadership (Bayirli & Balcı, 2021; Bolat & Baş, 2023; Chen *et al.*, 2021; Chuan-Hsing & Mei-Ju, 2016). The items prepared in this direction were presented to experts for their opinions. As a result of the literature review, a 45-item pool was written by the researchers to determine teachers' perceptions of curriculum leadership.

2.2.3. Determine the format for measurement

Likert-type measurement is a widely used and effective form of obtaining attitudes, beliefs, or opinions (DeVellis & Thorpe, 2021). This study used a four-point Likert scale. According to Johns (2006), the wisdom of offering a midpoint varies depending on the respondent's tendencies. If midpoint respondents are primarily indifferent, omitting the midpoint may overstate minority opinions. Conversely, when respondents use the midpoint to conceal socially undesirable attitudes, offering it can understate those perspectives. Given these considerations, Krosnick (1991) argues that respondents often seek easy escape options when cognitive demands increase. Meanwhile, Berinsky (2004) suggests that non-response is a strategy to avoid cognitive effort and social embarrassment. In line with these insights, this study employs a 4-point Likert scale to minimize central tendency bias and encourage participants to take a clear stance. By removing the neutral option, the scale reduces the likelihood of respondents selecting an easy escape response rather than engaging thoughtfully with the items. The response categories-1 (Does Not Reflect Me at All), 2 (Does Not Reflect Me), 3 (Reflects Me), and 4 (Completely Reflects Me)-were carefully selected to ensure clarity and facilitate meaningful interpretation. Additionally, this format aligns with findings suggesting that forced-choice response structures help mitigate social desirability bias while maintaining ease of response (Krosnick & Presser, 2010). Given the study's focus on teachers, eliminating a neutral option was deemed particularly important to obtain more engaged and authentic responses while reducing cognitive load.

2.2.4. Have initial item pool reviewed by experts

Two expert groups provided opinions to examine the appropriateness of the CLS's questions and response options. First, four curriculum development and instruction experts, one educational measurement and evaluation expert, and one Turkish language expert reviewed the items in the pool for face and content validity, language, and writing rules. Based on the feedback of these experts, five items were relocated, seven items were removed, and three items were shortened and edited for clarity.

2.2.5. Cognitive interviewing

The participants' comprehensibility of the items was examined as evidence of the scale's construct validity. The scale was presented to 10 branch teachers to gather their feedback on comprehensibility and ease of response. By the teachers' opinions, no items were removed from the scale, and only minor corrections were made to improve comprehensibility. The scale, revised to 38 items, was ready for application.

2.2.6. Consider inclusion of validation items

No validation items were used to keep the CLS clear, simple, and concise.

2.2.7. Administer items to sample

Evidence derived from response processes can be utilized as a form of validity evidence. The internal structure of the responses was investigated to obtain validity evidence of the CLS. Since this method relies on response processes, items were administered to two samples. A simple random sampling technique was used to select the study participants. The target population was middle school branch teachers working in various public schools. Specifically, the sample was drawn from middle schools in Ankara, Türkiye, with official permission from the Ministry of National Education (MoNE). Data was collected through official school WhatsApp groups

managed by school administrators. The scale link was shared within these groups, ensuring only authorized teachers participated voluntarily. This approach enabled access to a wide range of teachers from multiple schools, significantly enhancing the representativeness and generalizability of the findings. The participants' teaching experience ranged from 1 to 30 years. Responses from the first sample were used to explore the internal structure of responses via exploratory factor analysis procedures. A total of 358 middle school branch teachers participated in the study, with 222 in the first and 136 in the second. Participants responded to the scale via Google Forms. The scale link was shared through the WhatsApp groups of the schools through the administrators of the schools that received permission from the Ministry of National Education. Before the scale was administered, participants were given an informed consent form detailing the study's aims, confidentiality measures, and the condition of voluntary participation. Participants who accepted the conditions continued to fill out the scale. After examining the data, we excluded nine participants from the first round who either did not approve the informed consent form (1) or disrupted the normality of the distribution (8) and six from the second round who disrupted the normality of the distribution (6) from the analysis. In the normality of the distribution, kurtosis-skewness values and Q-Q plots were considered, and outliers were excluded from the data set. Therefore, the form consisting of 38 items was applied to the first group of 213 (36.6% men & 63.4 women) teachers in the first round. EFA and internal consistency coefficients were calculated to determine the scale's reliability and number of factors. In the second round, the form consisting of 21 items was applied to the second group of 130 (29.2% men & 70.8% women) teachers. CFA was conducted to confirm the structure determined by the EFA. Ho (2006) states that the sample size for factor analysis should be more than five times the number of items. Similar to this criterion, Bentler and Chou (1987) suggested that the sample size should be at least 5 times more than the number of estimated parameters.

Additionally, Kline (2014) emphasizes that a sample size of 200 is usually sufficient to extract reliable factors. This number can be reduced to 100 in cases where the factor structure is clear. Based on these standards, the sample size reached in the present study is sufficient.

2.2.8. Evaluate the items

In this study, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were conducted to evaluate the scale's construct validity. EFA was performed to explore the factor structure and determine which items were loaded onto each factor. CFA was then conducted to confirm the identified factor structure and assess model fit. The internal consistency of the scale was examined using McDonald's omega coefficient. Item discrimination analysis included comparisons of the top and bottom 27% groups. Additionally, a split-half reliability analysis was conducted to evaluate the reliability of the scale scores.

A two-step approach was administered to understand the validity and reliability properties of the CLS scores obtained. The first step involved Exploratory Factor Analysis (EFA) to understand the internal structure of the data obtained from the first sample. The number of dimensions in the data and the items highly related to each dimension are determined. The K1 method, which suggests that the eigenvalue should be greater than 1, and the parallel analysis method developed by Horn (1965) were used for the representation of the sub-dimensions in the scale. Furthermore, the eigenvalue difference among consequent dimensions was investigated. We assumed that no new dimension emerged when the slope of the scree plot became close to flat (Figure 1).

The suitability of the data for factor analysis was tested to perform EFA. A Kaiser-Meyer-Olkin (KMO) value greater than .60 and a significant result from Bartlett's test of sphericity ($p < .05$) suggest that the data are suitable for factor analysis (Frankel & Wallen, 2008; Pedhazur & Schmelkin, 1991). According to the analysis, the KMO value was .883, and Bartlett's test of sphericity was 2077.447 ($p = .001$), yielding a significant result. Hutcheson and Sofroniou

(2006) indicate that KMO values between .8 and .9 indicate excellent suitability, and values above .90 indicate the best fit. These results show that the data are suitable for analysis.

Mardia's multivariate normality test was conducted to assess whether the assumption of multivariate normality was met (Mardia, 1970).

Table 1. Mardia's Test of Multivariate Normality.

Measure	Value	Statistic	df	p
Skewness	143.522	5095.036	1771	< .001
Small Sample Skewness	143.522	5173.390	1771	< .001
Kurtosis	686.387	47.752		< .001

As seen in Table 1, the results indicated that the data significantly deviated from multivariate normality ($p < .001$). Exploratory factor analysis is used to preserve the total variance contained in the measured variables and transform it into a component with fewer variables (Park *et al.*, 2002). In cases where the multivariate normality assumption is violated, one appropriate approach for exploratory factor analysis (EFA) is Principal Axis Factoring (PAF). This method is robust against violations of normality assumptions and produces more accurate and stable results by focusing on common variance (Fabrigar *et al.*, 1999). Field (2009) recommends that these values be higher than .40. The common variance values of the items in the scale vary between .480 and .844. Accordingly, it was accepted that the common variance values of the items were appropriate for the scale.

Figure 1. A line graph of scale items' eigenvalues.

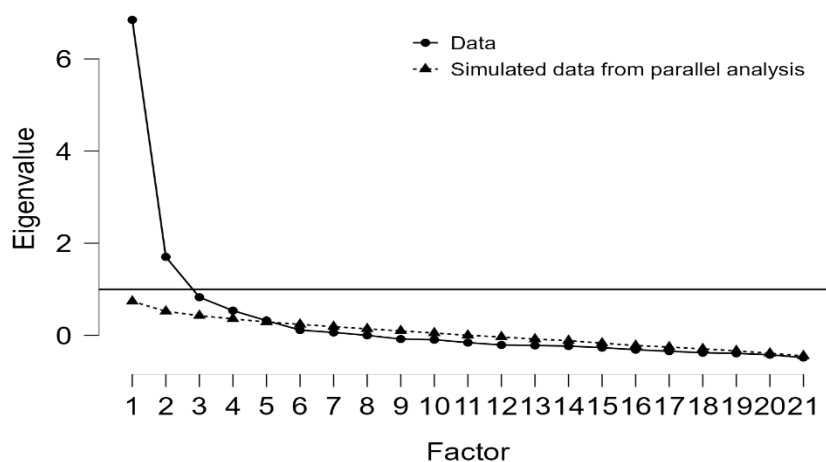


Figure 1 illustrates the four cut-off points that limit the number of factors to four. Table 2 presents the four-factor scale's eigenvalues and variance percentages.

Table 2. Eigenvalues and variance percentages of scale items.

Factors	Eigenvalue	% of variance	% of total variance
Factor 1	7.503	18.4	18.4
Factor 2	2.393	15	33.3
Factor 3	1.553	9.7	43.0
Factor 4	1.173	8.3	51.4

As seen in Table 2, the first factor contributes 18.4% to the total variance (eigenvalue = 7.503), the second factor contributes 15% (eigenvalue = 2.393), the third factor contributes 9.7% (eigenvalue = 1.553), and the fourth factor contributes 8.3% (eigenvalue = 1.173). As shown in Figure 1, the line graph continues horizontally after the fourth factor, and there is no significant drop between factors. These factors' contribution to the total variance has decreased. A four-

factor model structured the scale, accounting for 51.4% of the total variance. Akbulut (2010) states that the explained variance should be higher than the unexplained variance. Therefore, the variance of the scale explained is suitable.

EFA was conducted on 38 items using the oblimin rotation method. Items to be removed from the scale were determined based on a minimum factor loading of .40. Items were not allowed to load significantly on more than one factor. Additionally, attention was paid to factors consisting of three or more items. Consequently, items 15, 16, 18, 29, 33, and 38 were removed due to overlap; items 8, 9, 10, 12, 19, 24, and 35 were removed due to factor loadings below .40; and items 7, 11, 28, and 31 were removed because their contents did not match the relevant factor. In this direction, the scale was reduced to 21 items.

In the second step, goodness-of-fit indices and scale item fit indices were used for CFA. Robust Maximum Likelihood (MLR) estimation was preferred for CFA. MLR estimation is recommended when normality assumptions are unmet (Muthén & Muthén, 2007). The MLR estimator is resistant to distributional deviations, such as skewness and kurtosis, adjusting parameter estimates and standard errors accordingly to provide more reliable outcomes despite violations of normality (Brown, 2015). For reliability analysis, McDonald's omega analysis was conducted to measure the internal consistency among items at the scale level. Additionally, split-half reliability analysis and item discriminability analysis were performed. Voluntary consent forms were used for this study, and all participants who gave their consent completed the scale form in full. To prevent incomplete data, items were set as mandatory fields in the Google Form system. The data collected for the study were analyzed using the open-source JASP statistical software (R Core Team, 2019).

2.2.9. Optimize scale length

The scale length was optimized based on EFA and CFA results presented in the results section.

3. RESULTS

The findings section presents the EFA, CFA, and reliability analysis results in order.

3.1. Exploratory Factor Analysis

EFA included 21 items, and four factors were obtained. The oblimin rotation method was used to better explain the factor structure in exploratory factor analysis. This method is preferred when factors are correlated (Tabachnick & Fidell, 2007). Table 3 shows the item loadings under these factors due to the oblimin rotation.

The pattern matrix reflects the strength of each item within a specific factor. Field (2009) states that item loadings in the pattern matrix should be greater than .40. These findings deem the factor loadings in the pattern matrix suitable. The total explained variance should be 50% or higher (Thompson, 2004). According to the findings in Table 3, the factor loadings and explained variance in the pattern matrix are deemed suitable. The developed curriculum leadership scale clustered under four factors with eigenvalues greater than 1, explaining 51.4% of the total variance.

The first factor consists of eight items (17, 20, 21, 22, 23, 25, 26, and 27), with loading values ranging from .505 to .775. This factor is labeled "curriculum organization." The second factor consists of six items (1, 2, 3, 4, 5, and 6), with loading values ranging from .559 to .844, indicating "curriculum mastery." The third factor consists of three items (13, 14, and 30), with loading values ranging from .480 to .843, related to "collaboration with colleagues." The fourth factor consists of four items (32, 34, 36, and 37), with loading values ranging from .490 to .695, labeled as "openness to being a curriculum leader" (Table 4). Factors were named considering the literature on curriculum leadership and items (Akbaş & Keskin, 2021; Çelik, 2012; Harris *et al.*, 2020; Henderson *et al.*, 2018; Noddings, 2020; Wiles, 2016).

Table 3. The items under the factors and the variance they explain as a result of oblimin rotation.

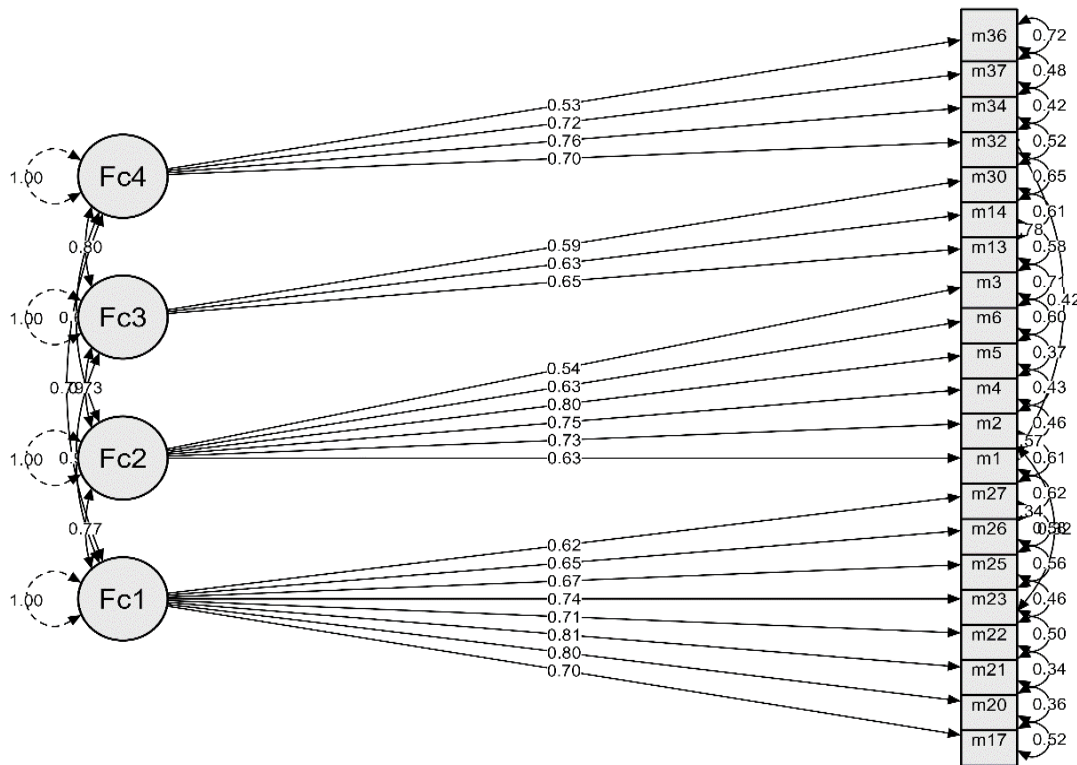
Factors	Items	Factors			
		1	2	3	4
Curriculum organization	I27	.775			
	I22	.766			
	I26	.743			
	I23	.637			
	I17	.628			
	I20	.578			
	I21	.550			
	I25	.505			
Curriculum mastery	I2		.844		
	I3		.717		
	I1		.716		
	I4		.648		
	I5		.645		
	I6		.559		
Collaboration with colleagues	I14			.843	
	I13			.789	
	I30			.480	
	I36				.695
Openness to being a curriculum leader	I37				.641
	I32				.521
	I34				.490
Eigenvalues		7.503	2.393	1.553	1.173
Explained variance (%)		18.4	15	9.7	8.3
Total variance (%)		51.4			

Table 4. Sample items on the scale.

Curriculum leadership perception scale statements	Rotated factor loadings
26 I make arrangements in the curriculum in line with the individual development needs of students.	.743
5 I have a good command of current curriculum design and teaching best practices.	.648
30 I guide my colleagues in the implementation of the curriculum.	.480
37 I think I should participate in the curriculum's leading, directing, and decision-making processes.	.641

3.2. Confirmatory Factor Analysis

The curriculum leadership scale, previously determined to have four dimensions in EFA, was tested using CFA with a different sample of 130 participants. The analysis results showed the goodness-of-fit indices and the covariance between items “1 and 2,” “13 and 14,” “2 and 22,” “26 and 27,” and “27 and 34” in the model presented in [Figure 2](#).

Figure 2. The model for Confirmatory Factor Analysis of the scale items.

The chi-square test was statistically significant ($\chi^2 = 267.442$, $df = 178$, $p < .001$). However, it is well documented that the chi-square test is sensitive to large sample sizes and tends to produce significant results even when the model is acceptable (Kline, 2014). Consequently, additional fit indices were examined. The Comparative Fit Index (CFI = .940) and Tucker-Lewis Index (TLI = .929) exceeded the recommended threshold of $\geq .90$, suggesting a good model fit (Hu & Bentler, 1999; Kline, 2014). Similarly, the Incremental Fit Index (IFI = .941) indicated a strong model fit. Furthermore, the Root Mean Square Error of Approximation (RMSEA) was calculated as .062 (90% CI [.046, .070]), signifying an acceptable level of fit. RMSEA values below .08 are considered satisfactory, whereas values $\leq .06$ indicate a good fit (Browne & Cudeck, 1993). Thus, the obtained RMSEA (.062) falls within acceptable boundaries. The Standardized Root Mean Square Residual (SRMR = .056) also indicated an acceptable model fit below the .08 threshold (Hu & Bentler, 1999). Although the Goodness of Fit Index (GFI = .842) slightly fell below the conventional threshold of $\geq .90$, it remained acceptable. Meanwhile, McDonald's Fit Index (MFI=.709) indicated moderate fit. Additionally, Hoelter's critical values at both .05 (103.134) and .01 (110.277) significance levels suggested an adequate sample size.

Based on the fit values in Table 5, the confirmatory factor analysis results indicate that the proposed model demonstrated acceptable to a good fit based on recommended fit index criteria in the literature (Browne & Cudeck, 1993; Hu & Bentler, 1999; Kline, 2014).

Table 5. The fit values obtained in CFA.

N	χ^2	df	χ^2/df	RMSEA	SRMR	TLI	GFI	MFI	CFI	IFI
130	267.442	178	1.502	.062	.056	.929	.842	.709	.940	.941

Table 6. Summary of confirmatory factor analysis results.

Factors	Item No	Factor Loading	Standard Error	<i>z</i>	<i>p</i>
F1. Curriculum organization	m17	.346	.039	8.828	< .001
	m20	.456	.043	10.702	< .001
	m21	.485	.044	11.004	< .001
	m22	.412	.045	9.172	< .001
	m23	.394	.041	9.525	< .001
	m25	.427	.051	8.330	< .001
	m26	.333	.042	8.017	< .001
	m27	.358	.047	7.594	< .001
F2. Curriculum mastery	m1	.356	.048	7.405	< .001
	m2	.398	.043	9.250	< .001
	m4	.436	.046	9.506	< .001
	m5	.449	.044	10.300	< .001
	m6	.398	.053	7.540	< .001
	m3	.282	.045	6.243	< .001
F3. Collaboration with colleagues	m13	.358	.051	7.014	< .001
	m14	.357	.052	6.815	< .001
	m30	.388	.060	6.472	< .001
	m32	.362	.043	8.401	< .001
F4. Openness to being a curriculum leader	m34	.416	.044	9.527	< .001
	m37	.425	.049	8.746	< .001
	m36	.307	.051	6.025	< .001
Correlation among factors	F1 ↔ F2	.773	.049	15.689	< .001
	F1 ↔ F3	.976	.075	13.075	< .001
	F1 ↔ F4	.789	.051	15.615	< .001
	F2 ↔ F3	.732	.094	7.813	< .001
	F2 ↔ F4	.614	.075	8.204	< .001
	F3 ↔ F4	.805	.092	8.758	< .001

The CFA indicated strong and significant factor loadings for all items ($p < .001$, Table 6). Additionally, also the correlations among the factors were moderate to high: Factor 1 showed strong correlations with Factor 2 ($r = .773$) and Factor 4 ($r = .789$), Factor 2 had moderate correlations with Factor 3 ($r = .732$) and Factor 4 ($r = .614$), and Factor 3 was strongly correlated with Factor 4 ($r = .805$). However, the correlation between Factor 1 and Factor 3 was very high ($r = .976$, $p < .001$). Although this correlation exceeds the typical limit (.85) recommended by Kline (2014), it does not necessarily imply that these two factors measure the same concept. As explained in the discussion and conclusion section, theoretical evidence and practical considerations demonstrate that Factors 1 and 3 measure distinct aspects of the broader construct. In social science research, closely related factors often have high correlations, yet they still represent separate, meaningful dimensions (Brown, 2015; Hair *et al.*, 2019). Combining these two factors could lead to a loss of valuable detail and reduce the clarity of the findings. Therefore, it is considered that the factors should remain separate.

These results indicate a coherent structure among the factors, indicating related yet distinguishable dimensions, which is common in social sciences research. Accordingly, the

correlations between the factors support the construct validity of the model (Brown, 2015; Hair *et al.*, 2019).

3.3. Findings Regarding the Reliability of the Scale

In light of this study's second research question, the reliability of the scale's items and factors was analyzed using McDonald's omega coefficient, the item discriminability method by comparing the 27% sub-upper groups, and split-half reliability analyses. Regarding scale reliability, McDonald's omega coefficient value should be equal to or greater than .70 (Frankel & Wallen, 2008).

Table 7. Factors' reliability coefficients.

Factors	McDonald's omega (α)	Number of Items
1	.893	8
2	.850	6
3	.799	3
4	.774	4
Total	.933	21

The reliability coefficients for the factors were calculated as follows: Factor 1 (curriculum organization), .893; Factor 2 (curriculum mastery), .850; Factor 3 (collaboration with colleagues), .799; Factor 4 (openness to being a curriculum leader), .774. The overall McDonald's omega coefficient for the scale was .933 (Table 7). The scale's reliability coefficients and its factors above .70 indicate that it is a reliable measurement tool.

3.4. Item Discrimination Analysis

An independent sample t-test examined the scale's item discrimination feature. The perception scores of the 27% lower and upper groups were compared (Table 8).

Table 8. Item discrimination analysis.

Measure	N	Mean	SD	df	t	p
Lower %27	35	2.72	0.159	68	19.23	.000
Upper %27	35	3.63	0.229			

The analysis showed a statistically significant difference between the 27% lower and upper groups ($t = 19.23$, $p = .00$, Table 8). The developed curriculum leadership perception scale can significantly differentiate between the lower and upper groups, demonstrating strong discriminative power.

3.5. Split-Half Reliability

The Split-Half method, another internal consistency coefficient calculation method, was used to determine the scale's reliability. This method was conducted separately for the EFA-applied group and the CFA-applied group.

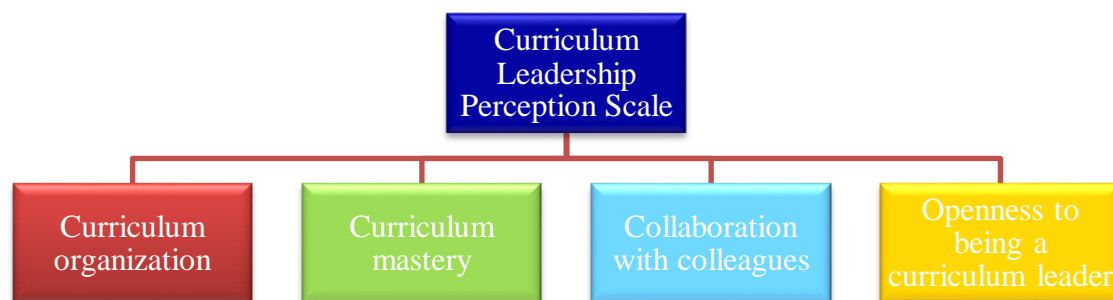
Table 9. Split-half analysis for both the EFA and CFA groups.

Analyses	Half	Cronbach's Alpha	Split-Half Reliability	
			Guttman Coefficient	Spearman-Brown Coefficient
EFA	First	.848	.840	.841
	Second	.837		
CFA	First	.890	.880	.881
	Second	.875		

Table 9 shows that Cronbach's Alpha internal consistency coefficients ranged from .837 to .890, the Guttman coefficients from .840 to .880, and the Spearman-Brown coefficients from .841 to .881. In scale development processes, reliability coefficients of .70 and higher are considered to have sufficient reliability (Carpenter, 2017; Hooper *et al.*, 1992; Frankel & Wallen, 2008). The values determined for the EFA and CFA groups show that the EPL scale has good internal consistency.

The analyses concluded that the CLPS for branch teachers is a valid and reliable measurement tool. The scale's sub-dimensions, as shown in Figure 3, align with the study's third research question.

Figure 3. Sub-dimensions of the Curriculum Leadership Perception Scale.



4.

DISCUSSION and CONCLUSION

This study aims to create a valid and reliable measurement tool to measure middle school branch teachers' perceptions of curriculum leadership. 358 middle school branch teachers participated in the validity and reliability study of the developed scale. Six experts evaluated the 45-item scale draft, leading to the removal of seven items. A pilot study was conducted with ten branch teachers on the 38-item trial form of the scale, and items that were not understood were revised based on feedback. The pilot application did not result in any items being removed from the scale. Following expert evaluation and pilot testing, the scale underwent refinement to enhance clarity and relevance.

4.1. Psychometric Properties

The scale development process involved exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to ensure construct validity. The KMO value of .883 indicated that the sample size was sufficient for EFA, and Bartlett's test of sphericity confirmed the sample's suitability for factor analysis. Care was taken to ensure that each factor consisted of at least two items. Four factors emerged from the oblimin rotation analysis: curriculum organization, mastery, collaboration with colleagues, and openness to being a curriculum leader. The EFA results showed that the four factors explained 51.40% of the scale variance. Consequently, items 15, 16, 18, 29, 33, and 38 were removed due to overlap; items 8, 9, 10, 12, 19, 24, and 35 were removed due to factor loadings below .40; and items 7, 11, 28, and 31 were removed because their contents did not match the relevant factor.

CFA was conducted to confirm the four-factor model. The fit indices of the four-factor model are as follows: $\chi^2/df = 1.502$; RMSEA = .062; SRMR = .056; GFI = .842; TLI = .929; CFI = .940; MFI = .709; IFI = .941. These values indicate a good fit for the model. We calculated the overall reliability coefficient of the scale as .933, which indicates satisfactory internal consistency. Internal consistency analysis results for each subscale are as follows: The values for Factor 1 are .893, Factor 2 is .850, Factor 3 is .799, and Factor 4 is .774. These values reflect acceptable levels of internal consistency for each factor. These findings suggest that the scale is theoretically and statistically sound for evaluating curriculum leadership perceptions among middle school teachers.

4.2. Comparison with Existing Instruments and Factor Structure

Several existing instruments measure curriculum leadership but primarily focus on administrative or principal-led perspectives. For instance, Wang and Chou (2016) proposed curriculum leadership indicators using the Delphi methodology, emphasizing administrative roles. Similarly, Bayırlı and Balcı (2021) developed a scale targeting principals' curriculum leadership roles within a hierarchical school structure. Additionally, Chen *et al.* (2021) investigated teacher curriculum leadership through field dynamic theory, highlighting the influence of individual and environmental factors. Bolat and Baş (2023) also emphasized the significance of curriculum leadership for educators, considering it a sub-dimension within their scale. Unlike these instruments, the CLPS developed in this study explicitly evaluates teachers' perspectives on curriculum leadership. This distinction is critical, as teachers play a pivotal role in curriculum implementation and adaptation. The scale fills a crucial gap in research by focusing on teacher agency. As a result of the analyses, the final version of the scale consists of 21 items and four dimensions (Appendix A1).

Curriculum leadership is critical to educational effectiveness and influences how the curriculum is designed, implemented, and improved. Curriculum leadership includes developing a vision, exceeding standards, aligning curriculum to stakeholders, conducting authentic assessments, establishing a functioning curriculum team, engaging administrators, teachers, parents, and other school stakeholders, and planning and managing change (Wiles, 2016, p. 10). The CLPS, developed to assess teachers' perceptions of curriculum leadership, identifies four factors that closely overlap with these tasks at the core of curriculum leadership. These dimensions align with the literature on curriculum leadership (Akbaş & Keskin, 2021; Harris *et al.*, 2020; Henderson *et al.*, 2018; Noddings, 2020; Wiles, 2016).

One of the most fundamental aspects of curriculum leadership is organizing and structuring the curriculum effectively (Wiles, 2016). The curriculum organization factor in the scale aligns with this principle, emphasizing teachers' roles in adapting and structuring curricula. Wiles (2016, p. 37) argues that curriculum leaders must define the school's curriculum by identifying goals and ensuring alignment with educational standards. Similarly, Jacobs (2004, p. 45) highlights the importance of stakeholder involvement in shaping curriculum structures, reinforcing the necessity of organized curriculum leadership.

Beyond organization, effective curriculum leadership requires mastery of the curriculum itself. Teachers must have deep knowledge of curriculum design, instructional strategies, and assessment methods to effectively implement and refine curricula (Harris, Jones, & Crick, 2020). Effective curriculum leaders should have expertise in curriculum content and pedagogy to guide their teaching practices (Wiles, 2016). This aligns with Posner's (1995, p. 56) assertion that teachers play a critical role in interpreting and realizing the curriculum. Moreover, Henderson *et al.* (2018, p. 82) emphasize the importance of continuous professional learning in enhancing teachers' curricular expertise. As curriculum leaders, teachers must continuously update their knowledge and skills to ensure their instructional practices remain practical and relevant.

Equally crucial in curriculum leadership is fostering collaboration among educators. Collaboration among educators is a cornerstone of curriculum leadership, fostering shared decision-making and collective improvement (Ho, 2010). Collaboration with colleagues underscores the necessity of teamwork in curriculum development and implementation. Wiles (2016) suggests that curriculum leaders should actively promote collaboration to create cohesive instructional practices. Furthermore, research indicates that collaboration enhances curriculum coherence, facilitates professional learning, and contributes to overall educational improvement (Henderson *et al.*, 2018). When teachers work together, they can share insights, refine their approaches, and create a stronger learning environment for students.

The willingness to assume curriculum leadership responsibilities is essential for fostering educational change (Ho, 2010). Leading curriculum development involves cooperation, critical thinking, and creativity (Noddings, 2013). Wiles (2016) further emphasizes the role of leadership in driving curriculum reforms and fostering instructional innovation. Teachers must recognize their potential as curriculum leaders and actively engage in curriculum development, implementation, and evaluation for meaningful change.

4.3. Contribution to International and National Literature

This research's primary contribution to the national and international literature is the development of a teacher-centered curriculum leadership scale. While existing studies have explored curriculum leadership from an administrative or institutional perspective, the current study highlights teachers' roles as active curriculum leaders. The findings underscore the necessity of empowering teachers as curriculum decision-makers, fostering a more decentralized and dynamic approach to curriculum leadership. Furthermore, by providing a reliable and valid instrument to assess perceptions of curriculum leadership, the scale may facilitate longitudinal studies examining the changing role of teachers in curriculum leadership. Given the increasing emphasis on teacher agency in curriculum development, this study offers a new perspective that bridges the gap between theoretical leadership models and practical classroom applications.

Since the proclamation of the Republic, many curriculum development studies have been carried out for different levels and disciplines in Türkiye, and numerous curricula have been implemented. However, each curriculum has encountered a variety of critiques. Consequently, minor adjustments or fundamental changes have been made in a single discipline, at one level of education, or across all levels from primary to high school (Çobanoğlu & Yıldırım, 2021). This indicates that the curriculum implemented in Türkiye has not achieved stability or has had short-lived stability. The stability of an implemented curriculum depends on its ability to meet the needs of individuals, society, and the subject area; reflect national culture; fulfill contemporary requirements; and, most importantly, have competent teachers to implement it.

Teachers are informed and supported about the curriculum implemented through pre-service education at the undergraduate level and in-service training during their careers. However, the constant changes in curriculum and the large number of teachers make this process challenging. In this context, teachers must master the curriculum to implement it correctly, make decisions and adjustments when necessary, inform and guide their colleagues about it, and ultimately lead it. Determining the status of all teachers in terms of leading the curriculum and identifying their needs may enable the preparation of in-service training programs to develop them.

4.4. Interpretation of Scale Scores

The scale is scored on a 4-point Likert scale as “1: It does not reflect me at all”, “2: It does not reflect me”, “3: It reflects me”, and “4: It reflects me completely”. Scores for the factors of the scale should be calculated by averaging the scores of the items belonging to each factor. The following cut-off points can be used in the interpretation of average scores: 1.00-1.74 should be interpreted as “Very Low Perception,” 1.75-2.49 as “Low Perception,” 2.50-3.24 as “High Perception,” and 3.25-4.00 as “Very High Perception.”

Accordingly, the high scores obtained from the scale indicate that the participants' perceptions of curriculum leadership are high. In particular, each of the dimensions, such as “Curriculum Organization,” “Curriculum Dominance,” “Collaboration with Colleagues,” and “Openness to Being a Curriculum Leader,” should be interpreted separately. The average score of each dimension should be used to determine the strengths and weaknesses of individuals in the relevant dimension. Interpreting the scale in this way will provide important data for improving curricula and strengthening educational leadership practices.

4.5. Future Research Directions

As a consequence of the CLPS application, there are some recommendations for future research. Future research can extend the application of the CLPS by exploring its use in diverse educational contexts, including elementary and high school settings. Additionally, studies examining the impact of professional development initiatives on teachers' curriculum leadership perceptions can further validate the scale's applicability. Individual differences in curriculum literacy, gender, seniority, education level, and age can also be examined in future studies. This study contributes to ongoing discussions on educational reform and instructional innovation by positioning teachers as central figures in curriculum leadership.

Declaration of Conflicting Interests and Ethics

The authors declare no conflict of interest. This research study complies with research publishing ethics. The scientific and legal responsibility for manuscripts published in IJATE belongs to the authors. **Ethics Committee Number:** Kırıkkale University, Social Sciences and Humanities Research Ethics Committee, 12-02.

Contribution of Authors

Cemile Keski: Investigation, Literature review, Data collection, Data interpretation, and Writing-original draft. **İlkay Doğan Taş:** Literature review, Methodology, Data analysis, Data interpretation, Writing-original draft, Supervision, and Validation.

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APPENDIX

A1. The Perception Scale for Curriculum Leadership (Eğitim Program Liderliği Algı Ölçeği)

Maddeler (Orijinal Ölçek Madde Numaraları)	Beni hiç yansıtmıyor	Beni yansıtmıyor	Beni yansıtıyor	Beni tamamen yansıtıyor
1 (1). Öğretim programlarına etki eden güncel eğitim politikalarına hâkimim.				
2 (2). Öğretim programının özel amaçlarına hâkimim.				
3 (3). Öğretim programında yer alan kazanımlara hâkimim.				
4 (4). Program tasarımı ve öğretimdeki güncel iyi uygulamalara hâkimim.				
5 (5). Öğretim programlarına etki edebilecek eğitimdeki eğilimleri takip ederim.				
6 (6). Öğretim programı politikalarını, öğrencilere ve velilere uygun bir şekilde açıklarım.				
7 (13). Meslektaşlarımla, öğretim programları hakkında anahtar yetkinliklere göre fikir alışverişinde bulunurum.				
8 (14). Meslektaşlarımla, öğretim programındaki kök değerlerin kazandırılmasına yönelik fikir alışverişinde bulunurum.				
9 (30). Öğretim programının uygulanmasında meslektaşlarıma rehberlik yaparım.				
10 (17). Öğrencilerin bireysel gelişimlerine rehberlik etmek için öğretim programının uygulanmasında öğretimle ilgili yeniliklerden yararlanırım.				
11 (20). Öğretim programının uygulanma sürecinde öğrencide meydana gelen gelişimi programın özel amaçlarına göre değerlendiririm.				
12 (21). Öğretim programının etkililiğini öğretimle ilgili verilere (akademik başarı, öğrenci gelişimi vb.) dayalı olarak değerlendiririm.				
13 (22). Öğrenme ve öğretme süreçlerini öğretim programının vizyon ve misyonuna göre düzenlerim.				
14 (23). Öğretim programıyla ilgili planlamalar yaparken, programın uygulamadaki yansımalarını dikkate alırım.				
15 (25). Öğretim programının iyileştirilmesine yönelik uzun vadeli planlamalar yaparım.				
16 (26). Öğrencilerin bireysel gelişim ihtiyaçları doğrultusunda öğretim programında düzenleme yaparım.				
17 (27). Dersin kazanımlarına ve alanımdaki diğer ilgili gelişmelere göre öğretim programı üzerinde düzenlemeler yaparım.				
18 (32). Öğretim programlarını uygulama sürecinde yeni fikirlere açığım.				
19 (34). Öğretmenlerin eğitim programına liderlik etme, yönlendirme ve karar alma süreçlerine katılmasının öğrenci yetkinliklerinin geliştirilmesine katkı sağlayacağını düşünüyorum.				
20 (36). Öğretmenlerin, idari pozisyonlara sahip olmasalar bile eğitim programına liderlik etme, yönlendirme ve karar alma süreçlerine katılabileceğini düşünüyorum.				
21 (37). Eğitim programına liderlik etme, yönlendirme ve karar alma süreçlerine katılmam gerektiğini düşünüyorum.				