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Development of the Professional Readiness Scale in Instrument Teaching: A Study of Validity and Reliability

Çalgı Öğretiminde Mesleki Hazırbulunuşluk Ölçeğinin Geliştirilmesi: Geçerlik ve Güvenirlik Çalışması

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ABSTRACT: This study was conducted to develop a standard measurement tool to assess the professional readiness levels of music teacher candidates specializing in music education, specifically instrumental music education, in terms of psychometric aspects. The scale was conducted with 569 prospective music teacher candidates. Expert opinions were obtained for the content validity of the scale. Construct validity was examined using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The analyses confirmed a two-factor structure in the scale: 'Planning and Managing Teaching Activities' and 'Teaching Competencies'. The model was found to be in adequate agreement with the data (X^2/df = 2.419, RMSEA = 0.073, SRMR = 0.033, CFI = 0.934, GFI = 0.905). In the reliability analyses of the scale, Cronbach's alpha coefficients ranged from 0.801 to 0.918, indicating strong internal consistency and a robust structure. Furthermore, item-total correlations and independent sample t-tests confirmed the scale's discriminant validity. In conclusion, the final version of the scale consists of 15 items across two dimensions. These findings indicate that the developed measurement tool is a reliable and valid instrument that can be used to assess the professional readiness levels of prospective music teachers in terms of psychometric aspects of instrument teaching. It is envisaged that the scale could be used in institutions aiming to train music teachers, enabling candidates to assess their own readiness before starting their careers and to develop their weaker areas based on feedback.

Keywords: Instrument teaching, professional readiness, psychometrics, reliability and validation study.

ÖZ: Bu çalışma, genelde müzik eğitimi özelde çalgı eğitimi alanında uzmanlaşan müzik öğretmeni adaylarının çalgı öğretiminde mesleki hazırlık düzeylerini psikometrik yönlerden değerlendirmek üzere standart bir ölçüm aracı geliştirmek amacıyla yapılmıştır. Ölçek 569 potansiyel müzik öğretmeni adayıyla gerçekleştirilmiştir. Ölçeğin İçerik geçerliliği için uzman görüşleri alınmıştır. Yapı geçerliliği, keşifsel faktör analizi (EFA) ve doğrulayıcı faktör analizi (CFA) ile incelenmiştir. Yapılan analizlerde ölçekte "Öğretim Faaliyetlerini Planlama ve Yönetme" ve "Öğretim Yetkinlikleri" olmak üzere iki faktörlü bir yapı doğrulanmıştır. Ölçekte modelin, verilerle yeterli uyum gösterdiği tespit edilmiştir (X^2/df = 2,419, RMSEA = 0,073, SRMR = 0,033, CFI = 0,934, GFI = 0,905). Ölçeğin güvenilirlik analizlerinde, Cronbach alfa katsayılarının 0,801 ile 0,918 arasında değişen değerlerle güçlü bir iç tutarlılık ve sağlam bir yapıda olduğu görülmüştür. Bunun yanısıra madde-toplam korelasyonları ve bağımsız örneklem t-testleri, ölçeğin ayırt edici gücünü doğrulamıştır. Sonuç olarak, ölçeğin nihai versiyonu, iki boyutta 15 maddeden oluşmaktadır. Bu bulgular, geliştirilen ölçme aracının müzik öğretmeni adaylarının çalgı öğretiminde psikometrik yönlerden mesleki hazırlık düzeylerini değerlendirmede kullanılabilecek güvenilir ve geçerli bir araç olduğunu göstermektedir. Ölçeğin müzik öğretmeni yetiştirmeyi hedefleyen kurumlarda, adayların mesleğe başlamadan önce kendilerinin hazır bulunuşluklarını değerlendirebileceği ve dönütlere göre eksik yönlerini geliştirmelerine olanak sağlayabileceği düşünülmektedir.

Anahtar kelimeler: Çalgı öğretimi, mesleki hazırbulunuşluk, psikometri, güvenilirlik ve geçerlilik çalışması.

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Music education has been regarded throughout history not only as an aesthetic activity but also as a multidimensional learning field that supports the cognitive, emotional and social development of the individual. In this context, instrumental training stands out as a fundamental component at the heart of music teacher training programmes, playing a decisive role in the formation of the prospective teacher's professional competence. Instrumental training represents a holistic process that encompasses not only the acquisition of technical performance skills but also the development of pedagogical skills, the structuring of teaching abilities, and the construction of the individual's own musical identity (Jørgensen & Hallam, 2016). In this respect, the importance of instrumental training in music teacher education stems from its enabling teacher candidates to position themselves with both a performer and an educator identity. The development of the teacher candidate's musical expression skills, their ability to communicate effectively with students, and their ability to support their pedagogical approaches with authentic musical experiences are largely related to the gains they acquire during the instrument training process. Therefore, the qualities expected of instrument teachers are not limited to technical competence; pedagogical competence, emotional awareness, communication skills, and the capacity to manage student motivation are also integral parts of this process (Kurbanbaevich, 2024). Therefore, in the training of music teachers, instrumental training is considered a fundamental preparatory area that directly affects the quality of professional practice.

However, due to its multi-layered structure, instrumental training also brings with it various difficulties in the learning-teaching processes. These difficulties generally arise in the cognitive, affective and psychomotor dimensions and often interact with each other. At the cognitive level, note reading, analysis of musical structures, repertoire diversity, and the development of effective practice strategies are among the fundamental elements that determine the quality of learning (Virkkula & Nissilä, 2017, p. 5). Students who fail to adopt systematic practice methods may experience concentration problems, an inability to recognise mistakes, and a lack of clear objectives (Hallam et al., 2018). Such cognitive difficulties are not only related to the learner but are also closely linked to how the teaching process is planned

At the affective level, motivation, self-efficacy perception and performance anxiety are the prominent variables. It is stated that students with low self-efficacy perception tend to perceive challenging tasks as threats, and this situation weakens their commitment to learning (Virkkula & Nissilä, 2017). Performance anxiety can disrupt the learning process by reducing the functionality of cognitive and psychomotor skills, particularly in assessment and performance settings. In the psychomotor dimension, there is a continuous development in technical areas such as finger skills, coordination, articulation, dynamic control, and body use (Jørgensen & Hallam, 2016). Difficulties in this area are mostly manifested through incorrect technical habits or ergonomic problems; if not addressed early on, they can become permanent.

At this point, the difficulties encountered in instrument training must be addressed not only as individual shortcomings but also in the context of instructional design and the learning environment. Educational and motivational elements that support effective learning play a decisive role in reducing these difficulties. From an educational perspective, the quality of teaching methods, the structure of feedback mechanisms, and the development of metacognitive skills come to the fore. Feedback

aimed at long-term development, in addition to immediate performance corrections, strengthens the learner's cognitive awareness and learning regulation skills (Virkkula & Nissilä, 2017, p. 5). Metacognitive strategies, encompassing planning, monitoring, and evaluation processes, are among the critical factors determining the pace of progress in instrument education.

From a motivational perspective, self-determination theory demonstrates that autonomy support fosters more sustainable learning commitment in students and is strongly associated with intrinsic motivation (Evans & Bonneville-Roussy, 2016). Involving students in decision-making processes, providing them with opportunities to set goals, and using a non-controlling teaching language can increase learning continuity. In addition, expectancy-value theory emphasises that the balance between the value the student attributes to the task and their expectation of success supports learning success (Burak, 2014). Social elements such as teacher-student interaction, peer and family support can also reinforce motivation by providing emotional satisfaction in the learning environment (Hallam et al., 2018). In this context, effective instrument training should be approached as a process that strengthens the student's self-efficacy and capacity to take responsibility for learning, beyond technical accuracy.

This multidimensional structure enables the evaluation of instrument training within the framework of the concept of readiness. Readiness is a fundamental concept encompassing the cognitive infrastructure, educational equipment, and professional adaptation capacity necessary for an individual to participate effectively in learning processes and professional responsibilities. Thorndike's Principle of Readiness draws attention to the function of this concept in learning processes by suggesting that an individual's participation in activities for which they are ready creates satisfaction, while being prevented from doing so can lead to negative emotions. Current approaches address readiness in cognitive, educational, and professional dimensions, emphasising the need to evaluate elements such as technical competence, pedagogical skills, motivation management, and adaptation to contemporary requirements, particularly in the teaching profession (Tuna & Kaçar, 2005; Cangelosi & Schlesinger, 2018; Vodneva et al., 2021; Yessenamanova et al., 2022).

In general music education, and more specifically in instrumental teaching, professional readiness and teaching competence are closely related constructs that are difficult to separate sharply in applied and performance-based disciplines. For this reason, considering these two integrated constructs together provides a more accurate and coherent perspective on the field. In line with this view, the present study conceptualizes readiness not as a purely psychological state distinct from instructional knowledge and skills, but as a professional competence domain that is integrated with the capacity to plan, conduct, and manage teaching processes effectively. Recent research indicates that professional readiness and professional competence should not be treated as opposing concepts, but rather as interrelated and overlapping dimensions of teacher development. Professional readiness is defined as a multidimensional construct that encompasses the cognitive, affective, and psychomotor components that enable individuals to carry out professional tasks effectively (Sulaiman et al., 2017). Within this framework, competence is regarded as one of the core structural components of readiness, since the capacity to demonstrate instructional knowledge and skills lies at the centre of being prepared for professional practice. Similarly, Mohamed

et al. (2017) argue that the question of whether student teachers are “ready to teach” can most meaningfully be answered with reference to teacher competence frameworks, emphasizing that readiness is operationalized through observable professional competencies. Empirical findings by Julia et al. (2020) likewise show that subject-matter knowledge and pedagogical skills constitute the foundation of teachers’ readiness to enter the profession. In domain-specific contexts, particularly in performance-oriented disciplines such as music education, the relationship between readiness and instructional competence becomes even more integrated. Provorova (2018), for example, defines the methodical readiness of future music teachers as the dynamic integrity of individual, personal, and vocational qualities that includes pedagogical knowledge, methodological skills, and the capacity to implement teaching strategies. In this respect, professional readiness in instrumental teaching should not be understood merely as a subjective perception or motivational tendency, but rather through the observable manifestations of teachers’ capacity to plan, manage, and effectively implement instructional processes. Thus, teaching competencies are not elements external to readiness; they represent its structural and functional components.

In the context of instrument teaching, professional readiness is related to the teacher candidate's capacity to transfer technical performance skills to pedagogical practices, manage student interaction, and holistically structure learning processes (Darling-Hammond, 2000; Lukas et al., 2019). Furthermore, the integration of digital technologies into music education has become an important component of the professional readiness expected of today's teachers (Ovcharenko et al., 2019; Vodneva et al., 2021). Although readiness scales have been developed for different educational fields (Sagita et al., 2020; Yıldırım & Köklükaya, 2019), the concept of professional readiness specific to musical instrument teaching has not been adequately measured.

In this context, the importance of instrument training in the education of music teachers becomes clearer when considered alongside the development of professional competencies, the multidimensional difficulties encountered in learning and teaching processes, and the educational and motivational factors that shape these processes. The quality of instrument training directly affects the development of teacher candidates not only as technically competent individuals but also as professionals who can understand their students' learning processes, motivate them, and guide them pedagogically. Therefore, theoretically grounding professional preparedness for instrument teaching and evaluating it with valid measurement tools is an important requirement in the field of music teacher training.

Theoretical Foundations for the Study Design

Developing a valid and reliable measurement tool for assessing the professional readiness of pre-service instrumental teachers requires a strong theoretical foundation grounded in teacher competency models, pedagogical frameworks, and scale development methodologies. Research on teacher readiness emphasizes the need for a multidimensional approach, integrating cognitive, pedagogical, and professional competencies to ensure that educators are well-prepared for their instructional roles (Li et al., 2024; Sarah et al., 2024). In the field of instrumental music education, pedagogical preparation extends beyond general teaching strategies to include technical

skill acquisition, individualized instruction, performance coaching, and student-centered learning approaches (Jumaniyazov, 2024).

Several studies have highlighted the importance of pedagogical conditions and instructional mechanisms that enhance instrumental teaching effectiveness. These conditions include active independent work, concert-based learning, and the integration of innovative and traditional teaching approaches to cultivate well-rounded music educators. Furthermore, effective music instruction relies on teacher-student relational dynamics, where recognition, empathy, insightfulness, and responsiveness (REIR framework) contribute to enhanced student engagement and creative possibilities (de Bruin, 2022). However, despite the increasing emphasis on student-centered practices and the need for adaptive teaching strategies in instrumental education, research on assessing pre-service instrumental teachers' preparedness remains fragmented (Lasauskienė & Yang, 2018).

In terms of scale development, previous research has established rigorous methodological frameworks for constructing teacher readiness instruments. Studies have employed exploratory and confirmatory factor analyses to validate measurement tools, ensuring their psychometric reliability and applicability across different educational contexts (Kohli et al., 2024; Li et al., 2024). The DeVellis framework, widely used in scale construction, outlines an eight-step process for designing and refining educational assessment tools (Sarah et al., 2024). These studies underscore the importance of integrating multiple dimensions of teacher readiness, such as technological, pedagogical, and subject-specific competencies, to develop comprehensive measurement tools that accurately reflect the evolving nature of teacher preparation (Bennett et al., 2024; Kim & Martin, 2024).

While existing teacher readiness scales have provided valuable insights into technology integration, subject-matter expertise, and general pedagogical preparedness, there remains a lack of standardized assessment tools specifically designed for instrumental teaching readiness at the undergraduate level. The current study builds upon these theoretical foundations by developing and validating the Instrumental Teaching Readiness Scale (RSIT), an instrument tailored to the unique challenges and instructional demands of pre-service instrumental educators. This scale draws from established measurement methodologies, incorporating insights from teacher competency frameworks, pedagogical research, and scale validation practices to offer a robust and empirically tested tool for evaluating professional preparedness in instrumental music education.

Addressing Gaps in Previous Research

Despite the extensive body of research on teacher preparation and competency assessment, studies specifically addressing the readiness of pre-service instrumental teacher candidates remain limited. Most existing teacher readiness scales primarily focus on general pedagogical training, subject-specific knowledge, or technology integration (Kohli et al., 2024; Li et al., 2024; Sarah et al., 2024). While these instruments provide valuable insights into broad dimensions of teacher education, they tend to overlook the distinctive characteristics of instrumental music education, which requires a highly specialized combination of technical mastery, individualized

instruction, repertoire selection, performance-based coaching, and continuous feedback processes (Afacan, 2019; Blackwell & McPherson, 2022; McDowell, 2007).

Within the field of music education, several scale development and adaptation studies have examined constructs such as attitudes toward instrumental practice, self-efficacy, practice strategies, and musical self-concept among pre-service music teachers. However, these instruments predominantly focus on single dimensions of the learning or teaching process and do not conceptualize professional readiness for instrumental teaching as a holistic psychometric structure. In particular, core components of the teaching profession—such as pedagogical content knowledge, assessment and evaluation competence, classroom communication, and feedback skills—are rarely examined together within a unified measurement framework. As a result, the multidimensional nature of professional preparation in instrumental teaching remains fragmented in the existing literature.

Furthermore, although some research has explored various aspects of music teacher education, these studies have not provided a standardized and validated measurement tool that systematically assesses the readiness of pre-service instrumental educators (Augustine & Wong, 2016; Provorova, 2017; Urniežius, 2020). Existing studies largely concentrate on curriculum design, instructional approaches, or teacher self-efficacy, yet they fail to offer a comprehensive method for quantifying readiness levels in a way that allows for objective comparison across institutions and training contexts. The absence of such a tool limits the ability to monitor professional development trajectories throughout teacher education programs and constrains evidence-based evaluation of instructional effectiveness.

Another critical gap in the literature concerns the lack of empirical evidence linking pre-service instrumental teachers' readiness levels to broader professional competencies and long-term teaching outcomes. Although theoretical discussions on pedagogical conditions, student-centered learning, and relational teaching strategies have contributed substantially to the understanding of effective music education, their implications for assessing instrumental teaching readiness remain underexplored (Jumaniyazov, 2024). Frameworks emphasizing teacher–student relational dynamics, such as the REIR framework, have been discussed in music education research; however, they have not been systematically operationalized within readiness assessment instruments (de Bruin, 2022).

Taken together, these limitations indicate that professional readiness in instrumental teaching is often evaluated indirectly, subjectively, or through isolated constructs rather than through an integrated psychometric model. This situation makes it difficult to objectively and comparably track the professional preparation of pre-service instrumental teacher candidates and leads program evaluation, curriculum development, and targeted pedagogical interventions to rely largely on subjective judgments. Consequently, there is a clear need for the development of a psychometrically valid and reliable standardized measurement tool that captures the multidimensional nature of professional readiness in instrumental teaching. Addressing this gap is essential not only for advancing the theoretical understanding of instrumental music teacher education but also for strengthening data-driven decision-making processes in teacher training programs.

Objective and Importance of the Study

The current study addresses these gaps by developing and validating the Instrumental Teaching Readiness Scale (RSIT), a specialized measurement tool that assesses pre-service instrumental teachers' professional preparedness. Unlike existing teacher readiness scales, the RSIT is specifically designed to capture both instructional and technical dimensions of instrumental teaching, ensuring a comprehensive evaluation of teacher readiness. This study contributes to the standardization of assessment practices in instrumental music education, offering a reliable framework for evaluating readiness levels and supporting evidence-based improvements in teacher training programs. By establishing a psychometrically sound measurement tool, this research enables educators, policymakers, and researchers to make data-driven decisions aimed at enhancing instrumental music teacher preparation and professional development.

Method

Participants

This study included 569 prospective instrument teachers enrolled in the third and fourth years of undergraduate programs at various universities in Turkey in the 2023-2024 academic years. Due to the lack of official national statistics on the total number of prospective instrument teachers in Turkey, it is difficult to determine if this sample represents an exact percentage of the population. However, based on higher education enrollment trends and existing music education programs, the sample size was considered sufficient for psychometric validation and statistical analyses (Büyüköztürk, 2017; Tavşancıl, 2010). Participants were divided into three groups: RSIT Pilot Implementation Group, RSIT Development Group, and RSIT Implementation Group. The selection of universities aimed to include a diverse representation of institutions from different regions, thereby increasing the generalizability of the findings to the Turkish higher education context. Informed consent was obtained from all participants, and participation was voluntary. General demographic characteristics of the participants, including gender distribution, age range, and years of music education, are presented in Table 1.

Table 1

Demographic Characteristics of RSIT Scale Development Study Group

	Categories	N	%
Gender	Woman	277	49.4
	Man	292	50.6
Department	Turkish Music State Conservatory	147	24.5
	Faculty of Fine Arts	159	29.4
	Faculty of Education	190	32.7
	Faculty of Music and Performing Arts	13	2.2
	State Conservatory	22	4.5
	Faculty of Art Design and Architecture	9	2.2
	Music Technology	16	2.6
	Faculty of Performing Arts	13	1.9
Speciality	Bağlama	146	25.7
	Kaval	10	2.2

	Categories	N	%
	Kabak Kemane	17	3.3
	Ud	11	1.9
	Kanun	22	3.3
	Violin	82	13.8
	Flute	35	6.7
	Guitar	86	14.9
	Piano	58	11.2
	Cello	16	3.3
	Viola	9	1.5
	Tanbur	10	1.1
	Vocal	67	11.2
Duration	0–4 year	380	68.4
	5–8 year	133	22.7
	9–12 year	27	3.7
	13 and over year	29	5.2

*Note: In Türkiye, voice training is offered as an instrument discipline in programmes providing professional music education and is therefore classified under instrument training in this study.

Pilot Study

A pilot study was conducted to evaluate the research methodology, assess item clarity, and refine data collection procedures. The group consisted of 30 senior students from the Division of Music Education and the Turkish Music State Conservatory of Burdur Mehmet Akif Ersoy University. The pilot study aimed to identify ambiguous items, analyze response patterns, and refine the initial 48-item scale before broader implementation.

Scale Development

The RSIT development group included 269 pre-service instrument teachers from various universities in Turkey. This group underwent exploratory factor analysis (EFA) to determine the instrument's factor structure. Initially, a 48-item version was tested, which was subsequently reduced to 37 items based on expert evaluations and statistical analyses. The criteria for item reduction included item-total correlations, factor loadings, and redundancy. The final 15-item, two-factor version was then tested on 270 participants for confirmatory factor analysis (CFA) to validate the final scale structure and assess construct validity. To ensure data reliability, attention-check items were included, and responses failing these checks, such as consistently selecting the same answer, were excluded from the final analysis.

Scale Development Process

The scale development process followed the guidelines of DeVellis & Thorpe (2021). The initial 48 items were generated based on an extensive literature review on professional readiness in music education, theoretical frameworks related to teacher preparedness, expert feedback from five specialists in music education and test development, and an analysis of pre-service teachers' experiences in instrument teaching. The item pool was refined through expert validation and categorized into two theoretical dimensions: Planning and Managing Teaching Activities and Teaching Competencies. The scale was designed as a five-point Likert-type instrument ranging

from 1 (Strongly Disagree) to 5 (Strongly Agree). Example items include statements assessing participants' ability to plan instructional activities and their competence in applying pedagogical strategies effectively. The initial 48 items were reduced to 37 based on expert feedback, content validity analysis, and pilot study findings. The final 15-item version was derived through exploratory factor analysis to identify the strongest items, confirmatory factor analysis to validate model fit, and item-total correlation analysis to remove weakly correlated items.

Data Collection

The final version of the scale was administered online via Google Forms during the 2023–2024 academic year to third and fourth-year undergraduate pre-service instrument teachers. The scale consisted of a demographic information section, RSIT items structured using a five-point Likert-type scale, and control items included to ensure data integrity. Following the examination of missing data and responses to the control items, 13 of the 582 collected responses were identified as invalid or incorrectly completed and were therefore excluded from the dataset. Consequently, a total of 569 valid responses were retained for further analysis.

Data Analysis

This study employed a two-stage data analysis approach. In the first stage, data from the pilot study were analyzed to assess the preliminary reliability and validity of the scale. In the second stage, data from the scale development and implementation group were analyzed to validate the final version of the instrument. The analyses included assessments of content validity, reliability, and construct validity.

Pilot Study Analysis

Content validity was evaluated to determine the extent to which the scale captured all relevant dimensions of professional readiness in instrument teaching. A systematic and multifaceted approach was adopted, beginning with a comprehensive literature review to establish the theoretical foundation of the scale. Based on this framework, scale items were carefully developed to reflect key dimensions of the concept. Expert opinions were sought to ensure content validity, after which the scale was tested in the pilot application group. The data collected from this group were analyzed using SPSS software, and Cronbach's alpha coefficient was calculated as 0.936. According to Büyüköztürk (2017), such a high reliability coefficient indicates that the scale demonstrates excellent internal consistency. Based on these findings, the 37-item version of the RSIT was determined to be suitable for the main application phase.

Scale Development and Validation Analysis

To assess the reliability of the scale, several statistical tests were performed, including test discrimination, item-total score correlation, Cronbach's alpha coefficient, and split-half reliability analysis. A Cronbach's alpha value above 0.70 was considered acceptable for scale reliability (Büyüköztürk, 2017). Additionally, item-total correlations and inter-dimensional correlations were examined, and the differences between the top and bottom 27% groups were analyzed to assess item discrimination.

For validity testing, sampling adequacy and normality distributions were examined through the Kaiser-Meyer-Olkin (KMO) test and Bartlett's Test of Sphericity. Skewness and kurtosis values were also evaluated to confirm the assumption of normality. Construct validity was assessed using confirmatory factor analysis (CFA) to determine item factor loadings and to verify the theoretical structure of the scale. Exploratory factor analysis (EFA) was conducted to further refine the factor structure, and goodness-of-fit indices, including Comparative Fit Index (CFI), Standardized Root Mean Square Residual (SRMR), and Root Mean Square Error of Approximation (RMSEA), were used to evaluate model fit (Erkorkmaz et al., 2013). Acceptable fit index values were defined as CFI ≥ 0.95, GFI ≥ 0.85, SRMR ≤ 0.08, RMSEA ≤ 0.08, and $\chi^2/df < 5$ (Marcoulides & Schumacker, 2001; Sümer, 2000).

In all CFA analyses, the maximum likelihood estimation technique was used, as the sample size exceeded 100-150 participants, increasing the sensitivity and robustness of the model (Hair, 2009). These statistical techniques ensured that the final version of the RSIT met the necessary reliability and validity criteria, providing a psychometrically sound instrument for assessing professional readiness in instrument teaching.

Ethical Permissions and Procedure

Ethics committee approval for the scale development, implementation, and validity and reliability studies was obtained from Burdur Mehmet Akif Ersoy University Non-Interventional Clinical Research Ethics Committee (Decision No: GO 2023/227). Participants were informed that their personal information would remain confidential, and data collection was conducted on a voluntary basis. No financial incentives were provided to participants.

Results

In this section, the findings obtained from the research process are organised and presented according to the research questions. The study has two main focal points: scale development process and implementation process. The findings are presented in a systematic way by considering these two processes. During the presentation of the findings, scale development and reporting approaches were taken into consideration.

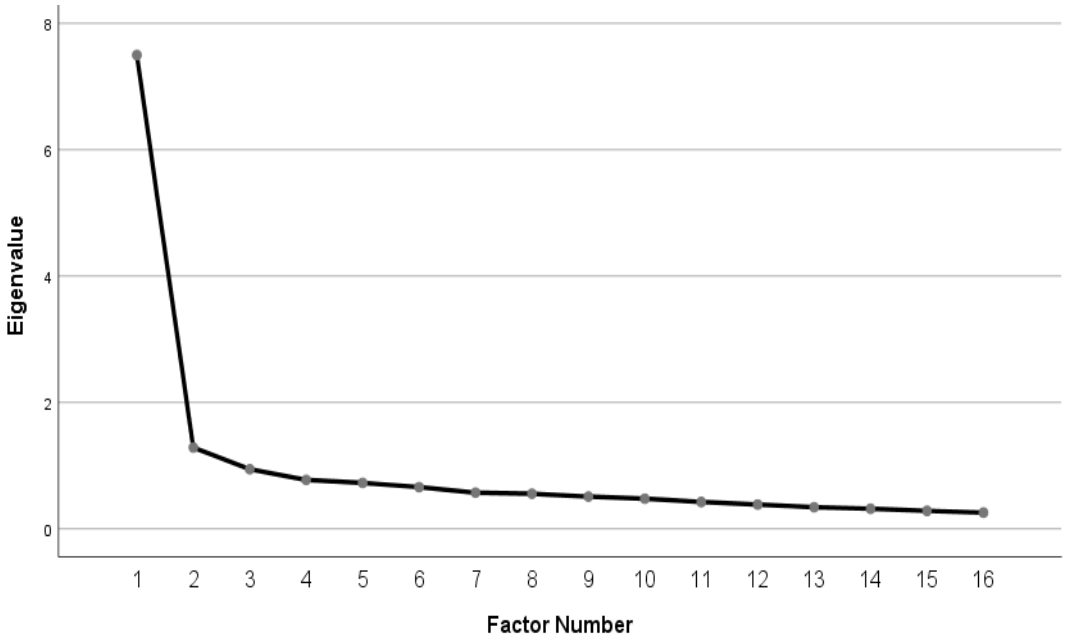
Validity

To address this research question, both content and construct validity of the scale were thoroughly analyzed. Content validity was assessed by evaluating how well the scale items covered the subject matter, with a five-member committee of experts from music education and test development fields reviewing the items. The evaluation process followed a structured approach, where each item was rated based on its relevance, clarity, and comprehensiveness. Items receiving a low relevance rating (below 0.75 on a 1-1.00 scale) were either revised or removed. Additionally, items with overlapping content were identified and merged to enhance clarity. During this revision process, several key modifications were made to improve the precision and validity of the scale. Some redundant items were removed, such as an item that specifically referred to the impact of online education on instrument teaching readiness, as it was context-dependent and did not align with the broader construct being measured. Similarly, certain statements were reworded for clarity and better measurement

accuracy. For instance, the item "Öğrencilerimin çalgısına olan sevgisini artırabilirim (I can increase my students' love for their instruments)" was revised to "Öğrencilerimi çalgıya yönelik olumlu bir tutum geliştirmeye teşvik edebilirim (I can encourage my students to develop a positive attitude towards the instrument)" to avoid subjective wording and ensure a more behaviorally measurable statement. Likewise, items that initially focused on specific pedagogical scenarios, such as preparing students for national or international competitions, were adjusted to more broadly applicable statements like "Öğrencilerimi performans etkinliklerine hazırlayabilirim (I can prepare my students for performance activities)", ensuring that the scale maintained generalizability across different teaching contexts. Construct validity was examined using exploratory (EFA) and confirmatory factor analysis (CFA). The skewness (-0.067) and kurtosis (-0.744) values indicated that the data followed a normal distribution, as values between -1.5 and +1.5 are considered acceptable for normality (Tabachnick et al., 2013). These analyses confirmed that the scale is valid and accurately measures the intended construct. The suitability of the sample for factor analysis was assessed using the Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett's test of sphericity. The KMO value was 0.937 (Büyüköztürk, 2017), indicating excellent sampling adequacy, and Bartlett's test was significant (χ^2 = 5996.698, p < .000), confirming the appropriateness of the data for factor analysis. According to Çokluk et al. (2012), a KMO value above 0.60 and a significant Bartlett's test (p < .05) suggest that the sample is suitable for factor analysis. Additionally, Şencan (2005) stated that the sample size is sufficient for perfect representation. The scatter plot of the factors formed by the scale items and their distribution in the factor space is presented in Figure 1.

Figure 1

Factor Scatter Plot



When Figure 1 is analysed, it is seen that the slope plateaus after the second point. In this framework, the cut-off point for the number of factors was determined as two (Çokluk et al., 2012). When the scatter plots of the factors in Figure 1 were

analysed, it was decided that the number of factors should be two considering the total variance explanation values and the Eigenvalue value. Afterwards, it was examined whether the related items conceptually expressed the same concept and it was decided that the factors were 'Factor 1: Planning and Management of Instructional Activities' and 'Factor 2: Teaching Competencies'.

As suggested in the related literature, it is stated that the items with factor loadings of 0.30 and above are well discriminative and those with factor loadings of 0.40 and above are very well discriminative (Büyüköztürk, 2017). In this context, the items that were below 0.40 and loaded on more than one factor in the first rotation phase were handled meticulously and directly excluded from the analysis. In addition, in order to determine the items that do not measure the same construct in factor analysis, the factor loadings of the items should be 0.40 or higher, the difference between the highest loading value of an item in the factors and the next highest loading value should be at least 0.10 and the common factor variance should be taken into consideration. Within the framework of these criteria, in the table obtained as a result of varimax rotation, the items with a difference of less than 0.10 were merged and the analysis was continued by re-evaluating each item after the rotation process. In addition, item total score correlations were also analysed. At this stage, the relationship between the total score obtained from the scale items and the total test score was analysed and the consistency between these two variables was examined. The values obtained as a result of EFA and item total correlation analyses are presented in Table 2.

Table 2

Exploratory Factor Analysis Results

Items	Factor 1	Factor 2	Item Correlation Scores
Item 33	.763		0.692
Item 19	.682		0.650
Item 18	.676		0.612
Item 15	.654		0.730
Item 14	.631		0.692
Item 25	.623		0.640
Item 31	.618		0.703
Item 10	.589		0.686
Item 17	.499		0.588
Item 2		.705	0.648
Item 7		.705	0.667
Item 3		.579	0.525
Item 1		.541	0.527
Item 5		.529	0.562
Item 4		.481	0.478

When Table 2 is examined, it is easily understood from the first column that some items were missing or excluded from the analysis. As a matter of fact, it is stated that the correlation coefficients should be 0.30 and above in the item total score correlation analysis performed to evaluate the internal consistency of the scale. As a result of the item analysis in which the problems in the scale expressions are determined and the predicted corrections are made, it is emphasised that the items with low correlations should be removed and consequently should not be included in the scale (Tezbaşaran, 2008). In the factor analysis performed on the 37-item draft scale, it was seen that the factor loadings and item total correlation values of some items were below 0.30. These items (6,8,9,11,12,13,16,20,21,22,23,24,26,27,28,30,32,34,35,36,37) were removed from the test. Since the scores here are above 0.30, it can be said that all items are consistent with the whole test (Büyüköztürk, 2017; Tavşancıl, 2010). 29th item is a control item. In this item, the students were asked to tick only a certain option, thus it was aimed to check whether the data were filled in well or not. In total, 22 items were removed from the final form of the scale and the analyses continued in this way. The exploratory factor analysis revealed that the scale consists of two sub-dimensions. The factor loadings of the items in the first dimension ranged between 0.499 and 0.763, with item-total correlations between 0.588 and 0.730. Similarly, the factor loadings of the items in the second dimension ranged from 0.481 to 0.705, while item-total correlations varied between 0.478 and 0.667. These results indicate that the items in both dimensions exhibit strong factor loadings and item-total correlations, supporting the scale's structural validity. The items belonging to each factor are presented in Table 2. The variance explained by 9 items in the first factor was 47,265 and the reliability coefficient (α) was 0,906; the variance explained by 6 items in the second factor was 8,569 and the reliability coefficient (α) was 0,812; the total variance explained for the overall scale (15 items) was 55,834 and the reliability coefficient (α) was 0,918. These values show that the scale is adequate in terms of factor structure, variance explained and reliability (internal consistency) values. The construct validity of the RSIT was evaluated by principal component analysis. In addition, confirmatory factor analysis (CFA) was conducted. CFA is an important method used to test the theoretical structural model of the scale. In this analysis, the accuracy of the previously proposed factor structure and the structural validity of the scale were examined in detail. The CFA results obtained are critical for assessing how accurately and consistently the scale measures the concepts it aims to measure. RSIT was developed to measure the vocational readiness levels of 3rd and 4th year undergraduate students receiving vocational music education. The scale is designed according to a 5-point Likert-type scoring system, i.e. positive items are evaluated as (1. Disagree, 2. Slightly Agree, 3. Moderately Agree, 4. Strongly Agree, 5. Fully Agree). Negative items were calculated by reverse coding. During the exploratory factor analysis (EFA), 22 out of 37 items were removed based on predefined psychometric criteria. Items with low factor loadings (< 0.40), high cross-loadings (difference < 0.10), or weak item-total correlations (< 0.30) were eliminated to enhance the scale’s structural integrity. Additionally, expert evaluations identified certain items as redundant or lacking conceptual clarity, leading to their removal. This process ensured that the final 15-item scale retained strong construct validity while effectively measuring professional readiness in instrumental

teaching. These criteria ensured that the retained items demonstrated strong construct validity and internal consistency while effectively capturing the intended conceptual framework of the instrument. Additionally, expert opinions were considered during the refinement process. Items that were found to be redundant or conceptually overlapping with other statements were also removed, as they did not provide unique contributions to measuring professional readiness. Furthermore, certain items were excluded due to lack of clarity or ambiguity in interpretation, as highlighted in expert evaluations. After these adjustments, the final 15-item scale exhibited a clear two-factor structure, aligning with the theoretical model. The revised version was subsequently validated through confirmatory factor analysis (CFA), conducted on an independent sample of 270 students, to further test the robustness of the final model. The CFA results confirmed that the refined scale effectively measured the intended constructs with strong model fit indices.

The path diagram related to the RSIT is presented in Figure 2. When the values of the path coefficients between the observed variables and latent variables in this diagram are analysed, it is understood that all items represent their latent variables well and it is appropriate to keep them in the scale ($p < 0.05$). This shows that each item reflects the factor to which it belongs in a good way. The fit indices related to confirmatory factor analysis are presented in Table 3.

Figure 2

Path Diagram of the RSIT

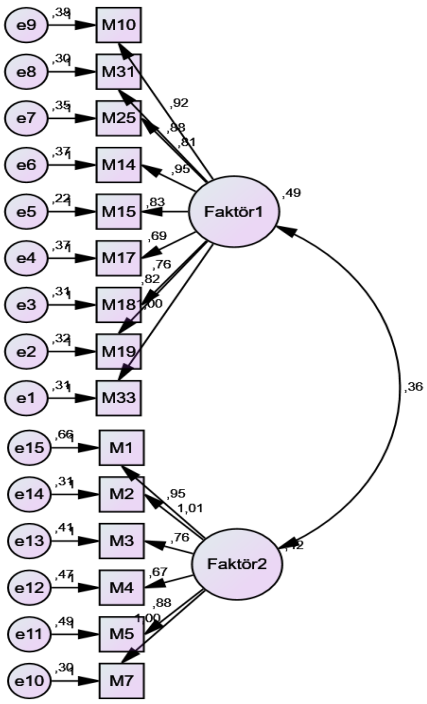


Table 3

Confirmatory Factor Analysis Results of the RSIT

Indeks	Values Related to the Model	Acceptable Values	References
X^2	215.259		
df	89		
X^2/sd	2.419	<5	Bollen (1989). Sümer (2000)
RMSEA	0.073	=0.80 ve <0.80	Bollen (1989). Sümer (2000). Marcoulides ve Schumacher (2001)
SRMR	0.033	=0.80 ve <0.80	
GFI	0.905	=0.85 ve üzeri	
CFI	0.934	=0.95 ve üzeri	

N=270

All analyses with AMOS were conducted using the maximum likelihood estimation technique. The modification indices in the CFA showed that model-data fit was achieved. The chi-square values in Table 3 were significant ($p<.001$), and the chi-square to degrees of freedom ratio (215.259/89) was 2.419, indicating adequate fit, as values of 5 or less are acceptable (Sümer, 2000). The fit indices for the scale were: RMSEA=0.073, SRMR=0.033, CFI=0.934, and GFI=0.905 (Table 3). These results suggest that most fit indices indicate an excellent model fit. While a CFI of 0.95 or higher is ideal, this result is within the acceptable range.

The analysis of the goodness-of-fit indices obtained from the confirmatory factor analysis (CFA) for the 15-item, two-factor structure of the RSIT indicated that RMSEA, SRMR, and GFI values demonstrated an excellent fit, while the CFI index also met the criteria for an excellent model fit.

Reliability

To address this research question, standard reliability analyses such as test discrimination, item-total score correlation, Cronbach's alpha, and split-half reliability were conducted. Test discrimination assesses whether the scale differentiates between participants at different ability levels, while item-total score correlation measures how well each item reflects the overall scale. Cronbach's alpha was used to evaluate the internal consistency and homogeneity of the scale, and split-half reliability calculated the consistency between two halves of the scale. These analyses are essential for determining the robustness and appropriateness of the scale's use. In order to determine whether the developed readiness scale distinguishes between adults who show the behaviour to be measured and adults who do not show the behaviour to be measured, a comparison was made between the lower and upper 27% groups. As a result of this comparison, the values related to the discrimination of the scale are presented in Table 4.

Table 4

Distinctiveness of RSIT (Lower-Upper 27% Group)

27% Group	n	Mean	Std. Deviation	sd	t	p
Lower	73	3.3680	0.28848	144	-36.073	0.000
Upper	73	4.7963	0.17669			

In order to determine the discrimination of the scale, a group of 27% was determined at the first stage. For this calculation, 27% of the 269 participants was found to be approximately 72.63 and therefore the number of groups was determined as 73. Total readiness scores were ranked from smallest to largest and two groups were formed from the lowest 91 data to the highest 91 data, this situation is shown in Table 4.

The difference between the lower and upper group averages was analysed by Independent Groups t-test and it was found that the difference between the lower and upper groups was significant ($t = -36{,}073$, $p < 0{,}05$). This result shows that there is a significant difference between the lower and upper groups. Therefore, it was concluded that the measurement tool distinguished between those who exhibited the behaviour to be measured and those who did not. Item-total correlation is a statistical method that measures the relationship of each item of a measurement tool with the total scale score. This correlation shows the relationship of each item to the overall performance of the scale and is important in assessing how well the item represents the scale. Item-total correlation is often used in item analyses and is taken into account when assessing the reliability of the scale. A good item-total correlation indicates that the item represents the scale well and is reliable. Item-total correlation usually takes a value between -1 and +1.

A positive correlation indicates that the item is positively correlated with the overall score of the scale, while a negative correlation indicates an inverse relationship between the item and the overall score of the scale. However, the item-total correlation is usually positive because the items are assumed to reflect the scale. An ideal value for the item-total correlation is not specified, but generally a correlation of 0.30 or higher is considered good. The better the items of the scale represent the overall scale, the higher the item-total correlation will be. Item-total test correlations were calculated for the item analyses of the RSIT. Item-total correlation is of critical importance in terms of expressing the level of relationship between an item and the whole test. According to the information presented in Table 2, item correlation values ranged between 0.478 and 0.730. These results show that the scale items measure the same construct and form a solid basis for the reliability of the scale.

Cronbach's alpha and split-half reliability are key statistical methods for evaluating the internal consistency of a scale and its sub-dimensions. Cronbach's alpha measures how consistently the items within the scale or sub-dimension relate to each other, with values typically ranging between 0 and 1, where higher values indicate greater internal consistency. Split-half reliability compares the consistency between two halves of the scale or sub-dimension and serves as an independent check on internal consistency. These methods are essential for determining the reliability of a

measurement tool. Within the scope of reliability analysis, Cronbach's Alpha and two half reliability values were calculated separately for the two sub-dimensions. According to the table, Cronbach's Alpha value for the first sub-dimension was found to be 0,906 and 0,812 for the second sub-dimension. The overall reliability coefficient of the scale was determined as 0,918. When the Cronbach's alpha value of internal consistency coefficients is >0.70, it shows that this scale is reliable (Büyüköztürk, 2017).

Discussion

Validity and Reliability of the RSIT

The findings of this study provide strong empirical evidence supporting the validity and reliability of the Readiness Scale for Instrumental Teaching (RSIT) as a standardized assessment tool for measuring the professional preparedness of pre-service instrument teachers. The exploratory factor analysis (EFA) confirmed that the variance ratios and factor loadings aligned with established psychometric principles, reinforcing the construct validity of the scale (DeVellis & Thorpe, 2021). These findings align with previous research emphasizing the role of factor analysis in validating measurement tools, particularly in educational and psychological assessments (Gauci et al., 2024). Confirmatory factor analysis (CFA) further substantiated the theoretical framework underlying the RSIT, with model fit indices ($X^2/df = 2.419$, RMSEA = 0.073, SRMR = 0.033, CFI = 0.934, GFI = 0.905) meeting recommended statistical thresholds, confirming its robustness as a valid assessment instrument (Kumari et al., 2021). These results indicate that the scale reliably measures professional readiness across its two-factor structure: "Planning and Managing Teaching Activities" and "Teaching Competencies".

The results of the reliability analyses also confirm the internal consistency of the RSIT. The Cronbach’s alpha coefficient, exceeding 0.918, indicates strong reliability, meeting the established criteria for educational measurement instruments (Cortina, 1993; Tavşancıl, 2010). Item-total correlations and test discrimination analyses demonstrate that the RSIT effectively differentiates between varying levels of professional readiness among candidates. Furthermore, significant differences observed between the lower and upper 27% groups further reinforce the scale’s sensitivity in distinguishing competency levels, demonstrating its utility as a diagnostic tool for assessing instrumental teaching readiness (Silva et al., 2022).

Contributions to Music Trainning Program

Beyond its psychometric validation, the RSIT contributes to the broader discourse on assessment in music teacher education. The results underscore the necessity of empirically validated instruments to evaluate and enhance teacher training programs. Given that readiness is a multidimensional construct encompassing pedagogical, cognitive, and instructional competencies, the RSIT provides a structured means of assessing these essential skills in instrumental music education (Ovcharenko et al., 2019). The findings indicate that teacher readiness is not solely a function of technical proficiency but also involves pedagogical adaptability, an area critical in contemporary teacher education (Hersman & Hodge, 2010; Lukas et al., 2019). The integration of a standardized readiness scale into music teacher education programs offers several benefits, including:

- Identifying strengths and weaknesses in pre-service teacher training
- Assessing the effectiveness of curricula and instructional methodologies
- Informing policy decisions regarding teacher certification and professional development (Abdelmounaim et al., 2022).

Implications for Music Teacher Training Programs

The RSIT provides a structured framework for assessing pre-service instrument teachers' professional readiness, offering valuable insights for teacher training programs. By systematically evaluating competencies in instructional planning, management, and teaching effectiveness, the RSIT enables institutions to refine their curricula, ensuring that candidates develop the necessary skills before entering the profession (Altunova & Kalender, 2022). The two-factor model of the RSIT highlights the importance of both pedagogical and practical competencies, suggesting that training programs should integrate comprehensive instructional strategies and competency-based assessments to enhance teacher preparation.

From a policy perspective, incorporating validated assessment tools like the RSIT can improve the standardization and objectivity of teacher evaluations. This is particularly relevant for accreditation and certification processes, where consistent benchmarks are required to assess professional readiness (Fong et al., 2010). The RSIT also facilitates data-driven decision-making, allowing education policymakers to track teachers' development over time and adjust professional training programs accordingly.

Beyond formal teacher education, the RSIT's structured assessment can be applied across various instructional contexts, including conservatories, music academies, private studios, and community-based programs. As music education increasingly incorporates diverse pedagogical approaches and teaching environments, future research should explore how the RSIT can be adapted to different institutional structures and instructional settings. Additionally, in multicultural music education contexts, where pedagogical adaptability is crucial, the RSIT may serve as a useful tool for evaluating how teachers integrate culturally responsive teaching methods into their practice (Yie & Ying, 2017).

Limitations and Directions for Future Research

Although the RSIT demonstrates strong psychometric properties, certain limitations must be acknowledged. The study sample consisted of pre-service instrument teachers from universities in Turkey, which may limit the generalizability of the findings to other cultural or institutional settings. Future research should aim to validate the RSIT across different educational systems, exploring how teacher readiness varies in diverse training models and curricula (Bostancı et al., 2022).

Additionally, the study relied primarily on self-reported data, which may introduce response biases (Yessenamanova et al., 2022). Future research could incorporate observational assessments, peer evaluations, or performance-based measurements to provide a more comprehensive evaluation of professional readiness. Furthermore, while the two-factor structure of the RSIT was confirmed, further research could investigate whether sub-dimensions exist within these factors, refining the scale for greater specificity in assessing teacher competencies.

Another important area for future research is the applicability of the RSIT in different teaching environments. The scale was developed primarily for undergraduate-level teacher preparation, and its relevance for certification at different levels (e.g., K-12, higher education, or professional development courses) requires further investigation. Moreover, given that the RSIT was originally developed in Turkish, additional studies should explore its cross-cultural applicability, ensuring that it remains valid and reliable when adapted into different languages and educational contexts.

Longitudinal studies would also provide valuable insights into how professional readiness evolves over time, examining the extent to which RSIT scores correlate with teachers' long-term success and classroom performance (Provorova, 2017). Additionally, examining how different instructional methodologies impact readiness scores could further enhance our understanding of effective teacher training strategies, informing both curriculum development and policy initiatives.

Conclusion

The findings confirm that the Readiness Scale for Instrumental Teaching (RSIT) is a valid and reliable measurement tool for assessing the professional readiness of pre-service instrument teachers. By adhering to rigorous psychometric validation processes, this study provides a standardized instrument that can support both academic research and practical applications in teacher training programs. The RSIT stands as a valuable contribution to music education, offering a structured approach to evaluating and enhancing the pedagogical competencies of future music educators. The item reduction process, which resulted in a final scale of 15 items from an initial pool of 37, was guided by established psychometric criteria rather than a conceptual narrowing of the readiness construct. Items demonstrating low factor loadings, high cross-loadings, or insufficient item-total correlations were excluded to strengthen the structural integrity of the scale. The final 15 items, organized under the dimensions of *Planning and Managing Teaching Activities* and *Teaching Competencies*, retain comprehensive coverage of the professional readiness construct by addressing its cognitive, pedagogical, and practical components in the context of instrumental teaching. Moving forward, continued refinement and application of the RSIT across different educational contexts will further strengthen its role in shaping effective teacher preparation programs.

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Statement of Responsibility

UO: Conceptualization, Study design, Data Collection, Data Analysis, Writing-original draft. **ZN**: Conceptualization, Study design, Writing- review & editing. **AB**: Writing- review & editing, Data Analysis. All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The all authors report there are no competing interests to declare.

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Appendix: Çalgı Öğretiminde Mesleki Hazırbulunuşluk Ölçeği

Aşağıda verilenlerden çalgı öğretiminde mesleki hazırbulunuşluk durumunuzu belirleyen ifadelere katılma düzeyinizi belirtiniz. **İlgili kutucuğa X işareti koyunuz**	**Katılmıyorum**	**Az Katılıyorum**	**Orta Düzeyde Katılıyorum**	**Büyük Ölçüde Katılıyorum**	**Tamamen Katılıyorum**
1. Öğrencilerim için gelişim raporları hazırlayabilirim.					
2. Farklı ölçme-değerlendirme teknikleri ile değerlendirme yapabilirim.					
3. Öğrencilerime rol model olabilirim.					
4. Ders esnasında zamanı etkili kullanabilirim.					
5. Öğrencilerin hazırbulunuşluk düzeylerini gözeterek her öğrenci için bireyselleştirilmiş öğretim programı hazırlayabilirim.					
6. Mevcut bilgi birikimimi artırmak için kendime zaman ayırabilirim.					
7. Çalgı öğrenmek için gerekli olan çalışma disiplinini öğrencilerime kazandırabilirim.					
8. Çalgı öğretimi için gereken fiziki şartların iyileştirilmesini sağlayabilirim.					
9. Öğrencilerimin gelişimlerini sağlayacak ev ödevleri verebilirim.					
10. Öğrencilerimin çalgısına olan sevgisini arttırabilirim.					
11. Çalgı öğretimini eğlenceli hale getirebilirim.					
12. Değerlendirme yaparken objektif/nesnel bir değerlendirme yapabilirim.					
13. Öğrendiğim öğretim yöntem ve tekniklerini çalgı öğretiminde verimli bir şekilde kullanabilirim.					
14. Karşılaşabileceğim sorunları gözeterek psikolojik olarak kendimi mesleğe hazır hissederim.					
15. Öğrencilerime not kaygısı olmadan öğrenmeye dönük bakış açısı kazandırabilirim.					

Note. High scores obtained from the scale indicate a high level of readiness for the profession in music education, while low scores indicate a low level of readiness for the profession. Scores on the scale range from 15 to 75. These scores have been evaluated in three main categories:

Low Readiness: Scores between 15 and 34 indicate that individuals have a low level of readiness for a career in music education.

Moderate Readiness: Scores between 35 and 54 indicate that individuals have a moderate level of readiness for a career in music education.

High Readiness: Scores between 55 and 75 indicate that individuals have a high level of readiness for a career in music education.