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EDITOR’S NOTE

Belgrade Centre for Music and Dance (BCMD) is a founder and publisher of *Accelerando: Belgrade Journal of Music and Dance*. BCMD is founded to establish cooperation and communication between local artistic and scholarly scene and the world’s. In order to achieve that goal BCMD launched *Accelerando: Belgrade Journal of Music and Dance* as an open access, double-peer-reviewed online journal. This journal allows Serbian scholars, artists, and educators to have permanent scholarly communication and interchanging of knowledge and information with the world’s renown artists, scholars, schools and universities.

Since knowledge is fluid and dynamic in nature, and transmitted through discourse, it is important for those who have a stake in advancing the knowledge base to participate in the discourse. Writing, as a form of communication, and publishing are ways of participating in the discourse. Research article is the end product of an investigation that has focused on a specific set of research questions. Research must be carefully planned, conceptually grounded, and methodologically sound, and must provide answers or possible answers and implications for further investigations.

Accordingly, the effort of editorial board members and reviewers of *Accelerando: BJMD* is dedicated to help authors reach the goal and craft the articles in a way that successfully, effectively and persuasively communicates the importance of the study. Through this mutual effort, work, and cooperation we hope that our journal promote values, expanding the base of knowledge and contribute to the discourse.

*With best regards,*

*Maja Marijan, Editor in Chief*
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The Self-Regulated-Learning Model and Music Education

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Abstract
Self-regulation and self-regulated learning (SRL) are important features in music education. In this research self-regulated learning model is presented as a complex, multidimensional structure. SRL starts with the self-regulation. Self-regulation is formed through interaction with the environment, thus self-learning, self-analysis, self-judgment, self-instruction, and self-monitoring are the main functions in self-regulatory structure. Co-regulation is needed, and helps self-regulation to be activated and monitored. In music education, co-regulation refers to the instructions that teacher introduces in the lessons. These instructions have to enhance learning and develop regulation over emotions, cognitive, auditor, and motor skills in students. Learning techniques and learning strategies are core components in music education. Adapting those, students become aware of their learning processes, actions, thoughts, feelings and behaviors that are involved in learning. It is suggested that every teaching methodology has to develop learning techniques, as well as metamemory and metacognition in students, in order to gain expertise. The author has emphasized her attention to every aspect that is believed to belong to SRL. There are not many articles on the SRL in music education, written by musicians, in compare with those written by psychologists and neurologists. Therefore, the author has suggested that this paper would encourage music teachers and performers to take an advantage in the research of SRL. These researches would help music educational systems and teachers to develop and promote learning techniques and strategies. The results would show improvement in student’s learning and self-regulation.

Keywords: self-regulation, self-regulated learning, learning techniques, metamemory, metacognition, music education
The only man who is educated is the man who has learned how to learn; the man who has learned how to adapt and change; the man who has realized that no knowledge is secure, that only the process of seeking knowledge gives a basis for security. Changingness, a reliance on process rather than upon static knowledge, is the only thing that makes any sense as a goal for education in the modern world.

Carl Rogers,
Freedom to Learn
(Columbus, Ohio: Merrill, 1969), p. 290.

Introduction

Practicing an instrument and learning the music are considered to have impact on cognitive abilities such as reasoning, processing speed, and working memory (Bergman Nutley et al. 2013), enhance IQ (Schellenberg 2005, 317-320, Schellenberg 2004, 511-4), improve sub-cortical encoding of linguistic pitch patterns (Wong et al. 2007, 420–422; Miendlarzewska and Trost 2013), phonetic abilities and linguistic organization in brain (Patel and Iversen 2007; Milovanov and Tervaniemi 2011). It has been shown that there are no pre-existing neural, cognitive or motor markers for music skills, therefore the structural enlargements in the musicians' brains are due to musical training, but not an inborn features (Norton et al. 2005, 124-34).

According to mentioned researches, we should reassess the hypothesis that learning music makes us smarter. What about mathematics? Does learning mathematics enhance our cognitive abilities as well? Yes, we would become smarter if only we applied the right learning technique(s) which would help us understand the laws and relationships in the subject. Furthermore, if we are learning music without good organized learning model, we would be unable to deal with music events and structures. In another words, one has to be aware and recognize the patterns, elements, and the rules that govern their relationships. Therefore, to be able to acquire knowledge, and understanding on the subject, one has to recognize what, where, and how to approach to the knowledge. "There is no such thing as Scientific Knowledge, there are only individual perceptions of what appears to each person to be such knowledge" (Rogers 1977, 281-337).
While the hypothesis in education would suggest that the musicians have to rely on multiple learning styles (visual, auditive, aural, kinesthetic, analytical, emotional), it has been shown that majority of college students use mostly one or two of them (Mishra 2007, 1-19). These different approaches in practicing, learning, and performing the music have to be complete, i.e. they have to gather all learning styles into one unique learning structure. This learning structure has to be complex, since in music education all sensory structures are involved: vision, touch, audition, and aural, as well as cognitive, motor, emotional, and behavioral features. Learning techniques and learning strategies involved in music education have to be introduced by the teacher, and later, to be developed by the student, since the teacher's role is to guide the student in the learning process. By monitoring own learning process and gaining self-regulation, one is approaching the expertise in his/her field (Zimmerman 1998, 73–86).

In the previous research, the author started with the hypothesis that introducing well-organized, qualitative strategy in the music education would result in the student’s development and improvement of musical skills: auditory, motor, and analytical (Marijan 2016). The results confirmed the proposed hypothesis. However, in this research, the author will put focus on the self-regulated learning (SRL) as the multidimensional phenomenon which is developed within the person and in the interaction between the person and the socio-cultural environment. The SRL structure will be explained through the examples from the music teaching methodology aspects as well.

Therefore, in the author’s approach to the self-regulated learning, two types of self-regulation emerge. The first type refers to the regulation of actions, thoughts and feelings in accordance to the external stimuli/environment. The second type is the regulation of the internal processes that occur within the person. In author’s opinion, these two types of self-regulations are the two interrelated actions on which human beings operate, where consciousness and awareness in the learning process are highly involved.


Self-Regulated Learning

Self-Regulation is Based on a System of Tension-Relaxation Continuum

Self-regulation refers to learning the skills and actions by self-observation, self-experiment, and self-judgment. Through these actions we are aware of ourselves: our own thoughts, actions and feelings (Janbush 2016; Zimmerman 2002). By adapting self-regulation over mental processes, motor actions and emotions involved in learning, we construct learning strategy that would help us in enhancing and expanding our knowledge and skills.

Self-regulation must not be replaced with self-control. These two have separated centers in the brain (Shanker and Bertrand 2013). It has to be understood that self-control could be considered as a part of self-regulation, or in another words “self-regulation makes self-control possible” (Shanker 2016).

According to Dr. Stuart Shanker, in self-regulation two systems are involved. The fist one is stress-load which deals with the arousal of energy, and second one is the stage of recovery. These two systems are constantly applied in continuum (Shanker and Bertrand op. cit.). Therefore, self-regulation allows us to control the amount and frequency of tension, created by external and internal stimuli, by which we arouse our opposite action – relaxation. These actions we can compare with breathing. When we inhale, our body starts to extend, so we need some amount of energy for this process. In the point when we can’t inhale anymore, we reach the final point of the inhalation procedure. Our stomach and chest are stretched to the maximum, we cannot gain more energy, and as a result, we exhale, relax our muscles, gather new energy for the inhalation. The learning process is similar. If we are studying, after a while we realize that we loose our concentration. We have to take a break. It has been shown that after 25-30 minutes, our energy break-down, so we need to make a shift and take a pause. After a break, we gain the energy for the continuation of the study progress (Lobdell 2011). In fact, the interaction between the tension and the relaxation processes is the basic driving action in the learning procedure. Therefore, knowing the principles of the tension-relaxation action will impact the span and quality of our mental and motor behaviors.

The control over tension-relaxation action is very important in music practice/instrument practice where motor, auditive, cognitive, and emotional behaviors are constantly involved. We,
musicians, have to organize our practice in such a way that we could obtain enough energy, strength, and concentration for the particular practice session. In the preparation for concerts or competitions, where performers are obligated to prepare very large repertoire, self-regulation and organization of actions involved in the instrument practice have crucial role. Therefore, in order to have strength for long-hour practice, and positive motivation and concentration over emotions, cognitive, auditory and motor/kinesthetic functions, awareness over tension-relaxation process is of enormous value. This process manages the whole structure of functions in self-regulated learning.

Self-Regulated Learning Structure

As the author has stated above, self-regulation plays an important role in learning activity. Self-regulated learning (SRL) is obtained through self-thought rules, self-management and reassessment over mental and physical activity, behaviors, and personal traits in the learning process. Personal traits have important role in SRL. If a person is self-observant, self-reliable, self-critique, or self-motivated, he/she would learn more easily. Optimism, temperament and personality traits are also important factors in SRL. It is shown that advanced music students high in self-efficacy beliefs are more successful in learning than those with low self-efficacy beliefs (Nielsen 2004). Habits and attentional behaviors such as time organization, planing activities, and awareness on deadliness for task completion, are part of SRL and one's personality. Physical abilities such as motor activity and kinesthetic movements are very important in music learning. Without physical strength, no performer would be able to manage to practice for hours. However, not everyone is granted with physical strength. Therefore, through self-observation, self-analysis, and self-awareness over physical capacity limits, a performer would be able to overcome his restrictions. Mental abilities refer to cognitive abilities such as perception, elaboration, forming the mental images, awareness on different learning techniques, making decisions, memorization techniques, and metacognition.

Self-regulated learning includes all the aspects within a person. How do we manage and approach consciously to all these behavioral and cognitive activities within us? According to Jabusch (2016), SRL comprises three phases: forethought or strategy planing, performance phase (application of the strategy), and self-reflection or self-judgment. These phases can be considered as self-generated thoughts on personal behavior, task, time organization, goals, and applied strategies. Therefore, SRL is a process of self-learning, and self-regulation of activities involved in learning.
Furthermore, similarly to Janbusch (2016), SRL can be regarded as a complex structure of interrelated cognitive activities, emotions, and behaviors, being managed through three phases (Figure 1). The first Planning Phase starts with self-motivation (ability to motivate oneself), and self-organization (organizing and managing learning time, organizing and managing learning space, organizing possible learning techniques, overcoming physical, intellectual limitations and discomfort). The second Elaborative Phase includes self-control (regulation over emotions, cognitive actions, and behaviors involved in the learning process), and self-knowledge (knowledge on own personal characteristics, habits and beliefs, physical strength, and cognitive abilities and skills). And finally, in the Summary Phase all previous actions and current result are subjected to the self-judgment, self-assessment and self-efficacy.

![Figure 1. The SRL structure and its processes](image)

Self-motivation is a starting point in SRL structure which triggers other activities: self-organization, self-control, self-knowledge, self-efficiency, self-assessment, and self-judgement. Assessment and evaluation over person, task, learning processes, learning strategies, and the final results, control further learning activities. Self-judgment, self-assessment, and self-efficiency beliefs would induce motivation again (see Figure 1). That is to say, personal overview between goal settings and gained results triggers the “need” for better results, the challenging feature which will have positive impact

The author has pointed out that SRL is achieved through three phases. However, those phases subordinate upon other structures: social, personal, cognitive, and educational. All these structures have impact on SRL activity, and make SRL possible. In Figure 2, the author shows how SRL and other structures comprise the whole activity of intra-personal and interpersonal events:

![Figure 2. Various structures, that are interrelated, make SRL possible](image)

**SRL and other structures**

**SRL and Socio-Cultural Environment**

Where are the roots of SRL? Self-regulation is the ability to respond and adapt to the environment in the behavioral, emotional, and mental domains. Self-regulation starts from the age we were born. Person is developed emotionally, behaviorally, cognitively, and physically through interaction with the socio-cultural surrounding.
The socio-cultural structure, presented in Figure 2, refers to the interaction between the social environment and the individual. This structure is the core base from which other structures emerge and enable SRL. According to the author, the relationship between the person and the particular social milieu determines to what extent skills and abilities will be developed. However, it has to be mentioned that environment, as a broad term, encompasses physical surrounding (Ferguson 2013, 437–468), cultural contexts (Valsiner 1997; Schech and Haggis 2000), and educational context (Petrill et al. 2010; Hart et al. 2016). Therefore, interaction between the environment and the individual the author represents in the socio-cultural structure, the structure with which SRL begins.

Development of children’s mental and physical abilities, in educational domains, depends upon qualitative and quantitative recognition of their abilities, teaching methodologies which employ qualitative learning techniques and strategies, educational systems, and parent-child-teacher interaction. Moreover, Vygotsky’s approach to child development can be significant for the following discussion. He proposed (Vygotsky 1997) that a person learn in the environment and developed with it, i.e. learning and development are regarded as socio-cultural processes. According to Vygotsky, there are two levels in learning: **intraphysiological** and **interphysiological** (Rohrkemper 1989, 143–167). The first “intra” level refers to the child’s personal cognitive development. The second “inter” level refers to child’s learning and development through peer interrelationship, in groups, or in the interaction with the teacher who conducts and directs child’s thoughts, emotions and action. This "inter" level is the key for understanding children’s abilities because “(…) profound thinkers (…) never entertained the notion that what children can do with the assistance of others might be in some sense even more indicative of their mental development than what they can do alone” (Ibid.). The interaction between these two levels in learning, personal and mutual or "intra" and "inter", Vygotsky called **Zone of Proximal Development**.

How can we define this “Zone”? The **Zone of Proximal Development** can be regarded as evolving process between the present/individual developmental level and the potential developmental level. Moreover, this **Zone of Proximal Development** explains the base of the interaction between person, environment, and learning. Whatever level in the cognitive or motor domains the child might show in the moment, these can be significantly improved by learning techniques and strategies. More advanced peers, parents or teachers can enhance child’s inner level of development and learning.
Also, this theory takes into account the distinction between child’s years of age and his/her mental age. Determination between child’s mental age and his/her physical age is needed in order to employ proper learning techniques and strategies. That is to say, techniques and strategies implied in learning have to be adjusted to the student’s mental capabilities, not to the student’s physical age (Vygotsky 1997, 29-36). This way, child’s inner abilities will be developed further, and from this point, we can predict to what extent child’s abilities will have been developed by the certain age. This view is very important for the educational systems and teaching methodologies, and have to be encounter into music education as well.

Finally, the author suggests that Vygotsky’s Zone of Proximal Development enables self-regulation and manifests through three main stages in the educational environment:

- guidance and co-regulation
- competitiveness
- optimization

**Guidance and Co-Regulation**

Self-regulation is achieved through interaction between the person and the environment. All starts with co-regulation (Shanker and Bertrand op. cit.; Siegel 2010). In the early stages of life, children learn through parent-child, child-child, and child-environment relationships; in childhood and adolescents they learn through teacher-student, student-school, and student-social relationships. Co-regulation also shapes temperament and personality features.

Guidance and co-regulation begin with sounds and words, thus children's tool for controlling their environment and their own thoughts starts with the language. They interact with their environment through adopting speech, symbols, and representations (Özdemİr 2011). Secondly, children learn how to self-regulate through games, songs, and physical activity. Children’s games introduce certain rules that modulate their thoughts, behaviors, and emotions. Therefore, while playing, children learn to regulate themselves through mutual co-regulation. Furthermore, acquisition of skills and knowledge through games will enable children to adapt themselves to the environment. For this reason, the author suggests that teaching methodologies in the early education have to be based on the principles of the children’s games and to include them in teaching systems, for the reason that most of the games incorporate learning as the primary action. Consequently, children will learn easily, because they are familiar with the games and their rules. Moreover, by
introducing familiar content in education, learning would become active and interesting cognition, thus development would be made possible for all participants involved in the process. There are plenty of researches that support author’s thoughts and opinions on this subject (Moursund 2006; Kirriemuir and Mcfarlane 2004). However, it is suggested that games should be instructional, and properly chosen in accordance to learning requirements (Hays 2005; Randel et al. 2016, 261 – 276).

**Competitiveness**

In the socio-cultural environment, person is influenced by other people, whether they are peers, parents, teachers, colleges, celebrities, social groups, communities. All these have influence upon the person's modulation of his/her characteristics. In author’s view, there are three types of competitiveness. First type deals with person to person “rivalry”. By observing and comparing with others, one shapes his/her personal traits. Being aware of the characteristics of others, one is becoming aware about own capabilities and limits. Second type deals with self-competitiveness and academic achievements. Thus, it is shown that students with predominantly Ego goals have ability to motivate themselves in order to achieve the best possible results (McCallum 2004). Finally, third type of competitiveness is developed between the person and the socio-cultural environment. If the environment supports the achievements, and promotes them, then this type of competitiveness will enhance self-regulation in students with high intentional goal-settings. Therefore, according to author, the particular socio-cultural surrounding would have influence on self-regulation and develop self-regulatory skills such as: goal-settings, responsibility, self-analysis, self-reinforcement, self-motivation, self-instruction, and self-judgement.

Educational system can introduce competitiveness through various means. In music schools, for example, frequent public performances can direct students to self-regulate their emotions, behaviors, as well as their cognitive skills and learning strategies. Furthermore, particular goals will be carried out successfully if the teachers introduce learning strategies and implement them in lessons (Berns and Erickson 2011). However, parent involvement in the learning process will be of particular interest for the child (Wood 1993).

Music competitions as well as appraisals can serve to modulate learning. However, it is known that unsuccessful performance and failure in the music competition can have negative influence, but on the other hand, it can arouse self-evaluation, that will have influence on development and further learning process. The author suggests that failure must be presented as
something that can be overpowered. Failure should be understood as an indicator of the wrong methods employed in the learning process, so trying to make change in the approach would be of significant value for student’s further development. Moreover, it is shown that competitions which promoted extrinsic motivation followed by the “under pressure” effect, would have negative influence on performance and discard the intrinsic motivation (Reeve and Deci 1996, 24–33). On the contrary, some studies pointed out the significance of the competitions. For example, in the competition condition participants better improvised and were creative, and intrinsic motivation was increased, while in no competition condition there was no improvement in creativity (Eisenberg and Thompson 2011, 129–136).

It has been stated that very large number of students do not know how to self-regulate themselves in the learning process, therefore teachers are suggested to introduce learning techniques and metacognition that will help students to construct their own learning strategies. Several teacher-feedback types important in the learning strategy are: verbalization and valuation of the steps applied in the strategy, effectiveness-feedback statement, and effort-attributional feedback (Manning 1991). These help students build self-reflection, self-awareness, self-esteem, self-efficacy, as well as other self-monitoring attributes (Schunk 1989, 83-110).

Also, as stated before, in the Vygotsky’s hypothesis the feedback will not be provided by the teacher only, but children involved in the group would increase their abilities more than when they are learning alone. Gathered in the group, children acquire knowledge and skills by cooperation, competitiveness, discussion, dialog, and social behavior. More advanced peers, regardless of the age, can be of significant importance for the mental growth for their less advanced peers (Vygotsky op. cit.). It is important to underline that children learn through imitation. The actions undertaken by advanced peers in the given tasks, will be imitated by their less advanced companions. Vygotsky has observed that the imitation is crucial for children’s learning and development because this process enables a child to go beyond personal limitations and capacity. Therefore, educational systems have to encompass and embrace this valuable kind of child-child feedback.

The involvement of peers and teachers is important in music education. Music has been regarded as an integrated part of the human society. Songs and dances have been played as parts of social events, whether religious or secular in nature. Through those social gatherings, children could have been introduced to musical patterns, rhythms and melodies. They have learned in the groups, by imitating adults, and inventing their own songs and plays (Lévi-Strauss, 1962). In music
education, it is important to learn from these experiences. Children have to learn music gathered in ensembles, playing with peers, and playing with their teachers. Besides, Howe (Howe et al. 1998, 399-442) has claimed that early experiences, habits, and influences have a crucial roll in the later expertise. Therefore, starting to learn music as early as possible, children would develop music skills and competences much faster, but only if the educational environment offers adequate sources and qualitative feedbacks. Moreover, learning from more advanced peer would be advantageous, but even more profitable is to have a teacher who is a good musician (Interview with Zoltan Kodaly). Expert music teacher/musician will be able to make music lessons as optimal as they need to be, i.e. to set special musical tasks, to play/sing for the students, to play/sing with the students, and to engage them fully in the leaning process.

**Optimization**

Setting optimal conditions for learning is another important activity that helps self-regulated learner. Favorable learning ambient can be regulated by the socio-cultural surrounding, educational environment, and the person himself/herself. Person can enhance learning by creating optimal learning area, having learning materials such as books, scholarly journals and magazines, knowing how to use the internet for the educational purposes, having personal instrument to practice, reaching peers and teachers for questions and help. Educational environment can offer the optimal conditions for the personal development by setting adequate school space, providing educational materials, and internet access, promoting qualitative teaching strategies, hiring experts and professionals, and introducing competitions between the schools, ensembles or individuals. Lastly, the roll of socio-cultural environment in setting optimal learning conditions refers to organizing educational and cultural events, including educational and qualitative radio and TV programs, enabling access to scientific databases, libraries, and internet, creating space for physical activities, lowering traffic noise in the urban areas. However, in the present world some researchers are concerned with the pollutants, food, noise, housing, and many other factors that can have impact on children’s development and cognition (Ferguson et al. 2013, 437–468). Therefore, optimal development and learning depend upon conditions that can be monitored by individual and/or environment. The more the conditions are optimal, the more development and learning will be successful.
Temperament and personality in the SRL structure

Temperament

Temperament is a structure of specific biologically based behavioral activities within a person and it is regarded as “evolutionary conserved core, from which personality develops” (Rothbart et al. 2004, 357-370). Temperament makes individual differences in reactivity and self-regulation in the emotional, motor and attentional domains (Gartstein et al. 2017). But also, self-regulation modulates the temperament by controlling the intension and duration of emotional, motor and attentional actions (Rothbart and Posner 1985, 93-123).

Therefore, temperament can be regulated by the person and by others in the co-regulation process. It is shown that parents, whose infants are high in negative emotionality, have to enhance sensitivity and responsiveness over their children (Gartstein et al. op. cit.), so to help their children to moderate self-behaviors. Moreover, it has been shown that sensitivity, child attachment, and early physiological development have impact on future regulatory and emotional development (Calkins and Fox 2002, 477-498).

Personality

Culturing our temperament in the social environment, through self-regulated activity, we develop personality. Thus, self-regulation is considered to underline personality (Denissen et al. 2013, 255–260). Garstein (op. cit.) has stated that older children and adolescents have greater self-regulatory abilities which enable them to observe and analyze their own reactions as well as behaviors of others, and through these actions implement different behavioral strategies. Following this statement, self-regulatory skills are developed through the experience and interactions, thus qualities of personality are merged.

Furthermore, self-regulatory processes develop self-beliefs, self-expectations, and self-generated thoughts about one-self and others. This self-concept shapes personality. The more established self-concepts and attitudes are within the person, the more characteristics of certain personality would be apparent. In Figure 3 we show how temperament, personality and self-regulation interact between each other:
Self-regulation operates learning process, where peculiar features of temperament and personality emerge. It is shown that correlation between big five personality traits and learning strategies overlap to some extent (Bidjerano and Dai 2007, 69–81; Zhang 2003, 1431–1446; Chamorro-Premuzic 2007, 241–250). Overall, it has been proven that Openness, Consciousness, and Agreeableness have important role in Deep and Achieving learning approaches, Neuroticism has been linked with Surface approach to learning, while Extraversion has no important link to any of learning approaches (Zhang op. cit.). Therefore, personality traits can predict to some extent what learning strategy will be employed. Nevertheless, regardless of the congruence between personality traits and learning strategies, teachers have to employ the best possible techniques and strategies for their students. Using deep approach, students are more eligible to elaborate their ideas more spontaneously by employing personal experiences in learning (Chin and Brown 2000, 109-138).

Temperament and personality role in music practice

Music can evoke different emotions and reactions. It is known that personality traits can predict preferences toward different musical styles. However, some researches show that empathy has an important role in music preferences, and the link between empathy and preferences is independent form of the Big Five personality traits (Greenberg et al. 2015, e0131151). In music practice, it has been shown that different forms of musicianship develop skills that can have impact on development of personality, but also certain skills developed in the childhood can make predispositions towards different instruments and styles (Kemp 1996). Conductors or singers are supposed to be extrovert, soloists introvert, chamber musicians collaborative, etc. Thus, the
personality of a musician depends upon featured musical skills, behaviors, and experience. Learning music involves time, strength, will, patience, concentration. Therefore, to be successful as a musician, the student has to make an effort and arouse will in the learning process. Knowing how to overcome some features of temperament and personality or how to have benefits from them is a part of self-regulatory structure in the music practice. How the musicians employ self-regulation over temperament and personality, the author has seen in two different behavioral modules.

**Self-regulation over behaviors and thoughts in the performance.** In the public performance, the musician does not express his/her personal emotions, but revives and reconstructs the emotions expressed in the musical structure. However, it doesn’t mean that the performer should dismiss his/her personal emotions, but adapt them to the logic of musical structure and flow. That is to say, the expertise in music performance is shown when the performer is adapted to the music, not adjusting music to personal feelings, attitudes or limits (Barenboim Masterclass). Playing or singing on the stage are similar actions to the actor/actress performing his/her dedicated role. Actor/actress has to transmute himself/herself into certain character, thus to give us impression of that character and to convince us in the presence and reality of that character. Accordingly, musician has to give impression of the music and its moods. However, music is changeable in mood and expression, so the performer has to regulate his/her emotions accordingly. Moreover, while playing in ensemble, musicians have to adjust their own emotions and temperament, and create one unique “feeling” or “active body” which derives from the music structure. It is interesting to observe how different temperaments and personalities, gathered in the process of performance, create unique musical expressive form.

**Controlling own behaviors and thoughts while practicing.** Musicians need to take advantage over their emotions to be able to regulate processes involved in learning and practicing the instrument. For example, everyday practicing is needed in order to gain strength, technique, and control. From the early age, teachers have to introduce an effective learning strategies which will help students to get control over their cognitive and motor skills. Although students employ different techniques and strategies in learning, it is shown that not all of them are effective and successful (Mishra 2002, .74-86; Dickinson 2009/2010, 271-283). However, whether students use their own techniques or employ those taught by the teacher, learners have to overcome temptations and repel distractions in order to achieve the best possible results. This way, they will gain self-control and self-observance
in their practice. Long-term practice and stage performing will take advantage over emotional control and will shape personality.

Moreover, despite some presumptions that types of learning strategy and personal traits may overlap (Bidjerano and Dai op. cit.), the author has suggested that deep approach to music learning is very important, because the music is complex phenomena of the visual, motor, auditory, and emotional events. Through Deep Approach musicians will be able to deal with musical patterns, make predictions, have ideas on peculiar forms of different styles, memorize, create, perform and/or improvise. However, Surface Approach can be useful at some levels in learning: sight-reading and re-reading the score. Therefore, different learning techniques and strategies are not only useful, but by implementing them in the learning process, they become the main tool for development and acquisition of knowledge.

**Learning techniques and SRL**

In this section we will discuss different types of learning techniques which are mostly involved in the music practice. However, before we examine different learning techniques, we have to make a distinction between the terms "learning techniques" and "learning strategies". Learning techniques are special methods of dealing with various elements employed in learning and practicing the music. The knowledge on how to choose, use, process, combine, and implement techniques at different learning stages refers to learning strategy.

In learning and practicing musicians implement certain techniques which help them learn and memorize. These techniques entertain certain skills that allow the musicians to understand, perform and improvise. There are vast majority of techniques that are used in understanding musical symbols and forms, and employed in instrumental practice as well. Certain famous pedagogues and performers were known for their suggestions on different learning techniques. Carl Czerny and his pupil Franz Liszt suggested that “the repetition is the mother of skill”. Josef Hoffman (1920) suggested that every pianist had to frequently renew pieces that had been already learned, in order to keep those in “mind and fingers”. Also, he advised that studying short pieces would enhance skills, improve memory, and amend sight-reading (Ibid.). Other pianists and pedagogues, such as Walter Giezeking and Karl Liemer in their book *Piano technique* developed a model for learning/memorizing through careful analytical approach of musical structure (Leimer and Gieseking 1972). Accordingly, Rubin-Rabson in her study has stated and presented that analytical
training and guidance as well as mental/silent practice are very important in learning and memorizing (Rubin-Rabson 1937, 220-220). Edgar Ross in his experimental study proved the hypothesis that guided analysis of constructive elements and principles, employed in the music composition, reduced significantly learning time, improved knowledge and understanding of music (Ross 1964, 269-278).

Furthermore, techniques employed in music learning and practice do not refer universally to cognitive actions only. Some studies present techniques which have positive effect on physical tension and relaxation in performers, such as Alexander Technique (Ying et al. 2015).

Therefore, music learning requires techniques to be implemented, whether they refer to cognitive actions or physical and motor control. The teacher has the responsibility to introduce various techniques to the students in order to enhance learning. In the following lines, the author will present some of the most important techniques that are to be used in music learning.

**Imitation**

This technique is very important in developing self-regulation, motor and auditive skills. Imitation, in author’s opinion, starts with visual stimuli, i.e. children often imitate what they see. Therefore, in music lesson, teachers have to show the proper way of sitting/standing, kinesthetic posture, position of the hands, fingers, different body movements (Yehudi Menuhin Violin Tutorial). By imitating the instructor the students will acquire stability and strength, and become aware of their apparatus. Later on, the basic imitation has to evolve from the kinesthetic to auditory. That is to say, students have to connect two different sensory structures: motor and auditory. In this stage of imitation, teacher has to introduce different qualities of the sound while singing and/or playing, by implementing special manners to emphasize different expressive qualities (Vengerov: Sibelius (Violin Concerto) - 'This Is Beauty'). By listening and watching the instructor, advanced peers and/or expert musicians, the novices will try to imitate certain movements or sounds. Thus, through the imitation, development of music skills will be successful and the link between the motor, auditory and visual information will be reinforced.

**Repetition**

The basic idea in this technique is the Latin proverb: “repetitio est mater studiorum”. However, the repetition can be the two-side coin. If we use repetition as a method of learning certain skills or
music elements, firstly we have to establish the proper way for producing a sound or a movement, and secondly, to exercise those by repetition. However, repeating auditory and/or motor tasks in incorrect way will not solve the problem. This is the main reason to suggest that imitation has to be done prior to repetition in music education. The teacher has to lead the way and show by example how the student will practice by repetition.

**Mnemonics**

This technique is used to enhance learning the abstract information by linking it with the familiar or stored knowledge (Bakken and Simpson 2011, 79-85; Neisser and Kerr 1973, 138-150). It has been shown that music mnemonics can help with memorization. Melodic-rhythmic template, when introduced along with non-music material, can significantly enhance memory for non-music information (Yeoh 2014; Thaut et al 2014; Pallison et al 2015, 503-517; Peterson and Thaut 2007, 217–221; Knott 2015). However, some studies revealed that musical mnemonics is significantly efficient with musicians more than with non-musicians due to musical training (Baird et al. 2017).

In music education several mnemonic techniques have been implemented. Mnemonics in music learning is based on representation of music material through visual, aural, affective, and motor means. Accordingly, it is important to underline that mnemonics applied in music learning has to develop the network between auditive, visual, and motor functions in the brain. The author supports this idea by the suggestion that mnemonics in music can be employed in three ways, that will be explained briefly below.

**Relating the auditive and visual stimulants.** It has been suggested that visual stimuli, such as paintings, presented with certain music elements can enhance listening skills (Shank 2003). Furthermore, it has been proven that despite differences in neural mechanisms, there is a brain tendency to bind visual and auditive information. In the study of Jeong (Jeong et al.) when the auditory and visual stimuli were presented sharing the similar emotional quality, visual information was seen more expressive, i.e. the music intensify the expression of the given visual information. On the contrary, auditory stimuli not sharing the same emotional data with the visual information, diminished the emotional context of the visual information (Jeong et al. 2011, 2973–82). Furthermore, regarding blind people, in the study of John Hopkins University neuroscientists has been stated that the sound stimuli activate the sight regions of the brain (Rosen 2015). They also
made a remark that the brain in the early childhood is very flexible and has a prominent capacity for functional adaptation, thus brain centers that are “qualified” for certain sensory activity, in certain circumstances can be “awakened” and modified by different senses. Furthermore, it has been shown, by other researchers, that audiovisual interrelation lies not only in the cross-modal abstraction, the “conscious sensory metaphor that is consistent between people”, but in the chromesthesia as well, the neurological phenomenon within some individuals that deals with sound to color synesthesia (Duthie 2013). They have suggested that cross-modal perception is not the only reason that enables people to relate different arts, but also, chromesthesia, as a phenomenon in some people, enables the perception of different sensory stimuli as a unique multi-sensory event. However, the cross-modal perception between the two sensory modalities is not governed by the same rule. It has been found that binding tendencies in the temporal and spatial tasks do not coincide, thus there is no universal parameter in the brain that governs this process. Instead, the binding tendencies are governed by stable but distinct perceptual biases within different domains, i.e. temporal or spatial (Odegaard and Shams 2016, 583 – 591).

In music education, binding tendencies over auditive and visual information can be strengthened through mnemonics. Accordingly, the elements of music can be presented in line with the colors, shapes, and other visual stimuli, in order to better understand melodic shapes, harmonic and instruments timbre, or formal structures. Also, the students in composition can experiment with different temporal or spatial tasks of the audiovisual events, where the sensory reactions of the listener will get the new form. Thus, mnemonic technique can be valuable for development of learning, the artistic creativity, illumination, and deeper apprehension of music.

Connecting auditive, visual and motor information. It has been suggested that audiovisual mirror neurons are responsible for the planning, execution, and recognizing certain motor actions (Kohler 2002, 846-8). The best example for this audiovisual and motor integration we can find in the Neisser’s theory of “complete” or multimodal perception (1976):

"When we look at someone who is speaking, the visual information about his lip movements supports the auditory information about the movements of his tongue and his articulators. We call this "hearing him speaking", but is really a multimodal enterprise because it is based on multimodal anticipations. When these anticipations are not fulfilled, as in dubbed movie, the result can be very disturbing."
This interconnection between audiovisual and motor processing in music education is possible only if the awareness over audio-visual-motor link is created. This link has been developing from the time we were born and by later experience, but the actual awareness and knowledge over this process has been created through education. Music education plays valuable roll in the development of the multimodal perception. For example, in piano practice, playing chords in very loud dynamics (forte, double or triple forte) in both hands, such as in the beginning of the Tchaikovsky’s Piano concerto no.1 in b-flat minor, the performer uses whole arm to be able to express and produce strong and loud sound. The audiovisual information we collect and connect with the kinesthetic movements of the performer. In the situations when we only hear this tune or similar music we can evoke or imagine kinesthetic movements, because we have already made a link between motor actions and audiovisual event from the previous experiences. Furthermore, the author has stated, from her pianistic experience, that expert performer is able to create audio-motor mental images by visual/analytical approach to the score, where no motor or auditive feedbacks are involved, because the pre-built knowledge database of visual audio-motor juncture has already existed in performer’s mind as a result of long term musical practice. Moreover, Kate Covington (2005) has stated that rehearsed music is much easier to hear in “the mind’s ear” due to mental schematic representations of the musical patterns and events that have been built during learning and practicing (Covington 2005, 25–41).

Also, awareness over visual, auditive and motor events is very important in the “mental practice”. "Mental practice" means that a musician is imagining visual elements of the score, movements and auditory events that he has been using during actual practice. This technique has been used by majority of famous musicians, music professionals, and composers (Newcomb 1921; Schonberg 1987). Although some researchers have suggested that mental practice can lead to motor control dysfunction due to plastic changes in the brain (Pascual-Leone 2001, 315–329), mental practice is very useful in the final stages of practicing, as a tool for shaping interpretation and mental organization of the visual, auditory and motor information (Lotze 2013: 280).

Creating linkage between the auditive event and motor action. Instrumental practice involves activation of both motor and auditory systems. Every teaching methodology has to develop auditory and motor skills homogeneously in students. This way, the students will approach to musical piece as an impetuous structure of movements and sound.
Motor or kinesthetic knowledge gathers information on musculature, finger positions, body movements. Kinesthetic information is structured in the motor cortex in the brain. The awareness on the movements, the way of placing fingers properly, the knowledge on how to use different parts of the hand and body in order to produce particular sound, passages, melodies and phrases, in another words, possessing certain skills in the motor domain is called technique.

In contrast, auditory knowledge refers to the perception of the auditory information that is perceived through listening. It is shown that every auditory event is structured in the special places of the auditory cortex (Krumhansel 1991; Deutsch 1984). However, auditive learning does not refer only to the acquisition of simple sound components, such as perception of simple sound features, but involves many other factors such as inner hearing, sensitivity to dynamics, rhythm, articulation, changes in tempo, harmony, and timbre. All these features of auditory learning are part of music performance. But how motor and auditory structures interact? Auditory and motor integration can be explored through neural, emotional, and behavioral domains.

Some studies has revealed that audio-motor interaction is based on shared neural structures. Zatorre and Penhune (2007) have suggested that when auditory feedback is interrupted, the motor control is disrupted accordingly, because listening (while performing) and playing “depend on a single underlying mental representation”. Following the same research, scientists have shown that auditory and motor imaginary structures overlap, i.e. when one of the feedbacks is excluded, the other one arouses (Zatorre et al. 2007). Similarly, the motor cortex in musicians is activated by auditive stimuli and without any physical movement involved (Zatorre and Halpern 2005; Hauenisen and Knösche 2001). Accordingly, both of these imaginaries are different in processing within the brain regions, but interact in sensory-motor integration system (Lotze et al. 2003, 1817–1829; Maes et al 2014).

Furthermore, musical training and music learning are important in development of the auditory-motor integrated system (Brown and Palmer 2013: 320; Pascal-Leone 2001, 315–329). Famous Soviet pedagogue and pianist Henrich Neuhaus has suggested that the physical movement is reciprocative to the sound produced, i.e. the level of the weight and hight of the hand corresponds to the sound volume (Neuhaus 1973). Therefore, motor and auditive functions are hardly separable in musical training. However, it has been suggested that, despite their interrelation, auditory learning and auditive imaginary skills in advanced musicians are performed prior to motor learning, because they mostly rely on auditory representations (Brown and Palmer 2013). But with novices it
is the opposite: they rely mostly on motor representations and kinesthetic memory (Chaffin 2007). These findings support the hypothesis that experts first employ analytical and auditory imaginary approach, because pre-built structures of auditory and motor knowledge allow them to concentrate on the musical idea and create the artistic representation of the music piece.

Humans’ basic reaction to the music is expressed through body movements. This reaction is exercised through listening. It has been shown that listening to music can evoke various physical movements in listeners (Leman et al. 2009, 263–278; Mitchell and Gallaher 2001, 65-85; Leman et al. 2013). Further, it has been shown that different types of music, energizing or calm, have adequate tactile responses in physical exercise (Terry and Karageorghis 2006, 415–419; Karageorghis and Priest 2012, 44–66). Moreover, some teaching methodologies, like Dalcroze method, insist on the body movements that can help in learning the music (Greenhead and Habron 2015, 93-112(20); Vongpaisal et al. 2016: 835). However, body movements are not only psychophysical reactions to music, but they incorporate emotional expression as well. This emotional datum can be regarded as an integrated part in the music learning. It is manifested through gestures and mimics in the music performance (Addessi 2000; Caterina et al. 2004; Delalande 1988). Also, gestures and mimics can often serve as performing cues in memorizing strategy (Rubin-Rabson 1939, 321-345; Chaffin op. cit.; Miklaszewski 1989, 95-109; Gabrielsson and Juslin 1996, 68-91). Therefore, physical mnemonics can enhance learning and understanding the music, and according to previously cited researches, it is suggested that kinesthetics and mimics can be included in music education as a tool in learning.

**Chunking**

Chunking is the cognitive ability dealing with the perceived stimuli. It has two functions: to break a very long string of perceived information into small units called chunks, and then, to group separate chunks into larger units. Chunking enables better apprehension, storage, and retrieval of information. Chunking, as the special ability of the memory to collect information, was introduced by Miller (Miller 1956) who has proposed that STM and working memory can perceive and store more amount of information by grouping the perceived data into chunks (Cowan 2015, 536–541).

Grouping smaller chunks into bigger and bigger chunks enables one to gather large number of similar data into one compact unite. The action by which we gather consonants and vowels to create words, or phrases to create sentences is called chunking. Chunking is applied in the visual,
motor/kinesthetic, and auditive domains, thus the author suggests that chunking is the basic technique by which musicians perceive and acquire musical ideas, forms and elements. Even though chunking is a natural function of the brain, in music education it is important to turn chunking into a conscious learning technique which will help flexibility in storing the knowledge. Accordingly, it has been suggested that chunking enhances processing speed, and it can be a powerful tool for learning (Jones 2012). Therefore, the author suggests that chunking or grouping employed as a learning technique will be of significant value in music education. Furthermore, there are three grouping categories employed in music learning: motor, auditory and visual.

Motor grouping. It has been shown that the brain has the function to bind as many as possible separate motor movements into a unique kinaesthetic structure (Foulsham 2012). In music education, motor chunking technique applied in instrumental practice can be regarded as a process of grouping various physical movements of the hand and body into an organized and logical kinesthetic form.

All elementary motor exercises begin with one tone. These are to be executed with the extreme attention given to the sitting/standing postures, hand movement (up-down motion), stability of the each finger, the quality of the produced sound, etc. Further exercises are composed to group the other fingers in succession, hand postures and movements. In order to allow students to be concentrated on the motor task, the technical exercises are designed in such a way that visual information overlaps with the hand/fingers posture. In Example 1 (a, b) the author shows how the note-group and hand position share the same “phrase”.


However, in advanced music literature very often the music material presented in the composition, and the "logic" of the hand movement do not overlap often. The method of grouping musical elements into logic motor/kinesthetic units is known as technical phrasing. Technical phrasing enables the performer to structure the music material in a specific way to fit the laws of the fingering, hand movements and positions. For example, pupils often struggle with the long phrases and uncomfortable jumps. For this reason, Egon Petri (Lieberman 2001) put towards his pupils the following task shown in the Example 2:

Example 2. Broken tenths. (author’s picture).

After some unsuccessful attempts to play these tenths, Petri revealed the “secret” to his pupils (see Example 3) by allocating the notes, grouping them into “accessible” broken octaves:

Example 3. “Secret revealed”. Broken tenths are now visually easy to apprehend, and thus to play. (author's picture)
Furthermore, in the Example 4, the performer breaks down the long line of notes into smaller groups of broken chords that fit to hand position. The groups (chunks) are marked with red lines:


Therefore, technical phrasing is the ability to chunk the visual information into the smaller meaningful units that fit to various hand positions. This way, the performer will easily brake down the long melodic lines into the smaller phrases that correspond to finger/hand logic momentum.

**Auditive chunking.** Auditive chunking is the ability to group the auditory information perceived through auditive sensory structure. But, how do we collect and chunk auditive information? The answer lies in the early childhood and in the child’s apprehension of the language. Several studies have shown that music and language have similar syntactic processing, i.e. neural mechanisms that process syntax in both language and music overlap (Koelsh et al. 2005, 1565–1577; Steinbeis and Koelsch 2007, 1169-1178; Jäncke 2012; Besson and Schön, 2001; Tallal and Gaab 2006, 382–390; Patel et al. 1998, 717-733). Patel has suggested that there are also some intuitive propositions made by some researchers and musicians, that music of a certain composer “sounds” similar to his native language (Patel 2009). These notions about similarity in the syntactic processing of the music and language drive us to another notion that language and music are both presented simultaneously in the earliest stages of child’s learning.

Language and music connections begin with the speech. Every vowel is a sound, every word has specific articulation and dynamics, every sentence has a shape and “melodic” line. Letters make
words, words make sentences, and sentences make phrases. The same is unfolding in the music. Notes are grouped into the motives, motives into phrases, phrases into music sentences. What we hear when listening to music, is actually a succession of sounds and harmonies. Ability to group the tones that are perceived through audition, enables us to understand musical language. However, in early music education music and language are presented simultaneously. This connection is rather intuitive in children's songs and games. Musical content helps the verbal, and vice versa (McIntire 2007, 44; Kolb 1996, 76). In fact, children’s games are constructed of simple words accompanied by simple rhythmic and melodic patterns. The sounds and rhythms of the music follow the rhythm and vowels of the words. Verbal sentence overlaps and “dictates” the musical sentence. This way children have been adopting the verbal logic, acquiring the meaning of musical language at the same time. When we speak we change our diction, breathing, and emphasize some words by speaking them loudly or quietly, furiously or peacefully. The same flow can be seen in the music.

The understanding of musical language arises from early ability to gather the sounds into “musically meaningful” groups or melodic-rhythmic sentences and phrases created as the “background” of the verbal content. How do we begin to “chunk” auditive information? The author is introducing the chunking process by an example of the children’s song “Jingle Bells”.

![Example 5. Chunks are being grouped into the increasingly larger chunks after repetitive exposure to the song.](image)

The chunking hypothesis suggests that if the material is presented once, each datum of perceived information will be stored as a separate chunk. If repeated, the larger number of information will be grouped as one chunk, thus the chunks will be expanded (Miller op. cit.). We perceive the starts and
ends, beginnings, flows and cadences of the melodic lines that overlap with the syntax in the language. In the Example 6 the author shows how the song “Jingle Bells” is “grouped” into to phrases:

Example 6. The music and language syntactic principles overlap.

From the Example 6, we can see how musical syntax overlaps with the language syntax. These small phrases are merged into larger groups that create larger form. The poetic text as well as the music "text" are structured in the in binary form: abab1. However, while the text is the same for the first/third and second/fourth phrases, the music changes and intensifies the meaning in the language syntax. For example, in the second phrase b, the cadence is on the Dominant, i.e. the phrase ends on
the fifth degree of the C Major scale. This melodic line has the upwards motion, so the voice will rise – this indicates that the song will continue. The final (fourth) phrase b1 has different “meaning” from the second phrase b. That is to say, the fourth phrase b1 has the cadence on the Tonic, i.e. the phrase ends on the first degree of the C major scale, the melodic line has downward motion, and the voice will fall silent – this indicates the end of the song.

Therefore, not only that structural properties of the language and music overlap in the children’s songs, but both stand in the specific interrelationship as well. Music can help with the understanding of principles that govern the sentences, and the language can help in learning and understanding the music structure. It can be proposed that, in children’s songs, language, intonation, and melodic-rhythmic structure overlap. The awareness over this notion will help processing the music material more easily.

Visual/analytical chunking. This technique is applied in the analysis of music, the process that involves silent and sight reading the score. It is shown that the main difference between the musician and non-musician in the processing of visual perception of the melody lies in the ability to group the long string of information into “chunks” which reduce the memory load (Halpern and Bower 1982, 31-50). This superior chunking ability is enabled due to the familiarity, qualitative elaboration and stored knowledge. The knowledge structures of music have been already stored in a musician’s mind, thus these structures will enhance the processing of perceived musical information. For novices or unexperienced student, the score is just a bunch of dots and lines. Musical training is the key for fast sight/silent-reading and chunking. Therefore, quality and quantity of the perception of music, between the musician and non-musician, lie in the long-term practice and expertise in the field.

In music education it is important to learn how to read the score. Reading the score without the instrument, auditory or motor actions is known as silent reading. Since the music score is not just dots and lines but a multidimensional set of different elements of music, familiarity with each of the element will enhance perceiving and reading of the score. The visualization of the music score employs the auditory and motor imaginaries as well (Karpinski 2000). Furthermore, a musician has to have knowledge on motor and auditory chunking techniques, so that auditive and motor imaginaries are aroused during visual perception (Brodsky et al. 2008, 427-445; Brodsky et al., 602-12). Therefore, it is very hard to distinguish visual, auditive, and motor in the music learning and score reading, since all these behaviors are dependent of each other.
The visual approach to the music score is complex action. It is the process of grouping the music material, in which auditory and motor imaginary structures play important role. When musician observes the score, he/she hears the pitches, timbres, melodies, rhythms, harmonies, tempi, articulation, dynamics, and other signs which give the meaning to the music. (Hubbard 2010, 302-29). Moreover, a musician is also able to feel and “see” the kinesthetic movements. Far more, the musician perceives structural elements of the music such as keys, clefs, modulations, phrases and other features. In the Example 7, the author emphasises the way of perception/analysis the music score employed by the musician:

*Example 7.* The music is visually perceived as groups of structures of musical elements, where auditory and motor imaginaries play important role. In this example of Chopin’s Etude, it is shown how chunking is activated. Lines above the notes represents the size of chunks at different levels of perception. Frederic Chopin Etude op. 10 no.2, a minor. Editor: Alfred Cortot. Publisher: Maurice Senart. Copyright Public Domain http://imslp.org/wiki/Special:ReverseLookup/367492

Analyzing this Etude (see Example 7), expert musician cognitively chunks the visual information fast, due to stored knowledge. Firstly, to be able to read the score, performer has to establish the key and meter (a minor, four beats). These two are the ground for the further orientation. Secondly, at the first sight, it can be observed the shape of the melodic line (upwards-
downwards motion), and the simple rhythmic pattern which underlines melody (sixteenth note pattern). Finally, the formal structure will be perceived (2+2 bars phrase), as well as the underlying harmonic progression (Tonic - Dominant to Tonic). After this roughly visualization, the performer will start with the brief perception. While analyzing the upper (right hand) part, the performer will perceive the chromatic scale, separated as “chunks” of four-note units in upward, downward or combined motion. Furthermore, on every beat, these four-note groups are merged in triads (with inversions included), and this will activate the motor imaginary. In the following Example 8, the author further elaborates how motor imaginary is activated by visual perception and notational audiation:

Example 8. First group of four-note pattern (picture on the left) is imagined as one hand movement, i.e. it is created the mental picture of the hand striking from above the keys, playing the group, lifting and preparing another similar motor action for the second group. In the bass-clef staff, there is a broken a-minor chord that represents a tonic harmony which lasts half-bar. The “hand movement” pattern in the left hand is a usually used model in the pianistic literature (picture on the right). However, these imagined “hand groups” represent the motor chunks, organized not only by the rules of kinesthetic motions, but by harmonic progression as well (picture on the center).

As the author shows, chunking is the basic mental activity that helps perception of visual information. The speed of processing depends on the level of expertise. The author has stated, in the
Examples 7 and 8, that the visual perception of music can be considered as a multidimensional process where chunking plays a main role. In these examples, there are several types of chunk structures: auditive (pitches, durations, scales, harmonies), motor (hand movements, fingering), structural (form, harmonic progression, cadences), and expressive (dynamics, articulation, phrasing, use of the pedal).

Therefore, the "mental learning" or silent reading are very important, because the performer will be able to create the complete mental map of the music piece. Practicing silent reading, musician will enhance own interpretation and ability to memorize music without an instrument. However, it is recommended that only experts use silent reading as a learning technique, because they have stronger auditory imaginary skills than novices. Without auditory imaginary, no kinesthetic imaginary is possible in music learning for the reason that every movement is actually “heard” at the same time. Thus, long-term “strongly coupled” auditory-motor learning will enhance auditory imaginary in students and enable auditory-motor imaginary skills (Brown and Palmer 2012: 567).

**Highlighting**

Visual highlighting of the music material refers to instant visual impression of the score in the process of silent and sight reading, where the “highlighting” or “magnification” of the specific elements and events in the score helps the performer to organize the music material and actions. The author suggests that before the student begins to learn the new piece, firstly he/she needs to “scan” the elements presented in the score, and then to highlight or “magnify” the specific patterns or features. In the Example 9, the author presents how experienced performers scan and highlight the material from the first sight of the score:
Example 9. Experts scan the score and highlight the specific features.
Ludwig van Beethoven, Piano Sonate op.57, no. 23.
Publisher: Leipzig: Breitkopf und Härtel, pp.165-90, Copyright: Public Domain,
http://imslp.org/wiki/Special:ReverseLookup/51795

The musician will highlight several elements which he/she observes in the score (Example 9): 1. broken chords in both hands (in downward and upward motion), 2. trills, 3. diminished chord downward motion passage, 4. full chords in both hands upward motion, 5. left hand repetition of one note. Also, basic harmonic progression such as cadences that underlie particular sections will be highlighted. In the same example, the performer visualizes the structural characteristics of the form. Finally, he/she creates an idea about motor actions that will be applied in the performance. These
highlighted features serve as the main structural points with regards to which the performer orientates him/herself during sight and silent reading. Other, middle components are to be encompassed within these “highlighted borders”. Therefore, with this technique one is able to create an instant image on elements employed in the score.

*Auditive highlighting* is activated when a musician spots specific sound quality (pitch, timbre, timing, and/or volume), harmonic progression, melodic motion, or other unique features that will be perceived through auditory sensory structure. The author shows, in the example of Bach’s invention no. 8 (Example 10), how the musician perceives the melody by auditive "highlighting" the advents of the melody:

![Example 10. Auditive highlighting.](http://imslp.org/wiki/Special:ReverseLookup/19938)

The Example 10 shows two-bar theme from the Bach’s Invention No.8. The Theme consists of the melody that has two differently expressed counterparts. In the first bar, the specific feature of the first part of the melody is upward jump movement on the broken tonic chord in the F Major scale. The other specific feature of the first part is constant returning to the first note, thus expanding the interval of the third to fifth and finally to octave (hidden polyphony). In the second bar (second par of the melody), there is a downwards diatonic motion that finishes on the tonic, or the note that the music has begun with. The most unique feature of the whole melody is the octave jump found between the first and the second bars. The musicians have to pay main attention to and highlight this octave jump, because it serves as a bridge between two opposite characteristics/parts of the melody. Now, the musicians will have the clear idea about the melody, its features, and its motion.
Therefore, it is of significant value to students to learn how and what to highlight while listening to music to be able to keep track on what is happening in the music.

**Elaborative interrogation**

It has been stated that expert musicians learn quickly due to pre-stored knowledge. These ready-made patterns/chunks enable experts to encode immediately new data and store them for a while. If the new information is elaborated further and practiced for a long-term period, it will be well stored in memory, and thus its retrieval will be fast due to elaborative practice (Ericsson and Kintsch 1995, 211-45; Chaffin and Imreh 2002). The process which enables new information to be well stored is called Elaborative Interrogation. As a learning technique in music education, elaborative interrogation can be applied in two main processes:

1. Connecting new with familiar knowledge or skill, and
2. Comparing the styles, structures, and forms.

**Connecting new with familiar knowledge or skill.** Well-leaned compositions, in the auditory-motor domains, will help the students to learn new music by using old knowledge and applying it in the new information. Well elaborated motor movements will enhance learning the new kinesthetic movements. Stored theoretical knowledge on music will help understanding the new information. Elaborated auditive skills will help encoding new auditory events. Also, knowledge from another fields can help elaboration of new ideas (see mnemonics).

**Comparing the styles, structures, and forms.** The musicians in every day practice elaborate scales, chords, trills, arpeggios, and other elements in music. These elements are elaborated through playing, singing or analyzing the score. The knowledge on those patterns, elaborated through different sensory skills, will help perception, recognition and memorization of the similar patterns. For example, in everyday practice we elaborate the scales playing them in various directions, dynamics, articulation, changing meter and rhythmic patterns. The most common scale exercise is the following (that the author shows) in Example 11:
The best example of how to apply elaboration in the practicing process is shown in the Franc Liszt’s Technische Studien S. 146 (Technical studies). The diatonic scale is divided into smaller patterns (example 12 a, b, c) and elaborated through various forms:

a) repetition of the single note of the scale:

b) five finger position:
c) parting the five finger position into two and three notes groups
with different rhythmical patterns, articulation, and dynamics:

Example 12. F. Liszt, Technische Studien, S.146,

These examples represent just few variant forms of the scale which the author has chosen to present. There are unlimited number of elaborations of the scale employed not only in technical exercises, but through composition as integral constructive unit.

Elaborative technique is employed not only to the scales, chords or other basic elements, but also to the formal structure, harmonic progressions, and expressive structures. For example, knowledge on the three-part/ternary song structure can be acquired by several processes: analysis, composing, listening, playing, and improvising on the structure/form. Elaboration of the harmonic progression refers to exercises where some bars in the written example can be left empty in order to be full-filled by the student, or the student can improvise on the specified harmony as well. Finally, elaboration of the expressive elements of music can be defined as acquiring the musical “taste” in performance. Dynamics, tempo, articulation, agogic, and emotions, belong to the expressive structure. The teacher has to show the student how to employ these elements into practice and performance in various ways. The author suggests that elaboration over the expressive features is essential for the expert performer.

Elaboration of different musical features will have impact on learning, sight/silent-reading, memory, motor and auditory skills. Teacher has to point out where, how, why, and which music elements are employed in different compositions, so the students will be able to recognize, compare, and perform different techniques and procedures employed in music, and create concepts on types of elements used in different styles and genres. In practicing an instrument or in composing process, it is suggested by the author to abstract one element and work on it in many variations as possible, as shown partly in the Example 12. This elaborative process on each element
and its parts plays an important role in gaining expertise in arts. Not only in music, but we can also observe that many great painters and sculptors, before starting and finishing their works, have made sketches and elaborated each element in detail. Therefore, elaborative interrogation can be described as “dissection”, exploration and elucidation of the methods, sources, and applications of the music features by asking questions, setting problems and solutions, and connecting ideas.

Summarization

This technique is used to reorganize what has been previously learned and to get an overview on learned information. It is a re-evaluation and recapitulation of learned information. In summarization process the musicians rely on “the cues” which build the “mental map” (Chaffin et al. 2009, 352-363). These cues or retrieval points refer to the motor, auditive, structural, and emotional contents that have been learned and memorised through practicing, which help musicians to build the mental map and “to travel” around it.

While practicing, performers start and stop on certain sections to elaborate them. Through this processes, they develop retrieval structures on which experts rely in the performance process (Chaffin and Imreh 2002, 342 – 349; Chaffin et al. 2009; Williamon and Valentine 2002, 1-32; Williamon and Egner 2004, 36–44). In the author’s previous research (Marijan 2016) the student was evaluated significantly higher after the author’s teaching model had been applied. This model included, among other learning techniques, summarization as the most important technique by which student used to organize his cues and get awareness over the mental map. The author pointed to the important cues to her student (motor, auditive, expressive, and structural) in the music pieces, on which he had to pay attention, learn and practice. The author found that these cues have enhanced greatly student’s skills and understanding of the music that he was preparing. Student’s mastery over these cues enabled him to build retrieval structures of motor, auditive, expressive, and analytical features, which helped him memorize the music, and get confidence while performing the pieces. Finally, by using this technique the quality of the performance was significantly higher. Therefore, the conclusion is that the summarization technique helps the musician to get an awareness over the performing cues, build retrieval structures and develop the mental map.
Learning techniques – conclusion

The author pointed out the important and valuable learning techniques employed in music education and music learning: imitation, repetition, mnemonics, chunking, highlighting, elaborative interrogation, and summarization. The summarization can be regarded as the process that has to follow all the previous techniques. Understanding and awareness over the elements of the score, which must be regarded as auditive, motor, expressive and structural units, are based on the quality and quantity of learning techniques. The quality of learning techniques pertains to the method of utilization of the technique. The quantity of learning techniques, applied in the teaching model, has significant grandness to the student, as long as their attributes serve the educational and artistic goals.

However, employment of techniques in learning is not enough for the self-regulated learner. These techniques can enhance learning, but to have a full control over own learning process, the musician has to develop learning strategies as well. Learning strategies involve complex cognitive processes that control the whole learning process, thoughts, actions, memories, emotions, and cognition. This control is gained through metamemory and metacognition.

Metacognition and metamemory in SRL structure

The knowledge on cognitive processes and the ability to regulate cognition, are the most essential activities in SRL activity. These two actions are closely related (Sperling et al. 2004; Schraw et al. 2006). There are two types of cognitive structures that are employed in SRL:

- **metacognition** — awareness over one’s own knowledge and processes involved in learning;

Metacognition

Metacognition is regarded as a construct that is included in SRL (Sperling et al. 2004). Flavell is considered a father of the concept of metacognition. For him, metacognition is knowledge “about anything cognitive” (Flavell 1987, 22). Metacognition often refers to knowledge about one’s
cognitive activity (Veenman and van Hout-Wolters 2006; Brown, 1978; Baker 1991; Flavell, 1979; Veenman and Spaans, 2005). For example, it can be an awareness on types of learning techniques that are implied in one’s learning process: "Think About Thinking—It's Metacognition!" (LSU Center for Academic Success). These quotations explain the core meaning of metacognition: “A person cannot teach another person directly; a person can only facilitate another's learning” (Rogers 1951). Teacher should only “act as a guide” (Simon 1999). “Children are their own best teacher. They need to create their own metacognitive reality” (Manning 1991). Dirkes (1985, 96 -100) has shown three basic levels of metacognitive strategies: connecting new information with previous knowledge; conscious selection of efficient techniques; planning, monitoring, and evaluating learning processes.

Accordingly, metacognition can be regarded as the (1) knowledge on how to change and apply different learning techniques for the given problem, (2) monitoring learning process and metamemory, (3) applying previous knowledge, (4) ability to review which techniques are used, what may be used in the future, and (5) reviewing the results: if they have achieved on time and at the level of expectations. Therefore, this high-mental ability manages the whole activity in SRL.

Metacognition helps one to become self-regulated learner. In music, metacognition is developed through learning, practicing, and performing. McPherson and Renwick have recently shown that every child differs in the way of practicing the instrument. They noticed that the children possessed the will to learn, regardless of the level of skill. However, novices, while being exited to learn the instrument, mostly lack in the way of how to practice. The researchers have suggested that the teachers have to create and develop strategies which will improve learning, instead of simply indicating “what” to practice (McPherson and Renwick 2001).

If a student has learned how to use metacognition, he will be able to consciously process and monitor his/her own thoughts, feelings, and eventually, develop self-regulation over mental activity, which will enhance perceiving, processing, and storing perceived information. Furthermore, metacognition will help student to form his own model and style of learning and acting.

**Metamemory**

Metacognition is a conscious control over one’s cognitive behavior. In music performance practice, memorization is the most important behavioral activity. There are different techniques that can be
applied in memorization process. But, proper use of those techniques, choices over techniques, as well as awareness over processes of the memory, require metacognitive knowledge and skills.

In music practice, it is difficult to separate learning from memorization because everything that is learned have to be performed from memory. Playing by heart is supposed to have been started from the 19th century. It was the practice of Paganini, Liszt, Clara Schumann, Chopin. Therefore, in music, every learning technique can be suggested to be memorization technique. Furthermore, metacognitive strategies applied in learning are also strategies to enhance memory.

However, not all metacognitive strategies refer to memory, but monitor memory. For example, some metacognitive strategies refer to decisions to learn or not, setting time framework for the learning session, learning different kind of content to help current learning, finding different solutions for the same problem, judging the results, picking appropriate information which is to be learned. But, despite metacognition, how can we be sure about the persistency and accuracy of our stored knowledge?

There is a process within metacognition that helps us to be aware over our memories. This process is known as metamemory. It is known that our memory is a structure of different levels in which several cognitive actions are involved: attention, perception, encoding, storing, and retrieving. The processing of information is not linear, but is elaborated through several stages which are known as sensory, short-term, working, and long-term memory (Sutton 2016).

However, how well something will be memorized, in author’s opinion, depends on two factors: external and internal. External features refer to the positive response from the student's environment that will enforce his/her memory skills. For example, these external stimuli come from the socio-educational environment – if the students are obligated to memorize or not; if they are praised for their memory abilities; if they get enough support in learning from the parents; if their teachers introduce memory techniques. Internal factors that enhance memory are self-motivation to learn, the will to memorize, and the most important – employment of metamemory strategies.

**Metamemory strategies**

Metamemory strategies allow one to self-judge his/her memory capacity and storage. This ability to self-judge and monitor one's own memory arouses metamemory judgements, the processes which operate under the metacognition. Metamemory strategy is not a memory skill, but it is an awareness over stored knowledge. It is one’s ability of making judgements over own memories (Metcalfe and
Dunlosky 2008, 349-362). Metamemory is activity of constant self-evaluation in the memorizing process. It is an active reassessment over stored knowledge, that is supported by these questions: “what I know/have memorized”, “what I have just learned”, “will I recall this correctly after the learning session”, “have I memorized this really well or not”, etc. Metcalfe and Dunolsky (Ibid.) have proposed several metamemory paradigms which the author is going to explain in the following lines and direct to the music education.

**Feeling of knowing judgement.** According to Metcalfe and Dunolsky (Ibid.) this type of judgement people create when they "know something, but do not know" at the moment. Feeling of knowing judgement is activated when people are (1) familiar with the question/cue, or know about the domain of the cue, (2) when "there is something in memory to be found out", and (3) it can be regarded as partial knowledge.

The **Feeling of knowing judgement** can be described as the first level of metamemory skill, where one examines the memory, but cannot retrieve the information at the moment. In music education, the teacher can improve students’ memory and learning involving this metamemory strategy. By using simple tests, students are forced to reassess their knowledge and memories. For example, teacher gives the test where the students have to recognize a piece of music. If students have studied it long ago, or heard it before, they can found themselves not recognizing the piece immediately, but it can "sound familiar". That is to say, students will have the feeling that they know the tune, but they cannot remember who is the composer, and how the composition is called, but they can, for instance, recognize in which style the composition is created. The author suggests that there has to be at least one current information that student is able to recall, so that he/she can predict the possible answer. If the part information is available in the student's memory, than the information has not been learned. Moreover, Joseph Hart, who was the first to explore metamemory systematically (Hart 1966, 347-349) has shown that the feeling of knowing on the former test will help in correctly choosing of an answer on the latter test. Furthermore, feeling of knowing judgements can be aroused through questioners, through filling-up musical assignments, listening tests, and other tasks. The reliability of feeling of knowing judgements has to be continually re-tested, in order to check the knowledge by measuring the correlation between the former and latter tests (Nelson and Narens 1980, 69-80).
Tip of the tongue states. Tip of the tongue statement is another response in metamemory probe of memory, suggested by Metcalfe and Dounolsky (op. cit.). It is the statement that “I almost know something, but I am blocked to say it!”. Actually, the tip of the tongue states can be non-blocking and blocking (Metcalfe, J. & Dunlosky, J. op. cit.). Non-blocking states are when one knows one part of the element that has to be recalled, but cannot retrieve the whole element. In music practice, this statement is often made when students are sure that they know the melody or the piece, but cannot recall it entirely, only some parts of it. The teacher can leave them to improvise on the melody in order to revive all of the missing/forgotten parts.

Blocking tip of the tongue statements can be compared to the similar effect in the music performance. The example of this is when the student has been practicing a composition for months, and then goes to perform the piece in public. After having started, he/she suddenly stops and cannot go further, as he/she is blocked. The student cannot even remember how the following bars sound, because of the “intensively active gap” (William James, 1890) that is persistent. The performer makes attempts one after another to remember, but fails. He/she gives up and leaves the stage. After the failure, the musician is aware that his memory has been blocked, and that nothing could be done to retrieve the further information from it, therefore it is not the stage fright to be blamed, but the problem lies in the wrong learning method that has been employed during practicing sessions. Furthermore, Nate Kornell and Janet Metcalfe (2006) have shown that blockers are not the real cause of retrieval difficulty, but they act as annoyance (Ibid., 248–261). The same study has shown that a period of incubation (i.e. taking a break) is helpful for retrieving the information and removing a blocker. Accordingly, the author suggests that if the student cannot remember what is going next in the piece, it is better to stop for a while, take a breath, and then try from the beginning, or from the particular structural or other cue.

Judgements of learning. This metamemory strategy enables accurate judgements over the actions involved in the learning process. However, some studies have revealed that people would often have false judgements over their learning (Corinne L. and Heit 2011, 204–216). Furthermore, judgements of learning are accurate in the following stages of learning: shortly after the study, but not immediately (Dunlosky and Nelson 1992, 374-80); while studying by stopping and making judgements over difficulties of information (Metcalf and Kornell 2005, 463–477); after the study by making estimation about the amount of learned, i.e. when someone has the ability to create keywords on learned material (Thiede and et al. 2003, 66–73), or convert others' thoughts into own
words, or make *metacomprehension judgements* (Dunlosky and Lipko 2007) after a restudy. In music education, *judgements of learning* can be used after the practice sessions, and in the learning process as well. While practicing, the students have to pay attention to the specific cues and work on them in details in order to recall them accurately after the practice. Accordingly, they have to chose which sections are less, more or the most difficult, so they will be able to organize their further practice. After the practice, it is recommended to take a break, and after a while, review how much is learned. This way, students are able to make judgements over the amount of leaned and time spent. The relation between these two features enables students to properly review results, actions, learning techniques and strategies which have been used, and to make decisions on how to organize those in the further learning sessions.

*Source judgements.* The *source judgements* refer to the origins of our thoughts and memories. People can often miscarry the source of their knowledge (Dodhia and Metcalfe 1999, 489–508). The problem of the *source judgements* the author finds in the complexity of the memory structures in the musician's mind. Musicians are able to grasp large amount of auditive data, visual data, kinesthetic data, analytical data, as well as emotional data, and develop structures that gather pieces of information that correspond to each other. Musicians are able to access and conjunct these structures of various knowledge by retrieval and elaboration of their inner elements. Now, how the performer controls the source of his/her knowledge while playing? How can he/she be sure on what images to rely on, i.e. what type of stored information to recall?

Musicians practice with and without the instrument, with the score and without the score, using Holistic or Segmental approaches (Mishra 2002, 74-86). Therefore, various behaviors, auditive, motor, analytical, emotional features are employed in practice, thus the problem of the source of their memory at the final performance cannot be simply determined. However, during performance musician relies on the performing cues which are elaborated and memorized during practice (Chaffin op. cit.). These perceptual cues have to be distinctive in order to be accessed easily. Ferguson (Ferguson et al. 1992, 443–352) has shown that when the perceptual cues come from different sources, they are much easier to remember, than those which come from similar sources. While practicing, performer activates not only visual memory or analytical memory, but also auditive and motor memories. Also, emotions, feeling, and mimics, play important role in gathering the information. With all these features, musicians are able to build their cues on which their performances will reside.
To musician, the score is a multilayered body of different events. While performing, musicians activate the cues that come from various-source memories. If the cues are well-learned, the musician will be aware on the particular cue and its source on which he/she will rely in the performance. The awareness over the memory source is the awareness over the mental map in which different behavioral aspects are activated simultaneously during the performance. That is to say, during the performance the structural cues will be active, at some point kinesthetic cues will arouse, or the expressive cues will be activated at a desired place. Thus, musicians cannot rely on analytical memory only, because the performance will be dead, or kinesthetic memory as this will lead to memory gaps and forgetting in the live performance (Chaffin 2007, 377-393). Furthermore, well-learned performing cues enable musicians to access different sources of their memories. This process, by which the performer activates the cues and control the performance is described by J. Ginsborg, R. Chaffin, and G. Nicholson (2006, 167-194):

“The landmarks are performance cues – features of the music that the musician has chosen to attend to during performance in order to ensure that things take place as planned. Performance cues are established by thinking of a particular feature of the music during practice, so that it comes to mind automatically as the piece unfolds during performance. Performance cues provide a way of consciously monitoring and controlling the rapid, automatic actions required of a performer or conductor, making it possible to adjust to the needs of the moment.”

Remember/Know judgement. It is very important to make a distinction between what is remembered, and what is learned. Remembering and knowing (RK) are two processes which refer to the strength of memory (Wixted and Mickes 2010, 1025–1054). Remembering depends on recollection, while knowing depends on familiarity. Recollection is characterized as slow, intentional, attention-demanding, while knowing is fast, automatic and has low demands on attention (Dunn 2001).

There are two different approaches to RK responses. The first is known as single-process model, which is opposed to dual-process model. In the single-process conception or unidimensional Single Detection Theory, RK responses are viewed as memory retrieving action on the base of strength of confidence (Hirshman and Master 1997, 345-351; Wixted and Stretch 2004, 616-41). Recent researches that support this kind of view for RK responses, have suggested that RK
responses can be quantitatively different rather than qualitatively (Rotello and Macmillan 2006, 479–494). Dual-process model, on the other hand, RK judgments examines as episodic versus semantic, recollection versus familiarity, the processes that arouse at different levels of consciousness – autonoetic versus noetic (Tulving 1985, 1–12; Dunn 2004, 524-542). Remembering is a process of episodic memory and autonoetic consciousness, which deals with self-judgments, self-recollection, and past to present events. Knowing is a distinctive process that operates within semantic memory and noetic consciousness (Gardiner 2001, 1351-1361).

However, whatever model is used to RK statements, it is obvious that remembering is not the same as knowing, thus these memory operations are processed differently. These two approaches to RK phenomenon have been developed for the purposes to make a clear distinction between remember – know processing. These phenomena are very complex to deal with. The author approaches to these RK statements as to multidimensional structures. We can remember the information from the very recent past or episodes from our experience (using episodic memory), but also remember what we have stored long ago or have been familiar with (using semantic memory). "Knowing" is not a single process, but it is the overview over the stored information presented on different levels in our mind. The information which has been learned long ago can be forgotten, but some present actions or objects can revive particular stored information. Accordingly, it has been shown that music can have impact on episodic memory. Some autobiographical events, that are supposed to have been forgotten, can be revived by melodies or sounds that have been engaged in particular situation. Although, not only the music itself enables recollection, but also emotions that have been aroused by the music in those situations (Jäncke 2008, 21; Schulkind et al. 1999, 948-55; Janata et al. 2007, 845-60).

The author has observed that students better remember the information that refers to themselves and when they are asked to create images. Furthermore, some researches have revealed that "remembering" is better when the information is presented in the "self-judgment condition" where self-referential attributes are linked with recollective responses, while "knowing" refers to semantic processing of information where elaboration and imagined actions have been involved in learning (Conway and Dewhurst 1995, 1-19, Conway and Dewhurst 2007, 125-140).

These researches can provide us some clues for RK responses in music education. How can we make a distinction between remembering and knowing in music learning? Remembering as a process of episodic memory can be prescribed to recollection of visual, auditive, motor and
emotional information perceived during lessons. All these sources being linked can shape memory retrieval. However, the "remembered" actions will be changed during practicing sessions, thus some of the "remembered" information will be modified, some elaborated, and some will be dismissed, depending on the progression of the student's leaning process. Furthermore, in the learning process, these remembered actions are merged with stored knowledge, and by linking the two, "remember" will be converted to the "known". Thus, the author suggests that elaboration of the remembered actions employed in the practicing is very important action in music learning. Therefore, we can conclude that teachers have to introduce qualitative learning techniques and strategies which will encompass visual, auditive, motor and emotional components, that students can easily remember and employ them in their practicing sessions. Through elaboration of remembered features, students will acquire knowledge, develop skills, and gain expertise. In performance practice, elaboration over remembered information will enable actions and thoughts to become fast, automatic and reliable.

Learning strategies – conclusion

Metacognition is regarded as the most important learning strategy that monitors all other cognitive and behavioral actions. Metamemory is the structure within metacognition, which monitors our memory processes. Metacognition and metamemory have to be incorporated as learning strategies in learning. Employing learning strategies, the students will shape cognitive skills and actions as well as their ability to memorize will be enhanced.

Music performance itself is an action where self-monitoring and self-judgment play an important role. Self-instruction will enhance learning, and through self-regulation the student will approach the expertise in music. Without learning strategies musicians will be incapable to learn the music effectively, memorize, improvise, and perform.

Conclusion and further research suggestions

In this paper the author has been trying to approach to self-regulated learning SRL as a complex structure of behavioral, emotional, and cognitive events developed through self-regulation in a socio-cultural environment. SRL starts from the time we were born, in the interaction between the
child and the environment. The forerunner of the SRL is co-regulation. This action is the base from which self-regulation arouses.

SRL employed to music education, has important role in the improvement of the students' cognitive, motor, auditive, emotional actions, skills, and behaviors. In order to become a successful self-regulated learner, one has to develop self-features such as self-monitoring, self-judgment, self-analysis, self-motivation, self-observance. These "self" actions are shaped through learning techniques and learning strategies introduced by the teacher. Adapting these learning techniques and strategies, students become aware of their own learning processes and actions involved in learning.

The author's suggestion to music teachers is to develop learning techniques and strategies constantly, and to make researches on music learning and self-approach in music learning. These contributions on how music students learn and can learn and develop and what learning strategies can be helpful in the performing arts, will be valuable for further researches in music education and have great impact on the educational systems.

**Recommendation for further research**

The author has found out another way to explore learning in music and self-regulation. Today, there are a lot of Master-Classes that refer to music performance. Those can be beneficial sources of how different learning techniques are to be introduced in student's practice. Since those Master-Classes are held in a very short time span, usually in two-three lessons, the author suggests that these classes can be made as examples of the efficiency or inefficiency of the learning techniques used by the students. Further, in the end of these classes final concerts of the attendants are usually held. It is very important to emphasize that the real value of the master-classes is not the final performance of the students, but the introduced techniques and the future application of these strategies by the attendants. If the instructor has introduced effective learning technique which can be applied in the future practice at various stages, then the Master-Class proved its merit in overall student's achievement. Therefore, these forms of the short-term lessons can provide researchers the insights into the relationship between the teacher, learning technique, and the student. This relationship is based on the teacher's ability to explain the technique efficiently, a choice of the introduced technique, which has been accepted in the short-term period, and further elaborated, and cognitive and motor abilities of the student. With this insight, teachers will be able to organize music lessons,
chose learning techniques and strategies which will serve to enhance learning and promote self-regulation.

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