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The Role of Self-Regulation, Quantity of Practice, and Self-Efficacy in Self-Assessment and Improved Performance among Lebanese and Czech Piano Students

Role seberegulace, kvantita cvičení a sebe-účinnost v sebehodnocení a zlepšování vystoupání u českých a libanonských klavírních studentů

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I declare that I developed this thesis on The Role of Self-Regulation, Quantity of Practice, and Self-Efficacy in Self-Assessment and Improved Performance among Lebanese and Czech Piano Students under supervision and worked independently using the works of the sources and literature listed. I also declare that this work was not published under a different or similar title.

Prague, July 2019

…….

signature

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J. S. Bach wrote *SDG* at the end of all his major compositions. SDG stands for **Soli Deo Gloria**, to God alone be the glory. As a humble follower of the great J. S. Bach, I would also like to thank **God almighty** for giving me the strength and determination to finish this work.

Abstract

This work studies the role of self-regulation and self-efficacy during piano practice in improved self-assessment and performance, since in the last couple of decades, research has shown that number of hours of practice is not the only predictor of improved performance. Piano students at the Beirut and Prague conservatories wrote weekly journals assessing their self-regulation during practice for nine months and then performed in an exam, in addition to filling an online questionnaire. Results showed that students self-regulated mostly using the method and social factors dimension. Moreover, although students in Prague performed a harder repertoire, they were not better in self-regulation compared to the students in Beirut, except for the time dimension of self-regulation. A list of self-regulatory behaviors is presented at the end of the work, in addition to the implications for music educators and piano students and the contributions to the field of music education in terms of preparation for performance in the absence of a teacher.

Keywords

piano pedagogy, practice, self-assessment, self-efficacy, self-regulation

Anotace

Tato práce zkoumá úlohu seberegulace a vlastní efektivity při klavírním cvičení, při zlepšování sebehodnocení a vlastní výkonnosti, protože v posledních několika desetiletích výzkum ukázal, že počet hodin cvičení není jediným prediktorem zlepšení výkonu. Studenti klavíru na konzervatořích v Bejrútu a Praze psali týdenní reflexe hodnotící jejich seberegulaci v cvičení po dobu devíti měsíců a poté vyplnili on-line dotazník. Výsledky ukázaly, že studenti seberegulují především dimenze metod a sociálních faktorů. Ačkoliv studenti v Praze připravovali náročnější repertoár, ve srovnání s žáky v Bejrútu nebyly lepší v seberegulaci, s výjimkou časové dimenze seberegulace. V závěru práce je prezentován seznam seberegulačního chování a důsledky pro hudební pedagogy a klavírní studenty. Zároveň jsou uvedeny příspěvky do oblasti hudební výchovy z hlediska přípravy na výkon v nepřítomnosti učitele.

Klíčová slova

klavírní pedagogika, cvičení, sebehodnocení, vlastní efektivita, seberegulace

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1 Introduction

It is puzzling for piano teachers to have students who seem to understand and even reproduce their instructions in class yet fail to perform adequately during the next class after one week. Throughout the history of piano instruction, teachers have been baffled at how students do not practice, practice little, or practice wrongly. While numerous books and articles have been written and much research has been done on finding appropriate, educational, and student-centered methods to teach piano to both beginners and advanced students, little has been done to come up with a list of strategies that students can use while they practice the piano at home. Little has been done to instruct piano teachers how to teach their students the elements of successful practice at home, in the absence of the teacher. True, that as of the last decade of the previous millennium a plethora of research exists that deals with self-regulation, be it with athletes, students, or musicians; yet, this is an area in piano pedagogy that is relatively young and new. The exploratory stage of research on self-regulation has revealed measures of self-regulation,[1] tested their psychometric soundness,[2] and found the best ways to test for the prevalence and magnitude of self-regulation. It has also found interesting areas involved in piano practicing at the cognitive, behavioral, motivational, and social levels, which were ignored in the years before the naissance of the concept of self-regulation in piano pedagogy. The main gap that still needs to be covered is the assembly of a list of self-regulatory skills that can be distributed to piano teachers and students, so that the former can teach them in their class sessions and the latter can use them in their everyday practice.

By its nature, practice happens almost entirely in the absence of the teacher, and while some teachers do guide their students into developing appropriate and adaptive practice habits, it is common for teachers to simply ask their students to practice ‘more’ and ‘better’. The question begs itself: how much of the class time is spent in instruction of technique, sheet music, musicality, and similar skills, and how much of it is devoted to teaching concrete skills and strategies that students could employ on a daily basis in their piano practice to ensure improved

[1] MIKSZA, P. The development of a measure of self-regulated practice behavior for beginning and intermediate instrumental music students. *Journal of research in music education,* 2012, vol. 59, no. 4, pp. 321-338. ISSN: 0022-4294.
[2] MIKSZA, P. Self-regulation questionnaire, cited by HOOPER, T. L. *The effects of teacher-directed versus self-regulated practice routines on undergraduate group piano students performing four-part chordal music*. Georgia, 2015. Doctoral dissertation. University of Georgia. Major professor Dr. Mary Leglar.

performance? The monotonic benefits assumption, which prevailed the world of music education for over two decades, asserted that quality of the performance is directly related to the amount of deliberate practice,[3] and therefore it was believed that the more number of hours students practice, the better the result would be. And while students might practice more, if they practice mindlessly and repeat the same mistakes over and over again, practice will not be better, and neither will the performance. Czech piano pedagogue Libuše Tichá affirms that practice should be motivated, conscious, concentrated, goal-oriented, conceptual, regular, and inventive. She gives an example from the great pianist and composer, Franz Liszt, who warns against mechanical practice (also known as drill practice).[4] Hence the interest in self-regulation in piano practice and self-evaluation[5] in performance, because self-regulated practice bridges the gap between two piano classes, allowing for improved performance. Self-regulation acts as a teacher in the absence of the teacher, allowing students to monitor their progress during the week, correct mistakes, focus on important aspects of their performance, and use different strategies to improve their performance until the next class.

Self-evaluation is another neglected aspect in the field of piano pedagogy. Piano students often overestimate their performance on an exam only to be surprised by a low evaluation from adjudicators, while others rate their performance at a standard that is below acceptable, only to find out that they were highly evaluated by adjudicators. Part of the reason of these gaps in self-evaluation is the lack of self-regulation during piano practice. Students who repeat the same mistakes over and over again sometimes do not know that they are playing with these mistakes.[6] Therefore, is it also important to consider how self-regulation can improve self-evaluation, a skill which would be of paramount importance in the future career of these students, especially for their self-confidence and psychological welfare.

As a result, this study focuses on self-regulation, because students have to learn how to self-regulate and self-evaluate in order to succeed in the world of musical performance without their teachers, having had the appropriate artillery and know-how to practice, what to focus on,

[3] ERICSSON, K. A. – KRAMPE, R. Th., – TESCH-ROMER, C. The role of deliberate practice in the acquisition of expert performance. *Psychological review,* 1993, vol. 100, no. 3, pp. 363-406. ISSN: 0033-295X.
[4] TICHÁ, L. *Slyšet a myslet u klavíru* [Listening and thinking at the piano] (1st ed.). Praha: Akademie múzických umění v Praze, 2009, 176 pages. ISBN: 978-80-7331-151-3.
[5] The terms self-evaluation and self-assessment are used interchangeably in this study.
[6] Attribution also plays a role in self-evaluation, as does stress, peer pressure, perfectionism, and other psychological constructs, which are beyond the scope of this work

how to develop new and different practice strategies and methods, and how to assess their performance and find out areas to improve for future performances.

1.1 Motivation to the study

As a doctoral student in music education focusing on piano pedagogy and as a piano teacher of private students in both Lebanon and the Czech Republic for the past ten years, working on the doctoral degree and writing a dissertation is a chance not only to benefit and learn from the available literature but also to contribute to the field of music education in general and piano pedagogy in particular. One aspect of music education when it comes to teaching piano is piano practice. As stated earlier, practice happens almost entirely in the absence of the teacher. It is sobering to realize that around 80% of the time students play the piano in the absence of the teacher, granted that most students meet their teacher once a week. Living in the era when self-regulation is a budding concept, it would be regretful not to study this important topic. Self-regulation would allow piano students to improve their performance and get more out of the practice time than just number of hours. Self-regulatory skills are an essential part of piano pedagogy, and piano teachers need to spend time in their classes teaching these self-regulatory skills to their students, instead of asking for 'more' and 'better' practice.

If 80% of the music-making happens during practice, then it is imperative that a significant section of the piano class be devoted to teaching students how to make the best of their practice sessions. Furthermore, piano pedagogy has undergone massive reforms in the past decade in Lebanon, and the administration and the head of the piano department are constantly working on improving their students' performance through using the best educational and pedagogical methods in class; however, little is being done to teach piano students self-regulatory skills that they can use during their personal practice time, especially that the practice time of these students is very limited.[7]

1.2 Aims

Besides the aim of an in-depth study of the literature pertaining to self-regulation of piano students, self-efficacy, and self-evaluation, and in addition to the aim of surveying the

[7] Read more in Chapters 5.1, 5.5, and 8.3

structure, educational philosophies and methods of both the Prague Conservatory and the Lebanese National Higher Conservatory of Music, this study has the following aims:

1. to establish the role of self-regulatory practice in quality of performance in addition to quantity of practice and self-efficacy
2. to show the relationship between self-evaluation and adjudicators' evaluation
3. to establish the relationship between self-regulation, self-efficacy, and self-evaluation
4. to contribute to the field of music education by providing self-regulatory skills that could be taught to piano students
5. to contribute to the field of piano performance by showing the importance of self-regulation and self-evaluation for a future career in performance
6. to study on a sample of Lebanese students, a sample which is absent in the literature on the topic of self-regulatory practice
7. to study the effect of the system of instruction on self-regulation and improved performance by comparing a sample of Lebanese students to a sample of Czech students, which come from two very different systems of instruction

1.3 Significance

This study contributes to the field of music education by providing a list of self-regulatory skills that could be taught to piano students by showing the importance of self-regulation and self-evaluation for a future career in performance. These strategies can be used as an in-class instruction by the teacher or as a reference for students at home for their daily practice sessions. Most of the research in piano pedagogy focuses on what happens in the piano classroom, and piano practice in the absence of the teachers receives little to no attention. The significance of this study lies in the fact that it doesn't collect its data from piano classes; rather, data collection is done throughout the week as students practice their repertoire on their own, in the absence of their teacher. Using a mixed qualitative-quantitative method, this study compares and contrasts a sample of students from the Lebanese National Higher Conservatory of Music and the Prague Conservatory, as well as the Czech Basic Art School. No comparison between the two samples has been done to date. This adds to the significance of the study, as the final list of self-regulatory skills is derived from the qualitative and quantitative data collected from students of these institutions, as both the Czech and Lebanese systems have

beneficial advantages and points of improvement to address in order to provide the best musical instruction to their students.

1.4 Definition of terms

1. Self-regulation: a process that emerges when students are metacognitively, motivationally, and behaviorally active participants in their own learning process.[8]
2. Self-efficacy: an individual's belief in their innate ability to achieve goals,[9] a personal judgment of how well one can execute courses of action required to deal with prospective situations.[10]
3. Self-evaluation: a process that involves looking at one's progress, development, and learning to determine what has improved and what areas still need improvement.[11]
4. Practice: an activity with the primary purpose of attaining and improving skills.[12]

1.5 Design

The following doctoral dissertation contains ten chapters:

1. The introduction includes the presentation of the topic, the advances made related to it in the past years, and the lacks that still need to be covered; motivation to the study; aims; and significance of the work, especially in regards to the work being a comparative study between students in Prague and student in Beirut; in addition to the definition of terms and design.
2. The second chapter introduces the theoretical background on which the current study is based, namely theories of self-regulation by McPherson and Zimmerman, other theories of self-regulation, such as the cyclical model of self-regulation, and theoretical

[8] ZIMMERMAN, B. J. 1986, p.308, as cited by BARTOLOME, S., J. Naturally emerging self-regulated practice behaviors among highly successful beginning recorder students. *Research studies in music education,* 2009, vol. 3, no. 1, pp.37-51. ISSN: 1321103X, p.38.
[9] SCHWARZER, R. – JERUSALEM, M. Generalized self-efficacy scale. In WEINMAN, J. – WRIGHT, S. – JOHNSTON, M. *Measures in health psychology: A user's portfolio. Causal and control beliefs*, 1995, Windsor, UK: NFER-NELSON pp. 35-37.
[10] BANDURA, A. Self-efficacy mechanism in human agency. *American psychologist,* 1982, vol 37, no. 2, pp. 122-147, ISSN: 0003-066X, p.122.
[11] Self-evaluation, http://www.businessdictionary.com/definition/self-evaluation.html. Retrieved June 6, 2019.
[12] ERICSSON, K. A. – KRAMPE, R. Th., – TESCH-ROMER, C. The role of deliberate practice in the acquisition of expert performance. *Psychological review,* 1993, vol. 100, no. 3, pp. 363-406. ISSN: 0033-295X, p. 367.

approaches to self-efficacy, including the social cognitive, social learning, self-concept, and attribution theories.

3. The third chapter surveys and reviews the available literature in the English, Czech, and French languages. Books, articles, doctoral dissertations, master's theses, conference proceedings, and other sources pertaining to the topic of this work are reviewed and presented in depth.
4. The following chapter sets forth the research questions and hypotheses of the study.
5. The fifth chapter introduces, compares, and contrasts the Lebanese National Higher Conservatory of Music in Beirut and the Prague Conservatory, in addition to the Basic Art School of Na Popelce in terms of their general structure and basic information, entry requirements, program and requirements for each year, graduation requirements, and practice rooms.
6. Chapter six displays the methodology of the study, its participants, time commitment, method, procedure, and data analysis.
7. Chapters seven presents the quantitative results.
8. Chapter eight presents the qualitative results.
9. The discussion of both quantitative and qualitative results can be found in chapter nine
10. The conclusion of the study in chapter ten. After having recapitulated the background of the study, its method, main results, and their ensuing discussion, the conclusion mentions the contributions of this study to the field, its limitations, and suggestions for future research.

2 Theoretical framework

This section explores the theoretical framework pertinent to the major independent variables of this study, self-regulation and self-efficacy. Zimmerman defines self-regulation as "a process that emerges when students are metacognitively, motivationally, and behaviorally active participants in their own learning process."[13] In this study, self-regulation is grounded on the model of McPherson and Zimmerman with its six dimensions: motive, method, time, behavior, physical environment, and social factors.[14] Two other theories of self-regulation are also briefly presented in this section: Zimmerman and Campillo's cyclical model of self-regulation and Baumeister's self-regulation theory. The second variable, self-efficacy, is based on four theoretical approaches: the social cognitive theory, the social learning theory, the self-concept theory, and the attribution theory. Additionally, self-efficacy is measured using the General Self Efficacy Scale by Schwarzer and Jerusalem. The authors of the scale define self-efficacy as a construct reflecting an optimistic self-belief. This is the belief that one can perform a novel or difficult task, or cope with adversity, in various domains of functioning.[15]

2.1 McPherson and Zimmerman's theory of self-regulation

McPherson and Zimmerman defined the construct of self-regulation as a "set of systematic efforts to direct thoughts, feelings and actions towards the attainment of one's goal."[16] Additionally, McPherson and Zimmerman proposed six behavioral dimensions of self-regulation (see Table 2.1). which include motive, method, time, behavior, physical environment, and social factors.[17]

[13] ZIMMERMAN, B. J. 1986, p.308, as cited by BARTOLOME, S., J. Naturally emerging self-regulated practice behaviors among highly successful beginning recorder students. *Research studies in music education,* 2009, vol. 3, no. 1, pp.37-51. ISSN: 1321103X, p.38.
[14] MCPHERSON, G. E. – ZIMMERMAN, B. J. Self-regulation on musical learning. In COLWELL, R. – WEBSTER, P. R. (eds.). *MENC handbook of research on music learning* (2nd ed.). Oxford University Press, 2011, pp. 130-175. ISBN: 978-0-19-975439-7.
[15] JERUSALEM, M., – SCHWARZER, R. Self-efficacy as a resource factor in stress appraisal processes. In SCHWARZER, R. *Self-efficacy: Thought control of action.* Washington, DC: Hemisphere, 1992, pp. 195-213.
[16] MCPHERSON, G. E. – ZIMMERMAN, B. J., 2002, as cited by SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808, p. 432.
[17] ZIMMERMAN, B. J. 1986, p.308, as cited by BARTOLOME, S., J. Naturally emerging self-regulated practice behaviors among highly successful beginning recorder students. *Research studies in music education,* 2009, vol. 3, no. 1, pp.37-51. ISSN: 1321103X, p.39.

Table 2.1

Dimensions of musical self-regulation, based on McPherson and Zimmerman (2002)

Psychological dimension	Self-regulation process
Motive	Self-set goals, self-reinforcement, and self-efficacy
Method	Self-initiated covert images and verbal strategies
Time	Time use is self-planned and managed
Behavior	Performance is self-monitored and evaluated
Physical Environment	Environments are structured by self
Social Factors	Help is sought personally

2.1.1 Motive

McPherson and Zimmermann explain that the motive dimension deals with students' own choices and self-motivational processes as well as with the "vicarious or direct reinforcement by others."[18] This dimension also explains how much worth students place over their learning process, choosing to pursue learning through musical practice.

2.1.2 Method

Santos and Gerling describe this dimension as planning and employing suitable strategies during practicing.[19] Method, therefore, involves practical steps and strategies that help in achieving a certain task at hand, as long as it is purposeful and self-determined[20] and thus contains increasingly advanced strategies to improve students' performance[21].

[18] MCPHERSON, G. E. – ZIMMERMAN, B. J., 2002, p.329, as cited by SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808, p. 433.

[19] SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.

[20] HALLAM S., 1997, as cited by SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.

[21] NIELSON K., 1999, as cited by SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.

2.1.3 Time

Time refers to a student's ability to plan and manage his or her time effectively within a deadline;[22] in other words, it refers to consistency of practice and time management.

2.1.4 Behavior

McPherson and Zimmerman characterize this dimension with "monitoring, evaluating, and controlling performance."[23] When problems surface and are recognized, the behavior dimension allows self-regulating students to choose, modify, and adapt their performance and practice. This means that the behavior dimension includes metacognition, that is thinking about thinking[24]. The behavior dimension comprises self-monitored performance and self-evaluated performance.

2.1.5 Physical environment

This dimension includes structuring the practice environment away from distractions.[25] McPherson and Zimmerman recognize the influence of distractions on the practice session. On the other hand, children also see the importance of this dimension of self-regulation every time their teacher asks them to sit with a correct posture or their mom turns of the television to avoid distraction.[26]

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[22] SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.
[23] MCPHERSON, G. E. – ZIMMERMAN, B. J. Self-regulation on musical learning. In COLWELL, R. – WEBSTER, P. R. *MENC handbook of research on music learning*. Oxford University Press, 2011, pp. 130-175. ISBN: 978-0-19-975439-7, p. 149.
[24] SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.
[25] SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.
[26] MCPHERSON, G. E. – ZIMMERMAN, B. J. Self-regulation on musical learning. In COLWELL, R. – WEBSTER, P. R. (eds.). *MENC handbook of research on music learning* (2nd ed.). Oxford University Press, 2011, pp. 130-175. ISBN: 978-0-19-975439-7.

2.1.6 Social factors

Piano students would be using this dimension of self-regulation when they actively seek information that might assist them in their practice sessions. While McPherson and Zimmermann speak of parents, teachers, siblings, and peers as the main sources of assistance, they also stress the importance of books and recordings.[27] Santos and Gerling also speak of live performance and web performances (such as YouTube videos).[28]

2.2 Other theories of self-regulation

There are numerous theories of self-regulation, but for the purposes of this study, two theories are hereby presented: the cyclical model of self-regulation by Zimmerman and Campillo and the self-regulation theory (SRT) by Baumeister.

2.2.1 The cyclical model of self-regulation

Zimmerman and Campillo conceptualized self-regulation as a cyclical process and determined the cyclical phases of self-regulation: forethought, volitional control, and self-reflection (see Figure 2.1).[29]

The forethought phase is based on task analysis (goal setting and strategic planning) and management of self-motivation beliefs (self-efficacy, outcome expectation, and intrinsic motivation).[30] An example of strategic planning for a musician, for instance, is to stop performing warm up material from the printed score and start playing the memorized text. Other

[27] MCPHERSON, G. E. – ZIMMERMAN, B. J. Self-regulation on musical learning. In COLWELL, R. – WEBSTER, P. R. (eds.). *MENC handbook of research on music learning* (2nd ed.). Oxford University Press, 2011, pp. 130-175. ISBN: 978-0-19-975439-7.
[28] SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.
[29] ZIMMERMAN, B.J. – CAMPILLO, M., 2003, as cited by LUDOVICO, L. A. – MANGIONE, G. R. Self-regulation competence in music education. *International Association for Development of the Information Society*. Paper presented at the International Conference e-Learning 2014. Multi Conference on Computer Science and Information Systems, Lisbon, Portugal, Jul 15-19, 2014. ISBN: 978-989-8704-08-5, p.48.
[30] MCPHERSON, G. E. From child to musician: skill development during the beginning stages of learning an instrument. *Psychology of music*, 2005, vol. 33, no. 1, pp. 5-35. ISSN 0305-7356.

strategies include hand annotations written on the score or well-known techniques of sight-reading.[31]

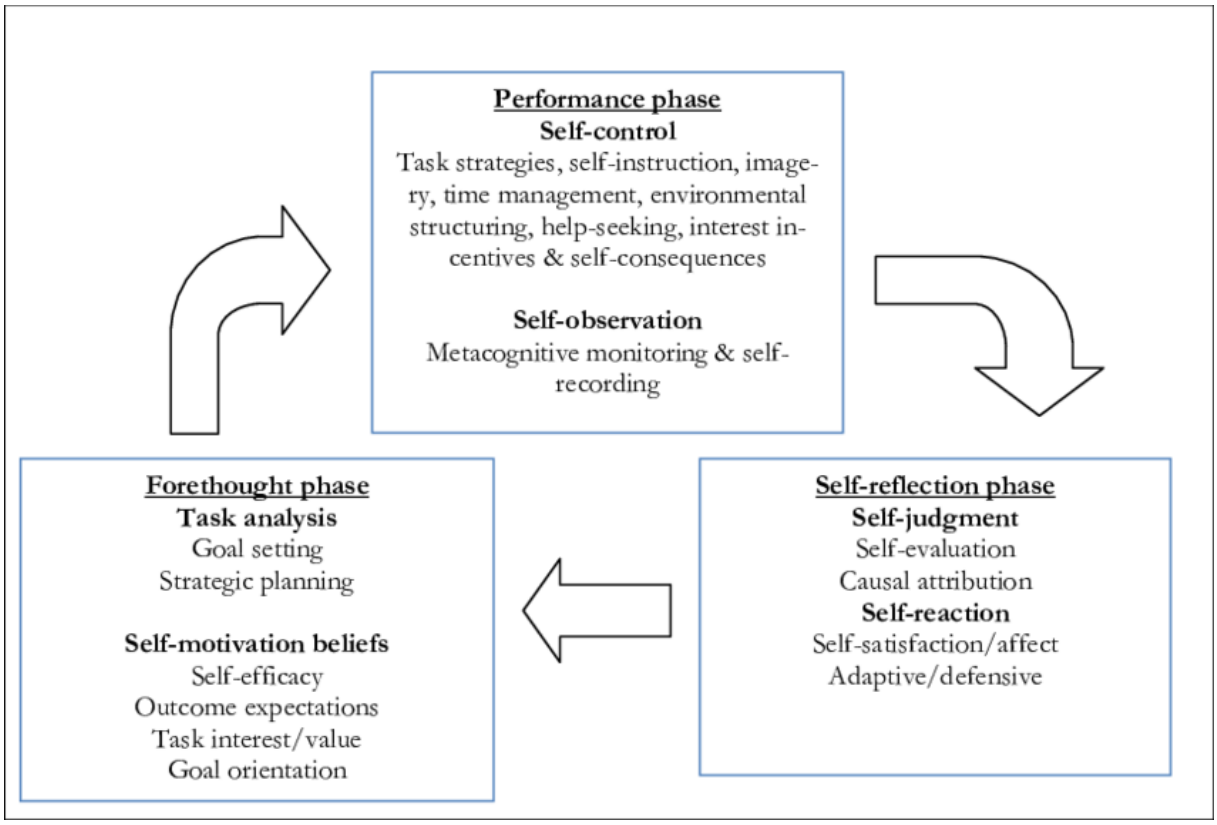

Figure 2.1: Cyclical phases of self-regulation by Zimmerman and Campillo

Volitional control (also known as performance control) comprises self-control and self-observation. Self-control includes self-instruction, imagery, attention, and focusing on inner self-speech, also known as positive self-talk. Self-observation incorporates self-recording (recording your own practice session or performance) and self-experimentation. These methods of control in self-regulated learning could be displayed through three kinds of representation:

1. an aural representation of the target performance (i.e. how the piece should be played)
2. a motor representation of the physical actions required

[31] MCPHERSON, G. E. – RENWICK, J. M. A longitudinal study of self-regulation in children's musical practice. *Music education research,* 2001, vol. 3, no. 2, pp.169-186. ISSN: 1461-380-8.

3. the representation of the current performance, which is constantly monitored and compared to the performance of reference the musician has in mind[32]

Finally, self-reflection happens in the final stage when learners review their performance toward final goals, while focusing on their learning strategies during the process. This phase consists of self-evaluation, causal attribution, self- satisfaction/affect, and adaptivity. A high self-satisfaction level will push students towards new goals and challenges.[33]

2.2.2 Self-regulation theory (SRT) by Baumeister

Baumeister, one of the leading social psychologists who have studied self-regulation, asserts that self-regulation has four components: standards of desirable behavior, motivation to meet these standards, monitoring of situations and thoughts that precede breaking said standards, and lastly, willpower. He expresses that self-regulation is complex and multifaceted and mentions three elements of self-regulation that result in either success or failure in self-regulating.

The first, similar to the first component of self-regulation, is standards. Baumeister asserts that without specific ideals for standards, there may be conflicting dilemmas that will result in an absence of self-regulation. The second element is monitoring, and when it is absent, people tend to lose control of success and attentiveness to behaviors. For example, individuals who undermine their competence to fulfill a task may not even attempt to reach that goal. The third, more complex element states that cognitive processes are initiated to accommodate states or behaviors that are falling short to reach a goal or standard. Baumeister concludes his theory with the hypothesis that an individual must almost certainly work through prompt

[32] ZIMMERMAN, B.J. – CAMPILLO, M., 2003, as cited by LUDOVICO, L. A. – MANGIONE, G. R. Self-regulation competence in music education. *International Association for Development of the Information Society*. Paper presented at the International Conference e-Learning 2014. Multi Conference on Computer Science and Information Systems, Lisbon, Portugal, Jul 15-19, 2014. ISBN: 978-989-8704-08-5.
[33] ZIMMERMAN, B.J. – CAMPILLO, M., 2003, as cited by LUDOVICO, L. A. – MANGIONE, G. R. Self-regulation competence in music education. *International Association for Development of the Information Society*. Paper presented at the International Conference e-Learning 2014. Multi Conference on Computer Science and Information Systems, Lisbon, Portugal, Jul 15-19, 2014. ISBN: 978-989-8704-08-5.

circumstances by considering long haul suggestions just as having an organized feeling of unwinding and a sound feeling of motivation control.[34,35]

2.3 Theoretical approaches to self-efficacy

Self-efficacy is defined as "how well one can execute courses of action required to deal with prospective situations".[36] Higher levels of self-efficacy, coupled with sufficient effort and good execution, lead to successful outcomes, whereas lower level of self-efficacy result in failure due to a lack of effort. Psychologists have studied self-efficacy from many different perspectives, examining different paths and influences in the development of self-efficacy. Hence, this study surveys four different theoretical approaches to self-efficacy: the social cognitive theory, the social learning theory, the self-concept theory, and the attribution theory.

2.3.1 Social cognitive theory

Psychologist Albert Bandura has defined self-efficacy as one's belief in one's ability to succeed in specific situations or accomplish a task. The manner in which one approaches goals, tasks, and challenges is largely dependent on their self-efficacy.[37] Therefore, any theory of self-efficacy would lie at the center of Bandura's social cognitive theory, which emphasizes the role of observational learning and social experience in the development of personality. The crux of social cognitive theory is that one's actions and reactions, as well as social behaviors and cognitive processes in different situations are influenced by the actions that one has observed in others. Since self-efficacy is developed from external experiences on one hand and self-perception on the other hand, both influential in determining the outcome of many events, it is an important aspect of social cognitive theory. Self-efficacy represents the personal perception of external social factors. According to Bandura's theory, people either view difficult tasks as

[34] BAUMEISTER, R. F. – SCHMEICHEL, J. B. – VOHS, K. D. Self-regulation and the executive function: the self as controlling agent. In KRUGLANSKI, A. W. – HIGGINS, E. T. *Social psychology: handbook of principles* (second edition). New York: Guilford, 2007, pp.516-539. ISBN: 978-1-57230-918-0.
[35] MURAVEN, M. – BAUMEISTER, R. F. Self-regulation and depletion of limited resources: does self-control resemble a muscle? *Psychological bulletin,* 2000, vol. 126, no. 2, pp. 247-259. ISSN: 0033-2909.
[36] BANDURA, A. Self-efficacy mechanism in human agency. *American psychologist,* 1982, vol 37, no. 2, pp. 122-147, ISSN: 0003-066X, p.122.
[37] LUSZCZYNSKA, A. – SCHWARZER, R. Social cognitive theory. In CONNER, M. – NORMAN, P. (eds.). *Predicting health behaviour* (2nd ed. rev. ed.). Buckingham, England: Open University Press, 2005, pp. 127–169. ISBN 978-0335-21176-0.

challenges that could be mastered (those with higher levels of self-efficacy) and believe they can perform well, or they view these tasks as something to be avoided.[38]

2.3.2 Social learning theory

There are some skills that are developed solely, or at least primarily, within a social group. Social learning is a process that happens within the social context and depends on whether individuals succeed or fail at dynamic interactions within the groups they belong to. It also encourages the development of individual emotional and practical skills, in addition to an accurate perception of self and acceptance of others. Similar to Bandura's theory of social cognition, this theory also asserts that people learn from each another through observation, imitation, and modeling. Self-efficacy exhibits an individual's understanding of what skills one can offer in a group setting.[39]

2.3.3 Self-concept theory

In line with the aforementioned theories, the self-concept theory sheds light on how people perceive and interpret their own existence from clues they receive from external sources, focusing on how these impressions are organized and the extent to which they are active throughout life. How people learn to view themselves and their relationships with others has a profound influence on how they view successes and failures. This theory describes self-concept as learned and not present at birth.[40]

2.3.4 Attribution theory

Attribution theory focuses on how people attribute events and how those beliefs interact with self-perception. Self-efficacy is directly and reciprocally related with causal attributions.[41]

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[38] BANDURA, A. Self-efficacy mechanism in human agency. *American psychologist,* 1982, vol 37, no. 2, pp. 122-147, ISSN: 0003-066X.
[39] ORMROD, J. E. *Human learning* (6th ed.). Upper Saddle River, NJ: Prentice-Hall, 2011, 624 pages. ISBN: 978-0-13-259518-6.
[40] MCADAM, E. K. Cognitive behavior therapy and its application with adolescents. *Journal of Adolescence*, 1986, vol. 9, no. 1, pp. 1–15. ISSN: 0140-1971.
[41] STAJKOVIC, A. D. – SOMMER, S. M. Self-efficacy and causal attributions: Direct and reciprocal links. *Journal of Applied Social Psychology*. 2000, vol. 30, no. 4, pp. 707–737. ISSN: 1559-1816.

This theory comprises three major elements: locus (internal or external), stability, and controllability.

For instance, if locus is internal, self-esteem and self-efficacy will increase following successes and decrease following failures and vice versa. Stability, on the other hand, describes whether the cause to which one attributes events is perceived as static or dynamic over time. When people attribute their failures to stable factors (such as the difficulty of a task), for example, they will expect to fail in that task in the future. Controllability describes whether a person feels actively in control of the attributed cause. Failure at certain tasks diminish feelings of control and lead to feelings of humiliation, shame, or anger.[42]

[42] CSIKSZENTMIHALYI, M. *The masterminds series. Finding flow: The psychology of engagement with everyday life* (1st ed.). New York, NY, US: Basic Books, 1997, 192 pages. ISBN: 978-0465024117.

3 Literature review

This chapter surveys, summarizes, and thematically presents a review of the literature pertaining to the topic of this work. Books, articles, doctoral dissertations, master's theses, conference proceedings, and other sources pertaining to the topic of this work are reviewed and presented in depth.

3.1 The monotonic benefits assumption

Up to the last two decades, the predominant theory regarding practice and its effect on improved performance was based largely on the monotonic benefits assumption, which stated that the quality of the performance is directly related to the amount of deliberate practice,[43] therefore it was believed that the more number of hours go into practice, the better the result would be.

In their article, The Role of Deliberate Practice in the Acquisition of Expert Performance, Ericsson, Krampe, and Tesch-Römer mention the famous 10-year rule for expertise as devised by Simon and Chase in 1973 regarding chess players. The 10- year rule, a decade's preparation to become an expert, is supported in many domains, even music, as even child prodigy composers who start composing at the age of six do not compose their masterpieces until the age of 16.[44] "Ericsson et al. (1993) found that the amount of accumulated practice reported by expert pianists in their sample was estimated at more than 10 times higher than that for amateurs. By the age of 20, pianists in this expert group estimated that they had practiced 10000 hours by the start of their performing careers."[45] The original study by Ericsson et al. had divided the participants into four levels in increasing proficiency. Their results revealed that pianists of the highest level had longer practice sessions, a fact in line with the monotonic benefits assumption. Williamon and Valentine state that this might be so because amateurs spend the same amount of time practicing as they ignore their strengths and weaknesses, while experts may focus on a particular skill or section until perfection is attained.

[43] ERICSSON, K. A. – KRAMPE, R. Th., – TESCH-ROMER, C. The role of deliberate practice in the acquisition of expert performance. *Psychological review,* 1993, vol. 100, no. 3, pp. 363-406. ISSN: 0033-295X.
[44] ERICSSON, K. A. – KRAMPE, R. Th., – TESCH-ROMER, C. The role of deliberate practice in the acquisition of expert performance. *Psychological review,* 1993, vol. 100, no. 3, pp. 363-406. ISSN: 0033-295X.
[45] WILLIAMON, A. – VALENTINE, E. Quantity and quality of musical practice as predictors of performance quality. British journal of psychology, 2000, vol. 91, no. 1, pp. 353-376. ISSN: 2044-8295, p. 354.

Also highly skilled pianists have developed more physical stamina over the years to endure the physical demands of practice.

McPherson studied music students for three years, and each year he asked the parents to choose a piece which would make their child stand out. Adjudicators scored the performances based on different standard, such as clarity of notes, musicality, sound quality, etc. These students scored much higher in the second and third years than the first year. One variable that was controlled for in this study was the amount of "deliberate practice",[46] a term coined by Ericsson and his colleagues. McPherson followed these students for three years and noticed that these students spent an increase number of hours in practice in the second and third years respectively. Hence, he concluded that the amount of deliberate practice improves performance.[47]

3.1.1 The three constraints

Inherent within the monotonic benefit assumptions lies the idea of the three constraints: resource constraint, effort constraint, and motivational constraint. While Ericsson viewed these constraints as related to quantity of practice, other researchers[48] have seen these constraints as evidence that quantity of practice alone cannot account for quality of results. Even the term coined by Ericsson, "deliberate practice" hints that practice is not only drill work done mechanically; rather it is deliberate, planned, and executed according to certain goals.[49] Ericsson explain the elements of the three constraints that need to be necessary in order for practice to aid in quality of performance. In other words, the absence of these elements jeopardizes improved performance.

The resource constraint includes "available time, energy, and access to teachers, training material, and training facilities"; the effort constraint involves avoiding exhaustion and practicing so much as to be able to recover; and the motivational constraint focuses on "viewing

[46] ERICSSON, K. A. – KRAMPE, R. Th., – TESCH-ROMER, C. The role of deliberate practice in the acquisition of expert performance. *Psychological review,* 1993, vol. 100, no. 3, pp. 363-406. ISSN: 0033-295X.
[47] MCPHERSON, G. E. From child to musician: skill development during the beginning stages of learning an instrument. *Psychology of music*, 2005, vol. 33, no. 1, pp. 5-35. ISSN 0305-7356.
[48] BARTOLOME, S., J. Naturally emerging self-regulated practice behaviors among highly successful beginning recorder students. *Research studies in music education,* 2009, vol. 3, no. 1, pp.37-51. ISSN: 1321103X.
[49] SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.

practice as instrumental in achieving further improvements in performance."[50] The resource constraint has a parallel in McPherson and Zimmerman's six dimensions of self-regulation.[51,52] Two of these dimensions are "time" and "social factors". The time dimension includes time spent practicing, naturally, and also time spent planning for practice.[53] The social factors dimensions includes making use of and benefiting from materials available, such as videos, books, and help from adults.[54]

The effort constraint involves the physical dimension of students, namely fatigue to the point of unproductivity. Performance would not improve if the student is exhausted and working counterproductively, thus shedding light on the limited perspective of the monotonic benefits assumption.[55]

The motivational constrained is best explained by the MUSIC model of academic motivation. The MUSIC model – eMpowerment, Usefulness, Success, Interest, Caring – not only increase student motivation, but they result in increased student learning.[56]

[50] ERICSSON, K. A. – KRAMPE, R. Th., – TESCH-ROMER, C. The role of deliberate practice in the acquisition of expert performance. *Psychological review,* 1993, vol. 100, no. 3, pp. 363-406. ISSN: 0033-295X, pp. 370-372.
[51] MCPHERSON, G. E. – ZIMMERMAN, B. J. Self-regulation on musical learning. In COLWELL, R. – WEBSTER, P. R. (eds.). *MENC handbook of research on music learning* (2nd ed.). Oxford University Press, 2011, pp. 130-175. ISBN: 978-0-19-975439-7.
[52] See Chapter 3.3.1
[53] SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.
[54] MCPHERSON, G. E. – ZIMMERMAN, B. J. Self-regulation on musical learning. In COLWELL, R. – WEBSTER, P. R. (eds.). *MENC handbook of research on music learning* (2nd ed.). Oxford University Press, 2011, pp. 130-175. ISBN: 978-0-19-975439-7.
[55] LUDOVICO, L. A. – MANGIONE, G. R. Self-regulation competence in music education. *International Association for Development of the Information Society*. Paper presented at the International Conference e-Learning 2014. Multi Conference on Computer Science and Information Systems, Lisbon, Portugal, Jul 15-19, 2014. ISBN: 978-989-8704-08-5.
[56] JONES, B. D. Motivating students to engage in learning: The MUSIC model of academic motivation. *International journal of teaching and learning in higher education*, 2009, vol. 21, no. 2, pp. 272-285. ISSN: 1812-9129.

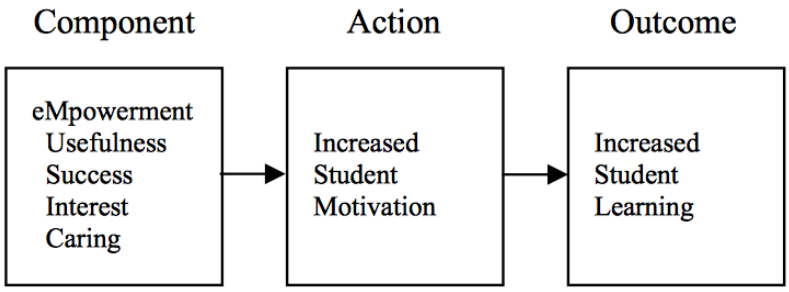

Figure 3.1: The MUSIC model of student motivation

Further studies[57] have found out that not only extrinsic but also intrinsic motivation improve performance, since intrinsic motivation overlaps with self-regulation. Students' self-perceptions of how efficient their practice is showed to be influenced by not only their self-regulation but also their motivational beliefs. Czech piano pedagogue Libuše Tichá affirms that motivation is essential in the lives of piano students, especially at the early stages. The job of the teacher is to plant the motivation to learn the piano in their young students, as well as giving them ample chances to perform. The reason for the latter is that the idea of performance in front of friends and family creates an element of motivation, which improves practice sessions, and ameliorates performance.[58]

Motivation also depends on the situation. Studies have found a clear distinction in motivation and practice times between practicing in preparation for a performance versus practicing without having an upcoming performance. "Music students increase their practice times when practicing for an upcoming performance. Thus, an upcoming performance seems to have an extrinsically motivating effect." (see Figure 3.2).[59]

[57] MIKSZA, P. An exploratory investigation of self-regulation and motivational variables in the music practice of junior high band students. *Contributions to music education*, 2006, vol. 33, no. 2, pp. 9-26. ISSN: 01904922.
[58] TICHÁ, L. *Slyšet a myslet u klavíru* [Listening and thinking at the piano] (1st ed.). Praha: Akademie múzických umění v Praze, 2009, 176 pages. ISBN: 978-80-7331-151-3.
[59] HARNISCHMACHER, C. The effects of individual differences in motivation, volition, and maturational processes of practice behavior of young instrumentalists. In Jørgensen, H. – Lehmann, A. C. (eds.). *Does practice make perfect? Current theory and research on instrumental music practice* (1st ed.). Oslo: Norges musikkhøgskole, 1997, 231 pages. ISBN: 8278530076, p. 72.

	Concert preparation	No concert preparation
Ideal time*	39.16	36.26
Maximum time**	32.77	29.33
Minimum time**	14.44	11.41
Practice days***	4.69	4.69
Days with listeners***	1.08	1.37

Note: *Minutes per day in one week, **Minutes of one day in the last week, ***related to the last week.

Figure 3.2: Difference between concert preparation and no concert preparation

3.1.2 The refutation of the monotonic benefits assumption

Following the findings of different research studies, such as the ones mentioned in the previous section, research about practice and improved performance started moving away from the monotonic benefits assumption, where quantity of practice is the sole (or at least major) contributor to improved performance, and started to look into other factors that enhance or impeded performance.

Williamson and Valentine, for instance, point out that not all demands of practice are physical. Whether students or experts, musicians have to deal with challenges on the cognitive, perceptual, and motor skills level both during practice and performance.[60] Also, Ericsson himself stated that preparation time is not the only variable, but also that level of performance can be increase even by highly experienced individuals as a result of deliberate efforts to improve.[61] He also defined deliberate practice as practice that includes activities that have been specifically designed to improve the current level of performance.[62] He then listed two characteristics of deliberate practice: change of methods/discovering new methods and refining

[60] WILLIAMON, A. – VALENTINE, E. Quantity and quality of musical practice as predictors of performance quality. British journal of psychology, 2000, vol. 91, no. 1, pp. 353-376. ISSN: 2044-8295, p. 354.
[61] ERICSSON, K. A. – KRAMPE, R. Th., – TESCH-ROMER, C. The role of deliberate practice in the acquisition of expert performance. *Psychological review,* 1993, vol. 100, no. 3, pp. 363-406. ISSN: 0033-295X.
[62] p. 368

methods in response to errors and violated expectations. By this he was paving the way away from the monotonic benefits assumptions into what would be known as self-regulation.

In an extensive literature review, Marcos Vinícius Araújo also refutes the monotonic benefits assumption theory by mentioning factors that contribute to the quality of performance in addition to the amount of time spent practicing. In his review of literature, Araújo cites four factors: good use of time in practice, time spent in formal practice, self-efficacy beliefs, and the use of cognitive and metacognitive strategies.[63] His first and second factor go hand in hand to show that it is not only the quantity of formal practice but the good use of that quantity. This shows that quantity and quality of practice go hand in hand.[64] His third and fourth factors are already out of the realms of quantity, a clear refutation of the long-held beliefs of the exclusivity of number of hours of practice in the improvement of performance among piano students.

3.2 Practice

Practice is defined as an activity with the primary purpose of attaining and improving skills.[65] Gregor states that the goal is practice is to constantly improve.[66] Franz Liszt believes that some parents force their kids into mechanical practice, with no link to love or beauty. All they care about is success and virtuosity, in the absence of soul, thinking, and hearing. He warns against this kind of practice, which he calls drill practice, and shows its dangers.[67] Tichá asserts that practice should be motivated, conscious, concentrated, goal-oriented, conceptual, regular, and inventive. In order for practicing to reach its goals and be effective, students need to know what problems there are to resolve, concentrate on them, find methods and ways to solve them, in addition to finding conceptual strategies and persisting regularly.[68] She creates an analogy between piano practice and the practice of Hatha yoga. The principles of Hatha yoga are

[63] ARAÚJO, M. V. Development of a measure of self-regulated practice behavior in skilled performers. Paper presented at the International symposium on performance science, 2013. European Association of Conservatoires (AEC), Brussels, Belgium, 2013. ISBN: 978-2-9601378-0-4.
[64] WILLIAMON, A. – VALENTINE, E. Quantity and quality of musical practice as predictors of performance quality. British journal of psychology, 2000, vol. 91, no. 1, pp. 353-376. ISSN: 2044-8295, p. 354.
[65] ERICSSON, K. A. – KRAMPE, R. Th., – TESCH-ROMER, C. The role of deliberate practice in the acquisition of expert performance. *Psychological review,* 1993, vol. 100, no. 3, pp. 363-406. ISSN: 0033-295X, p. 367.
[66] GREGOR, V. *Jak studovat klavírní repertoár* (1st ed.). Praha: Karolinum, 2012, 88 pages. ISBN: 978-80-7290-599-7.
[67] NEUHAUS, H. *L'art du piano* [The art of playing the piano] (1st ed.). Paris: Éditions Van de Velde, 1996, 239 pages: ISBN: 978-2-85868-013-2. Translated from the original Russian language by Olga Pavlov and Paul Kalinine.
[68] TICHÁ, L. *Slyšet a myslet u klavíru* [Listening and thinking at the piano] (1st ed.). Praha: Akademie múzických umění v Praze, 2009, 176 pages. ISBN: 978-80-7331-151-3.

controlling the mind and body and letting go of external effects. This kind of yoga works on the spiritual, psychological, physical, and behavioral dimensions, and the person practicing it feels good, happy, and in harmony. If the goal of life is to be happy, so should the process. Similarly, students should feel good, happy, and in harmony during and after their piano practice.

Chaffin and Logan conclude their study on how concert soloists prepare for performance by stating that "a performance must be practiced to the point that it can be delivered automatically and reliably under pressure. At the same time, it must remain flexible enough to permit recovery from mistakes, which can occur, no matter how thoroughly the musician prepares."[69] Even anticipated stress is a good element during practice. When students imagine or envision themselves performing in front of a public, they experience anticipated stress, which prepares them for the actual stress of the performance.[70]

Another very important aspect of practicing is training the fingers. Different music pedagogues and researchers have different ideas on how finger training is best done. For instance, Chang prefers the C position, fingers of the hand placed on C-D-E-F-G respectively, practicing each finger separately, while pressing the other keys gently or holding fingers silently at the top of the keys.[71] On the other hand, Tichá mentions two different schools when it comes to finger technique. Firstly, she mentions Moscheles, who claims that all fingers should have the same strength and sound the same. Therefore, he advises students to practice accordingly. Chopin, in contrast, mentions that each finger had its individuality, and it would be going against nature to ask them all to play using the same strength. There are as many different kinds of sounds as there are fingers, so students should do their best to highlight that.[72] Finally, Gregor suggests two ways in which fingering can help solve difficult technical problems. First, fingers

[69] CHAFFIN, R. – LOGAN, T. R. Practicing perfection: How concert soloists prepare for performance. *Advances in cognitive psychology*, 2006, vol. 2, no.2-3, pp. 113-130. ISSN: 1895-1171, p. 140.
[70] HARNISCHMACHER, C. The effects of individual differences in motivation, volition, and maturational processes of practice behavior of young instrumentalists. In Jørgensen, H. – Lehmann, A. C. (eds.). *Does practice make perfect? Current theory and research on instrumental music practice* (1st ed.). Oslo: Norges musikkhøgskole, 1997, 231 pages. ISBN: 8278530076.
[71] CHANG, C. C. *Fundamentals of piano practice* (1st ed.). Greenville: BookSurge Publishing, 266 pages. ISBN: 978-419678592.
[72] TICHÁ, L. *Slyšet a myslet u klavíru* [Listening and thinking at the piano] (1st ed.). Praha: Akademie múzických umění v Praze, 2009, 176 pages. ISBN: 978-80-7331-151-3.

should be in maximum contact with keys. Second, the pianist must take maximum time to shape sound.[73]

Finally, practice is very personal, and there is no universal formula. Physical and psychological methods depend on the reasons of practice, such as learning a new piece, a particular passage, preparing for exams or competitions, etc.[74]

3.3 Self-regulation in practicing

Although Ericsson stated, "skill improvement is attained through solitary deliberate practice,"[75] salient qualitative properties of practice (e.g. task analysis, goal setting, strategy choice, self-monitoring, and self-evaluation) have been recently studied as key components of self-regulation in music students. [76,77] Araújo, for instance, has come up with five dimensions of self-regulation: self-efficacy, goal orientation, goal setting, metacognition, and self-evaluation. According to him, "testimonials on self-regulation strategies have been presented as predictors of performance improvement."[78] Bartolome concludes her research with the idea that self-regulation is teachable. She believes the music education community can benefit from the "'teachability' of self-regulation, as it relates to music practice and the effect such instruction has on performance achievement and instrumental skill."[79]

[73] GREGOR, V. *Jak studovat klavírní repertoár* (1st ed.). Praha: Karolinum, 2012, 88 pages. ISBN: 978-80-7290-599-7.
[74] TICHÁ, L. *Slyšet a myslet u klavíru* [Listening and thinking at the piano] (1st ed.). Praha: Akademie múzických umění v Praze, 2009, 176 pages. ISBN: 978-80-7331-151-3.
[75] ERICSSON, K. A. – KRAMPE, R. Th., – TESCH-ROMER, C. The role of deliberate practice in the acquisition of expert performance. *Psychological review,* 1993, vol. 100, no. 3, pp. 363-406. ISSN: 0033-295X, p. 366.
[76] MCPHERSON, G. E. – ZIMMERMAN, B. J. Self-regulation on musical learning. In COLWELL, R. – WEBSTER, P. R. (eds.). *MENC handbook of research on music learning* (2nd ed.). Oxford University Press, 2011, pp. 130-175. ISBN: 978-0-19-975439-7.
[77] SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.
[78] ARAÚJO, M. V. Development of a measure of self-regulated practice behavior in skilled performers. Paper presented at the International symposium on performance science, 2013. European Association of Conservatoires (AEC), Brussels, Belgium, 2013. ISBN: 978-2-9601378-0-4, p. 106.
[79] BARTOLOME, S., J. Naturally emerging self-regulated practice behaviors among highly successful beginning recorder students. *Research studies in music education,* 2009, vol. 3, no. 1, pp.37-51. ISSN: 1321103X, p. 49.

3.3.1 McPherson and Zimmerman's six dimensions of self-regulation

Zimmerman defines self-regulating as "a process that emerges when students are metacognitively, motivationally, and behaviorally active participants in their own learning process."[80] Additionally, McPherson and Zimmerman have proposed six behavioral dimensions of self-regulation[81], which have since been used in multiple studies on self-regulation[82].

One of these studies was done in Brazil by Santos and Gerling. These researchers studied piano students at the undergraduate and graduate level who were asked to prepare a short piece without teacher supervision in order to study the process of self-regulation. Their results showed that most of the participants talked about method during the interviews (72%), followed by behavior (16%) and social/cultural factors (12%), which reveals that it is easier to talk about (and regulate) ways of doing rather than ways of thinking. Their experiment found out that, overall, global coherence and phrase contour are closely related and most focused on, which means that with correct phrasing, the piece will overall sound nice. Some participants lost the expressive side at the expense of getting accurate note and rhythm, while others messed up on note and rhythm (and tempo) while trying to execute appropriate phrasing.[83]

On the other hand, Bartolome found that all six dimensions of self-regulation were present among the practice behaviors of the three elementary recorder students that she studied, although none of them were explicitly taught how to use self- regulation. Although the three students each relied more on certain dimensions than others, they used all six dimensions. Bartolome states that her results have major implications for educators, mainly to teach self-regulatory skills instead of assigning a set time limit for practice.[84] Her implications are at a stark contrast with the monotonic benefits assumption.

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[80] ZIMMERMAN, 1986, p. 308, as cited by BARTOLOME, S., J. Naturally emerging self-regulated practice behaviors among highly successful beginning recorder students. *Research studies in music education,* 2009, vol. 3, no. 1, pp.37-51. ISSN: 1321103X, p. 38.
[81] See Table 1, Chapter 2.1
[82] BARTOLOME, 2009; SANTOS and GERLING, 2011
[83] SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.
[84] BARTOLOME, S., J. Naturally emerging self-regulated practice behaviors among highly successful beginning recorder students. *Research studies in music education,* 2009, vol. 3, no. 1, pp.37-51. ISSN: 1321103X.

3.3.1.1 Motive

The motive dimension of self-regulation includes students' own choices and self-motivational processes as well as with the "vicarious or direct reinforcement by others."[85] This dimension also explains how much worth students place over their learning process, choosing to pursue learning through musical practice. In other words, the motive dimension comprises two sub-dimensions, self-set goals and self-reinforcement.[86] Motivation is a large part of the motive method, since motivated students tend to pay attention to the task at hand, use effective learning strategies and skills, and ask for help from different sources when needed.[87] In other words, motivated students have the motive to self-regulate, setting and achieving their goals. Zimmerman interviewed many students, and most of them claimed that when they lack the motivation to practice, they just force themselves to practice longer.[88] That is why, the first dimension of self-regulation, motive, focuses on the awareness that students have in realizing the gaps and the problematic areas, setting the appropriate goals, and rewarding themselves when these goals are met.[89]

3.3.1.2 Method

Method involves practical steps and strategies that help in achieving a certain task at hand, as long as it is purposeful and self-determined[90] and thus contains increasingly advanced strategies to improve students' performance.[91] Santos and Gerling describe this dimension as

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[85] MCPHERSON, G. E. – ZIMMERMAN, B. J., 2002, p.329, as cited by SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808, p. 433.

[86] MCPHERSON, G. E. – ZIMMERMAN, B. J. Self-regulation on musical learning. In COLWELL, R. – WEBSTER, P. R. (eds.). *MENC handbook of research on music learning* (2nd ed.). Oxford University Press, 2011, pp. 130-175. ISBN: 978-0-19-975439-7.

[87] JONES, B. D. Motivating students to engage in learning: The MUSIC model of academic motivation. *International journal of teaching and learning in higher education*, 2009, vol. 21, no. 2, pp. 272-285. ISSN: 1812-9129.

[88] ZIMMERMAN, B. Self-regulated learning and academic achievement: An overview. *Educational psychologist*, 1990, vol. 25, no. 1, pp. 3-17. ISSN: 0046-1520.

[89] MCPHERSON, G. E. – ZIMMERMAN, B. J. Self-regulation on musical learning. In COLWELL, R. – WEBSTER, P. R. (eds.). *MENC handbook of research on music learning* (2nd ed.). Oxford University Press, 2011, pp. 130-175. ISBN: 978-0-19-975439-7.

[90] HALLAM S., 1997, as cited by SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.

[91] NIELSON K., 1999, as cited by SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.

planning and employing suitable strategies during practicing.[92] The method dimension can be further divided into two sub-dimensions: self-initiated correct images and technical aspects.

3.3.1.2.1 Self-initiated correct images

Mental imagery is one of the most important elements of a good performance. Technique alone is never enough; students have to use mental images in order to have good musicality, which, in turn helps, technique as well.[93] In a lengthy systematic review of self-regulation and music learning, Varela, Abrami, and Upitis classified mental imagery as an essential element of not only self-regulation but also of self-control, in addition to technical prowess.[94] In other words, as students master self-control over technical matters, such as speed, they are to focus on acquiring the correct mental imagery of their repertoire also, if they want to be self-regulated students. McPherson also identified mental imagery as one of the predictors of a successful performance.[95] Finally, Neuhaus insists that even the simplest melodies should have character, thinking, and imagination.[96]

3.3.1.2.2 Technical aspects

Technical aspects of the method dimension include speed (working slowly, using a metronome), practicing each hand alone, adjusting fingering, pedaling, and memorization. Gregor lists seven phases of preparing repertoire. In his list he places memorization before faster practice. Students should have the piece memorized in slow tempo before they attempt to play faster, of course always using the metronome. He then continues the list with three phases of stabilization before students could perform the piece in public.[97]

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[92] SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.
[93] TICHÁ, L. *Slyšet a myslet u klavíru* [Listening and thinking at the piano] (1st ed.). Praha: Akademie múzických umění v Praze, 2009, 176 pages. ISBN: 978-80-7331-151-3.
[94] VARELA. W. – ABRAMI, P. C. – UPITIS, R. Self-regulation and music learning: a systematic review. *Psychology of music*, 2014, vol. 44, no. 1, pp. 55-74. ISSN: 03057356.
[95] MCPHERSON, G. E. From child to musician: skill development during the beginning stages of learning an instrument. *Psychology of music*, 2005, vol. 33, no. 1, pp. 5-35. ISSN 0305-7356.
[96] NEUHAUS, H. *L'art du piano* [The art of playing the piano] (1st ed.). Paris: Éditions Van de Velde, 1996, 239 pages: ISBN: 978-2-85868-013-2. Translated from the original Russian language by Olga Pavlov and Paul Kalinine.
[97] GREGOR, V. *Jak studovat klavírní repertoár* (1st ed.). Praha: Karolinum, 2012, 88 pages. ISBN: 978-80-7290-599-7.

Chaffin and Logan explored another aspect of the importance of speed and tempo in practice. They measured the speed of musicians during their practice sessions and realized that major change of speed are indicators of hesitation. Early practice sessions showed more hesitation than later practice sessions, where tempo was more consistent (see Figure 3.3).[98]

The great Carl Czerny summarizes the method dimension by offering three phases of practice that result in a successful performance:

1. play slow with correct fingering (fingering)
2. play step by step faster (speed)
3. think of how to present it, elaborating different shades (mental imagery)

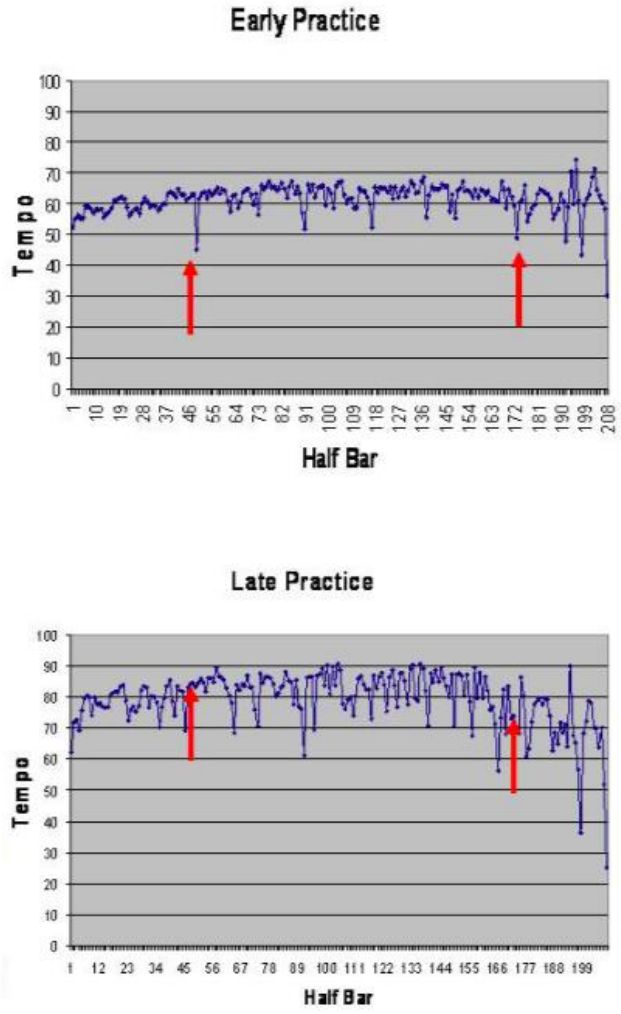

Figure 3.3: Speed in early versus late practice sessions

[98] CHAFFIN, R. – LOGAN, T. R. Practicing perfection: How concert soloists prepare for performance. *Advances in cognitive psychology*, 2006, vol. 2, no.2-3, pp. 113-130. ISSN: 1895-1171.

As for pedaling, Tichá believes that pedaling must be done according to phrasing, harmony, and articulation. She encourages the piano student to think of the character of pedaling. How much pedal do you want? How short? How long? Her advice is to use pedal wisely for tone. The strings vibrate longer and give a chance for much color and richness in tone. After all, there are many ways of depressing the pedal: deeply, slowly, quickly, half, etc. Ultimately the ear is the judge.[99] Gregor also mentions that the ear is the ultimate judge. He then goes on to specifically discussion the disadvantages of using the pedal mindlessly. For instance, while playing Baroque music, especially polyphonic music, one has to use the pedal very prudently, as the pedal is not good friends with polyphony. Even music of the Classical era doesn't require heavy use of pedal. After all, the music of these eras was played on different instruments than the one we have today.[100]

Neuhaus stresses the importance of thinking about the relationship of pedal and sound before attempting to use pedal. He mentions four elements that are necessary for a good relationship between pedal, fingers, and sound.

1. force (or strength)
2. matter
3. speed
4. altitude[101]

Finally, the pianist Daniel Barenboim talks about the illusion of long notes. The piano, being a hybrid instrument and belonging to the percussion family, cannot sustain long notes, unlike other instruments or the full orchestra. He also talks about the illusion of growing in sound on one note (crescendo), also not possible on the piano. He claims, however, that through phrasing and pedal, the pianist can create these illusions.[102]

[99] TICHÁ, L. *Slyšet a myslet u klavíru* [Listening and thinking at the piano] (1st ed.). Praha: Akademie múzických umění v Praze, 2009, 176 pages. ISBN: 978-80-7331-151-3.
[100] GREGOR, V. *Jak studovat klavírní repertoár* (1st ed.). Praha: Karolinum, 2012, 88 pages. ISBN: 978-80-7290-599-7.
[101] NEUHAUS, H. *L'art du piano* [The art of playing the piano] (1st ed.). Paris: Éditions Van de Velde, 1996, 239 pages: ISBN: 978-2-85868-013-2. Translated from the original Russian language by Olga Pavlov and Paul Kalinine.
[102] Barenboim as cited by TICHÁ, L. *Slyšet a myslet u klavíru* [Listening and thinking at the piano] (1st ed.). Praha: Akademie múzických umění v Praze, 2009, 176 pages. ISBN: 978-80-7331-151-3.

Another element of the technical aspects of the method dimension is memorization. As a musician, one is expected to memorize not only music but also dynamics, articulation marks, phrasing, pedal marks, and other details. During the performance one doesn't have the time to stop and try to recall instructions. Therefore, one has to have securely memorized everything which is found on the sheet music and every detail that was thought of, spoken about, and worked on during practice.[103] Inadequate memory and lack of confidence are the main causes of nervousness.[104] According to Tichá, memory is a function of time. One acquires it through rigorous practice, mnemonics, and self-regulated rehearsal, and one loses it as it fades over time. The capacity of memory is limited, and many factors play a role in impeding performance from memory: fatigue, stress, interest, and personal factors.[105] She goes on saying that playing by memory is mainly for soloist and is especially hard for them. Perhaps that is why Gregor mentions that the stress of solo performance is much more than playing collaboratively or in chamber ensembles.[106] However, Tichá warns against repeating the piece a million times. Tha is not an effective strategy. The point is to use a strategy which combines hearing, imagination, visual, sensory motor, kinesthetic, auditive, analytic.[107]

Aiello and Williamon mention suggestions to improve memory:[108]

1. practicing each hand separately, singing the different melody lines,[109] especially in polyphony
2. playing at a slow tempo, reflecting on the structure and patterns of the piece
3. practicing away from the piano[110]
4. analyzing the piece
5. memorizing in sections

[103] GORDON, S. Techniques to develop secure memorization. In GORDON, S. *Mastering the Art of Performance: A Primer for Musicians* (1st ed.). Oxford: Oxford University Press, 2010, 224 pages. ISBN: 978-0195398724.
[104] CHANG, C. C. *Fundamentals of piano practice* (1st ed.). Greenville: BookSurge Publishing, 266 pages. ISBN: 978-419678592.
[105] TICHÁ, L. *Slyšet a myslet u klavíru* [Listening and thinking at the piano] (1st ed.). Praha: Akademie múzických umění v Praze, 2009, 176 pages. ISBN: 978-80-7331-151-3.
[106] GREGOR, V. *Jak studovat klavírní repertoár* (1st ed.). Praha: Karolinum, 2012, 88 pages. ISBN: 978-80-7290-599-7.
[107] TICHÁ, L. *Slyšet a myslet u klavíru* [Listening and thinking at the piano] (1st ed.). Praha: Akademie múzických umění v Praze, 2009, 176 pages. ISBN: 978-80-7331-151-3.
[108] AIELLO, R. – WILLIAMON, A. Memory. In PARNCUTT, R. – MCPHERSON, G. E. *Science and psychology of music performance* (1st ed.). Oxford: Oxford University Press, 2002, 400 pages. ISBN: 978-0-19513-810-8.
[109] See also TICHÁ, L. *Slyšet a myslet u klavíru* [Listening and thinking at the piano] (1st ed.). Praha: Akademie múzických umění v Praze, 2009, 176 pages. ISBN: 978-80-7331-151-3.
[110] See also GREGOR, V. *Jak studovat klavírní repertoár* (1st ed.). Praha: Karolinum, 2012, 88 pages. ISBN: 978-80-7290-599-7.

6. using markers of different colors to highlight important themes
7. moving to the rhythm of the music
8. improvising in the style of the piece

3.3.1.3 Time

Time refers to a student's ability to plan and manage his or her time effectively within a deadline.[111] While the monotonic benefits assumption focused exclusively on quantity of practice, McPherson and Zimmerman[112] and other researchers, such as Miksza, realize that longer practice hours might not necessarily indicate drill practice (against which even the great Franz Liszt warns)[113]; rather, larger quantities of practice time might actually be an indicator of self-regulation, given that the student is taking time to make a plan, apply self-regulatory strategies, and control behavior.[114] Bartolome, on the other hand, realizes the dangers of spending unplanned time at the piano. She asserts that it is more effective to set forth specific tasks to be accomplished during each practice session rather than a set time limit for practice. She continues by saying that students (piano or other instruments) tend to spend a lot of their practice time in "off-task or non-music behaviors such as daydreaming or changing materials. Ten minutes of practice might involve only a brief amount of actual playing."[115] However, if the practice session includes goals to be met and tasks to be accomplished, then this encourages self-regulation and increases the chance that practice time will be spent on actually practicing the music, instead of being distracted by non-playing activities.

Another aspect of the 'time' dimension is practice efficiency.[116] Practice efficiency refers to structuring the time during practice in such a way that greater results are attained in less time. The authors of this systematic review assert that students should "foster time-

[111] SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808, p. 433.
[112] MCPHERSON, G. E. – ZIMMERMAN, B. J. Self-regulation on musical learning. In COLWELL, R. – WEBSTER, P. R. (eds.). *MENC handbook of research on music learning* (2nd ed.). Oxford University Press, 2011, pp. 130-175. ISBN: 978-0-19-975439-7.
[113] TICHÁ, L. *Slyšet a myslet u klavíru* [Listening and thinking at the piano] (1st ed.). Praha: Akademie múzických umění v Praze, 2009, 176 pages. ISBN: 978-80-7331-151-3.
[114] MIKSZA, P. An exploratory investigation of self-regulation and motivational variables in the music practice of junior high band students. *Contributions to music education*, 2006, vol. 33, no. 2, pp. 9-26. ISSN: 01904922.
[115] BARTOLOME, S., J. Naturally emerging self-regulated practice behaviors among highly successful beginning recorder students. *Research studies in music education,* 2009, vol. 3, no. 1, pp.37-51. ISSN: 1321103X, p 48.
[116] VARELA. W. – ABRAMI, P. C. – UPITIS, R. Self-regulation and music learning: a systematic review. *Psychology of music*, 2014, vol. 44, no. 1, pp. 55-74. ISSN: 03057356.

management skills while remembering to make room for informal/creative activities as these sustain motivation levels."[117] As stated earlier, studies have found a clear distinction in motivation and practice times between practicing in preparation for a performance versus practicing without having an upcoming performance. "Music students increase their practice times when practicing for an upcoming performance. Thus, an upcoming performance seems to have an extrinsically motivating effect."[118]

3.3.1.4 Behavior

When problems surface and are recognized, the behavior dimension allows self-regulating students to choose, modify, and adapt their performance and practice. This means that the behavior dimension includes metacognition, that is thinking about thinking.[119] The behavior dimension comprises self-monitored performance and self-evaluated performance. Hooper calls the 'behavior' dimension the 'what?' of practicing. He states that the behavior dimension contains a socialization process as well as a self-regulatory process. As a socialization process, students realize that their performance is socially monitored and evaluated, be that by their teachers, cohorts, parents, or others. As a self-regulatory process, students realize that their performance is monitored and evaluated by themselves instead of others. Both realizations lead to a difference in the quantity and quality of piano practice.[120]

McPherson and Renwick discovered that students who are young and have not yet mastered the types of strategies that lead to more effective self-evaluation and monitoring of their own progress "simply 'run out of pieces' to work on". Their results provide evidence that these strategies do, indeed, develop over time, and young players need many years to assimilate self-regulatory strategies to monitor their progress.[121]

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[117] p. 3
[118] See Figure 3.2
[119] SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.
[120] HOOPER, T. L. *The effects of teacher-directed versus self-regulated practice routines on undergraduate group piano students performing for-part chordal music*. Georgia, 2015. Doctoral dissertation. University of Georgia. Major professor Dr. Mary Leglar.
[121] MCPHERSON, G. E. – RENWICK, J. M. A longitudinal study of self-regulation in children's musical practice. *Music education research,* 2001, vol. 3, no. 2, pp.169-186. ISSN: 1461-380-8, p. 222.

3.3.1.5 Physical environment

Physical environment deals with the relationship of students with the location where the learning process takes place and the potential aspects for their concentration and/or distraction.[122]

"Self-regulated learners are aware that their physical environment should be conducive to efficient learning."[123] In their study they found out that students chose different locations for practice, ranging from a private bedroom to a shared family space. Students who had more than one piano (or keyboard) would alternate their practice location based on what was happening in different rooms of the house on a particular day. Other children had to use a shared space and battle with distractions from brothers and sisters, pets, or even the sound of the television in the next room. The researchers even go on saying that the posture of the student effects practice. In their study, they noticed that one trumpet student practiced in his pajamas, while sitting cross-legged on his pillow, and another one practiced laying back on an armchair.

McPherson and Renwick do mention, however, that the presence of other family members is not necessarily a bad thing, since they might offer constructive criticism and serve as agents of monitoring and evaluating the student's performance.[124] They could be the common factor between this dimension and the next,[125] serving as a detrimental factor in one but a constructive factor in the other. Gregor is also aware of the presence of others during practice, be it family members, classmates, or other musicians. According to his ten phases of repertoire preparation, students should pass through the first seven phases of familiarizing themselves with the piece, working on details, attaining mastery, playing by memory, reaching the tempo that corresponds to the metronome indication, and passing through the first and second phases of stabilization before they could play in front of someone.[126]

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[122] MCPHERSON, G. E. – ZIMMERMAN, B. J. Self-regulation on musical learning. In COLWELL, R. – WEBSTER, P. R. (eds.). *MENC handbook of research on music learning* (2nd ed.). Oxford University Press, 2011, pp. 130-175. ISBN: 978-0-19-975439-7.

[123] MCPHERSON, G. E. – RENWICK, J. M. A longitudinal study of self-regulation in children's musical practice. *Music education research,* 2001, vol. 3, no. 2, pp.169-186. ISSN: 1461-380-8, p. 182.

[124] See Chapter 3.3.1.4

[125] See Chapter 3.3.1.6

[126] GREGOR, V. *Jak studovat klavírní repertoár* [How to study piano repertoire] (1st ed.). Praha: Karolinum, 2012, 88 pages. ISBN: 978-80-7290-599-7.

3.3.1.6 Social factors

This is the dimension used by piano students as they actively seek assistance from books and recordings[127] or live performances and web performances (such as YouTube videos)[128] in their practice sessions. Tichá highlights the importance of this dimension when she claims that in order to have the best quality and quantity of practice for children, it is imperative to emphasize the role of the task of parents and teachers alike. The teacher should help the student in class and teach what to practice and how to practice. The parents, taking it from there, take care of what has been taught in class and see to it that the child implements it in practice. The child should be happy at the end of the practice session. The cooperation of parents and teacher is absolutely necessary to ensure quality practice and improved performance.[129]

3.3.2 The cyclical model of self-regulation

Zimmerman and Campillo conceptualized self-regulation as a cyclical process and determined the cyclical phases of self-regulation: forethought, volitional control, self-reflection.[130,131] Many researchers have based their research on the cyclical nature of self-regulation, who have come to stress the importance of self-regulation in scaffolding student learning, which leads to improved performance.[132]

Upon studying the cyclical model of self-regulation and discovering its importance in the lives of music students, Ludovico and Mangione created an e-book which fosters self-regulation. In the process of creating the e-book, the researchers discovered that scaffolding, and hence improvement, happens at each level of the cyclical process. Therefore, they designed their e-book in a way to help develop skills at each level of the cycle which results in optimal

[127] MCPHERSON, G. E. – ZIMMERMAN, B. J. Self-regulation on musical learning. In COLWELL, R. – WEBSTER, P. R. (eds.). *MENC handbook of research on music learning* (2nd ed.). Oxford University Press, 2011, pp. 130-175. ISBN: 978-0-19-975439-7.
[128] SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.
[129] TICHÁ, L. *Slyšet a myslet u klavíru* [Listening and thinking at the piano] (1st ed.). Praha: Akademie múzických umění v Praze, 2009, 176 pages. ISBN: 978-80-7331-151-3.
[130] ZIMMERMAN, B.J. – CAMPILLO, M., 2003, as cited by LUDOVICO, L. A. – MANGIONE, G. R. Self-regulation competence in music education. *International Association for Development of the Information Society*. Paper presented at the International Conference e-Learning 2014. Multi Conference on Computer Science and Information Systems, Lisbon, Portugal, Jul 15-19, 2014. ISBN: 978-989-8704-08-5, p.48.
[131] See chapter 2.2.1
[132] BARTOLOME, 2009; LUDOVICO and MANGIONE, 2014.

learning and performance. At the forethought level, students learned sight-reading better than they would using traditional sheet music, as they could control the tempo, make highlights, and go back and forth on the screen, changing the size of the display to suit their convenience. At the volitional control level, students benefitted from the interactive e-book to circle parts that they could not perform up to par,[133] and to seek peer assistance when needed. Finally, at the self-reflection level, students mastered several skills, such as seeking peer advice, probing, questioning, and being motivated by rewards.[134,135]

Table 3.1

Cyclical self-regulatory phases

Cyclical self-regulatory phases		
Forethought	**Performance/volitional control**	**Self-reflection**
Task analysis Goal setting Strategic planning Self-motivation beliefs Self-efficacy Outcome expectations Intrinsic interest/value Goal orientation	Self-control Self-instruction Imagery Attention focusing Task strategies Self-observation Self-recording Self-experimentation	Self-judgment Self-evaluation Causal attribution Self-reaction Self-satisfaction/affect Adaptive-defensive

3.4 The role of self-efficacy in self-regulatory practice

A study was conducted on students' self-belief in order to discover how these beliefs shape and change as students gather more experience and knowledge in music education. Results found that self-esteem, self-efficacy, self-concept, and attributions are components of self-belief.[136] Self-efficacy is defined as "an individual's belief in their innate ability to achieve

[133] This is possible do to on traditional sheet music but not on traditional computers
[134] LUDOVICO, L. A. – MANGIONE, G. R. An active e-book to foster self-regulation in music education. *Interactive technology and smart education*, 2014, vol. 11, no. 4, pp. 254-269. ISSN: 1741-5659.
[135] See Table 3.1
[136] KATSOCHI, C. Students' self-beliefs and music instruction: a literature review. In MARIN, M. M. – PARNCUTT, R. (eds.). Proceedings of the First International Conference of Students of Systematic Musicology (SysMus08), Graz, Austria, 14-15 November 2008.

goals,[137] a personal judgment of how well one can execute courses of action required to deal with prospective situations."[138] In other words, self-efficacy beliefs have to do more with expectancy beliefs rather than self-competence to perform. Self-efficacy is determined by cognitive and biological factors (personal) and environmental influences and is developed through previous experience, where successful experiences would strengthen self-efficacy beliefs while failed experiences would worsen these beliefs.[139]

This echoes the claims of attribution theory, attribution in itself being a component of self-belief, as discovered by Katsochi.[140] The attribution theory suggests that Failure at certain tasks diminish feelings of control and lead to feelings of humiliation, shame, or anger.[141] McPherson and Zimmerman also included self-efficacy in their studies of instrumental music education research, focusing on the cognitive strategies that students use, the effect of practice during a performance or an exam, and the level of anxiety versus confidence that students experienced vis à vis their own judgment of their abilities.[142] McPherson discovered that self-efficacy is the most important predictor of achievement in music students,[143] while Araújo included self-efficacy in his model of the five dimensions of self-regulation.[144]

One of the greatest areas of research which developed in the past decade is that of musical self-efficacy. For musicians, belief in one's abilities is very importance to have a successful performance experience. However, in the beginning of the new millennium there were no formal means of measuring musical self-efficacy. However, the year 2007 witnessed

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[137] SCHWARZER, R. – JERUSALEM, M. Generalized self-efficacy scale. In WEINMAN, J. – WRIGHT, S. – JOHNSTON, M. *Measures in health psychology: A user's portfolio. Causal and control beliefs*, 1995, Windsor, UK: NFER-NELSON pp. 35-37.

[138] BANDURA, A. Self-efficacy mechanism in human agency. *American psychologist,* 1982, vol 37, no. 2, pp. 122-147, ISSN: 0003-066X, p.122.

[139] KATSOCHI, C. Students' self-beliefs and music instruction: a literature review. In MARIN, M. M. – PARNCUTT, R. (eds.). Proceedings of the First International Conference of Students of Systematic Musicology (SysMus08), Graz, Austria, 14-15 November 2008.

[140] KATSOCHI, C. Students' self-beliefs and music instruction: a literature review. In MARIN, M. M. – PARNCUTT, R. (eds.). Proceedings of the First International Conference of Students of Systematic Musicology (SysMus08), Graz, Austria, 14-15 November 2008.

[141] CSIKSZENTMIHALYI, M. *The masterminds series. Finding flow: The psychology of engagement with everyday life* (1st ed.). New York, NY, US: Basic Books, 1997, 192 pages. ISBN: 978-0465024117.

[142] MCPHERSON, G. E. – ZIMMERMAN, B. J. Self-regulation on musical learning. In COLWELL, R. – WEBSTER, P. R. (eds.). *MENC handbook of research on music learning* (2nd ed.). Oxford University Press, 2011, pp. 130-175. ISBN: 978-0-19-975439-7.

[143] MCPHERSON, G. E. From child to musician: skill development during the beginning stages of learning an instrument. *Psychology of music*, 2005, vol. 33, no. 1, pp. 5-35. ISSN 0305-7356.

[144] ARAÚJO, M. V. Development of a measure of self-regulated practice behavior in skilled performers. Paper presented at the International symposium on performance science, 2013. European Association of Conservatoires (AEC), Brussels, Belgium, 2013. ISBN: 978-2-9601378-0-4.

the pilot of three new instruments for measuring musical self-efficacy. These instruments included measures of general musical self-efficacy, as well as self-efficacy related to musical learning and performance. The results of conducting studies[145] using these measures showed that there was a positive relationship between self-efficacy scores and the social factors dimension of self-regulation.[146] Although general self-efficacy was found to be the lowest among music students, performance self-efficacy was high, and musical learning self-efficacy was even higher. Furthermore, musical self-efficacy correlated with the way students rated their other musical abilities, such as musicality, perseverance, and the ability to deal with performance anxiety.[147]

3.5 Performance

Franz Liszt has remarked that everyone knows how to play, but only a few know how to interpret. According to Tichá, performance is a combination of playing and interpreting a musical work. The performer functions as a bridge between the composer and the public, transforming the ideas of the composer to the audience. The performer is, as if, going up a staircase, from the musical thoughts and imaginations of the composer all the way to performing in front of a public, passing through the influences of performance styles of the era of the composition, his or her own practice and preparation, music performance anxiety, etc.[148] Gregor expands on the idea of the performer being the interpreter of the composer's mind by reviewing the history of composers and performers in classical music and their overlap. He mentions, for instance, that composers such as Franz Liszt and Achille Claude Debussy were excellent pianists as well as composers and interpreted their own works, whereas in the 20th century we rarely have composer and pianist in one.[149]

[145] RITHIE, L. – WILLIAMON, A. Measuring self-efficacy in music. Paper presented at the International symposium on performance science, 2007. European Association of Conservatoires (AEC), Utrecht, The Netherlands, 2007. ISBN 978-90-9022484-8.
[146] As devised by McPherson and Zimmerman
[147] RITHIE, L. – WILLIAMON, A. Measuring self-efficacy in music. Paper presented at the International symposium on performance science, 2007. European Association of Conservatoires (AEC), Utrecht, The Netherlands, 2007. ISBN 978-90-9022484-8.
[148] TICHÁ, L. *Slyšet a myslet u klavíru* [Listening and thinking at the piano] (1st ed.). Praha: Akademie múzických umění v Praze, 2009, 176 pages. ISBN: 978-80-7331-151-3.
[149] GREGOR, V. *Klavír – černobíle tajemství interpretace* [Piano – a black and white secret of interpretation] (1st ed.). Praha: Karolinum, 2012, 164 pages. ISBN: 978-80-246-2141-8.

Neuhaus instructs pianists to put themselves into the musical work but without taking the composer out.[150] By this he not only alludes to the character and style of each composer but also to what's known as historically informed performance, taking into consideration the style and characteristics of the time period (the era) in which the music was written, the instruments for which it was composed, and the extent to which the modern piano can be used to enhance the piece without jeopardizing its authenticity. Gregor gives us a colorful example, in which he shows the bizarreness of playing Beethoven mostly lyrically, Debussy aggressively, Bach with exaggerated agogics, Chopin ruthlessly rhythmically or Ravel dramatically. By doing so, we would stab these authors in the heart.[151] Tichá wonders what would happen to a performance if the pianist were to be unaware of the importance of ornaments and improvisation in the Baroque era, the scarcity of pedal in the Classical era, the freedom of expression in the Romantic era, and the planned atonality of the 20th century.[152]

Performance also depends on four important musical capabilities:[153]

1. auditory: which entails hearing vertically (the melody) and horizontally (the harmony) during practice and performance
2. psychomotor: using the whole body during performance;[154] after all, the human organism is rhythmic (heartbeat, breathing, etc.)[155]
3. analytical-synthetic: also known as musical thinking. Vladimir Tichý[156] highlights the importance of the analytic-synthetic capability by showing the ineffectuality of music theory in the absence of said capability. Tichý writes that music theory cannot replace the inspiration and the imagination of the creative

[150] NEUHAUS, H. *L'art du piano* [The art of playing the piano] (1st ed.). Paris: Éditions Van de Velde, 1996, 239 pages: ISBN: 978-2-85868-013-2. Translated from the original Russian language by Olga Pavlov and Paul Kalinine.
[151] GREGOR, V. *Klavír – černobíle tajemství interpretace* [Piano – a black and white secret of interpretation] (1st ed.). Praha: Karolinum, 2012, 164 pages. ISBN: 978-80-246-2141-8.
[152] TICHÁ, L. *Slyšet a myslet u klavíru* [Listening and thinking at the piano] (1st ed.). Praha: Akademie múzických umění v Praze, 2009, 176 pages. ISBN: 978-80-7331-151-3.
[153] SEDLÁK, F. as cited by VÁŇOVÁ, H. – SKOPAL, J. *Metodologie a logika výzkumu v hubební pedagogice* [The methodology and logic of music education research] (2nd ed., rev. ed.). Praha: Karolinum, 2007, 198 pages. ISBN: 978-80-246-1367-3.
[154] NEUHAUS, H. *L'art du piano* [The art of playing the piano] (1st ed.). Paris: Éditions Van de Velde, 1996, 239 pages: ISBN: 978-2-85868-013-2. Translated from the original Russian language by Olga Pavlov and Paul Kalinine.
[155] GREGOR, V. *Klavír – černobíle tajemství interpretace* [Piano – a black and white secret of interpretation] (1st ed.). Praha: Karolinum, 2012, 164 pages. ISBN: 978-80-246-2141-8.
[156] TICHÝ, V. as cited by ICHÁ, L. *Slyšet a myslet u klavíru* [Listening and thinking at the piano] (1st ed.). Praha: Akademie múzických umění v Praze, 2009, 176 pages. ISBN: 978-80-7331-151-3.

artist. At best, music theory can be useful to both composer and performer as a tool.

4. music-intellectual: analysis of the piece, composer, era; intuition; personality. Gregor focuses on the intuition and personality of the performer by strongly asserting that if it were indeed enough for a performer to convey the author's thoughts by suppressing one's own intuition and personality, it would naturally mean that the interpreter does not have, rather must not have, a distinctive individuality.[157]

Neuhaus[158] quotes different successful and famous pianists as they speak about performance. For instance, he claims that some play to please the audience, based on the motto of Horowitz, success before all, while others play for the sake of the music, based on the maxim of Richter, art before all. Rimsky Korsakov has a more practical approach to performance: the more the preparation, the less the stage fright. Cortot advises pianists to have good sleep and a good stomach before performing. He also emphasizes that when performers know that they have not prepared enough, their freedom is paralyzed.

3.6 Self-evaluation

Hewitt studied instrumentalists in junior high school. The purpose of his study was to examine the effects that self-listening (listening to oneself on audiotape) and self-evaluation have on these instrumentalists' performance and attitude about practice. His results showed that self-listening was not as effective alone as when paired with self-evaluation. Although he mentioned that students didn't use self-evaluation very effectively, he concluded that self-evaluation is an essential skill, without which self-listening wouldn't produce effective results in improved performance or ameliorated attitudes towards practice.[159]

[157] GREGOR, V. *Klavír – černobíle tajemství interpretace* [Piano – a black and white secret of interpretation] (1st ed.). Praha: Karolinum, 2012, 164 pages. ISBN: 978-80-246-2141-8.
[158] NEUHAUS, H. *L'art du piano* [The art of playing the piano] (1st ed.). Paris: Éditions Van de Velde, 1996, 239 pages: ISBN: 978-2-85868-013-2. Translated from the original Russian language by Olga Pavlov and Paul Kalinine.
[159] HEWITT, M. P. The Effects of Modeling, Self-Evaluation, and Self-Listening on Junior High Instrumentalists Music Performance and Practice Attitude. *Journal of Research in Music Education*, 2001, vol. 49, no. 4, pp. 307-322. ISSN: 0022-4294.

Alexander Pope has said "The greatest magnifying glasses in the world are a man's own eyes when they look upon his own person."[160] Based on this quote, Sedikides and Strube studied the concept of self-evaluation in depth and extracted four components related to self-evaluation: self-enhancement, self-verification, self-assessment, and self-improvement.

Self enhancement is the tendency of people to accentuate the positivity of their self-conceptions and eliminate the negativity, in order to protect their self- concepts. By increasing the positivity and decreasing the negativity of the self, people can achieve a high level of self-esteem. In self-verification people are not satisfied with merely sustaining the positivity of self-conceptions; rather, they strive to authenticate existing positive self-conceptions. People are generally compelled to retain a certain level of consistency between their self-conceptions and new self-relevant information, and hence self-verification cultivates a sense of control and predictability in the chaotic social environment of everyday life. Self-assessment is achieved when people look for diagnostic information (both positive or negative) and adhere to its implications for the self, regardless if the information affirms or challenges existing self-conceptions. Therefore, self-assessment increasing the certainty with which people retain their self-knowledge. Finally, self-improvement propels people to improve their traits, skills, abilities, health status, and psychological welfare.[161]

3.6.1 Self-evaluation versus adjudicators' assessments

Lebler compared self-assessment of students with assessment conducted by adjudicators. His intention was to enhance self-assessment, because it is a skill that is highly compatible with the requirements of the Bachelor of Popular Music program in Australia. According to Lebler, the program requires skills that students need, all of which can be achieved through learning self-assessment:[162]

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[160] Alexander Pope (1688-1744), as cited by SEDIKIDES, C. – STRUBE, M. J. Self-Evaluation: To Thine Own Self Be Good, To Thine Own Self Be Sure, To Thine Own Self Be True, and To Thine Own Self be Better. *Advances in Experimental Social Psychology*, 1997, vol. 29, no. 1, pp. 209-269. ISSN: 00652601.

[161] SEDIKIDES, C. – STRUBE, M. J. Self-Evaluation: To Thine Own Self Be Good, To Thine Own Self Be Sure, To Thine Own Self Be True, and To Thine Own Self be Better. *Advances in Experimental Social Psychology*, 1997, vol. 29, no. 1, pp. 209-269. ISSN: 00652601.

[162] LEBLER, D. Promoting Professionalism: Developing Self-assessment in a Popular Music Program, Queensland Conservatorium Griffith University, Australia, 2014. Retrieved from https://www.researchgate.net/publication/270904975_Promoting_professionalism_Developing_self-assessment_in_a_popular_music_program, p.183.

1. independent, life-long learning
2. cognitive skills to review critically, analyze, consolidate, and synthesize knowledge
3. exercise critical thinking and judgment
4. application of knowledge and skills

His research found that within 20 years the self-assessment and teacher's assessment reached a correlation of 100% compared to a 25% at the beginning of the study, whereas even at the beginning of the student assessment of different teachers were highly correlated. He concluded that self-assessment performance improves over time and experience.[163]

Figure 3.4 shows the self-evaluation versus teacher-evaluation of students in year 1, 2, and 3 of a music program. While it is true that lower percentages are recorded for a higher agreement between self- and teacher-evaluations, year 3 students consistently outperform students of year 1 and 2.

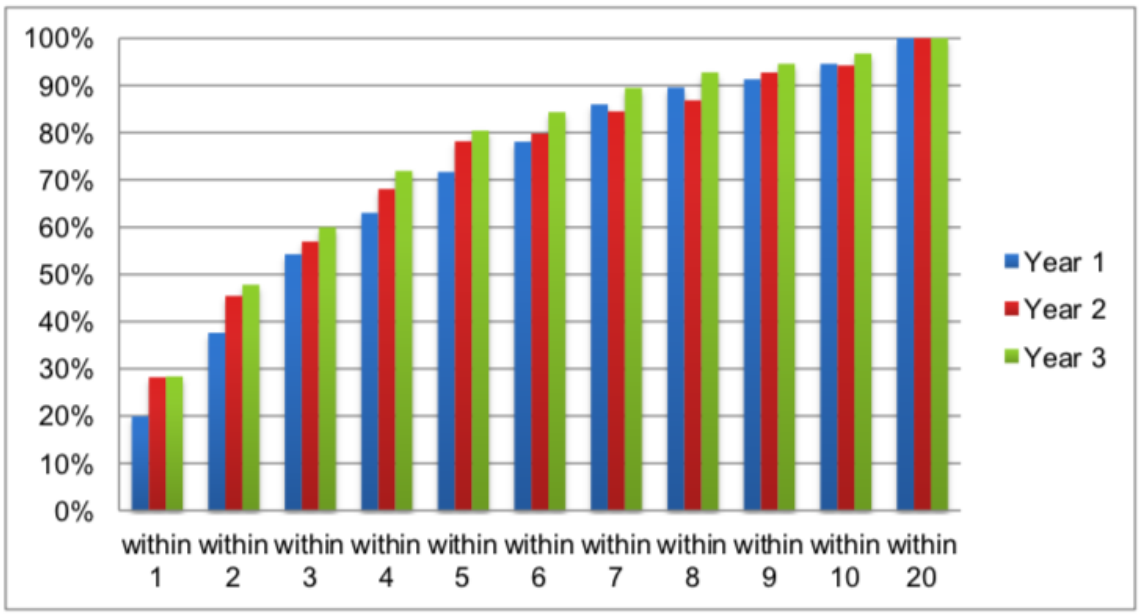

Figure 3.4 self/teacher evaluation of year 1, 2, and 3 students

[163] LEBLER, D. Promoting Professionalism: Developing Self-assessment in a Popular Music Program, Queensland Conservatorium Griffith University, Australia, 2014. Retrieved from https://www.researchgate.net/publication/270904975_Promoting_professionalism_Developing_self-assessment_in_a_popular_music_program

3.7 Conclusion

The literature pertaining to piano practice prior to the 1990s focused mostly on the quantity of practice (the number of hours) as a predictor and element of improved performance. The monotonic benefits assumption, asserting that quantity of practice and performance are directly proportional, the expertise rule, suggesting that an endeavor of over 10 years at any enterprise makes one an expert, and other theories hailing the importance of longer hours of practice left little to the cognitive, behavioral, and social aspects of students and their practice sessions.[164,165]

Following the refutation of the monotonic benefits assumption things changed. Ericsson, a proponent of the monotonic benefits assumption, himself started discovering other factors that must be present during practice in order to guarantee improved performance. He coined the term "deliberate practice",[166] which entails the cognitive faculty as well, setting goals and being mindful of them during piano practice. More and more research was done on piano students, teachers, and professional performers to understand the other faculties used during practice, the role of motivation in improved performance, and the extent to which the self plays a role in bridging the gap between practice and performance in the form of self-control, self-efficacy, self-evaluation, self-appraisal, and, of course, self-regulation.

Monumental discoveries were made when McPherson and Zimmerman introduced the term self-regulation as related to music students. Although they list six dimensions – motive, method, time, behavior, physical environment, and social factors – of self-regulation,[167] each of McPherson and Zimmerman alone, or in collaboration with other colleagues, have come up with extra dimensions or elements of self-regulation, as well as the notion that self-regulation is a cyclical process consisting of forethought, volitional control, self-reflection.[168]

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[164] ERICSSON, K. A. – KRAMPE, R. Th., – TESCH-ROMER, C. The role of deliberate practice in the acquisition of expert performance. *Psychological review,* 1993, vol. 100, no. 3, pp. 363-406. ISSN: 0033-295X.
[165] WILLIAMON, A. – VALENTINE, E. Quantity and quality of musical practice as predictors of performance quality. *British journal of psychology*, 2000, vol. 91, no. 1, pp. 353-376. ISSN: 2044-8295.
[166] ERICSSON, K. A. – KRAMPE, R. Th., – TESCH-ROMER, C. The role of deliberate practice in the acquisition of expert performance. *Psychological review,* 1993, vol. 100, no. 3, pp. 363-406. ISSN: 0033-295X, p. 364.
[167] MCPHERSON, G. E. – ZIMMERMAN, B. J. Self-regulation on musical learning. In COLWELL, R. – WEBSTER, P. R. (eds.). *MENC handbook of research on music learning* (2nd ed.). Oxford University Press, 2011, pp. 130-175. ISBN: 978-0-19-975439-7.
[168] ZIMMERMAN, B.J. – CAMPILLO, M., 2003, as cited by LUDOVICO, L. A. – MANGIONE, G. R. Self-regulation competence in music education. *International Association for Development of the Information Society*.

Furthermore, McPherson and Zimmerman also mentioned self-regulatory skills, including observation, emulation, self-control, and self-regulation as prerequisites for academic achievement.

Self-regulation and self-efficacy, coupled by a reasonable number of hours of practice, have had a profound influence on improved performance on one hand and improved self-evaluation on the other hand, as witnessed by findings of the research studies discussed above.

Paper presented at the International Conference e-Learning 2014. Multi Conference on Computer Science and Information Systems, Lisbon, Portugal, Jul 15-19, 2014. ISBN: 978-989-8704-08-5, p.48.

4 Research questions and hypotheses

After the refutation of the monotonic benefits assumption theory, where quantity of practice is considered the sole factor in improved performance,[169] the last two decades have focused on self-regulation in piano practice as one of the main contributors to enhanced performance, as it focuses on the content and quality of the practice as well as self-belief among students of musical instruments and expert performers. One aspect of music education when it comes to teaching piano is piano practice, which happens almost entirely in the absence of the teacher. Students spend most of their time practicing for their upcoming classes and exams, and if they go about practicing mindlessly and aimlessly, they will not be able to improve their performance.

Moreover, self-regulation during practice has been found to improve self-evaluation of one's own efforts and performance, greater intrinsic and extrinsic motivation, and even longer hours at the piano.

Bearing these facts and information in mind, the researcher sought to answer the following research question:

1. What is the role of self-regulation in the academic and artistic life of a piano student?
2. To what extent is self-regulation important in improved performance?
3. What are other factors that help improve performance?
4. Are there any differences between the conservatory systems of Lebanon and the Czech Republic?
5. What are the main differences and why?
6. Are students able to anticipate what grade they will received on an exam based on their preparation (practice) for it? What are the contributing factors?
7. What is the role of self-efficacy in self-regulatory practice and improved performance?
8. How are different dimensions of self-regulation used by students of different systems (Lebanon versus the Czech Republic), levels, ages, and self-regulatory skills?

[169] See Chapter 3.1.2

In order to answer these questions, a review of the available literature, a survey of the background of the topic of the current research, and an in-depth study of the structure of the Prague Conservatory and the Lebanese National Higher Conservatory of Music was conducted, and based on the results of these queries, the following hypotheses are proposed:

1. Students with higher self-regulation will evaluate their performance more accurately
2. Students with higher self-regulation will have better performance
3. Quantity of practice will improve performance only if accompanied by high self-regulation
4. There will be a positive correlation between self-assessment and adjudicators' assessment
5. There will be a significant difference in quantity of practice between students in Prague and students in Beirut
6. There will be a significant difference in self-regulation between students in Prague and students in Beirut
7. There will be a significant difference in piano exam grades (performance) between students in Prague and students in Beirut
8. Students will use the "method" dimension of self-regulation the most (from the six dimensions of McPherson and Zimmermann)
9. Students of the Beirut conservatory will report about the "time" dimension differently than students of the Prague conservatory

5 The Prague conservatory and the Beirut conservatory

This doctoral dissertation is a comparative study with self-regulation and self-efficacy as its independent variables and improved performance and self-evaluation as its dependent variables. The comparison is between Lebanese and Czech piano students, and hence the choice of students from the Prague Conservatory[170] and the Beirut Conservatory.[171] The following chapter surveys the general structure, basic information, entry requirements, student demographics, study programs and repertoires, and graduation requirements of the Prague Conservatory and the Beirut Conservatory. In order to gather data and information about both institutions, interviews were conducted with MgA. Milan Langer, head of department of piano studies at the Prague Conservatory[172] and Mrs. Houri Sarafian, head of department of piano studies at the Beirut Conservatory.[173] In addition to the interviews, documents pertaining to the study programs of the piano departments of both conservatories were downloaded from the websites of both institutions.[174,175]

Upon the analysis of both quantitative and qualitative data, and referring back to the interviews mentioned above, the researcher discovered the vast gap between the two conservatories in terms of program, requirements,[176] and average number of hours of daily practice.[177] Therefore, the researcher deemed necessary to include a third element into the comparative study, the Basic Art School[178] of the Czech system, the basic system and program requirements of which are closer to that of the Beirut Conservatory.

There are two main differences between the Beirut Conservatory and the Prague Conservatory, both of which make the Beirut Conservatory more similar to the ZUŠ[179] of the Czech system, rather than the Prague Conservatory. The first is that the Beirut Conservatory has many branches in different parts of Beirut (as well as in different Lebanese cities), and the same teachers teach in all (or most of) these branches on different days. It is not uncommon

[170] Pražská konzervatoř (in the official Czech language)
[171] Lebanese National Higher Conservatory of Music; المعهد الوطني العالي للموسيقى (in the official Arabic language)
[172] See Appendix A for the transcript of the interview with MgA. Milan Langer
[173] See Appendix B for the transcript of the interview with Mrs. Houri Sarafian
[174] See Appendix D for the study program of the Prague Conservatory
[175] See Appendix E for the study program of the Beirut Conservatory
[176] See chapter 5.5
[177] See chapter 7
[178] Základní Umělecká Škola – ZUŠ (in the official Czech language)
[179] Hereafter the abbreviation ZUŠ will be used to denote the Basic Art School of the Czech system

for students to have classes in different buildings, even with the same teacher. There is one administration that governs the whole conservatory in its many branches across Lebanon.

The second main difference between the Beirut and Prague conservatories is that students of the Beirut Conservatory attend regular schools (or universities) and go to their classes at the conservatory after their school hours, similar to the students at the Czech ZUŠ; whereas students of the Prague Conservatory do not attend regular schools, as the conservatory is recognized by the state as a legitimate school. Furthermore, the Lebanese Conservatory has students as young as six years old all the way to students of the master's degree, which would be a combination of the Czech ZUŠ, Conservatory, and even the Academy of Performing Arts.[180]

Hence, this chapter will also include a description of the Basic Art School system, basic information about it, in addition to its programs, classes, and graduation requirements as a third element in the comparative study. For this purpose, an interview was conducted with Ing. Vojtěch Fröhlick, deputy director of the Basic Art School of Na Popelce.[181]

5.1 General structure and basic information

The Prague Conservatory is a public school (state school), and it belongs to the city of Prague. It is open for all students who speak Czech, but there is the possibility to study in a foreign language, where students have to pay, and they only receive certificates at the end of their studies, not diplomas. Czech students study for free for six years. After the maturity exam (fourth year), students have the possibility to continue studying at any university they choose, but most students prefer to finish the complete studies, because in the fifth and sixth years they study methodology, didactics, and pedagogical studies. After the sixth year, upon receiving the diploma, graduates can teach at different music schools, including ZUŠ, in addition to teaching music classes at elementary schools.

The ZUŠ is part of the Czech educational system, so it is considered a public school; it is supported by the state, but the administration can take money from the parents, as opposed

[180] Akademie Múzických Umění v Praze, Hudební a taneční fakulta – HAMU (in the official Czech langugage)
[181] See Appendix C for the transcript of the interview with Ing. Vojtěch Fröhlick

to normal schools. One can take a certificate from ZUŠ but not a diploma. It has its own national framework for art school education, which is important to observe, as the ZUŠ is part of the Czech school system. Music teachers must have a diploma from a conservatory, pedagogical faculty, or academy.

While the ZUŠ accepts students as young as 5 or 6 years old,[182] the Prague Conservatory has a higher age of entry. However, the age of entry has changed in the last couple of years. In earlier years it was strictly 15 or 16, but now (in the last ten years) there are older students also, as a lot of students come to Prague Conservatory after maturity from other schools. Currently 50% of students come to the conservatory after having reached maturity level elsewhere. There is no age limit for entrance, so sometimes students apply to study at the conservatory even after having finished university and having worked a couple of years. These are usually students who would like to return to music after having guaranteed another profession. However, these students do not usually reach the levels of those students who study full-time only at the conservatory. After playing the graduation concert (a minimum of 30 minutes recital all the way to a full recital for really good students, in addition to chamber music), students get the DiS title.

There is increased interest in studying piano, which is good news, because of the Young Pianist competition[183] and the International Summer Courses of the Prague Conservatory,[184] which are designed for the purpose of attracting students. Currently there are about 40 students in the piano department; however, in the coming years there will be less enrollment because of decreased demographics (less babies born) and loss of interest in higher studies in general. As for teachers, the Prague Conservatory boasts in having the best piano teachers in the country, nine teachers in total, including, for instance, renowned pianists Martin Kasík and Ivo Kahánek, but since they also teach at HAMU, they have less and less time for the Prague Conservatory. The conservatory program comprises six years, with a maturity exam at the end of the fourth.

At the ZUŠ, students have two years of preparatory classes, followed by seven years in the first level and four years in the second level. Upon completion of the two level, students could study another four years as adults, but they would have to pay themselves, as this

[182] Or even 3 and 4 in very special cases
[183] Mladý Klavír (in the official Czech language)
[184] Mezinárodní Letní Klavírní Kurzy Pražské Konzervatoře – MLKKPK (in the official Czech language)

extension is not supported by the state. This is not a very common phenomenon, as after the normal duration of study, students usually go to a conservatory or pedagogical faculty.

The Beirut Conservatory is also a public school (state school), but it belongs to the ministry of education. It is open for all students who speak Arabic, English, or French, as classes are offered in all three languages. There is a symbolic registration fee at the beginning of the year but no tuition. As mentioned earlier, the main difference between the Beirut and Prague conservatories is that in Lebanon the conservatory, though a public institution, does not act as a secondary school. Students study at the conservatory concurrently with their school programs at private or public high schools. The first possible diploma to receive is the baccalaureate, which would not be the equivalent of a High School Lebanese baccalaureate diploma. In other words, even if students want to continue higher education in music, they still have to graduate from a regular school accredited by the Lebanese ministry of education. Subsequent degrees are the license (equivalent to a university bachelor's degree) and master's degree (equivalent to a university master's degree).

The conservatory accommodates students as young 6 years old in the musical formation[185] program, upon the completion of which students can study at the conservatory (including piano). Piano studies leading up to the baccalaureate degree last eight years, plus a minimum of one year for preparation of the diploma program in order to receive the degree. The license program is a two-year program, followed by a minimum of one year to prepare the exam. The master's program follows the same pattern. The basic years up to the baccalaureate degree are further divided into two cycles: cycle 1 comprises of years 1-4, and cycle 2 comprises of years 5-8.

In order to create an equivalence with the Czech system for the purposes of this work, the Beirut Conservatory system will be divided as follows: grades 1-4 (cycle 1) will be considered equivalent to the Czech ZUŠ, grades 5-8 and the baccalaureate exam preparation years (cycle 2) will be considered equivalent to the Prague Conservatory, and the license and master's programs will be considered equivalents to the HAMU.[186] This classification is done based on the average age of students in these levels at the Prague and Beirut conservatories. In order to be able to compare the students of the Beirut Conservatory to those at the Prague

[185] Formation Musicale – FM (in the official French language).
[186] See Table 5.1

Conservatory, only students of cycle 2 (years 5 till the end of the baccalaureate exam) are chosen from the Beirut Conservatory. While this age-based comparison serves well in terms of demographics, it creates a vast gap between the programs offered at these different institutions. A survey of the repertoire and literature of these institutions creates a different equivalence, where cycle 2 of the Lebanese Conservatory would be analogous to the Czech ZUŠ, and the license and master's programs would approximate the program of the Prague Conservatory.[187,188]

Table 5.1

Equivalence of the Czech piano education levels and the Beirut Conservatory levels

Basic Art School (ZUŠ)	Grades 1-4
Conservatory	Grades 5-8 + baccalaureate exam
HAMU	License and master's levels

The Beirut Conservatory has three branches, in Sin el Fil, Monot, and Zokak el Blat, all run by the same administration and taught by the same teachers. These three branches are part of the Lebanese Conservatory with its many branches all over the country. For the purposes of this study, students from the Sin el Fil Conservatory in Beirut will be observed.[189]

Enrollment at the Beirut Conservatory piano department is very high, and therefore efforts are being exerted to introduce children in FM to other instruments, as there will soon be a saturation of pianists and piano teachers in the country. In the levels chosen for this study, there are about 150 students in Beirut alone, some of which do not end up graduating, because they do not fulfill the requirements of the theoretical courses. Those who finish all the required classes present a mock exam to a jury of three to five members, and upon their suggestions, they work on their repertoire and present their actual exam after two weeks to the same, similar,

[187] See chapter 5.3, 5.4, and 5.5
[188] See Appendices D and E
[189] The Sin el Fil branch is the main branch where the conservatory administration is

or totally different jury. The exam is open to family and very close friends should the student wish to invite people.

5.2 Entrance exam and entry requirements

Students applying to study at the Prague Conservatory must have finished the two cycles of basic school.[190] Also, students must pass an entrance exam. The requirements for the entrance exam are:

1. scales: students must know all of them - major, harmonic and melodic minors, arpeggios. During the exam they can choose which one to play.
2. etudes: three different etudes, minimal level Czerny op.740, but students can also play more difficult Czerny etudes, Cramer, and all the way to Chopin.
3. Bach: the minimal level is one two-part and one three-part invention.
4. sonata: one fast movement of a Classical sonata (Haydn, Mozart, Beethoven)
5. Romantic piece: students are advised to choose an easier piece (between three and five minutes), such as a Nocturne by Chopin or a children's piece by Schumann, although most students opt to play harder pieces.
6. Twentieth century (or contemporary): one small piece

At the Beirut Conservatory things are very different. The ages of students at the conservatory for one particular level are greatly dispersed because of many reasons. First, some students simply start late. Other students take a break from piano to focus on their school studies, especially during year 9 and year 12 of the regular school program when they have state exams. Furthermore, some students come to the conservatory later in life, after realizing that music is lacking in their lives. Since the Beirut Conservatory caters to very young students (as young as 6), its entrance exam requirements are vastly different according to the age of the prospective student. For instance, 6-year-olds would be required to sing a song and recognize whether a note is higher or lower with respect to the preceding note, similar to the entrance exams at ZUŠ for very young students.

[190] Grade 9 followed by the *Brevet* state exams in the Lebanese equivalent

For the purposes of this study, the entrance exam requirements of cycle 2 of the Beirut Conservatory will be presented:

1. scales: students must choose three scales from each cycle, sharps and flats - major, harmonic minor, arpeggios. During the exam they play whatever the jury chooses.
2. etudes: one etude, Czerny op.740 or op. 299, but students can also play more difficult Czerny etudes, Cramer, and all the way to Chopin.
3. Bach: one invention or one prelude
4. Sonata: one fast movement of a Classical sonata (Haydn, Mozart, Beethoven) or the second and third movement of a similar sonata.
5. Romantic or twentieth century piece: students are free to choose
6. Imposed piece: all students are required to play a piece imposed by the entrance exam committee. Students are given the piece two months in advance.

5.3 Program requirements for each year

At the Prague Conservatory students have three classes a week (twice a week: one double class of 120 minutes and one single 60-minute class).[191] There are two exams every year in January and in June. For the first year, students have to play a set program in January and another set program in June. Starting the second year, students have a yearly requirement, but they can choose which part of the required program to play in January and which in June. Some students play more than the required program.

Students in the Beirut Conservatory have one class per week (45-60 minutes), although some teachers call their students for extra classes during the weeks before the exams.[192] There are two exams every year in February and in June. For the February exam students play half the required program (usually the Bach piece and the etude), and for the June exam they play the other half of the program, in addition to the imposed piece that all students of that grade level have to play.

[191] The program for each year could be found in Appendix D
[192] The program for each year could be found in Appendix E

While the Czech ZUŠ and Prague Conservatory are more flexible in allowing teachers to choose the best repertoire for their students to meet specified competencies, the Beirut Conservatory has specific pieces from which teachers must choose at each level to teach their students. The Czech ZUŠ follows the national framework, which requires an output at the end of the first level and the second level, but the school requires an output for each year. Teachers get a guideline, but they choose whatever pieces they want to teach, since there is no recommended literature. There are competences that the pupil has to master, and the teacher chooses how to achieve these competencies. There are two exams per year in the piano department, similar to both Prague and Beirut conservatories. After the first semester students play etudes, and at the end of the year they play the rest of the repertoire (Romantic, Baroque), but teachers are free to assign different pieces for the first exam and keep etudes for the final exam.

5.4 Graduation requirements (theory, harmony, exam, concert)

Besides their piano repertoire, students at the Prague Conservatory are required to pass exams in theory, harmony, history, and other subjects.[193] The requirements for graduation itself are done during the sixth year. Students present an exam in January, and if they score 1 (excellent) or 2 (very good), they can play a concert, which is open to the public. If they get lower marks, they play a concert only for the jury. Students choose the program as they wish, but they are advised to play in different styles. Students are allowed to play up to two pieces from their repertoire of previous years.

Other than the concert, students have to write a diploma thesis related to the branch of their studies (pianos, composers, teaching, etc.). They all have a thesis advisor and three opponents. They have to defend their thesis after having read the reviews of the opponents. Students also have an exam, which consists of a foreign language (usually English, German, or Italian) and music subjects (theory, history, harmony) as a package where there are 15 questions and the students blindly choose one.[194] Finally, they have to teach a child (chosen by the conservatory from a pool of the best students of a well-known ZUŠ) in front of a jury. At the

[193] The requirements for each year could be found in Appendix F
[194] The question of choice could be a question about composers of a certain time period, or some composition which students have to analyze, or history, harmony, etc.

ZUŠ students have all theoretical, historical, and musical education into "music theory" classes, which students take for the first five years. After these five year, students attend piano seminars.

At the Beirut Conservatory things are very different. Students can apply for the graduation exam after they fulfill all the requirements of the theoretical studies department.[195] After successfully passing all the exams, students apply for a mock piano exam, where they present their full program and are offered suggestions and corrections by the jury. Two weeks later, the graduating students present the same program again, and if they receive above 60%, they can graduate.

5.5 Comparison of the study programs and graduation requirements

There are many similarities and striking differences between the two conservatories. There are also similarities between the Lebanese program and the ZUŠ program.

On one hand, both conservatories include etudes (Czerny op. 299, 740, etc.), Bach (inventions, preludes and fugues), classical sonatas, and romantic and modern pieces in their repertoire. On the other hand, the Prague Conservatory allows more freedom for the students to choose their own repertoire (within the set parameters), similar to the ZUŠ, whereas the Beirut Conservatory has a narrower range of choice for its students,[196] especially by including an imposed piece to be played by all students of a certain level at the end of each academic year.

The number of pieces to be prepared per year is larger at the Prague Conservatory (four etudes by Chopin, for instance, compared to one etude by Chopin at the Beirut Conservatory), and the level of difficulty of pieces is on a higher level in Prague also. Bearing in mind that students at the Beirut Conservatory also attend a regular high school in order to obtain a diploma recognized by the government, versus students at the Prague Conservatory, who attend conservatory as their only high school, the level of difficulty and number of pieces discussed above is not unreasonable.

[195] The requirements for each year can be found in Appendix G
[196] See Appendix E

The gap widens when it comes to theoretical and miscellaneous subjects. While students of both conservatories have to take harmony, theory, analysis, counterpoint, and chamber music, students at the Prague Conservatory take additional classes, such as music history, technology, history of art, modern harmony, etc.[197] Also, students at the Prague Conservatory are obliged to take these materials during their assigned years, whereas students at the Beirut Conservatory delay these materials until graduation, and that is what halts most students in the baccalaureate class from presenting their exam on time. Students at the Prague Conservatory also take language classes, English and Czech, civic education, physical education (sports), and general history.

In general, the differences between the two institutions are because of the fact that in the Czech Republic, the conservatory is considered a high school, whereas in Lebanon, the conservatory is considered an extracurricular activity. If the students at the Beirut Conservatory also had the luxury of being exempted from their scientific classes, the requirement to study the history, geography, and civic laws of Lebanon, in addition to the Arabic language and major philosophers, and the other classes they take from 7 AM till 3PM, they could have had the time to prepare a longer, harder repertoire.

5.6 Practice rooms

In both conservatories, as well as the ZUŠ, finding practice rooms is a problem for students, because during the normal teaching hours all rooms are occupied. At the Prague Conservatory students usually practice in the classrooms of teachers who are absent or away, unless there is a substitute teacher. Therefore, students come at 7:00 am to practice until 8:30 or 9:00 am when teachers usually come to teach. Teaching finishes at 6:00 pm, so again students can practice until 9:00 pm. The Prague Conservatory is also open on Saturday mornings and Sunday afternoons. Recently, electronic keyboards have been placed in the corridors of the fourth floor for students to practice.

At the Beirut Conservatory, students who are free in the morning can find many free practice rooms since most students come to the conservatory after regular school hours (after 3:00 pm), which is the same case at the ZUŠ. The disadvantage is that the vast majority of

[197] See Appendix F

students are at school (or university) in the morning, and therefore cannot go to their music schools to practice.

The one advantage of the Lebanese system is that the conservatory has many branches in different (even remote) parts of Lebanon, and they are all run by the same administration. Teachers are required to teach in at least two different branches, so that one branch would not be favored above the others (such as pianists of the caliber of Martin Kasík teaching only in Prague). Therefore, students living in remote areas do not have to move to or commute to the capital every day for practice or lessons. They can study in the branch closest to their house and practice at home. Many excellent students in the Czech Republic move to Prague at the age of 14 or 15, since the level and caliber of the Prague Conservatory is higher than those of other cities in the Republic.[198]

[198] This topic is beyond the scope of this work

6 Methodology

This study examines the role of self-regulation, quantity of practice, and self-efficacy on improved performance and self-assessment among piano students in Beirut, Lebanon and Prague, Czech Republic. It utilizes the mixed methods approach having self-regulation, number of hours of practice, and self-efficacy as its independent variables, and performance[199] and self-assessment as its dependent variables. Self-regulation and self-efficacy are measured through self-reported measures whereas quantity of practice and grades on the exams are derived from students directly. Self- assessment is measured by examining the difference between anticipated grade on the piano exam and the actual grade the student received.

The following section describes the design of the research, participants, time commitment, material, procedure, and overview of the data analysis.

6.1 Research design

This study utilizes the mixed methods approach. The mixed methods design is a method which uses two (or more) research methods in a single study, when one (or more) of the methods is not complete in itself. In other words, this method integrates two or more methodological strategies into a single research study, in order to answer the research questions.[200] And while the mixed method design could use qualitative or quantitative methods alone respectively or both qualitative and quantitative methods together, the current study uses the mixed method employing quantitative and qualitative methods together.

Additionally, the current study applies the research methods and concepts of practice-based research and research-based practice.[201] On one hand, the researcher uses theories and questionnaires to do academic research; on the other hand, students self-regulate during their practice sessions, and through conscious self-regulation they discover elements of self-regulation and ways to improve their performance. Finally, as students learn more about self-

[199] Measured through the grades students receive on their final exams in piano performance

[200] MORSE, J. M. – NEIHAUS, L. *Mixed method design: Principles and procedures* (2nd ed.). New York: Routledge, 2016. ISBN: 978-1-59874-297-8.

[201] SMITH, H. – ROGER, T. D., Introduction. In SMITH, H. – ROGER, T. D. (eds.). *Practice-led research, research-led practice in the creative arts* (1st ed.). Edinburgh: Edinburgh University Press, Ltd., 2009, 288 pages. ISBN: 978-0-7486-3628-0, p. 20.

regulation through the online questionnaires, they apply elements of self-regulation to their practice sessions, resulting in better practice and performance alike.

Furthermore, the process of data collection for this research includes a qualitative element, which is represented by the journals that piano students from the Beirut Conservatory and Prague Conservatory periodically sent. This would be largely similar to the Narrative Inquiry Method, developed by Peter de Vries.[202] The rationale for asking participants to tell stories or write journals is that people share musical experiences through telling stories. The five elements of narrative inquiry – character, setting, problem faced, actions taken, resolution – allow for a rich data collection in depth and in breadth.

6.2 Participants

For the qualitative part of the study, a group of eight students between the ages of 15 and 22 at the Beirut Conservatory ($n = 5$) and Prague Conservatory ($n = 3$) were chosen as the subjects of this study. The students were randomly chosen from a list of names provided by the administration of the conservatory. Originally ten names were chosen, but one student declined to participate in the study and another one interrupted her participation halfway through the study. From the Lebanese Conservatory three were males aged 16, 19, and 20 respectively, and two were females aged 15 and 19 respectively. From the Prague Conservatory one was female, aged 19, and the other two were males aged 19 and 24 respectively. For ease of comprehension, students are labeled student 1-8 in the following formation:

Student 1: female, 15, Beirut
Student 2: male, 16, Beirut
Student 3: male, 20, Beirut
Student 4: male, 19, Beirut
Student 5: female, 19, Beirut
Student 6: female, 19, Prague
Student 7: male, 24, Prague
Student 8: male, 19, Prague

[202] PHELPS, R. P. *A guide to research in music education* (5th ed.). Lanham: The Scarecrow Press, 2005, 288 pages. ISBN: 978-0810852402.

For the quantitative part of the study, 12 students from the Beirut Conservatory and 13 students from the Prague Conservatory filled an online questionnaire provided by the researcher.[203] The online questionnaire contained two scales as well as demographic information, such as gender and age, in addition to number of hours of practice and grades on piano exams. All participants were fluent in either English or Czech and signed a consent form at the beginning of the study.[204]

The Lebanese Conservatory in Beirut has 75 piano students above the age of 15, but only 12 responded (16% response rate). The Prague Conservatory has 40 piano students, but only 13 responded (32.5% response rate). A low response rate doesn't give an accurate representation of the population, and caution must be taken before generalizing the findings of this study.

The reasons for a low response rate are many. Firstly, students in both Beirut and Prague are very busy with academic demands, and an additional school-related task is not welcome in their busy daily life. Secondly, some of the students who were under 18 years old had to take permission from their parents, despite of the permission granted by the administration of their conservatory. Some parents did not want their children to participate in the research. Finally, there were delays beyond the control of the researcher in both Beirut and Prague. The Lebanese Conservatory assigned a new president, who insisted on rereading every document pertaining to the research before allowing the online questionnaire to be administered to the students. This created a five-month delay. At the Prague Conservatory, students would not fill the online questionnaire because of the language barrier, as most of them claimed their English language is not good enough. The online questionnaire was translated into Czech, which created an additional delay. Had it not been for these delays, a higher response rate could have been obtained.

[203] See Appendix H and I for the English and Czech versions of the questionnaire respectively
[204] See Appendix J

6.3 Time commitment

For the qualitative part, the eight students agreed to make a time commitment of nine months, from the beginning of the academic year in October until the piano exams in June. They submitted reports every two weeks, which, on average, took them about 5-10 minutes to write. As for the quantitative part, the 25 students who engaged in filling the consent from and online questionnaire agreed to do so online, an activity which would last about 10-15 minutes.

6.4 Materials

For the qualitative part of the study, students communicated with the researcher through email. For the quantitative part of the study, students filled an online questionnaire, which contained two scales.[205]

The first scale in the online questionnaire is the General Self-Efficacy Scale (GSES) by Schwarzer and Jerusalem.[206] It is a self-reported measure which assesses a general sense of perceived self-efficacy, while having the goal of predicting how one copes with daily difficulties and different kinds of stressful life events. The GSES has high reliability and validity, with a Cronbach's alpha ranging between .74 and .90, convergent validity with significant direct correlations with measures of optimism, work, and satisfaction and discriminant validity with significant inverse correlations with measures of depression, stress, burnout, and anxiety. It has 10 items on a 4-point Likert scale ('not at all true', 'hardly true', 'moderately true', and 'exactly true') and uses cumulative scoring.

The second scale in the online questionnaire is the Self-Regulation Questionnaire (SRQ) developed by Peter Miksza based on the six dimensions of self-regulation as described by McPherson and Zimmermann: motive, method, behavior, time management, and social influences.[207] The test is a self-report measure of self-regulated practice behaviors for beginning and intermediate instrumentalists. The questionnaire's psychometric soundness has been

[205] See Appendix H and I for the English and Czech versions of the questionnaire respectively
[206] SCHWARZER, R. – JERUSALEM, M. Generalized self-efficacy scale. In WEINMAN, J. – WRIGHT, S. – JOHNSTON, M. *Measures in health psychology: A user's portfolio. Causal and control beliefs*, 1995, Windsor, UK: NFER-NELSON pp. 35-37.
[207] MIKSZA, P. Self-regulation questionnaire, cited by HOOPER, T. L. *The effects of teacher-directed versus self-regulated practice routines on undergraduate group piano students performing four-part chordal music*. Georgia, 2015. Doctoral dissertation. University of Georgia. Major professor Dr. Mary Leglar.

assessed using a sample of 302 music students. The scale has high internal consistency, with Cronbach's alpha between .76 and .90, test–retest reliability with a significance of $p < .001$, and high convergent validity, as assessed by the significant direct correlation between its subscales and self-reported practice habits, such as quantity of practice, practice efficiency, and time spent of formal practice. The scale has six subscales, based on the six dimensions of self-regulation proposed by McPherson and Zimmermann, a total of 45 items on a 5-point Likert scale ('strongly disagree', 'disagree', 'neither', 'agree', and 'strongly agree') and uses cumulative scoring.[208]

6.5 Procedure

After the interviews with MgA. Milan Langer, head of department of piano studies at the Prague Conservatory and Mrs. Houri Sarafian, head of department of piano studies at the Beirut Conservatory, the researcher contacted different teachers and students at each of the conservatories in order to gather a sample of students who would like to participate in the qualitative part of the research. The researcher met with the students, explained to them the purpose and aim of the research, went over the informed consent form with them, and once their signatures were obtained, the researcher asked for email addresses in order to communicate and send reports. The researcher had to make three trips to Beirut to meet with students, teachers, and the head of piano studies.[209] Each student was expected to write bimonthly journal entries about their practice sessions, reflecting on the six dimensions of self-regulation by McPherson and Zimmerman. Students sent their reports via email. The administration of both conservatories granted permission to conduct the research and to have access to the students' final grades. At the end of the academic year, the eight students were asked to evaluate themselves with a grade for their performance on the piano exam, and the researcher compared that estimate with their actual grade as received from the administration of both conservatories.

For the quantitative part, the researcher prepared an online questionnaire comprising the GSES and the SRQ, had them translated into the Czech Language by a Czech language

[208] MIKSZA, P. The development of a measure of self-regulated practice behavior for beginning and intermediate instrumental music students. *Journal of research in music education,* 2012, vol. 59, no. 4, pp. 321-338. 0022-4294.
[209] The trips to Beirut were made possible by the generous support of the Faculty of Education at Charles University and the Charles University Grant Agency

teacher,[210] obtained consent from students and the administration of both conservatories, and shared the online questionnaire with all piano students of both institutions via Google Forms.

6.6 Data analysis

Quantitative data were analyzed using the Statistical Package for Social Sciences (SPSS) software,[211] licensed to the University of New York in Prague. The software was only used in the computer lab of the university. Qualitative data were thematically analyzed based on the six dimensions of self-regulation as described by McPherson and Zimmermann: motive, method, behavior, time management, and social influences. Interviews with MgA. Langer, Mrs. Sarafian, and Ing. Fröhlick were recorded using the software Voice Memos on iPhone 6 and transcribed by the researcher.[212]

[210] Mgr. Věra Miláčková
[211] To assist in the statistical analysis using the SPSS software, FIELD, A. *Discovering statistics using SPSS* (3rd ed.). London: SAGE Publications, 2009, 822 pages. ISBN: 978-1-84787-906-6 was used as a reference book
[212] See Appendices A, B, and C for transcripts of the interviews

7 Quantitative results

This section contains the descriptive statistics and normality tests of each of the independent and dependent variables[213] of the study, in addition to the statistical analyses needed to test the hypotheses of the study. Data analysis is carried out using the Statistical Package for Social Sciences (SPSS) software.

7.1 Descriptive statistics and normality

The mean of self-regulation scores was 160.88 (*SE* = 3.418), which was slightly higher than the median score, 159.00. Scores ranged from 134 to 209 with a standard deviation of 17.089. Self-regulation scores were normally distributed according to the Shapiro-Wilk test of normality ($p > .05$) (see Table 7.1).

Table 7.1
Descriptive statistics for the Self-Regulation Questionnaire (SRQ)

	N	*M(SE)*	*Md*	*SD*	*Min*	*Max*	*Shapiro-Wilk (p)*
Self-regulation	25	160.88 (3.418)	159.00	17.089	134	209	.154

The mean of self-efficacy scores was 30.60 (*SE* = .936), which was slightly lower than the median score, 31.00. Scores ranged from 21 to 40 with a standard deviation of 4.682. Self-efficacy scores were normally distributed according to the Shapiro-Wilk test of normality ($p > .05$) (see Table 7.2).

[213] Since exam grades at the Prague Conservatory are nominal (1=excellent, 2=very good, 3=average, 4=poor, and 5=fail), whereas exam grades at the Beirut Conservatory are on a numerical scale, the researcher created a Lebanese equivalence, where Czech grades were transformed into score variables by taking the lower limit assigned to that category, and a Czech equivalence, where Lebanese grades were transformed into their corresponding categories

Table 7.2
Descriptive statistics for the General Self-Efficacy Scale (GSES)

	N	*M(SE)*	*Md*	*SD*	*Min*	*Max*	*Shapiro- Wilk (p)*
Self-efficacy	25	30.60 (9.36)	31.00	4.682	21	40	.802

The mean of the Lebanese equivalent of grades on the piano exam was 88.32 (*SE* = 1.991), which was lower than the median score, 92.00. Scores ranged from 55 to 95 with a standard deviation of 9.957. Grades on the piano exams were not normally distributed according to the Shapiro-Wilk test of normality ($p < .05$) (see Table 7.3).

Table 7.3
Descriptive statistics for the Lebanese equivalent of grades on the piano exam

	N	*M(SE)*	*Md*	*SD*	*Min*	*Max*	*Shapiro- Wilk (p)*
Self-efficacy	25	88.32 (1.991)	92.00	9.957	55	95	.000

The mean of the Lebanese equivalent of expected grades on the piano exam was 86.00 (*SE* = 2.00), which was lower than the median score, 90.00. Scores ranged from 60 to 95 with a standard deviation of 10.00. Expected grades on the piano exams were not normally distributed according to the Shapiro-Wilk test of normality ($p < .05$) (see Table 7.4).

Table 7.4
Descriptive statistics for the Lebanese equivalent of expected grades on the piano exam

	N	*M(SE)*	*Md*	*SD*	*Min*	*Max*	*Shapiro- Wilk (p)*
Self-efficacy	25	88.32 (1.991)	92.00	9.957	55	95	.002

The mean of the average number of days of practice per week was 5.40 (*SE* = .271), which was slightly lower than the median score, 6.00. Scores ranged from 3 to 7 with a standard deviation of 1.354. Average number of days of practice per week were not normally distributed according to the Shapiro-Wilk test of normality ($p < .05$) (see Table 7.5).

Table 7.5
Descriptive statistics for the average number of days of practice per week

	N	*M(SE)*	*Md*	*SD*	*Min*	*Max*	*Shapiro- Wilk (p)*
Self-efficacy	25	5.40 (.271)	6.00	1.354	3	7	.008

The mean of the average number of hours of practice per day was 2.40 (*SE* = .224), which was slightly higher than the median score, 2.00. Scores ranged from 1 to 5 with a standard deviation of 1.118. Average number of hours of practice per day were not normally distributed according to the Shapiro-Wilk test of normality ($p < .05$) (see Table 7.6).

Table 7.6
Descriptive statistics for the average number of hours of practice per day

	N	*M(SE)*	*Md*	*SD*	*Min*	*Max*	*Shapiro- Wilk (p)*
Self-efficacy	25	88.32 (1.991)	92.00	9.957	55	95	.019

In order to measure self-evaluation in the current study, the difference of actual score on the piano exam and expected score on the piano exam was calculated for each participant. Participants with smaller values of difference between actual score and expected score were considered to have higher self-evaluation, and participants with larger values of difference between actual score and expected score were considered to have lower self-evaluation. The mean of the difference of actual score and expected score on the piano exam was 2.32 (*SE* = 1.173), which was higher than the median score, .00. Scores ranged from -5 to 20 with a standard deviation of 5.865. The scores of the difference of actual score and expected score on

the piano exam were not normally distributed according to the Shapiro-Wilk test of normality ($p < .05$) (see Table 7.7).

Table 7.7
Descriptive statistics for the difference between actual score and expected score on the piano exam [self-evaluation]

	N	*M(SE)*	*Md*	*SD*	*Min*	*Max*	*Shapiro- Wilk (p)*
Self-efficacy	25	2.32 (1.173)	.00	5.865	-5	20	.000

7.2 Hypothesis testing

The first hypothesis of this study states that students with higher self-regulation will evaluate their performance more accurately. In order to test this hypothesis, two different tests were run because of the differences in the grading system in Prague and Beirut.[214] First, the grades of the Lebanese students were transformed into a nominal variable, and hence self-evaluation was measured by whether actual grade matches expected grade or not, also a nominal variable. Participants whose actual grade matched their expectation were considered to be high on self-evaluation, and participants whose actual grade did not match their expectation were considered to be low of self-evaluation. Second, the grades of the Czech students were transformed into a score variable, and hence self-evaluation was measured by calculating the difference of actual score on the piano exam and expected score on the piano exam was calculated for each participant. Participants with smaller values of difference between actual score and expected score were considered to have higher self-evaluation, and participants with larger values of difference between actual score and expected score were considered to have lower self-evaluation.

To test the first variant of the first hypothesis, a binary logistic regression was run with scores on the SRQ as its independent variable and self-evaluation (whether actual grade

[214] See the previous footnote

matches expected grade or not) as its dependent variable. The data displayed goodness of fit (Pearson Chi-Square Value/df = 1.470).

The binary logistic regression model was not statistically significant according to the Omnibus Test (p = .076) (see Table 7.8).

Therefore, the first variant of the first hypothesis was not confirmed.

Table 7.8

Omnibus Test[a]

Likelihood Ratio Chi-Square	df	Sig.
30.878	21	.076

Dependent Variable: Difference between expected and actual grades

Model: (Intercept), SRQ

a. Compares the fitted model against the intercept-only model.

To test the second variant of the second hypothesis, a correlation was run between scores on the SRQ and the scores on the difference between expected and actual grades (self-evaluation) using Spearman's rank-order correlation, since scores on the difference between expected and actual grades (self-evaluation) were not normally distributed.[215] The results showed that self-regulation and self-evaluation were directly but not significantly correlated,[216] r_s (23) = .391, p = .053 (see Table 7.9).

Therefore, the second variant of the first hypothesis was not confirmed.

[215] See Table 7.7

[216] It could be argued that the result was marginally significant, since the p-value is not much larger than .05; however, the correlation coefficient itself is not very high (.391 being in the lower end of the moderate range), and hence the researcher considers the result insignificant

Table 7.9
Correlations

			Difference between expected and actual grades [Lebanese equivalent]
Spearman's rho	Self-regulation scores	Correlation Coefficient	.391
		Sig. (2-tailed)	.053
		N	25

The second hypothesis of this study stated that students with higher self-regulation will have better performance. In order to test this hypothesis, a correlation was run between scores on the SRQ and the grades on the piano exam (Lebanese equivalent) using Spearman's rank-order correlation, since grades on the piano exam were not normally distributed.[217] The results showed that self-regulation and performance were negatively and not significantly correlated, r_s (23) = -.043, p = .837 (see Table 7.10).

Therefore, the second hypothesis was not confirmed.

[217] See Table 7.3

Table 7.10
Correlations

			What was your last piano exam grade? [Lebanese equivalence]
Spearman's rho	Self-regulation scores	Correlation Coefficient	-.043
		Sig. (2-tailed)	.837
		N	25

The third hypothesis of this study stated that quantity of practice will improve performance only if accompanied by high self-regulation. In order to test the hypothesis, a partial correlation was run between average number of hours of practice per day and grades on the piano exam (Lebanese equivalent), while controlling for the SRQ scores. Results showed that average number of hours of piano practice per day were positively but not significantly correlated with grades on the piano exam, while controlling for the SRQ scores, r (22) = .195, p = .361. Zero-order correlations also showed that average number of hours of practice per day and grades on the piano exam (Lebanese equivalent) were positively but not significantly correlated, r (23) = .175, p = .402 (see Table 7.11).

Therefore, the third hypothesis was not confirmed.

Table 7.11
Partial correlation

Control Variables			What was your last piano exam grade? [Lebanese equivalence]
-none-[a]	On average how many hours do you practice per day?	Correlation	.175
		Significance (2-tailed)	.402
		df	23
Self-regulation scores	On average how many hours do you practice per day?	Correlation	.195
		Significance (2-tailed)	.361
		df	22

The fourth hypothesis of this study stated that there will be a positive relation between self-assessment and adjudicators' assessment among students. In order to test this hypothesis, the Czech equivalence of the scores was selected, since changing the Lebanese scores into categories places students 100% correctly into their corresponding categories; however, while changing the Czech scores to their Lebanese equivalent, the lower end of each category was chosen, which may or may not have been the actual grade of the Czech student, if ever Czech adjudicators think in terms of continuous numbers to start with.

In order to test the fourth hypothesis [Czech equivalent], a Pearson Chi -Square test was run to see the relationship between expected grade (self-assessment) and actual grade (adjudicators' assessment). Results showed that 60% of students correctly assessed the grade they would receive (52% expected and received 'excellent', 4% expected and received 'good', and 4% expected and received 'acceptable'); and among the 40% of students who did not

correctly assess the grade they would receive, 5 students (20%) expected to receive 'good' but ended up getting 'excellent', one student (4%) expected 'acceptable' but received 'excellent'. Furthermore, one student expected 'good' but received 'acceptable', and three students expected 'acceptable', but received 'excellent', 'good', and 'poor' respectively. Finally, one student expected 'poor' but ended up failing (see Table 7.12). These differences were statistically significant according to the Pearson Chi-Square test, χ^2 (12, N = 25) = 38.205, p = .000 (see Table 7.13).

Therefore, the fourth hypothesis was confirmed.

Table 7.12
Crosstabulation

		Expected grade				
		Excellent	Good	Acceptable	Poor	Total
Actual grade	Excellent	13	5	1	0	19
		52.0%	20.0%	4.0%	.0%	76.0%
	Good	0	1	1	0	2
		.0%	4.0%	4.0%	.0%	8.0%
	Acceptable	0	1	1	0	2
		.0%	4.0%	4.0%	.0%	8.0%
	Poor	0	0	1	0	1
		.0%	.0%	4.0%	.0%	4.0%
	Fail	0	0	0	1	1
		.0%	.0%	.0%	4.0%	4.0%
Total		13	7	4	1	25
		52.0%	28.0%	16.0%	4.0%	100.0%

Table 7.13
Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	38.205	12	.000
Likelihood Ratio	21.271	12	.047
Linear-by-Linear Association	13.889	1	.000
N of Valid Cases	25		

The fifth hypothesis of this study stated that there will be a significant difference in quantity of practice between students in Prague and students in Beirut. In order to test this hypothesis, two independent-samples *t*-tests were run with 'Conservatory' being the independent variable and 'average number of days of practice per week' and 'average number of hours of practice per day' as depend variables respectively. Although the scores on the dependent variables were not normally distributed (see Tables 7.5 and 7.6), the *t*-test was used since it is robust to violations of normality. In both cases there was homogeneity of variances as assessed by Levene's test of homogeneity of variances ($p > .05$) (see Table 7.15).

Students in Beirut practiced on average 4.75 days per week, which is lower than the average number of days that students in Prague practice, which is on average 6 days per week, a significant difference of 1.25 days, $t\ (23) = -2.559$, $p = .018$ (see Tables 7.14 and 7.15).

Students in Beirut practiced on average 1.92 hours per day, which is lower than the average number of hours that students in Prague practice, which is on average 2.85 hours per day, a significant difference of .929 hours, $t\ (23) = -2.245$, $p = .035$ (see Tables 7.14 and 7.15).

Therefore, the fifth hypothesis was confirmed.

Table 7.14
Group Statistics

	Conservatory	N	Mean	Std. Deviation	Std. Error Mean
On average how many days do you practice per week?	Beirut Conservatory	12	4.75	1.138	.329
	Prague Conservatory	13	6.00	1.291	.358
On average how many hours do you practice per day?	Beirut Conservatory	12	1.92	1.165	.336
	Prague Conservatory	13	2.85	.899	.249

Table 7.15
Independent Samples Test

		Levene's Test		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
On average how many days do you practice per week?	Equal variances assumed	.000	.983	-2.559	23	.018	-1.250
	Equal variances not assumed			-2.572	22.959	.017	-1.250
On average how many hours do you practice per day?	Equal variances assumed	.098	.757	-2.245	23	.035	-.929
	Equal variances not assumed			-2.221	20.688	.038	-.929

The sixth hypothesis of this study stated that there will be a significant difference in self-regulation between students in Prague and students in Beirut. In order to test this hypothesis, an independent-samples *t*-test was run with 'Conservatory' being the independent variable and SRQ scores as the dependent variable. SRQ scores were normally distributed according to Shapiro-Wilk's test of normality (see Table 7.1), and there was homogeneity of variances as assessed by Levene's test of homogeneity of variances ($p > .05$) (see Table 7.16).

The average self-regulation score for students in Beirut was 168.25, which is higher than the average self-regulation score for students in Prague (M = 154.08), a significant difference of 14.173, t (23) = 2.238, p = .035 (see Tables 7.16 and 7.17).

Therefore, the sixth hypothesis was confirmed.

Table 7.16
Group Statistics

	Conservatory	N	Mean	Std. Deviation	Std. Error Mean
Self-regulation scores	Beirut Conservatory	12	168.25	19.438	5.611
	Prague Conservatory	13	154.08	11.543	3.201

Table 7.17
Independent Samples Test

		Levene's Test		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Self-regulation scores	Equal variances assumed	3.360	.080	2.238	23	.035	14.173
	Equal variances not assumed			2.194	17.616	.042	14.173

The seventh hypothesis of this study stated that there will be a significant difference in piano exam grades (performance) between students in Prague and students in Beirut. In order to test this hypothesis, an independent-samples *t*-test was run with 'Conservatory' being the independent variable and actual grade on the piano exam (Lebanese equivalent) as the dependent variable. Although the exam grades were not normally distributed according to Shapiro-Wilk's test of normality (see Table 7.3), the *t*-test was used as it is robust to violations of normality. There was homogeneity of variances as assessed by Levene's test of homogeneity of variances ($p > .05$) (see Table 7.8).

The average grade on the piano exam for students in Beirut was 83.58, which is lower than the average grade on the piano exam for students in Prague (M =92.69), a significant difference of 9.109, t (23) = -2.529, p = .019 (see Tables 7.18 and 7.19).

Therefore, the seventh hypothesis was confirmed.

Table 7.18
Group Statistics

	Conservatory	N	Mean	Std. Deviation	Std. Error Mean
What was your last piano exam grade? [Lebanese equivalence]	Beirut Conservatory	12	83.58	12.176	3.515
	Prague Conservatory	13	92.69	4.385	1.216

Table 7.19
Independent Samples Test

		Levene's Test		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
What was your last piano exam grade? [Lebanese equivalence]	Equal variances assumed	9.701	.005	-2.529	23	.019	-9.109
	Equal variances not assumed			-2.449	13.613	.029	-9.109

The eighth and ninth hypotheses of this study stated that 'students will use the "method" dimension of self-regulation the most (from the six dimensions of McPherson and Zimmermann)' and 'students of the Beirut conservatory will report about the "time" dimension differently than students of the Prague conservatory' respectively. These hypotheses were tested using the qualitative method.[218]

[218] See Chapter 8

In order to further test the influence of self-regulation on improved performance coupled with amount of practice,[219] in addition to other demographic variables and self-efficacy, a multiple linear regression was run with self-regulation scores, age of commencement of piano classes, quantity of practice, and self-efficacy as predictors, and actual grade on the piano exam as the dependent variable.

The assumption of independence of errors was not violated according to Durbin-Watson statistic, 1.585. The tolerance value was greater than 0.1, hence there was no multicollinearity. The residuals were normally distributed.

Self-regulation, age of commencement of piano classes, quantity of practice, and self-efficacy combined did not significantly predicted performance, F (6,18) = 2.026, p = .115. However, self-regulation was the predictor with the second highest beta coefficient, the highest t score, and added marginally significantly to the prediction, p =. 055 (see Tables 7.20, 7.21, and 7.22).

The regression intercept, coefficients, and beta values can be found in Table 7.22.

[219] Two questions in the online questionnaire pertained to quantity of practice: "on average how many days do you practice per week?" and "on average how many hours do you practice per day?"

Table 7.20
Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.635[a]	.403	.204	8.883	1.585

a. Predictors: (Constant), Self-regulation scores, How old were you when you started playing the piano?, On average how many days do you practice per week?, Self-efficacy scores, On average how many hours do you practice per day?, Conservatory

b. Dependent Variable: What was your last piano exam grade? [Lebanese equivalence]

Table 7.21
ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	959.090	6	159.848	2.026	.115[a]
	Residual	1420.350	18	78.908		
	Total	2379.440	24			

a. Predictors: (Constant), Self-regulation scores, How old were you when you started playing the piano?, On average how many days do you practice per week?, Self-efficacy scores, On average how many hours do you practice per day?, Conservatory

b. Dependent Variable: What was your last piano exam grade? [Lebanese equivalence]

Table 7.22
Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	53.770	27.932		1.925	.070					
	Conservatory	8.777	5.424	.449	1.618	.123	.466	.356	.295	.430	2.326
	How old were you when you started playing the piano?	-.485	.669	-.167	-.725	.478	-.251	-.168	-.132	.624	1.602
	On average how many days do you practice per week?	1.640	1.872	.223	.876	.392	.315	.202	.160	.512	1.954
	On average how many hours do you practice per day?	-2.093	2.230	-.235	-.938	.360	.175	-.216	-.171	.529	1.891
	Self-efficacy scores	-.647	.501	-.304	-1.293	.212	-.251	-.291	-.235	.599	1.670
	Self-regulation scores	.254	.124	.435	2.049	.055	.106	.435	.373	.736	1.359

a. Dependent Variable: What was your last piano exam grade? [Lebanese equivalence]

8 Qualitative results

For the qualitative part of the current study, the researcher contacted different teachers and students at the Beirut and Prague conservatories and gathered a sample of eight students (five from Beirut and three from Prague), who agreed to participate in the research. Each student wrote bimonthly journal entries about their practice sessions, reflecting on the six dimensions of self-regulation by McPherson and Zimmerman. Students sent their reports via email.

The reports that the students sent as they reflected on their practice sessions were thematically analyzed according to the six dimensions of self-regulation proposed by McPherson and Zimmermann: motive, method, time, behavior, physical environment, and social factors.

8.1 Motive

McPherson and Zimmermann explain that the motive dimension deals with students' own choices and self-motivational processes, as well as with the "vicarious or direct reinforcement by others".[220] This dimension also explains how much worth students place over their learning process, choosing to pursue learning through musical practice. In other words, the motive dimension comprises two sub-dimensions: self-set goals and self-reinforcement.[221] Two out of eight students seemed to be using the motive dimension during their practice sessions. They were specifically using the self-set goals subdimension. For instance, student 1 reported that when faced with challenging repertoire, her first reflex would be to set a goal and organize her time, since number of hours of practice doesn't count as much as being disciplined. "It's not the total quantity of practice hours that counts, it's their regular repartition and how disciplined you are," she said. Student 3 also admitted that planning practice time is essential, as well as setting goals. No mention of self-reinforcement was seen in the reports sent by the students. As for reinforcement by others, student 1 considered her teacher's comments and satisfaction by her work the most important aspect of reinforcement, as she said, "and although

[220] MCPHERSON, G. E. – ZIMMERMAN, B. J., 2002, as cited by SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808, p. 433.
[221] MCPHERSON, G. E. – ZIMMERMAN, B. J. Self-regulation on musical learning. In COLWELL, R. – WEBSTER, P. R. (eds.). *MENC handbook of research on music learning* (2nd ed.). Oxford University Press, 2011, pp. 130-175. ISBN: 978-0-19-975439-7.

I practiced every day, the quality of my practice wasn't me! When I went to class, my teacher barely recognized me."

8.2 Method

Method involves practical steps and strategies that help in achieving a certain task at hand, as long as it is purposeful and self-determined[222] and thus contains increasingly advanced strategies to improve students' performance.[223] The method dimension can be further divided into two sub-dimensions: self-initiated correct images and technical aspects. While all students reflected on their problems and self-regulation in the second sub-dimension (working slowly, using a metronome, practicing each hand alone, adjusting fingering etc.),[224] only four of them used the first sub-dimension, also known as using mental imagery. Students 1 and 2 would imagine a whole orchestra playing the Haydn sonata, for instance, breaking down the piece and analyzing its motifs and harmonies, or would play a Bach invention voice by voice, as though played by separate instruments to heard them independently.

Student 4 claimed that the most important part of any interpretation is knowing the composer's musical path. He gave the example of how he imagined perturbed waters and waves as he played Beethoven.

> *"The most important in any interpretation is knowing the Composer's biography or at least what change he did in the Music path. As for Beethoven, the big deal is with contrast and leading the harmony ahead a certain aim to build tension and suspense. It isn't just a series of arpeggios (3rd movement)[225] but a simulation of danger, perturbated water, culminating waves, with a tendency to walk towards a casted moon. So, I am trying to pursue building this tension by taking care of the tempo evenly and most importantly, the harmony." (Student 4)*

[222] HALLAM S., 1997, as cited by SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.
[223] NIELSON K., 1999, as cited by SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.
[224] See chapter 8.2.1 and 8.2.2
[225] See Figure 8.1

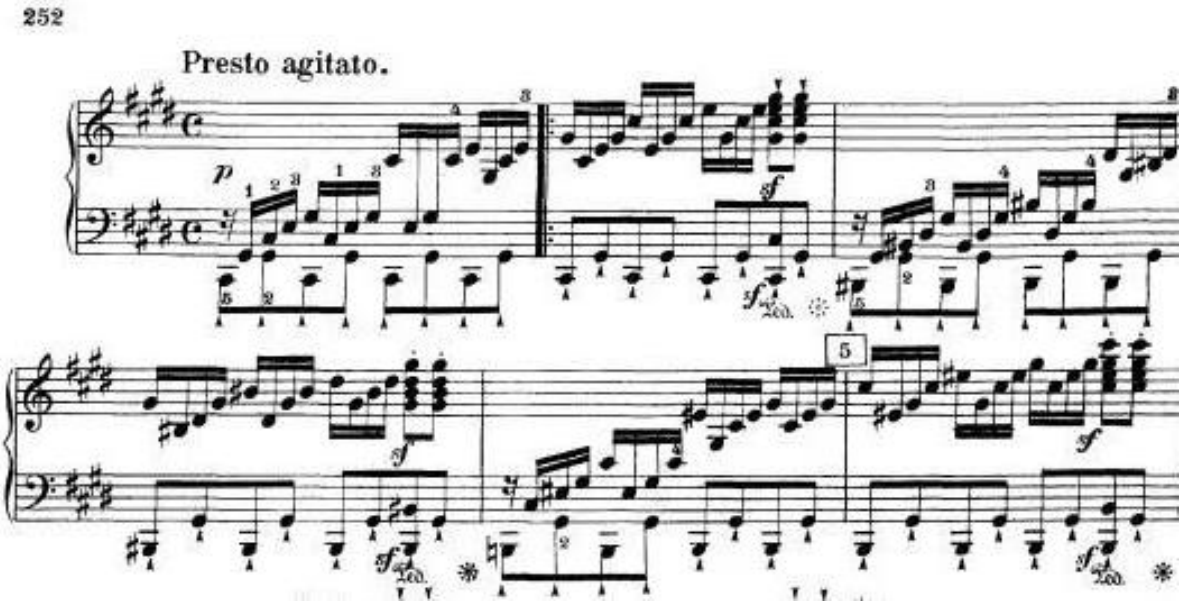

Figure 8.1: Excerpt from the third movement of Sonata Op. 27, no. 2[226]

Student 5, on the other hand, reflected upon his experience of playing a piano duo, saying that one has to imagine that he is playing the parts of the other pianist in order to make sure to perform adequately, notwithstanding the technical aspects of the piece, such as working with a metronome.

> *"We practiced the fast passages with a metronome. Over the time we have been playing together we figured out that it works miracles for us not to get those places out of control at concerts. It is very tricky to be together in the Largo of the Fantasy. It helped us to pretend or think that we are playing the part of the other person. That way, it helped to create the music together even if one of us is not playing at that point, rather than just try to hit the keys at the same time as your partner. We worked on the voicing and polished the details as we have been working on that piece for quite a while now." (Student 5)*

[226] Image from https://www.chinahao.com/product/553400169543/, retrieved June 10, 2019

As for the technical aspects of practicing, three elements appeared in the reports of the students: speed, technique, and memorization.

8.2.1 Speed

All students agreed that working slowly and gradually increasing the speed is a good idea. Student 1 worked with a metronome (as did student 2), "working slowly so that the hand doesn't hurt." She also stressed on the importance of practicing with a ridiculously slow speed, profound touch, and good attack. Student 3 advised to solve problems with speed by scales and exercises, whereas student 6 recommended the "Chinese method", which she explained as such:

> *"I have a metronome, and I start with a very, very slow tempo, and when I can play it without mistakes, I add one number on the metronome (for example, I start with tempo 80, then 81, 82…) My purpose is not to play it in the final tempo today, but to get it better." (Student 6).*

Student 7 played without looking at his hands, slowly and without pedal. When the piece sounded worse and worse, he went back to slow practice, rethinking fingering (and even playing the same passage in two different fingerings).

8.2.2 Technique

Student 2 stated that he would "release the tension in [my] left arm and let it go" to improve technique, and student 3 recommended an increased amount of practice, scales and exercises to solve technical issues such as equal power for fingers. Student 4, on the other hand, focused on "understanding, improving touch, focusing on playing with a deep touch, and finding appropriate hand positions to improve sound", while student 5 was more practical and mentioned specific ways in which one could improve technique, such as practicing passages in staccato and then in legato, playing each hand alone, and playing without pedal so as to hear inaccuracies in performance. Similarly, student 6 suggested an exercise where one lifts the fingers high and pushes the keys hard, and student 8 mentioned the importance of merging technique and interpretation. According to him, one has to master the technique and speed in order to start working on musicality, but at the same time, musicality has to be worked on in slow speed and focus.

8.2.3 Memorization

Student 1 mentioned her struggle with trying to memorize the Haydn sonata that she was playing. “Of course, I know the melody by heart, and I know when and how each phrase begins or ends, but there's always this chord or that measure that suddenly goes blank,” she asserted. Her strategy for fixing this was “aiming [my] focus every day on 2 lines (or a phrase) so that my brain grasps more details.” Student 2 mentioned that the Bach piece was hard to memorize, and so he “kept repeating and forcing [my] memory”, and student 8 recommended to work separate hands and memorize the hand with the more difficult part.

Student 6 reported having had an injury in one of her right-hand fingers. So, she practiced with the left hand alone. “It was super hard to play it from memory”, she said, but she tried it anyway, so that she improves her memory, and this gave her an idea on how to improve memorization. “On stage it will be better, since both hands will play, so kinesthetic memory will be at its best,” she claimed.

Student 4 seemed to summarize it all, as he said, “playing slowly is not enough to improve technique, one has to also harmonically analyze the piece, which also has the added benefit of improving memorization.”

8.3 Time

Time refers to a student’s ability to plan and manage his or her time effectively within a deadline.[227] While students of the Beirut conservatory (students 1-5) frequently mentioned in their reports that they couldn’t practice enough because of exams at school, students of the Prague conservatory would seldom miss practice, and if so, for reasons of being on a concert tour in England or performing chamber music concerts in Prague. Some of the reasons for missing practice included exams, math tests, a political strike, international day of Francophonie, and preparation for the Scholastic Aptitude Test (the SAT exam). As for time spent during individual practice sessions, student 6 of Prague mentioned that she practiced about two to three hours in the morning, then again after lunch, and once more after dinner,

[227] SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808, p. 433.

while student 1 of Beirut prided in having had at least a couple of chances during the academic year to practice three hours in one day.

Student 4 shared her strategy of doubling practice time the day after a missed practice day, and students 3 (Beirut) and 8 (Prague) stressed the importance of planning the time available for practice regardless of how long that time interval is. Student 8 would rather spend time "planning ahead and estimating how much time it would take to memorize the piece" and "spend some time writing the fingering in the early stages of practice", even if practice time were little. Student 1 claimed to have skipped school on more than one occasion, because "practicing in the morning is ten times better". She also revealed that when she had busy weeks, her first reflex would be to organize herself and make a practice plan. "It's not the total quantity of practice hours that counts, it's their regular repartition and how disciplined you are," she claimed.

8.4 Behavior

When problems surface and are recognized, the behavior dimension allows self-regulating students to choose, modify, and adapt their performance and practice. This means that the behavior dimension includes metacognition, that is thinking about thinking.[228] The behavior dimension comprises self-monitored performance and self-evaluated performance. Four students have reflected on the first but none on the second aspect. Student 4 realized the importance of the unity of the entire piece. He therefore monitored his dynamics as he played and readjusted them so that the piece develops and embraces the performer with emotions. This helped him solve problems that arose, such as starting the phrase too loud or speeding up the tempo.

> *"Considering this part as a unity, in the beginning, I was playing each phrase with a crescendo starting anew from piano to forte. Then a recognized that in order to preserve this UNITY, I mustn't start the next phrase from piano but from the nuance which ended up the phrase before, so it'd be like: piano to mezzo piano, mezzo piano to forte, forte to... to create the culmination and sustain the melody line. Moreover, I found that the*

[228] SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.

metronome was necessary to preserve the tempo, as the Beethoven's music tends to embrace you with emotions, so you move one with a slender speed up." (Student 4).

Student 6 used self-monitoring by pretending there is an audience in the room. She mentioned in one of her reports that she felt her hands were cold, and therefore she had to slow the tempo down. Student 1 started applying self-monitoring half-way through the academic year and reported:

"Now that I look at my practice with brand new fresh eyes, I can see that I was completely blind to the miracles happening at the ends of my fingertips! And I feel ashamed, really ashamed to have neglected and put aside all the technical bases I needed: gammes (scales),[229] arpeggios, dominant and diminished sevenths. But most importantly, I had utterly forgotten that even my etude was a masterpiece, and any interval I could possibly play, every key I could hit, was MUSIC… I was hitting the keys, with clear articulation, paying attention to every note (almost holding my breath), and I felt something strange. Those dry exercises that once bored me had suddenly become EMPOWERING. The more I played, the quicker and sharper my fingers ran. That said, I practiced my etude for an hour too with the same fever. I was almost sweating, and it felt amazing." (Student 1).

Student 7 realized that many problems arose because of tremolos in the left hand. After having tried a couple of different possibilities, he ended up choosing a strategy that would best reflect the composer's style, even if it would not be the best option for himself as a pianist.

"It took me a while to decide what to do with the tremolos in the left hand. To play with the pedal or without? I didn't like either. Played a few days with the pedal, few days without the pedal, asked for opinions of others and finally decided to play without. It is maybe a little more difficult, but it is what Beethoven wanted and it makes more sense". (Student 7).

[229] Parenthetical translation added by researcher

8.5 Physical environment

Physical environment deals with the relationship of students with the location where the learning process takes place and the potential aspects for their concentration and/or distraction.[230] None of the students had mentioned anything in their reports about the physical environment of their practice sessions. However, in interviews with the head of departments of piano sections of both conservatories, the problem of practice rooms was evident, as none of the conservatories have practice rooms to offer. Students can only practice at times where instruction does not take place, which would be the morning hours in Beirut, but students are at school, and the very early morning hours and very late-night hours for the Prague students, in addition to electronic keyboards with headphones placed in the corridor.

8.6 Social factors

Santos and Gerling explain the social factor as social and cultural factors, which "refer to a student's capacity to seek information and to get help from other possible resources such as recordings, books, live performances and web performances."[231] Except for student 6, all students mentioned that they have sought help from social factors to enhance their practicing, such as attending concerts (students 1 and 7), or even a series on concerts, every night for one week (student 5), participating in masterclasses, where one learned about new ways of thinking about musical pieces in general, and about the character of the melody of a piece in particular (student 3), competitions ("the Chopin competition motivated me to practice," student 8), reading about the composer ("I am reading more and more about Beethoven and drawing a clearer picture in my head", student 4), and listening to their pieces on YouTube (students 2, 5, and 7) or pieces by the same composer in general (students 2 and 4). Student 7 wrote, "I normally listen to the piece of music couple of times in different interpretations before I start learning it. It prevents me from the awkward steps in the beginning." Student 2 heeded to the advice of his teacher and listened to different pieces by Mozart in order to familiarize himself with Mozart's style, which, in turn, would enhance his own performance of the Mozart sonata that he was practicing for the exam.

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[230] MCPHERSON, G. E. – ZIMMERMAN, B. J. Self-regulation on musical learning. In COLWELL, R. – WEBSTER, P. R. (eds.). *MENC handbook of research on music learning* (2nd ed.). Oxford University Press, 2011, pp. 130-175. ISBN: 978-0-19-975439-7.

[231] SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808, p. 433.

Student 1 additionally mentioned meeting "a very special pianist"[232] and attending "multiple concerts of the philharmonic", and that these made her feel like she had been asleep for so long, but now she is awake.

[232] Student 1 mentioned in an informal meeting in the corridor of the Beirut Conservatory that the "very special pianist" in her reports referred to the researcher

9 Discussion

The current study focused on piano students at the Lebanese National Higher Conservatory of Music in Beirut, the Prague Conservatory, and the Basic Art School of Na Popelce in order to explore the role of self-regulation during piano practice sessions, quantity of practice, and self-efficacy on improved performance and self-evaluation. Twelve students from the Beirut Conservatory and 13 from the Prague Conservatory filled an online questionnaire measuring their self-efficacy as well as self-regulation on the six dimensions proposed by McPherson and Zimmermann. Students also provided the amount of time they spend practicing, their piano exam grades, as well as the grades they expected to receive on their piano exam. Additionally, eight students took part in the qualitative section of the study. Five students from the Beirut Conservatory and three from the Prague Conservatory sent bimonthly reports via email, reflecting on McPherson and Zimmermann's six dimensions of self-regulation as manifested through their practice sessions.

Thematic analyses of the bimonthly reports of the students revealed similarities and differences between students in Beirut and students in Prague, which could be partly explained by examining the vast differences between the systems of the two countries. Bearing in mind that the Prague Conservatory functions as a school that students attend instead of a regular school, while the Beirut Conservatory operates as an extracurricular entity that students attend in addition to their regular school, it was no surprise that students from Prague reported a much higher amount of daily piano practice than students from Beirut. Based on the reports of student 6 from Prague, for instance, one could see that her average practice time amounts up to six hours a day, while students in Beirut only reach a maximum of 2-3 hours the week before exams.

Prior to further discussion on the influence of each country's music education system on the results of this study, in this section the nine hypothesis and the quantitative and qualitative results are systematically presented and discussed.

The first hypothesis of this study stated that students with higher self-regulation will evaluate their performance more accurately. Whether the Lebanese equivalence grading were used or the Czech equivalence, the results showed that the hypothesis was not confirmed. One of the main issues pertaining to this hypothesis was the fact that self-evaluation was measured

through a comparison of students' actual grade on their piano exam and the grade they expected to receive. This, in itself, is not an issue; the issue was that students filled the online questionnaire after their final exam (in order to know what grade they received), and hence their expectations of what grade they would receive were biased by the actual grade and passage of time, which might have very well led to forgetting their expectations. Also, some students go into an exam and come out of it with zero expectations, but the online questionnaire forced an answer in order for the participant to continue, and hence these students were also not taken into consideration. Finally, a self-evaluation scale could have been administered to the students as part of the online questionnaire; however, self-evaluation in this study was not concerned with students' ability to evaluate any task that they do, any creative thought that passes their mind, or any endeavor they engage in. Self-evaluation in this study was concerned with students' accurate evaluation of their own performance (the piano exam, in this case). The aforementioned issues could explain why the first hypothesis was not confirmed.

The second hypothesis of this study stated that students with higher self-regulation will have better performance. This hypothesis was also not confirmed based on the lack of significance in the statistical testing. However, the actual matter is the definition of better performance. In this study, better performance was operationally defined as receiving higher grades on the piano exam at the end of the year. However, upon completing the study, the researcher discovered this definition does not take into account the quantity and quality of pieces performed per year. Upon an in-depth study of the program requirements and repertoire of each of the Beirut and Prague conservatories,[233] the researcher realized that the number of pieces to be prepared per year is larger at the Prague Conservatory (four etudes by Chopin, for instance, compared to one etude by Chopin at the Beirut Conservatory), and the level of difficulty of pieces is on a higher level in Prague also. Therefore, the dependent variable is, in fact, adjudicators' evaluation, rather than improved performance.

Another reason for the insignificance of the results of testing this hypothesis might be the fact that, apparently, only high-achieving students participated in the study to begin with. In order to further explore the relationship between self-regulation and performance (grades on the piano exam),[234] the researcher divided participants into two groups according to their self-

[233] See Appendices D and E
[234] Czech equivalent

regulation scores on the SRQ: low self-regulation and high-self-regulation.[235] Upon constructing a clustered bar chart, the researcher realized that 76% of all participants (whether in the low or high self-regulation group) received an 'excellent' evaluation on their exam. Only 4% (one student) failed, and 20% received evaluations in between (see Figure 9.1). This means that 3/4th of the participants obtained an excellent score, which suggests that high-achieving students took part in the study, not representative of the actual sample of students at the conservatories.

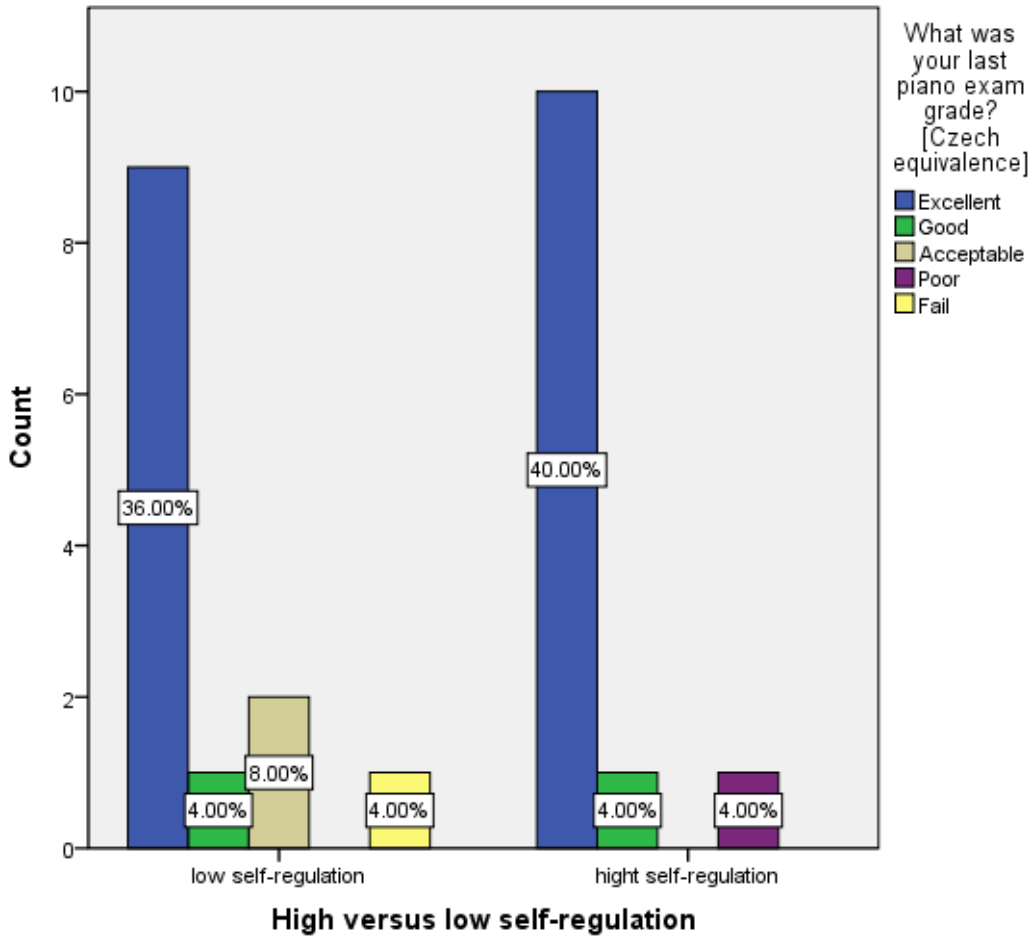

Figure 9.1: Clustered bar chart of self-regulation and actual score on the piano exam

The third hypothesis of this study stated that quantity of practice will improve performance only if accompanied by high self-regulation. If the second hypothesis were not confirmed, then it would not be unreasonable that this third one wasn't confirmed also. Here, it

[235] Participants were divided into these two groups based on their SRQ scores. Scores that fell below the median were classified into the 'low self-regulation' group, whereas scores that feel on the median and above were classified into the 'high self-regulation' group.

is imperative to look at the cyclical nature of quantity of practice, self-regulation, and good grades.[236] Students who practice countless hours to ensure the correct notes and speed are actually exercising self-regulation to an extent. Adjudicators who hear a Chopin etude played flawlessly at a speed of quarter note equals 160 would think twice before awarding that performer anything less than an 'excellent'. These good grades end up motivating the student to practice longer hours, watch YouTube videos, and participate in a study about the effect of self-regulation on improved performance.

For the student participants of the current study, quantity of practice should be definitely considered a measure of self-regulation.[237] For the students in Beirut who are swamped with other academic duties and responsibilities, making the time to diligently practice requires self-regulation. Student 1 claimed to have skipped school on more than one occasion, because "practicing in the morning is ten times better".[238] This shows planning, managing time, and setting goals. For the students in Prague, entering Prague conservatory was something they spent years preparing for. Prague conservatory has a special superiority compared to conservatories in other cities, and hence the best students of ZUŠes of other cities end up in Prague, studying at the prestigious Prague Conservatory.[239] Therefore, as MgA. Langer and the interviewed students would informally mention, most students end up getting an 'excellent' anyway,[240] and most students self-regulate anyway. Perhaps it would be more revealing to carry out research with students who are failing or barely making the passing mark. Then one could explore the effect of the lack of self-regulation and/or quantity of practice and their effects on their performance.

[236] See Figure 9.2
[237] Even McPherson and Zimmerman mention 'time' as one of the six dimensions of self-regulation
[238] See Chapter 8.3
[239] See Chapters 5.1 and 5.6
[240] See Figure 9.3. Only 1 student (4%) has scored a 'very good' in Prague, whereas we have students scoring lower in Lebanon and even one student who has failed

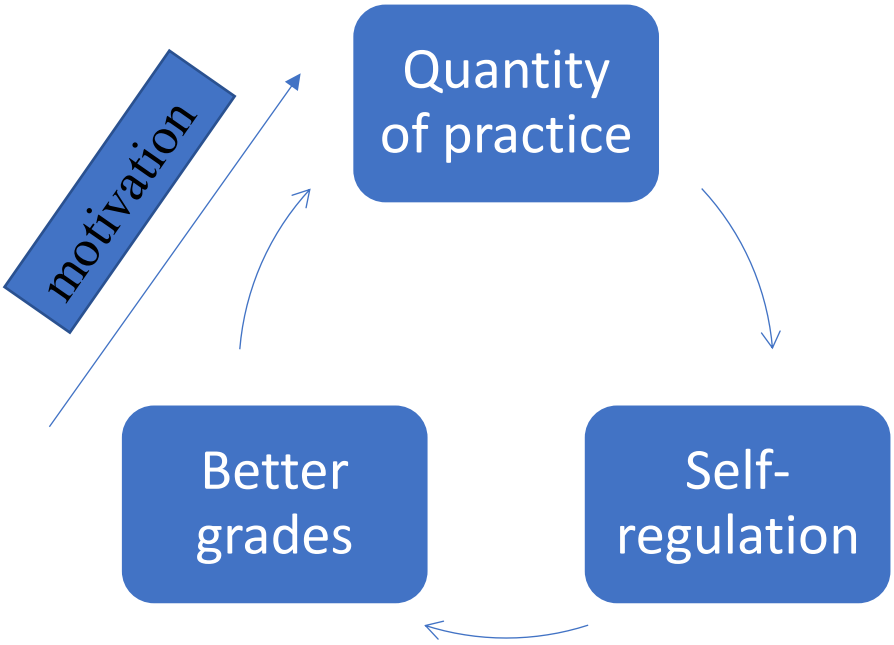

Figure 9.2: Cyclical nature of quantity of practice, self-regulation, and better grades[241]

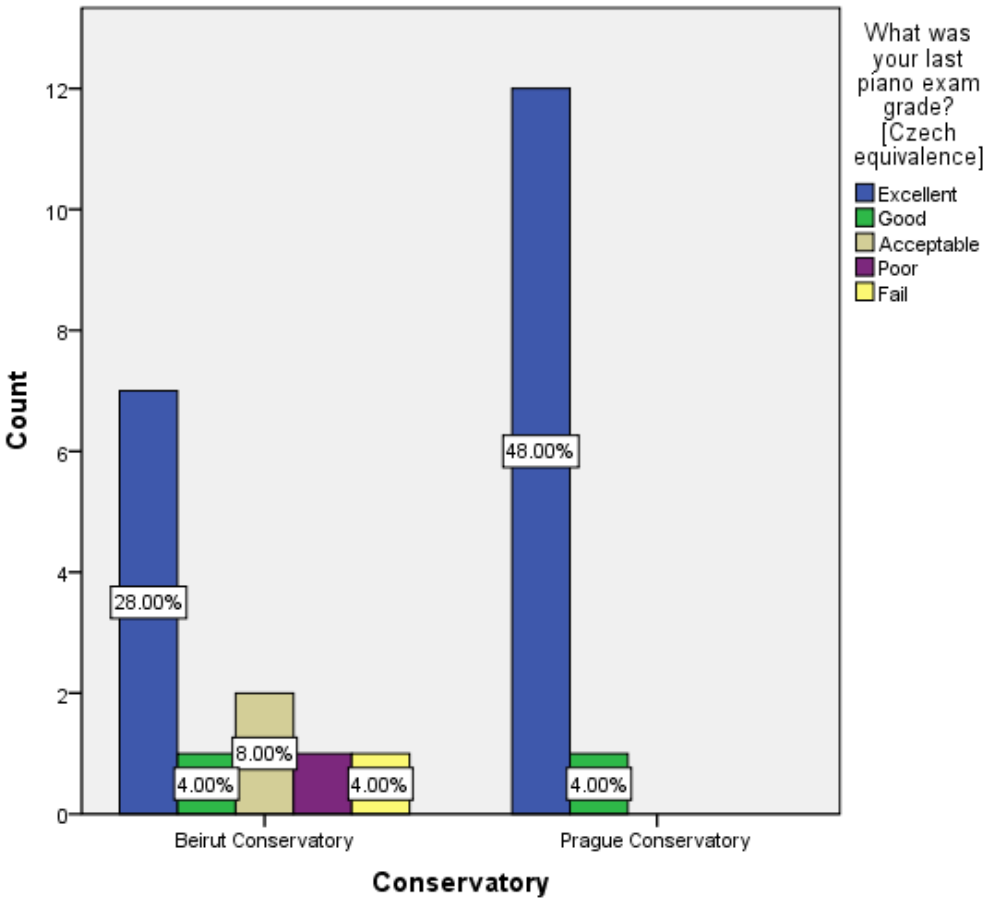

Figure 9.3: Clustered bar chart of conservatory and actual grade on the piano exam

[241] Diagram created by the researcher

Additionally, Peter Miksza found an eye-opening result, through which he realized that quantity of practice might mean self-regulated practice after all.

> *Significant relationships were found among overall practice efficiency ratings, practice habit items, and factor scores. Practice times reported were found to be significantly related to practice efficiency ratings, suggesting that subjects may be equating the amount of time they spend practicing with how effectively they practice. The significant, positive relationship between formal practice percentages and efficiency ratings suggests that subjects who spend more time on purposeful, deliberate practice activities perceive their own practicing as efficient. The significant, negative correlation found between informal practice percentages and efficiency ratings suggests an inverse relationship in that those subjects who spend more of their time on informal activities perceive their practicing to be less efficient.*[242]

The fourth hypothesis of this study stated that there will be a positive correlation between self-assessment and adjudicators' assessment among students with high self-regulation and high self-efficacy. The Pearson Chi-Square test showed significant results, with 60% of students correctly assessing the grade they would receive (52% expected and received 'excellent', 4% expected and received 'good', and 4% expected and received 'acceptable'). Among the 40% of students who did not correctly assess the grade they would receive, 5 students (20%) expected to receive 'good' but ended up getting 'excellent', one student (4%) expected 'acceptable' but received 'excellent'. Furthermore, one student expected 'good' but received 'acceptable', and three students expected 'acceptable', but received 'excellent', 'good', and 'poor' respectively. Thus, the fourth hypothesis was confirmed.

This finding echoes the findings of Lebler,[243] who found out that self-assessment and adjudicators' assessment are highly correlated. Lebler mentioned two factors that enhance this

[242] MIKSZA, P. An exploratory investigation of self-regulation and motivational variables in the music practice of junior high band students. *Contributions to music education*, 2006, vol. 33, no. 2, pp. 9-26. ISSN: 01904922, p. 23.
[243] LEBLER, D. Promoting Professionalism: Developing Self-assessment in a Popular Music Program, Queensland Conservatorium Griffith University, Australia, 2014. Retrieved from https://www.researchgate.net/publication/270904975_Promoting_professionalism_Developing_self-assessment_in_a_popular_music_program

agreement of evaluations. Firstly, the element of time. His research found that within 20 years self-assessment and teacher's assessment reached a correlation of 100% compared to a 25% at the beginning of the study, whereas even at the beginning of the study assessment of different teachers were highly correlated. He concluded that self-assessment of performance improves over time and experience. The second element is the presence of four different skill sets:

1. independent, life-long learning
2. cognitive skills to review critically, analyze, consolidate, and synthesize knowledge
3. exercise critical thinking and judgment
4. application of knowledge and skills

These skills, although not named self-regulatory skills by Lebler himself, are skills of self-regulation, and parallels could be found with McPherson and Zimmerman's six dimensions of self-regulation.

The fifth hypothesis of this study stated that there will be a significant difference in quantity of practice between students in Prague and students in Beirut. The hypothesis was confirmed as seen by the significant result on the independent-samples *t*-test, comparing the average number of hours of practice of the Czech and Lebanese samples. Students in Beirut practiced on average 4.75 days per week and 1.92 hours per day, both of which are lower than the average number of days that students in Prague practice, which is on average 6 days per week and the average number of hours that students in Prague practice, which is on average 2.85 hours per day. However, the qualitative analysis further revealed two aspects.

First, the reasons that cause the students of the Beirut Conservatory to practice fewer hours or not at all are all related to the fact that they have to attend a regular school in the morning, meet its academic demands, sit for exams, and attain passing results. Second, guilt feelings are shown by these students, versus feelings of pride that the students of the Prague Conservatory display for having missed practice for more important, musical reasons, such as playing in concerts (solo and chamber music), participating in competitions, and traveling on a tour to perform in other countries along with their other classmates and teachers.

These findings also confirm the ninth hypothesis of the current study, students of the Beirut Conservatory will report about the "time" dimension differently than students of the

Prague Conservatory. However, upon looking deeper into the dimension of time as not only daily practice and its amount but also planning and managing one's time effectively within a deadline,[244] it is seen that the gap narrows between students of the two countries, and the effect of the different systems subsides to give way to the individual self-regulatory behavior of the student. While it is true that student 8 from the Prague Conservatory would rather spend time "planning ahead and estimating how much time it would take to memorize the piece" and "spend some time writing the fingering in the early stages of practice", even if practice time is little, and this shows excellent planning and managing ability, student 1 from Beirut claimed that the best strategy is to organize oneself and make a practice plan. "It's not the total quantity of practice hours that counts, it's their regular repartition and how disciplined you are," she claimed. This approach also shows excellent self-regulatory planning and managing of one's time. This provides evidence that the "time" dimension is used by students of both Beirut and Prague.

The sixth hypothesis of this study stated that there will be a significant difference in self-regulation between students in Prague and students in Beirut. Although not officially written as part of the hypothesis, based on the structure and requirements (and hence the level) of both conservatories, the researcher latently hypothesized that students at the Prague Conservatory will have significantly better self-regulatory skills. While the hypothesis in its neutral statement was confirmed as seen by the significant result on the independent-samples *t*-test, comparing the self-regulation scores of the Czech and Lebanese samples, there were two interesting outcomes, one on the quantitative end and the other on the qualitative end.

As far as the quantitative results are concerned, the numbers showed the exact opposite of that the researcher had covertly hypothesized. The average self-regulation score for students in Beirut was 168.25, which is higher than the average self-regulation score for students in Prague (M = 154.08), a significant difference of 14.173.[245] Since the hypothesis was worded neutrally, it was confirmed, as there was a significant difference between the self-regulation scores of the two samples; however, despite the fact that the Beirut Conservatory is not a school in itself, and in spite of the lesser requirements for Lebanese students, both in terms of quantity and difficulty, students at the Beirut Conservatory seem to not only be self-regulating but doing

[244] SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.
[245] See Table 7.16

so better than their Czech counterparts. One could argue that there is over-reporting on the Lebanese students' part; however, that assumption could be equally true for the Czech students. It seems it's true that, for the current sample at least, students at the Beirut Conservatory have higher self-regulation.

On the other hand, the qualitative analyses did not show vast differences between the students of the two countries. A brief look at the usage of the six dimensions of self-regulation shows that students used some dimensions more, some dimensions less, and some dimensions not at all, but there is no evident pattern that students of the Prague Conservatory use these six dimensions more (quantity) or more thoroughly (quality).

The motive dimension, for instance, appeared only in the reports of students 1 and 3, both from Beirut, and only student 1 of Beirut reported the importance of her teacher's comments and satisfaction by her work as an aspect of external reinforcement. The method dimension was used equally in both groups as well (see below for further elaboration on the use of the method dimension). As discussed above, the time dimension appeared to be different in the Czech and Lebanese samples, based on the number of days and amount of hours of practice per day, but, in fact, students demonstrated the usage of planning and managing their time, regardless of the limitations imposed on them or advantages bestowed upon them by the system of musical education in their countries.

The behavior dimension, manifested in self-monitored practice and problem-solving strategies, also appeared in both samples, as students 1 and 4 of Beirut reported having used this dimension to a certain extent to control dynamics and tempo, and students 6 and 7 of Prague also reported using this dimension to solve emerging problems, such as dealing with cold hands or problematic tremolos in the left hand. The physical environment dimension was missing from the reports of both Czech and Lebanese students, and the social factors comprised listening to YouTube recordings of one's own pieces in both samples, although Lebanese students also reported listening to other pieces by the same composer (student 2), reading about the composer (student 4), or attending concerts (students 1 and 5), while the Czech students reported listening to their pieces, but also deriving motivation from the infamous Chopin competition (student 8).

Three reasons could explain why this hypothesis was not confirmed through the qualitative analysis. One of the possible reasons is the fact that students were asked to report

their practice sessions based on the six self-regulation dimensions of McPherson and Zimmermann, which means that students were aware of the topic and aims of the study. When given a list of six dimensions to consider, students would have felt compelled to shape their reports, at least in part, to accommodate the six dimensions. Had the students been asked to simply report their practice sessions without knowing that the current study examined the role of self-regulation in the lives of piano students, the results might have been much different.

A second reason would be the fact that students self-regulate regardless of the country or culture they belong to. These students are conservatory students, who have decided to take their piano classes seriously, not only as a leisurely activity. As mentioned in the literature review, different studies[246] have found out that not only extrinsic but also intrinsic motivation improve performance, since intrinsic motivation overlaps with self-regulation. Czech piano pedagogue Libuše Tichá affirms that motivation is essential in the lives of piano students, especially at the early stages. The job of the teacher is to plant the motivation, since it creates an element of regulation, which improves practice sessions and ameliorates performance.[247]

The numerous demands of the Lebanese academic life have affected the quantity of practice but not the intention of students to self-regulate in order to improve their performance. Under the monotonic benefits assumption,[248] the Czech students would be considered the better sample; however, given the refutation of the assumption and the focus on other aspects of practice, such as self-regulation, the Lebanese sample is on an equal platform with the Czech sample in terms of applying the dimensions of self-regulation to their practice. Nonetheless, the requirements of the Prague Conservatory are much more than those of the Beirut Conservatory (four Chopin etudes per year in Prague versus only one Chopin etude per year in Beirut), and hence students of the Prague Conservatory do perform more pieces, harder pieces, and more complex material. One could argue that the Czech students have better performance, and one would be correct; however, this difference in better performance, according to the qualitative results of this study, is due to the number of classes students have per week, number of hours they practice per day, and the requirements of their school (which, in themselves, are contingent upon the quantity of lessons and practice), but not self-regulation or the lack of it.

[246] MIKSZA, P. An exploratory investigation of self-regulation and motivational variables in the music practice of junior high band students. *Contributions to music education*, 2006, vol. 33, no. 2, pp. 9-26. ISSN: 01904922.
[247] TICHÁ, L. *Slyšet a myslet u klavíru* [Listening and thinking at the piano] (1st ed.). Praha: Akademie múzických umění v Praze, 2009, 176 pages. ISBN: 978-80-7331-151-3.
[248] See Chapter 3.1

The seventh hypothesis of this study stated that there will be a significant difference in piano exam grades (performance) between students in Prague and students in Beirut. The hypothesis was confirmed, as the average grade on the piano exam for students in Beirut was 83.58, which is significantly lower than the average grade on the piano exam for students in Prague (*M* =92.69). The issue with this hypothesis, though, is the different grading systems. In order to be able to compare the Czech and Lebanese samples, two equivalences had to be created. Since exam grades at the Prague Conservatory are nominal (1=excellent, 2=very good, 3=average, 4=poor, and 5=fail), whereas exam grades at the Beirut Conservatory are on a numerical scale, the researcher created a Lebanese equivalence, where Czech grades were transformed into score variables by taking the lower limit assigned to that category, and a Czech equivalence, where Lebanese grades were transformed into their corresponding categories. In order to test this hypothesis, the Lebanese equivalence of the scores was selected, in order to be able to run a test of comparison of means instead of crosstabulation with a Pearson's Chi-square significance. In other instances, the Czech equivalence of the scores was selected, since changing the Lebanese scores into categories places students 100% correctly into their corresponding categories; however, while changing the Czech scores to their Lebanese equivalent, the lower end of each category was chosen, which may or may not have been the actual grade of the Czech student, if ever Czech adjudicators think in terms of continuous numbers to start with.

Earlier, the fact that students at the Prague Conservatory play harder pieces in greater quantities was mentioned. If these students are playing a harder repertoire and are performing more pieces per academic year, with the same (or even less) self-regulation as the Lebanese students, and are still managing to be evaluated with a higher score (notwithstanding that different adjudicators graded the students of different countries), then what is the factor that is leading to improved performance among the students at the Prague Conservatory?

There are actually two factors that are, apparently, leading to improved performance in the Czech students. First, quantity of practice, as shown through the fifth hypothesis of this study. True, this does seem like this study has circled back to the monotonic benefits assumption, but there are important factors mentioned above (Prague Conservatory only accepting high-achieving students, McPherson and Zimmerman mentioning 'time' as one of their dimensions of self-regulation) that show that the Czech students take their practice time seriously. In the qualitative results section, the reader could see that one of the reasons Czech

students spend a lot of time practicing is because self-regulatory skills need time. Student 6 of Prague, for instance, claimed that she uses the "Chinese method", which, using a metronome, starts with a very slow tempo and gradually accelerates, only if the piece is played without mistakes in the slower tempo. This takes time. Student 7 wrote that he normally listens to the piece of music a couple of times in different interpretations. This also takes time.

Although the quantitative data showed that students in Prague do practice significantly longer (and more) than Lebanese students, one could still argue that the Lebanese students are applying self-regulatory skills within their constraints. Here lies the importance of the second factor that helps the Czech students attain better performance: the system of musical education in the two countries. As stated many times hitherto, piano students in Lebanon are drowned by the requirements of their morning schools: the classes, projects, assignments, and exams. The Czech students, on the other hand, attend conservatory as a high school, thus being exempted from subject areas such as mathematics and the sciences. While students in Prague are busy preparing for prestigious competitions and playing chamber music, students in Beirut are preoccupied with passing exams that they know they will never use in their future.

Probably the only hypothesis out of the nine hypotheses that could be confirmed only exclusively via the thematic analysis of the reports of the students is the eighth hypothesis: students will use the "method" dimension of self-regulation the most. The qualitative analyses showed that this hypothesis was confirmed, as all eight students reported both sub-dimensions of the method dimension, self-initiated correct images and technical aspects (speed, technique, memorization). In addition to that, student reports via emails were categorized based on the six dimensions of self-regulation, and word count of the reports, categorized into the six different dimensions, showed that students' reports contained references to the use of the motive dimension 2.7% of the time, the time and social factors dimensions 13.5% each, and the behavior dimension 16.2% of time; the reports also revealed an absence of the physical environment dimension, while the method dimension occupied 54.1% of students' reports. This means that students reported the use of the method dimension more than half the time and more than all the other dimensions combined. This is in line with the findings of the exploratory study done in Brazil in 2011, where most of the students reported the use of the method dimension

(72%) of self-regulation; only 16% reported self-regulation strategies related to the behavior dimension, and only 12% reported benefited from the social factors around them.[249]

[249] SANTOS, R. – GERLING, C. (Dis)similarities in music performance among self-regulated learners: an exploratory study. *Music education research*, 2011, vol. 13, no. 4, pp. 431-446. ISSN: 1461-3808.

10 Conclusion

Research about the topic of self-regulation in piano practice has focused on children, students, advanced students, and expert musicians. The sample of the current study is different in that it is a group of advanced intermediate piano students at the Lebanese National Higher Conservatory of Music as well as the Prague Conservatory. While self-regulation has been credited to enhance performance in students all through the literature, the current research adds another component, which is self-evaluation. It is true that researchers have interviewed students regarding their practice behavior and self-regulation; however, the current research focuses on students' self-evaluation of their performances and views these evaluations in light of adjudicators' evaluations. Furthermore, the current research studies the factor of self-efficacy as not only a factor influencing self-regulation during practice, as many researchers have throughout the literature, but also as a factor influencing self-evaluation and improved performance.

The major conclusion that could be derived from this study is that self-regulation does have a profound role in the lives of piano students. Although this is not evident in the insignificant quantitative results, self-regulation seems to be the protective factor that is allowing students in the Lebanese conservatory to thrive, despite the harsh demands of a parallel academic life. While students at the Prague Conservatory perform more complex pieces and in a higher number, results of this study showed that it is not a lack of self-regulation among the Lebanese students that puts the Czech students at a higher level of performance; rather, it is the system of the country, which treats the conservatory as a school, allowing its students to focus on music and afford to practice an average of six hours a day, unlike the Lebanese students who would seldom reach three hours of practice, as they juggle their school requirements and the conservatory program.

10.1 Contributions and implications

The implications of the current research extend beyond the traditional implications that skills of self-regulatory practice must be taught to students during their private piano classes. This research suggests to educators and piano students that self-regulation during practice not only enhances performance but also allows for a better judgment of one's abilities and performance, thus contributing two important aspects to the lives of students' piano

performance and piano pedagogy in general. First, students can learn how to better assess their own performance, which implies that students can evaluate themselves before the performance or examination (mock exams or performing in front of peers) accurately, reevaluate their practice strategies, and modify their practice methods until the date of the actual performance. Second, students can prepare for their future career as performers where a teacher or adjudicator is not always available to scaffold, correct, evaluate, and suggest ways to improve performance.

10.2 Limitations

Three limitations can be perceived based on the design of the current study:

First, the data collected from the students regarding their self-regulatory practice is based on journals and questionnaires, which are subjective self-reports prone to biases such as acquiescence (a tendency to agree with what the researcher/question states), image management (respondents presenting themselves in an image that they would like to portray to the researcher at the expense of honesty), and lack of introspection.

Second, the current research does not take into consideration two factors that might greatly influence performance and self-evaluation: talent and performance anxiety.

Finally, the response rate was very low. The Lebanese Conservatory in Beirut has 75 piano students above the age of 15, but only 12 responded (16% response rate). The Prague Conservatory has 40 piano students, but only 13 responded (32.5% response rate). A low response rate doesn't give an accurate representation of the population, and caution must be taken before generalizing the findings of this study.

The reasons for a low response rate are many. Firstly, students in both Beirut and Prague are very busy with academic demands, and an additional school-related task is not welcome in their busy daily life. Secondly, some of the students who were under 18 years old had to take permission from their parents, despite of the permission granted by the administration of their conservatory. Some parents did not want their children to participate in the research. Finally, there were delays beyond the control of the researcher in both Beirut and Prague. The Lebanese Conservatory assigned a new president, who insisted on rereading every document pertaining to the research before allowing the online questionnaire to be administered to the students. This

created a five-month delay. At the Prague Conservatory, students would not fill the online questionnaire because of the language barrier, as most of them claimed their English language is not good enough. The online questionnaire was translated in to Czech, but that created an additional delay. Had it not been for these delays, a higher response rate could have been obtained.

10.3 Suggestions for future research

It is the suggestion of the researcher that future research be done taking into consideration the limitations of the current study, as well as the vast differences in the systems of the Lebanese and Czech conservatories.

Firstly, it is suggestion of the researcher to do further research, which studies the relationship between self-regulation and self-efficacy on one hand and talent and performance anxiety on the other hand and their effect on self-evaluation and improved performance. By controlling for covariates such as talent and performance anxiety, future research can better understand the role of self-regulation and self-efficacy in improved performance and self-evaluation.

Secondly, it would be advisable to use different criteria or different norms for the Czech versus Lebanese conservatories. The Prague Conservatory is a school in itself, whereas the Lebanese Conservatory is an extracurricular activity, and hence the amount of time students could devote for their piano classes and practice vastly differs in both institutions. This inevitably results in a less complicated and advanced repertoire at the Lebanese Conservatory, less time spent practicing, and a significant difference in the role of self-regulation on their performance.

Finally, students' practice sessions could be monitored via video cameras or recorded for further analysis, upon compliance with the General Data Protection Regulation (GPDR). While this method would be more time consuming, allowing students time to get used to the camera in the room and act like themselves, it would provide higher ecological validity and more accurate results, as self-report measures might distort the truth, but coupled with the unbiased observations of the researcher, they might yield a more accurate description of students' self-regulatory behavior during their practice sessions.

10.4 Concluding remarks

The current study adds to the literature of piano pedagogy by not only addressing a very important topic, self-regulation, but also by providing a list of self-regulatory skills (behavior) or practices that piano teachers can teach their students, and piano students can use as a checklist during their practices to enhance their performance and self-evaluation. Furthermore, the aforementioned list comes not only from the survey of the literature, but also from the thematic analysis of the qualitative data, which is the reports that students wrote about their own practices; in other words, the list of self-regulatory skills is derived from actual piano students, their habits, struggles, and aspirations, which allows future piano students to identify with, benefit from, and put these skills to good use in their academic life.

10.5 List of self-regulatory skills for students

Below is a list of self-regulatory skills for piano students. This list has been developed through the qualitative analysis of the journal entries of the eight students who participated in this study.

1. setting goals for each practice session instead of playing until the designed time is up
2. self-reinforcement (for a job well done)
3. mental imagery: different pictures, images, sounds, and colors
4. verbal strategies, speaking to oneself during practice
5. timing practice, dividing it into different parts, taking breaks
6. self-evaluating during the practice session (giving oneself a grade), and verbally saying what needs improvement
7. keeping a rehearsal journal (for oneself or to share with the teacher)
8. structuring the practice venue (minimal distractions, good light, etc.)
9. attending concerts, masterclasses, listening to the practiced pieces played by professionals, comparing different editions of the same piece, and reading about the composers' lives and musical styles

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Appendices

Appendix A	Transcript of the interview with MgA. Milan Langer, head of the piano department at the Prague Conservatory
Appendix B	Transcript of the interview with Mrs. Houri Sarafian, head of the piano department at the Beirut Conservatory
Appendix C	Transcript of the interview with Ing. Vojtěch Fröhlick, deputy director of the Basic Art School of Na Popelce
Appendix D	Study program of the Prague Conservatory
Appendix E	Study program of the Beirut Conservatory
Appendix F	Theoretical requirements for each year at the Prague Conservatory
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Appendix H	Online questionnaire (English)
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Appendix J	Consent form (Quantitative part)
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