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INSTRUMENT PRACTICE HABITS AND METACOGNITIVE STRATEGIES: AN EXPERIMENTAL STUDY ON VIOLIN STUDENTS

(Research article)

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Instrument Practice Habits and Metacognitive Strategies: An Experimental Study on Violin Students

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Abstract

Getting into a strong habit of practicing a musical instrument may be a way to achieve success for students who set their own goals in this profession. A metacognitive awareness on this route to the destination can fortify the strategies. This experimental research, designed to determine the effect of a metacognitive awareness-based violin teaching program on violin students' instrument practice habits, aimed to utilize the following learning strategies through metacognitive awareness: rehearsal strategies, elaboration strategies, organizational strategies, affective strategies, and comprehension monitoring strategies. In this context, experimental and control groups were formed by random assignment, and study data were collected using the "Instrument Practice Habits Scale." The study concluded that the practices aimed at improving metacognitive awareness in violin education affected the following sub-dimensions in the instrument practice habits of the experimental group violin students: "appreciating the practice," "interest and desire," "preparation for the practice," and "efficient time usage and regular practicing." In this context, encouraging students to plan, monitor, and evaluate their training has been recommended.

Keywords: Instrument practice habits, metacognition, violin education, learning strategies

1. Introduction

Professional musical performance–one of the most challenging tasks for the human central nervous system–combines precisely executed rapid and complex physical movements and emotional experiences under continuous acoustical feedback (Altenmüller & Gruhn, 2002). Playing the violin is a coordination-required activity with mentally and physically complex processes. Achieving success on this long, challenging road demands diligent and systematic practicing as well as talent (Galamian, 1961).

There is a strong positive relationship between practice and success in musical performance (Sloboda et al., 1996). Lehmann et al. (2007) define the concept of practice as "the time spent to play an instrument, getting the instrument ready to play, understanding/observing/interpreting

music, allocating quality time, structuring/holistically thinking, improving, and setting goals." In order to practice effectively, students need to be aware of their learning process. Because students do not always practice under their teachers' supervision and often practice during out-class hours. This awareness facilitates their autonomy while practicing and grants proper practice habits, while efficient learning strategies develop this awareness. Among these learning-facilitative strategies are rehearsal strategies, elaboration strategies, organizational strategies, affective strategies, and comprehension monitoring strategies (metacognitive awareness strategies) (Weinstein & Mayer, 1983; Ertem, 2014). The most appropriate strategy (strategies) for the pre-determined practice targets is selected and implemented on the first step of metacognitive awareness. Then, the validity of the preferred method to achieve success is checked with an inspection at a random point during the training. Then, if necessary, the current strategy is quitted, and another is adopted. Ultimately, self-control will determine personal success. Barry & Hallam (2002) describe the appropriate practice and learning strategies to be incorporated into music teaching to grow students' autonomy:

- Using physical training and mental training together.
- Practicing in a systematic and target-oriented manner.
- Examining and analysing the situation.
- Scheduling relatively short and regular practice sessions.
- Being intrinsically motivated.
- Listening to appropriate music samples, including professional recordings and (or) teachers' recordings and (or) concerts (p.151).

1.2. Metacognitive processes

Studies show that professional musicians are highly skilled in "learning to learn" strategies (Hallam, 2001). Metacognition includes and guides "self-regulated learning" and "learning to learn" concepts, which are gaining importance. The Metacognition notion began to be discussed by educators in the early 1970s. Metacognition, which requires deep thinking skills and broad learning-teaching activities, includes a series of cognitive processes that can be called "thinking skills," "practice skills," or simply "intelligent self-awareness" and "independent learning" (Benton, 2013). Metacognitive knowledge is knowledge or beliefs about oneself, tasks, actions, strategies, and how they interact (Flavell, 1979).

While musicians condition their minds and bodies to produce sounds, they cognitively decode musical notes. These complex body and mind functions require the use of Metacognitive behaviours (Costa & Kallick, 2009). Metacognitive behaviour-developing strategies include determining "known and unknown" compounds, talking about thoughts, keeping a "thought" diary, planning, self-control, questioning the thinking process, and self-evaluation (Blakey & Spence, 1990).

1.2. Practice habit and metacognition

Getting into a habit of doing something valuable is a long process that starts with thinking in detail and being conscious of the paths to be followed (Jorgensen, 2008). Countless repetitions are required to develop new skills and turn these complex tasks into motor skills (Altenmüller & Gruhn, 2002). Repeated actions steadily become easier to do (Jorgensen, 2008:36). It is also essential to thoroughly evaluate the training period and make it a daily habit (Galamian, 1961). In order to give students a practice habit, teachers should investigate how the violin students plan their personal practice, describe the dynamics and discipline of instrument practice by

analogy with theatre, sports, etc., encourage them to repetitions, and determine the target in practicing (Akkuş, 2000).

In violin education, students' mental, physical, and spiritual states, motivation, and well-organized practice spaces are paramount to ensure an effective practice process (Şendurur, 2001). In this direction, Affective strategies are one of the most prominent strategies for efficient training. For a properly functioning self-control mechanism, individuals must be able to motivate themselves. Individuals intrinsically motivated to successfully play an instrument will probably achieve their goals, whatever piece of literature is put in front of them (Greco, 1997).

If young people develop their self-motivation skills with "affective strategies" instead of external motivation, this will positively affect their instrument-practicing process. In addition, the person should regulate the practice environment and social life. In this context, in order to use metacognitive awareness strategies, violin students should be able to ask themselves questions and get answers to analyze their goals and objectives, the correctness of the path they follow, and what strategies they need to achieve success. It can also be relatively easy to answer such questions when asked by other people. The point is to ask these questions to oneself and answer them sincerely. Answering the questions is not enough. The person must also be able to choose the right strategy to achieve success and apply it. Improving violin students' metacognitive awareness is essential to establish correct practice habits. The current study conducted in this context aimed to reveal the effect of metacognitive awareness strategies on violin students' instrument practice habits. For this purpose, this research sought answers to the following questions:

- Is there a significant difference between the practice habits pretest and posttest scores in the experimental group trained using metacognitive strategies and the control group traditionally trained?
- Is there a significant difference between the experimental and control groups in the exercise habits posttest scores?

2. Methods

2.1. Study model and participants

The current study determined the effect of metacognitive strategies on violin students' practice habits with a randomized pretest-posttest control group design. In this context, experimental and control groups were formed by making random assignments from the sample pool. The study covered 16 violin students in Trakya University Music Education Program (*Female*=13, *Male*=3, aged 19 to 24, *M*=21.1, *SD*=1.1). The participants were divided into the experimental (n=8) and control (n=8) groups with random assignment, and their practice habits were measured. Later, the experimental group received a 10-week metacognitive strategies-based teaching, while the control group got a traditional violin training program. In the last stage, the practice habits of both groups were measured again.

Table 1. *Study Design*

	Group	Pretest	Procedure	Posttest
16 students randomly selected	***Experimental***	***O_1***	***X***	***O_3***
	Random assignment of 8 students to the Experimental group	(Instrument Practice Habits Scale)	Metacognitive strategies-based Teaching	(Instrument Practice Habits Scale)
	Control	***O_2***	***X***	***O_4***
	Random assignment of 8 students to the Control group	(Instrument Practice Habits Scale)	Traditional Teaching	(Instrument Practice Habits Scale)

The study first compared the experimental and control groups' pretest scores in the Instrument Practice Habits Scale (IPHS). The Shapiro-Wilk test used for normality analysis demonstrated no significant difference in pretest and posttest scores of all factors ($p>.05$). For this reason, parametric tests (*paired and dependent-samples tests*) were employed in the study. Independent t-test results regarding the pretest scores of the groups did not show a significant difference between the groups ($p>.05$) (Table 2).

Table 2. *Pretest scores in the IPHS*

	Group	n	$\bar{x}$	sd	*t*	p
Appreciating the practice	**Experimental**	8	25	1.60	1.51	.15
	Control	8	22.88	3.64		
Interest and desire	**Experimental**	8	16.75	1.04	.67	.51
	Control	8	17.44	2.98		
Preparation for the practice	**Experimental**	8	13	1.60	1.06	.31
	Control	8	12	2.13		
Efficient time usage and regular practicing	**Experimental**	8	7.50	1.41	.49	.63
	Control	8	7.13	1.64		

2.2. Data collection

The 18-item, 5-point Likert-type Instrument Practice Habits Scale (IPHS) (1=Strongly disagree, 5=Strongly Agree) developed by Küçükosmanoğlu et al. (2016), was used to determine the practice habits of the students. The scale consisted of four factors: *appreciating the practice, interest and desire, preparation for the practice,* and *efficient time usage and regular practicing.* The Kaiser-Meyer-Olkin (KMO) value of the scale was .93, and the Barlett test result was significant ($p<.01$). Reliability coefficients (α) based on factors were between .81 and .85. Scores obtained from the scale were evaluated over factor scores instead of total scores.

2.3. Procedure

- The research first pretested the instrument practice habits of the experimental and control groups. After the pretest, the students in the experimental group received a "Teaching learning strategies" course using a "Direct instruction model" and recorded.
- After "Teaching learning strategies," the experiment group obtained a 20-minute-a-week "Individual practice" process for three weeks using metacognitive awareness questions. Meanwhile, the control group received traditional training.

- The questions used in the "Individual practice" process (planning-monitoring-evaluation) were the ones developed by King (1991: as cited in Schraw, 1998) regarding the metacognitive awareness stages. In this process, the experimental group students were supplied with various educational materials, such as coloured pencils, lead pencils, and erasers, as well as strategy pool paper that covered Rehearsal strategies, Elaboration strategies, Organizational strategies, Affective strategies, and Comprehension monitoring strategies (Weinstein & Mayer, 1983; Ertem, 2014). The practice etudes were preferred in line with expert lecturers' opinions at each grade level. The study was carried out in three steps, namely planning, monitoring, and evaluation:
    - During the planning phase, experimental group students were given five minutes to plan their practice. This stage included determining the goals and objectives, the most appropriate strategies, and the resources and materials that might be needed.
    - The monitoring phase included assessing whether the way the students adopted for ten minutes was fruitful, how close they were to the goal, and whether they needed a different strategy or a different goal setting during their practice.
    - The evaluation phase of five minutes included thinking about whether they accomplished the goal, whether they were successful, and what they had to do differently to achieve in the subsequent practice.
- After the "Individual practice" process, a three-week follow-up process called the “Diary Writing Phase” was carried out. This process ensured the students did all their practices in the "Individual practice" stage and recorded their training on their own.
- After the "Individual practice" and "Diary writing" processes, the current study applied “Instrument Practice Habits” scale posttest measurements to the experimental and control groups and controlled whether there was a significant difference between the two groups in terms of instrument practice habits.

2.4. Analysis

Shapiro-Wilk test performed to determine the normal distribution of the data showed no significant deviations from normality ($p>.05$). In addition, skewness-kurtosis values were within the range of ±2, which was an acceptable level for normality (George & Mallery, 2010). For this reason, parametric tests were applied in the study. In order to compare the practice habits of the groups at the outset, the independent-sample *t-test* was performed through the pretest scores. The same test also served to compare the posttest scores of the groups. The study employed a paired-sample *t-test* for two groups to analyze in-group pretest-posttest scores and, thus, the development in the experimental and control groups' violin practice habits was observed after the process.

Cohen's *d* values were calculated to determine the effect sizes. The $d=t/\sqrt{N}$ formula was calculated for the paired-samples *t-test* and the $d=(\text{Mean difference}/SD_{pooled})$ formula for the independent-samples *t-test*. Effect size values were interpreted as small if they were between 0.20 and 0.49, medium if between 0.50 and 0.79, and large if larger than 0.80 (Cohen, 1988).

2.5. Ethical aspect

An ethics committee approval was obtained from Trakya University (dated 09/09/2020 and numbered 76878310-903.07.01-E.21446) for the research on the conformity of the study with scientific rules.

3. Results

3.1. Practice habits pretest-posttest results

Table 3. *Experimental and control group's practice habits pretest-posttest scores*

Appreciating the practice		n	$\overline{x}$	sd	*t*	p	d
Experimental	**Pretest**	8	25	1.60	9.03	**.00****	**3.19**
	Posttest	8	32.13	.99			
Control	**Pretest**	8	22.88	3.64	.50	.63	-
	Posttest	8	23.50	4.30			
Interest and desire		n		sd	*t*	p	d
Experimental	**Pretest**	8	16.75	1.04	8.88	**.00****	**3.14**
	Posttest	8	20.00	.35			
Control	**Pretest**	8	17.44	2.98	.16	.88	-
	Posttest	8	17.38	3.25			
Preparation for the practice		n	$\overline{x}$	sd	*t*	p	d
Experimental	**Pretest**	8	13	1.60	8.25	**.00****	**2.91**
	Posttest	8	19.13	.99			
Control	**Pretest**	8	12	2.13	.89	.41	-
	Posttest	8	12.63	1.51			
Efficient time usage and regular practicing		n	$\overline{x}$	sd	*t*	p	d
Experimental	**Pretest**	8	7.50	1.41	4.33	**.00****	**1.53**
	Posttest	8	12.13	1.89			
Control	**Pretest**	8	7.13	1.64	1.11	.31	-
	Posttest	8	7.75	1.67			

**$p<.01$

The posttest scores of the experimental group students for the factors of "Appreciating the practice" ($\overline{x}_{posttest}$ = 32.13, $\overline{x}_{pretest}$ = 25, $t_{(7)}$ = 9.03), "Interest and desire" ($\overline{x}_{posttest}$ = 20, $\overline{x}_{pretest}$ = 16.75, $t_{(7)}$ = 8.88), "Preparation for the practice" ($\overline{x}_{posttest}$ = 19.13, $\overline{x}_{pretest}$ = 13, $t_{(7)}$ = 8.25), and "Efficient time usage and regular practicing" ($\overline{x}_{posttest}$ = 12.13, $\overline{x}_{pretest}$ = 7.50, $t_{(7)}$ = 4.33) were significantly higher than their pretest scores (p<.01, Table 3). Effect sizes were "large" (d>.80). The control group showed no significant difference in their pretest and posttest scores (p>.05).

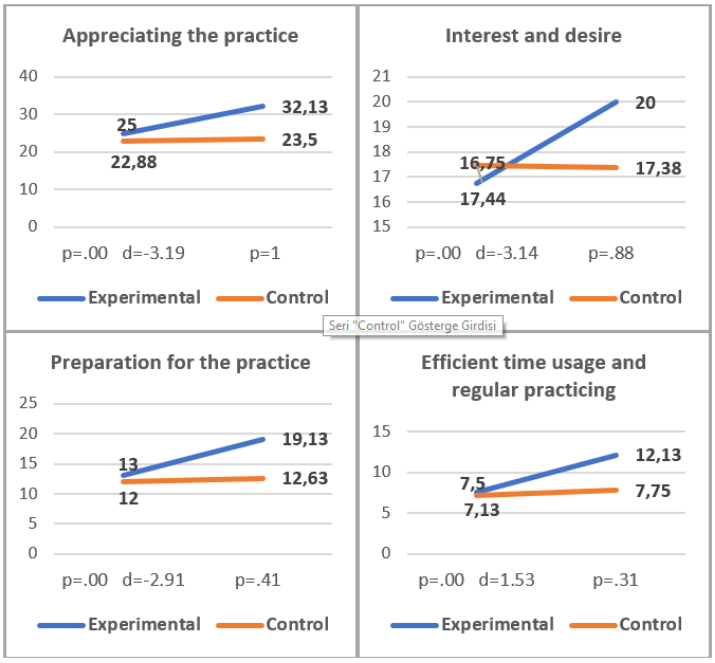

Figure 1. *Practice Habits pretest-posttest results*

3.2. Practice habits posttest results

Table 4. *Experimental and control group's practice habits posttest scores*

	Group	n	$\bar{x}$	sd	*t*	p	d
Appreciating the practice	**Experimental**	8	32.13	.99	5.52	**.00****	**.27**
	Control	8	23.50	4.31			
Interest and desire	**Experimental**	8	20.00	.35	2.29	**.04***	**.08**
	Control	8	17.38	3.25			
Preparation for the practice	**Experimental**	8	19.13	.99	10.20	**.00****	**.51**
	Control	8	12.63	1.51			
Efficient time usage and regular practicing	**Experimental**	8	12.13	1.89	4.92	**.00****	**.25**
	Control	8	7.75	1.67			

$^{*}p<.05$, $^{**}p<.01$

There was a significant difference in favor of the experimental group in all factor scores. In the factors of "Appreciating the practice" ($\bar{x}_{experiment}$ = 32.13, $\bar{x}_{control}$ = 23.50, $t_{(14)}$ = 5.52, p<.01), "Interest and desire" ($\bar{x}_{experiment}$ = 20, $\bar{x}_{control}$ = 17.38, $t_{(14)}$ = 2.29, p<.05), "Preparation for the practice" ($\bar{x}_{experiment}$= 19.13, $\bar{x}_{control}$= 12.63, $t_{(14)}$ = 10.20, p<.01), "Efficient time usage and regular practicing" ($\bar{x}_{experiment}$= 12.13, $\bar{x}_{control}$= 7.75, $t_{(14)}$ = 4.92 , p<.01), the experimental group appeared to show more improvement than the control group (Table 4). The effect size was moderate (d>.50) in the "Preparation for the practice" factor and small in the other factors (d<.50, d<.20).

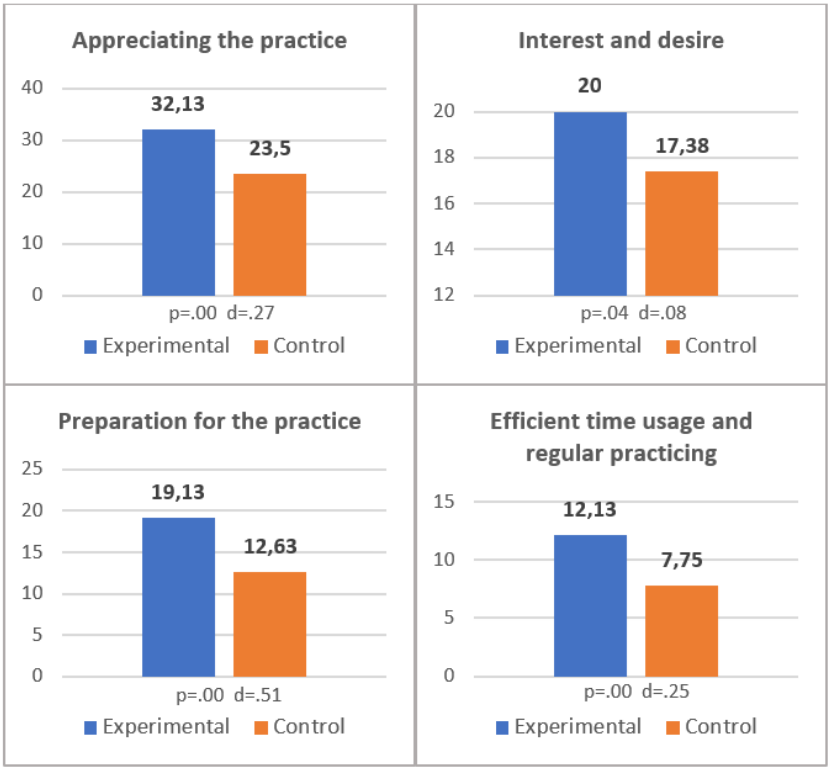

Figure 2. *Practice Habits posttest results*

4. Discussion

4.1. Preparation for the practice

This research revealed that a teaching program with metacognitive learning strategies highly affects violin students' instrument practice habits both "in total" and in the "Appreciating the practice," "Interest and desire," "Preparation for the practice," and "Efficient time usage and

regular practicing" sub-dimensions. In the current study, after the teaching stages, the experimental group exhibited improvement in all factors compared to the control group. The in-group comparison of the posttest scores revealed that this positive effect heavily emerged in the dimension of "Preparation for the practice" and was relatively small in other factors. This result may have arisen from the strategies used by the students while planning their own practice at the "metacognitive awareness planning stage" of this research.

Given that the learning strategies (rehearsal, elaboration, organizational, affective, and comprehension monitoring strategies) in practice contained the correct posture and gripping, finger exercises, preparation of materials, making technical and formal analysis in the "preparation for the practice" dimension, the broadest effect reasonably emerged on this factor. Nielsen (2015) stated that self-regulated students used a series of cognitive strategies–such as identifying problematic areas, practicing on them by disintegrating these areas, then integrating them to associate with existing information–and thereby improved their performance by monitoring their progress, designing and implementing appropriate cognitive approaches, evaluating their condition, reviewing their strategies where they failed (Nielsen, 2015). Vellacott & Ballantyne (2022) reported that the most beneficial methods were recording-listening, slow-tempo practices, focusing, self-awareness, self-motivation, and taking rest breaks.

In their studies, Gürel (2022) found that singing students' practice habits were moderate in "preparation and warm-up" sub-dimensions and high in other sub-dimensions; Kumtepe (2022) reported that musicology students had a very high "preparation for the practice," a high "appreciating the practice" and "interest and desire," and a moderate "efficient time usage and regular practicing" sub-dimension scores; Şen & Akçay (2021) found that students had high scores in the "appreciating the practice," "preparation for the practice," "interest and desire," and "efficient time usage and regular practice" sub-dimensions; Albayrak & Bulut (2021) revealed that the instrument practice habits of the cello students in the fine arts high school were high "in total" and in the sub-dimensions; Piji Küçük & Kar (2021) documented that music teacher candidates' "appreciating the practice," "preparation for practice," "interest and desire" sub-dimension scores were high, while their "efficient time usage and regular practice" sub-dimension score was moderate; Şentürk et al., (2018) stated that students' individual instrument practice habits were perfect; Çini (2020) reported that students' instrument practice habits were high in all sub-dimensions. Previous studies have associated students' practice habits with the age, gender, grade level, school, and academic achievement variables (Kurtuldu, 2021; Çini, 2020; Albayrak & Bulut, 2021; Erden-Topoğlu, 2022; Öztürk & Öztürk Başpınar, 2021; Şentürk et al. al., 2018; Kement, 2018; Toy, 2019; Gerçeker; 2018). Furthermore, some studies show that metacognitive learning activities affect students' instrument performance and metacognitive awareness (Yokuş, 2009; Yokuş, 2010; Sakarya & Şendurur, 2020). The current experimental study contributes to the literature by associating the students' violin practice habits with metacognitive awareness. The study findings will be presented by discussing data on metacognition.

4.2. Interest - desire and appreciating the practice

The study results demonstrated that metacognitive practices increased violin students' "interest and desire" and the "appreciation for the practice." This result showing the effect of metacognition on self-motivation can imply that students use "affective strategies" in their practice and improve themselves. Furthermore, with this result, one can comprehend that students use metacognitive awareness elements to start and maintain the training in line with a particular purpose and target. Some studies reported that students aiming to achieve a

professional career with their instrument in the future have higher practice habits (Aka, 2019; Erden-Topoğlu, 2022; Hamann & Frost, 2000; Moray, 2003). On the other hand, Kement (2018) concluded that the desire to be a teacher does not make a significant difference. There is a linear relationship between the "interest and desire" levels of music education students and their instrument practice habits (Doğan, 2021). Aka (2019) and Piji Küçük & Turan Engin (2021) claimed that students who choose their instruments by their own desire and decision would have higher "practice habits." Some researchers have observed that students working alone set goals for themselves and enjoy their practice (Hamann & Frost, 2000). In addition, students' use of metacognitive training tactics differs significantly according to instrument experience years, daily training durations, and average success points (Çiftçi & Erim, 2022).

4.3. Efficient time usage and regular practice

The metacognitive processes included in this study affected the violin students' "efficient time usage and regular practice." Time management and regular practice are metacognitive activities to maintain the training in line with a specific plan and to allow the students to monitor themselves. Kurtuldu (2021) reported that piano students who practice under a particular systematic program were more successful. However, some studies announced that time constraints due to spatial impossibilities in the dormitory environment led students to use time more efficiently and effectively (Kolbaşı, 2019). In addition, Bağcı & Can (2016) stated that practicing in the study rooms at the school provides a more efficient environment and motivation as it blocks other distracting elements. Besides, Erden-Topoğlu (2022), in her study where she associated music teacher candidates' instrument practice habits with metacognitive awareness, suggested that the reason behind the students' failure to achieve academic success despite their regular and scheduled instrument training might be their lack of effective metacognitive and self-regulated training strategies. Self-regulation strategies and regular and planned instrument practice habits appear as a factor for successful instrument performance (Piji Küçük & Turan Engin, 2021). Reportedly, music teacher candidates who adopt a *deep approach*–also mentioned in the theoretical framework of this research–seek to analyze and eliminate their own deficiencies and find solutions (Aksu & Kurtuldu, 2015).

Violin education is a process carried out in a particular exchange within a teacher and learner relationship, and considering this approach, the current study was conducted on students who received professional music education at the higher education level. It would not be wrong to expect the students at this level to carry the responsibilities for the training culture and approach to some extent. However, in some cases, students may not have such a consciousness. In this direction, the present study suggests that:

- Instructors should focus on the subtleties of metacognitive approaches and encourage the students to use them when practicing violin alone outside the classroom.
- In order to make the students "autonomous learners," the instructors should educate students about where and how they will use the learning strategies. Besides, the teachers should supervise the students during the process and, in the end, leave them alone to practice.
- Teachers should encourage and raise awareness of instrument students to plan, monitor, and evaluate their own practice.

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