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# The Effects of Video Recording on the Level of Expertise and Self-Regulated Learning Ability of Adults in a Beginner Classical Guitar Class

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## ABSTRACT

This mixed methods study investigated the effects of video recording on the self-regulated learning behaviours and achievement levels of adults in a beginner classical guitar class. The class met for twelve sixty-minute sessions. Participants ($N$=25) were recruited from a community arts organization, were over the age of eighteen, and had little or no previous classical guitar experience. Participants were randomly assigned to a control ($n$=13) or experimental ($n$=12) group. All participants completed pre and post measures of self-regulation, and responded weekly to four reflection questions. Experimental group participants submitted short musical excerpts each week by video. All participants submitted a performance video at the conclusion of the study. An external examiner assessed all final videos using the researcher-constructed performance scale. Results from the performance measures indicated statistically significant ($p$ = .037) group differences, suggesting that the experimental group performed more musically, with better tone, greater rhythmic precision, and with a more secure technical foundation than the control group. Results from the self-regulation measures were not statistically significant, however self-efficacy levels increased for the experimental group participants and decreased for the control group participants over the study interval. Qualitative data indicated that most participants were intrinsically motivated yet persistent disruptions hindered them from successfully managing their practice time and environment. These disruptions centred on commitments to family, work, domestic duties, and health related issues. Methods of instruction that take into consideration the life stage challenges faced by adult learners are discussed.



Keywords: classical guitar, self-regulation, self-regulated learning, expertise, classroom guitar, video recording, guitar assessment, guitar pedagogy.

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## Introduction

Compared to many other educational settings, instrumental music students spend a considerable amount of time practicing away from the direct guidance of their teachers (Sloboda, Davidson, Howe, & Moore, 1996). This self-guided instruction is critical to the development of fundamental skills and activities that may lead to future musical success (Miksza, 2012). As such, instrumental music practice may be examined in terms of the self-regulation processes that students develop and deploy in order to become more proficient musical practitioners (McPherson & Renwick, 2001). Self-regulated learning has been defined as active behavioural, cognitive, metacognitive, and highly motivated participation in one's own learning and has been positively related to academic (Zimmerman, 1986) and musical (McCormick & McPherson, 2003) achievement. In this introductory chapter, research relevant to the current study will be discussed according to the following categories: (a) construct of self-regulation, (b) measurement of self-regulation, (c) instruments that have been developed to measure achievement in classical guitar performance, (d) effectiveness of educational interventions on self-regulation, and (e) third phase adult novice musicians.

### Construct of Self-Regulation

Self-regulation has been viewed as an open-ended cyclic process that occurs in three phases: (a) forethought – thought processes and personal beliefs that precede efforts to learn, (b) performance/volition control - processes that occur during the learning effort that affect concentration and performance, and (c) self-reflection – reactions and responses that occur after the learning efforts (McPherson & Zimmerman, 2002, p. 340). These processes are thought to be cyclical because the self-reflection phase feeds back into the forethought phase. Within this model, Nielson (2001) explored the construct of self-regulation through video analysis of two

advanced conservatory students' performance preparation. She noted that these two organists first analysed the musical task before them and then set goals concerning what they thought was attainable within a given practice period. Goals were arranged hierarchically and participants subsequently chose appropriate strategies for approaching these goals based on contextual factors. Such behaviours exemplified the forethought aspect of self-regulation. During what could be described as the performance/volitional control phase, the students engaged in self-instruction by verbalizing and planning how they should proceed as they executed certain tasks. Familiar task learning strategies such as isolating problem spots from within a given context and reducing the task to its essential parts were exhibited. Self-monitoring was also evident as the students made judgements that demonstrated knowledge of when they were performing well and when they were not. In the third phase, self-reflection, Nielson's two participants self-evaluated by comparing their current performance with their ideal of the piece, and thus changes in strategic activities were made.

Further unpacking the construct of self-regulation, McPherson and Zimmerman (2002) outlined six potential dimensions: (a) motive, dealing with self-motivation, how individuals come to value their learning, and why they choose to continue their learning in spite of many obstacles; (b) method, referring to the types of skills, knowledge, and understanding that are required when deciding which approach is superior when engaging with music; (c) time management, referencing how individuals successfully plan and manage their time efficiently; (d) behaviour, dealing with an individual's ability to self-monitor and evaluate his or her own performance; (e) physical environment, relating to controlling the space where learning takes place; and (f) social factors, concerning an individual's disposition to reach out to knowledgeable others, or to acquire support materials when faced with difficulties.

Music researchers have incorporated this theoretical framework of self-regulation into their investigations of music practice. For example, Miksza, Prichard, & Sorbo (2012) investigated intermediate band students' self- regulated behavior during individual music practice. Participants' practice sessions were rated for evidence of self-regulated behavior using a rating scale comprised of items that addressed McPherson and Zimmerman's (2002) method, behavior, and time-use dimensions of self-regulated learning. Results indicated significant relationships between self-regulation ratings and frequencies of certain practice behaviors.

McPherson & Renwick (2001) studied the common trends and individual differences of seven beginner band students according to the six dimensions of self-regulation as outlined by McPherson and Zimmerman (2002), (i.e., method, behavior, time, motive, social factors and environment). Participants were video recorded over the course of three years. Behavioural coding was conducted on the content of practice, the nature of errors and off-task behaviours, and the interaction of family members. Results showed that participants chose a wide variety of practice locations ranging from quiet bedrooms to busy family rooms and were generally well equipped with music stands and an appropriate chair. Higher levels of cognitive engagement were associated with intrinsic motivation; thus, participants motivated by personal rather than external factors were more likely to engage in self-regulatory behaviour. Participants practice strategies were minimal, consisting of playing straight through the piece 90% of the time. Virtually no evidence of deliberate practice strategies was exhibited. Time spent playing during rehearsal increased from 72.9% in year one to 84.1% in year three.

Research conducted by McPherson and McCormick (2006) examined the role of motivation in young musicians' capacity to prepare for, and to satisfactorily complete, prepared examinations on their instruments. The study consisted of students ($N$=686) preparing for

examinations with the Australian Music Examination Board ranging in levels from grades 1-8. Structural equation analysis was used and self-efficacy was found to be the most important predictor of achievement.

The theoretical framework of expertise explains expert performance as the end result of individuals' prolonged efforts to improve performance while negotiating motivational and external constraints. The construct of deliberate practice plays a central role within this framework. Ericsson, Krampe, & Tesch-Römer (1993) have described deliberate practice as, "a highly structured activity, the goal of which is to improve performance" (p. 368). These researchers assessed the levels of deliberate practice in three groups of elite, adult violinists whose performance differed. The researchers analyzed the amount of practice the violinists had acquired by the age of 18 and concluded that there were significance differences among the groups. The best violinists had accumulated an average of 7,410 hours of practice, the second best performers had accumulated an average of 5,301 hours and the third group had accumulated an average of 3,420 hours. As the amount of deliberate practice increased so too did the level of expertise.

Hallam et al. (2012) assessed 3,325 young people ranging in level of expertise from beginner to the level required for entry to higher-level education. A questionnaire was completed with a number of statements related to practice strategies, organization of practice and motivation with a 7-point rating scale. The researchers sought to know whether musicians with less expertise adopted similar practice strategies to those musicians with greater expertise. The researchers also investigated whether these strategies changed as expertise increased over time. Results of factor analysis revealed seven factors: adoption of systematic practice strategies, organisation of practice, use of recordings for listening and feedback and use of metronome, use

of analytical strategies, adoption of ineffective strategies, concentration, and immediate correction of errors. Results indicated that as expertise increased students practiced more minutes, adopted more systematic practice strategies, organized their practice more efficiently, used recordings for feedback, and engaged in more analytic strategies (Hallam et al., p. 665). The factor entitled "use of recordings for listening and feedback and use of metronome" explained 7.6 percent of the amount of variance, behind organization of practice (7.7%), and adoption of systematic practice strategies (10.7%).

Araujo (2016) explored self-regulated behaviours in advanced musicians ($N$=212) through an online questionnaire using a five point Likert-type scale. He found that self-regulation through personal resources was the most predominant in practice approaches, and that self-regulation through external resources decreased with experience (Araujo, 2016, p. 278). Araujo's instrument assessed three factors of self-regulated behaviours; the "self-regulation through practice organization" factor included items derived from the goal-setting theories of locke & Latham (2013).

**Measurement of Self-Regulation**

Perhaps the most frequently used measure for evaluating the effects of classroom academic performance is the Motivated Strategies for Learning Questionnaire (Duncan, McKeachie, 2005). The MSLQ is an 81-item, self-report instrument with a motivation section and a learning strategies section. There are 31 items in the motivation section assessing student goals and value beliefs for a course, their beliefs about their skills to succeed in a course, and their anxiety concerning tests in a course. Thirty-one items also comprise the learning strategy section dealing with students' use of cognitive and metacognitive strategies. There is also a learning strategies section that has 19 items concerning student management of different

resources (2005). All questions are paired with a seven-point Likert-like scale. This tool has proven to be reliable and useful, having been adapted for a number of different purposes for researchers, instructors and students.

Most quantitative studies examining self-regulated music practicing have used an adapted version of the Motivated Strategies for Learning Questionnaire developed by Pintrich and colleagues (Pintrich, Smith, Garcia, & McKeachie, 1993). However Zimmerman (1998) has defined self-regulation as being context-specific. The reliability and validity of these self-report measures used in music education research may therefore have been impacted. Because of this, a number of music researchers (e.g., Araujo, 2016; Hallam *et al*; 2012; Miksza, 2012) have set out to create reliable measures of self-regulated learning in music. For example, Miksza tested the construct validity and reliability of a measure of self-regulated practice behaviour based on the six dimensions of self-regulation outlined by McPherson and Zimmerman (2002). Construct validity was tested using confirmatory factor analysis. Internal consistency and consistency over time were also assessed. A sample ($N$=302) of middle school band students was used. Factor analysis showed the dimensions of self-efficacy, method/behaviour combined, time management, and social influences as the best fit. Cronbach's alpha and test retest reliability results indicated good to excellent consistency for all self-regulation subscales, with coefficients ranging from .79 to .90. Significant correlations ($p$ <.001) between self-regulation subscales and self-reported practice habits provided preliminary evidence of predictive validity of the measure (Miksza, 2012).

Araujo (2016) created an online questionnaire based on behaviours identified in the literature regarding expert music performance. Cronbach's alpha was used to test the measurement's internal reliability. The coefficient for the final version of the measure was $a$ =

.86. Exploratory factor analysis indicated three different aspects of music practice: (a) practice organization; (b) personal resources, which included reflexive/metacognitive strategies during practice and the evaluation of executed tasks; and (c) external resources, such as teachers, peers, and materials.

Hallam (2012) designed a questionnaire based on the findings from existing literature. Two groups of questions were established a priori in order to carry out multiple regression analysis: 1) statements relating to practicing, and 2) factors contributing to motivation. A Cronbach's alpha statistic was calculated for each group of items. In addition, as Cronbach's alpha statistic does not confirm uni-dimentionality of included items the factor structure for each composite was also examined (Grayson 2004). The Cronbach's alpha statistic for each composite measure was as follows: (a) practicing strategies $a$=.866; organization and self-management of practice $a$=.637; practicing when not preparing for an examination $a$=.67; practicing when preparing for an examination $a$=.75; self-belief $a$=.796; support from family, friends, and teachers $a$=.709; enjoyment of performing $a$=.852; attitudes towards playing an instrument and perceptions of its value $a$=.813: enjoying musical activities $a$=.786: future aspirations $a$=.787: and teachers ratings $a$=.927.

While these previous measures have been shown to be a reliable and effective manner of gathering and assessing data concerning music students' practice habits, each has their limitations. Hallam et al's. measure (2012) contained items on practice strategy and organisation of practice, yet none from the social factors aspect of self-regulation. Similarly, Araujo's measure contained items from the social factors aspect of self-regulation, yet items from the motive aspect are absent. Miksza's measure adhered most closely to McPherson and Zimmerman's (2002) self-regulation model, however, as previously mentioned, the physical

environment aspect of self-regulation was absent from his measure. Because important aspects of McPherson and Zimmerman's (2002) model of self-regulation were absent from each of the previous measures there is a need for a new measure that more completely assesses each of the dimensions of this model.

### Measurement of Classical Guitar Performance Achievement

In order to examine potential effects of levels of self-regulation on musical achievement, reliable assessment measures for musical achievement are needed. Musical performance assessment is an important part of the instructional process for both solo and ensemble programs. Performance assessment is a regular part of summative assessments, examinations, and music festivals (Zdzinski & Barnes, 2002). During performance assessments students are evaluated on their ability to apply skills, demonstrate understanding of concepts, and to meet specific objectives. The evaluation of a musical performance however has generally been considered a difficult endeavour; reliability among assessors is sometimes low and significant biases often influence the results (McPherson & Thompson, 1998, p. 12). The creation of a common set of evaluative dimensions may increase inter-judge reliability when rating performances (McPherson & Thompson, 1998).

An early example of such a rating system was the *Watkins Farnum Performance Rating Scale* (1954). The scoring for this scale was based on measure-by-measure performance errors, and while the scale is highly reliable, questions have been raised regarding the validity of the measure because important parameters such as musical interpretation, intonation, and tone quality are left unevaluated (Stivers, 1972; Zdzinski & Barnes, 2002). More recently, researchers have utilized facet-factorial design procedures to create a number of instrument-specific performance assessment measures (e.g., Abeles, 1973; Bergee, 1987; Horowitz, 1994; Zdzinski

& Barnes, 2002). These designs seek to improve the evaluation of musical performances by replacing judges' general impressions with a more systematic procedure - a common set of evaluative dimensions or "factors" is used. Common factors include tone, intonation, and tempo and several questions may be contained within each factor. Judges then rate performers using a Likert-like scale for each question. Data collected may be summed to generate a cumulative score. The facet factorial design is therefore an attempt to provide an improved performance assessment by providing common judging criteria not possible in global rating scales (Zdzinski & Barnes, 2002).

There are several instruments that measure guitar proficiency (e.g., Fink 1973; Russell 2010; Watkins 1982). Russell's measure gathered items concerning the characteristics of a good or poor guitar performance from guitar performance literature, previously constructed rating scales, and statements from professional guitar players, guitar teachers, and college guitar majors. Ninty-nine item statements were identified and placed into a priori categories established in previous research by Abeles (1973), Bergee (1987), and Zdzinski and Barnes (2002). A five-point Likert scale was used and 100 recorded samples of guitar performance excerpts were adjudicated by 67 volunteer judges. The results of a factor analysis identify a five-factor structure consisting of 1) interpretation/musical effect: seven items including, "spiritless playing" and "melodic phrasing", 2) technique: six items including, "played fluently" and "flubbed", 3) rhythm/tempo: seven items including, "the tempo was in good taste" and "hurried repeated notes", 4) tone: seven items including "tone is rich", and "tone quality is beautiful", 5) intonation: four items including; "ignored key signature" and "intonation is good". These factors accounted for 71% of the total variance. Based on factor loadings 32 items were selected to represent the Guitar Performance Rating Scale. Alpha reliability for the 32 item scale was .962.

Horowitz's scale (1994) examined improvisation from a jazz guitar perspective. Items were gathered through analysis of pedagogical materials, teacher-generated essays, and published interviews of established guitarists. Statements were paired with a 5-point Likert scale and used by 28 judges to rate 70 student performances. Factor analysis indicated a model of three factors of ten items each: 1) musicianship: including "plays wrong notes for certain chords" and "sounds like just a bunch of licks over changes", 2) expression: including "has something that grabs you" and "tone quality alive", and 3) overall structure: including "reaches climax of solo at appropriate moment" and "solo doesn't end well". Inter-judge reliability estimates for the overall score were >.96, and for the three subscales >.94. Inter-item reliability estimates were .87 to .97 for the eight solos.

These scales are not without limitations, however. Neither of the two extent studies that assess guitar playing with a facet factorial design (Horowitz 1994, Russell 2010) takes into consideration the specific demands of classical guitar technique or its repertoire. Russell's scale (2010) attempts to measure "general guitar performance", yet this is problematic. It would seem that each instrument must be evaluated according to its unique features - excellent violinists have superior vibrato, pianists do not, nor should they be expected to. To illustrate this point, Russell's scale asks adjudicators to rate whether the performer played with, "Poor synchronization of pick and fretting hand fingers" (p.29). This item clearly indicates that the meaure was designed for plectrum guitar styles. The plectrum, or guitar "pick" is used by folk, rock, and jazz performers, however classical and flamenco guitarists use only their fingers to pluck the strings. In a similar manner, Horowitz states that the items in his Jazz Guitar Instrument Rating Scale "do not appear to be specific to the guitar" and that the scale "may be applicable to jazz improvisation in general" (Horowitz, 1994, p. 64).

The manner in which the guitar is played is also dictated by the multiplicity of genres that is afforded it. Guitar styles such as rock, jazz, classical, folk, and flamenco each use specific techniques and have stylistic characteristics which must be measured on their own merits and according to the demands of their own repertoire (McPherson & Thompson, 1998, p. 13). For instance, the guitar can be played harmonically (strumming), monophonically (with a pick), or homophonically, (a combination of pick and fingers). Folk Music, Death Metal and Flamenco guitar styles have only a few practical aspects in common with each other. The type of guitar being played - whether steel string, classical, electric, or cutaway - will also determine the types of questions that will be asked. These will in turn affect the validity and reliability of data gathered. In light of the limitations of the measures discussed above, and because greater precision in assessment is needed to provide more accurate information to guitar students and teachers alike, there is, therefore, a need for the creation of a new measure.

### The Effect of Interventions on Self-Regulated Learning

Educational interventions designed to enhance self-regulated learning skills in academic settings have been examined since the early 1980's (Hattie, Biggs & Purdie, 1996, p. 100). The majority of these interventions have taken place in the domains of reading comprehension, mathematics and mathematical problem solving, and science and social sciences (Dignath, Buttner & Langfeldt, 2008). Broadly speaking, these interventions have targeted the cognitive, metacognitive, and motivational dimensions of self-regulation. Findings show that interventions are most effective when they are context-related, which is easier to do when integrated into the classroom instruction, and when students are given opportunity to apply and practice newly acquired strategies (Dignath et al., p. 102).

Dorrenbacher and Perels (2016b) examined a sample of college students (*N*=173) that signed up for a course to improve their self regulated learning skills. The study was based on Zimmerman's social cognitive model (2000) of self regulation and addressed the forethought, performance, and reflection phases of the theory. The study utilised a 2 x 2 x 2 control group design and analysed the effects of a general self regulated learning program, a learning diary, a combination of the two interventions, and a control group. The researchers hypothesised that the latter condition would display the most robust results because "learning diaries stimulate self-monitoring and therefore should cause behavioural optimization processes" (Dorrenbacher & Perels, 2016a, p. 53). Learning diaries consisted of 47 self report items and were completed each day during the study. The general self regulated learning intervention included seven topics including goal setting, time and strategic planning, self-motivation and procrastination, volition and attention, focusing, task strategies, self reflection and causal attribution. The intervention took place once per week for 90 minutes. Self observation was not included in the training. This component was fostered separately through the use of the intervention of learning diaries. The 54-item self regulated learning questionnaire was administered before the study began, during the last training session (eight weeks later), and a third time eight weeks after the training ended. Results indicated that the self regulation training positively influenced self regulated learning behaviours, whereas the learning diary alone had no effects. The combination of both interventions produced the highest effect, as the researchers had hypothesized. Although effects were stable for eight weeks, no transfer effect was found. The analysis revealed a statistically significant multivariate two-way interaction of Time x Training, $F(12, 158) = 2.16$, $p < 0.05$, as well as a statistically significant multivariate two-way interaction of Time x Learning Diary, $F(12, 158) = 1.85$, $p < 0.05$. Both interactions were in the hypothesized directions because the

intervention groups showed higher gains than the corresponding non-intervention groups. Furthermore, a statistically significant multivariate three-way interaction Time x Training x Learning Diary was found, $F(12, 158) = 2.04$, $p < 0.05$.

Using a similar research design Bellhauser, Losch, Winter and Schmitz (2016) examined the effects of a web-based self regulation trainer and a learning diary on 166 university math students. Participants were randomly assigned to four groups in a 2 (training vs. no training) x 2 (diary vs. no diary) between subjects design. Group TD (training plus diary) attended the web-based training and kept an online diary, while group T (training) attended the same training but did not keep a diary. Group D (diary) kept a diary but had no access to the web-based training. Finally, group C (control) did not receive training or keep a diary. Tests were administered before the study period began and four weeks later at the conclusion of the intervention period. These tests contained 42 items on self regulated learning and other constructs, a 20 question multiple choice test on declarative knowledge of self regulated learning, and a mathematics test. Lessons contained in the web based training were based on the three phases of Zimmerman's (2000) self regulation theory; 1) preaction, 2) action, and 3) post-action. Each lesson contained various videos, presentations, self-tests, exercises, and group discussions on an online bulletin board. Three lessons were completed each week over the four week treatment period. The learning diary contained both open ended questions to foster metacognition and closed questions for measurement. These items were assessed on a six-point rating scale. Results showed that the training had significant effects on self regulated learning knowledge, self regulated learning behaviour, and on self-efficacy.

Many studies have used an educational intervention in an effort to increase the self-regulated learning skills of students in domains other than music. Within the domain of music,

studies have examined the effects of self regulated learning as they relate to certain aspects such as self-evaluation, performance achievement and motivation. Few music studies, however, have attempted to use educational interventions to increase levels of self regulated learning behaviour in students.

Hewitt (2011) conducted one such study. The researcher sought to determine whether self-evaluation instruction would have an impact on student self-evaluation, music performance, and self-evaluation accuracy of music performance among middle school instrumentalists. He also sought to understand if student grade levels affected these variables. Participants ($N$=211) within each grade level (5 through 8) were assigned to one of three treatment conditions: self-evaluation instruction (SE-1), evaluation only (SE-O), or no self-evaluation (SE-No). The treatment period was eight weeks in duration and students meet four days a week for 40 minutes each time. At least 25 minutes of each class was used to instruct the SE-1 group in self-assessment methods; thus, totalling a minimum of 500 minutes of instruction. Music used in the study consisted of three pieces for each grade level. Researchers chose pieces based on three criteria: 1) that the pieces possessed appropriate grade level musical demands, 2) that the pieces would avoid a floor and ceiling effect, and 3) that the pieces were similar in difficulty for each instrument within each grade level. Each group played through music used in the study at each lesson and heard a model recording of the piece. Students evaluated themselves using a pre-existing measure (Woodwind Brass Solo Evaluation Form) with seven subareas including, tone, intonation, melodic accuracy, rhythmic accuracy, tempo, interpretation, and technique. Pre test performance testing and self-evaluations took place during the third week. A second performance recording and self-evaluation took place during week eight. Student performances were recorded and assessed by three adjudicators. Results suggested that those who received

self-evaluation training were generally inaccurate in their assessments and did not improve as a result of self-evaluation instruction. Performance scores also increased similarly across all treatment groups.

Cremaschi (2012) reported that studies designed to measure the effectiveness of interventions among various stages of self-regulation are uncommon in music education research literature. Similarly, Grunson (1988) stated, "it would be interesting to investigate by means of a specific training program whether practice is modifiable or whether it is purely a function of experience" (p. 110). And Hallam et al. (2012) has recommended that further research be conducted into potential effects of the use of recordings in practice on the level and quality of expertise (p. 672). One such possible intervention that may act to modify the self-regulating behaviours of music students during musical practice may be the inclusion of video recordings.

The use of video recording as a means of intervention began in the 1980s with sports (Liebermann et al., 2002, p. 756). Research in this domain has shown that when video feedback is provided in an appropriate manner, motor skill acquisition improves significantly (Schmidt & Lee, 1999). In one study of Montreal area amateur hockey players (midget through to college and junior pro) findings suggested that players at a younger age used video recording as a tool to help them "reach the next level", whereas older players in higher levels used video recording to study "the other team's system as well as their own" (Lee, 2011, p. 1). From this perspective, athletes record themselves so that critical events in their performance can be identified and quantified in a consistent and reliable manner, allowing for "accurate and objective qualitative and quantitative feedback" (Lee, 2011, p. 4).

In a similar manner, McPherson and Zimmerman (2002) proposed video recording as an effective way for musicians to engage in self-regulating behaviours, perhaps because students

who receive feedback through viewing a video are afforded the ability to engage in much more in-depth analysis of performance (Fautley, 2013). Fautley has viewed the use of video recording as an act of cognitive redistribution, in essence offloading cognition externally (Dror & Harnad, 2008). Students who self-evaluate recordings of their performances are, cognitively speaking, 'freed up' to concentrate solely on listening and evaluating their performance rather than having to do so synchronously during its production (Fautley, 2013, pp. 38-39). This practice affords the performer the ability to fully engage with the auditory and visual aspects of the performance, rather than having to cognitively multitask. Fautley argues that this, "allows for much more in depth analytical listening to take part as a result" (pp. 38-39). Music research literature supports the notion that it is difficult for performers to focus on both the execution of the performance and the evaluation of the performance with a high degree of accuracy (Silveira & Gavin 2015, p. 7).

Other studies (e.g., Deniz, 2012; Hallam et al., 2012; Yarbrough, 1986) have provided evidence for the value of utilizing video recording technology as a tool to aid self-regulation. Hallam et al. (2012) examined the practice behaviour of young musicians in relation to their level of expertise and by the quality of their performance. These aspects were operationalized as the highest grade level achieved in a musical examination, and by the mark obtained in the highest grade. A statistically significant linear trend was found, indicating that as expertise increased, so did the use of self-recording for listening and feedback. Hallam et al. posit that this type of feedback may be particularly useful to learners as it is visual as well as aural.

Deniz (2012) conducted a qualitative study in which participants were videotaped during lessons and were then required to view their videos before practicing. During follow up interviews, participants reported that they were able to detect strong and weak characteristics of

their playing, that they were able to correct these deficits, that their quality of performance had improved, and that they were more motivated.

Yarbrough (1986) conducted research using video recording with conducting students. Students in six conducting classes observed videotapes of themselves conducting, used observation forms for self-evaluation, wrote self-critiques, and completed a posttest. Relationships between correct self-observation mark, verbal reinforcements in self-critiques, and correct posttest scores were examined. Analysis of control and experimental groups showed significant and positive correlations between posttest scores and correct self-observation marks, and nonsignificant but positive correlations between correct posttest scores and verbal reinforcements. Yarbrough's results indicated that conducting students who watched themselves through video-playback reported that self-observation significantly contributed to improvements in achievement due to its immediacy and the opportunity to study one's own behaviour in great detail and at length (p. 188).

Similar to video recording interventions, Silveira and Gavin (2015) examined the effects of audio recording and playback on middle school students' ($N$=112) ability to self-assess themselves. Students assessed their performances using a 7-point Likert-type scale. The young musicians then listened to a recording of their performance and completed another identical self-assessment. A third identical assessment occurred two days later after listening to the same recorded performance. Aspects being examined were chosen from Bergee's (1993) 27-item performance rating scale, including 1) tone quality/intonation, 2) technique: 3) rhythm/tempo; and 4) interpretation. A repeated measures multivariate analysis of variance was used to test for differences among the three listening conditions for the four elements. A statistically significant effect was obtained. Follow up univariate tests revealed significant differences between the three

conditions of tone, pitch, and rhythm, but not for dynamics. Post-hoc analysis were conducted for mean differences in self-assessment scores across the three listening conditions. Significant differences were found between live and recorded performance two days later for the elements of tone ($p$ <.05), pitch (p <.01), and rhythm (p <.001).

Interventions aimed at developing the self regulated learning abilities of students within the musical domain are infrequent. It may be that implicit interventions, compared to instruction-based interventions, may be more effective in this domain. If novice musicians are so preoccupied with the task of learning to play an instrument that they cannot self-monitor and assess effectively, retroactive monitoring through video recordings may allow them to do so. Video recordings may afford musicians the opportunity to engage in metacognitive analysis apart from the act of performing via cognitive redistribution. Introducing video recording into student practice environment may be seen as an intervention that facilitates the development of self regulated learning skills through more implicit means.

### Third Phase Adults as Novice Musicians

Music researchers have investigated beginner instrumental music students from a number of groups, including school-aged children (Hallam, 2011; Sloboda, Davidson, Howe & Moore, 1996), older adults (Creech, Hallam, Varvarigou, McQueen, & Gaunt, 2013), and intergenerational music making groups (Newman, Hatton-Yeo, 2008). Researchers have defined older adults in terms of a Third and Fourth phase (Creech, Hallam, McQueen, & Varvarigoou, 2013). Generally, Third phase adults are categorized as those who enjoy a considerable degree of resilience in relation to independence, autonomy, and cognitive functioning (p. 87). In contrast, the Fourth phase is one of a period of disengagement and dependency, involving physical and mental decline (p. 87). Researchers investigating Fourth phase adults have examined how

participation in making music can enhance this population's social, emotional, and cognitive well-being. Roulston and Jutras (2015) attempted to examine third phase adults in their paper, *Adult Perspectives of Learning Musical Instruments*. The researchers did not initially anticipate recruiting adults aged 60 or older, yet those who volunteered tended to be older; two-thirds of their participants were over 60 years old. This recruitment trend may have been because retired individuals have fewer commitments and more discretionary time than adults who are at an earlier stage in the life cycle. The researchers found that participants' main challenges included manual dexterity and hand-eye coordination; the cognitive processes of learning to read music were also described as physically and mentally challenging (p. 329). Participants in the present study were from the third phase; primarily non-retirees, currently in the workforce and many with school-aged children. There is a dearth of beginner instrumental music research addressing the unique challenges that beset this particular age demographic.

The purpose of this study was to investigate the effects of student self-assessment of video recordings on the self-regulating behaviours and achievement levels of adults in a beginner classical guitar class. The following research question was asked: Among adult beginner classical guitarists, does video recording musical excerpts cause more self-regulated learning behaviours and greater levels of expertise than those who do not video record musical excerpts? The following two hypothesis are put forward: 1) Participants who self-assess video recorded performances will engage in more self-regulated learning behaviours; 2) Participants who self-assess video recorded performances will exhibit greater levels of expertise.

## Method

The present study examined the effects of assessing self-recorded video performances on the self-regulated practice behaviours and achievement levels of beginner adult classical guitar students.

### Participants

Participants (*N*=25) in the study were adults over the age of eighteen who self-reported little or no previous classical guitar performance experience. The sample included both males (*n*=8) and females (*n*=17). Permission to recruit participants was granted from the University of Western Ontario Research Ethics Board. Recruitment posters with tear off phone tabs were placed on community bulletin boards throughout the city of Brantford, Ontario, requesting volunteers to take part in a research study on music practice. Information on the posters outlined that participants would take part in a group guitar class administered through the Guitar Society of Brantford. Participants were to be 18 years of age or older and were to have little or no previous guitar playing experience. Interested persons were invited to phone the organization for more information. A research assistant at the Society explained the study procedures to callers. Potential participants were informed that there was no fee for the instruction, and that instruments and materials would be provided to those who needed them. After the initial conversation with the research assistant, those people who expressed interest were emailed a letter of information and consent explaining further details of the study, and were requested to sign the document and return it to the research assistant. All members of the guitar class were participants in the research study. The course was taught by the researcher and instruction took place at a local art gallery.

## Measures

### Classical Guitar Performance Rating Scale

The researcher-designed Classical Guitar Performance Rating Scale (CGPRS, see Appendix B) was developed to be used by both research participants for self-assessment and by independent judges to assess the dependent variable of performance achievement. The Likert-type measure was based on Russell's (2010) Guitar Performance Rating Scale, but was altered to represent techniques more specifically involved in classical guitar performance. Russell's original measure addressed five performance dimensions: (a) interpretation/musical effect, (b) technique, (c) rhythm/tempo, (d) tone, and (e) intonation. Russell suggested that future rating scales for guitar performance should include assessments of visual as well as aural aspects. As a result, additional items were added to the measure to assess the basic physiological principles of classical guitar technique (Shearer, 1990), including the proper positioning of the body, arms, hands and fingers, and the orientation of the instrument. These items were included within the technique dimension. In addition, two other items were added to specifically address pitch accuracy and continuity issues. The number of items addressing intonation was reduced to one based on the rationale that the guitar is a fretted instrument with fixed pitches, similar to the piano or harp, and does not deal with intonation issues in the conventional sense that fretless string and wind instruments do.

### Instrumental Music Student Self-Regulation Measure

The Instrumental Music Student Self-Regulation Measure (IMSSRM, See Appendix A) was developed by the researcher to assess whether the experimental intervention elicited greater self-regulatory practice behaviours among participants. The measure addressed the six dimensions of self-regulation outlined by McPherson and Zimmerman (2002): (a) motive, (b)

method, (c) behaviour, (d) time management, (e) physical enviroment, and (f) social factors. The 25-item IMSSRM was a Likert-type scale based on previous measures created by Hallam et al. (2012), Miksza (2012), and Araujo (2016), with items altered to address the goals and objectives of the present research design more specifically. For example, Hallam et al.'s measure included the item, "I record myself playing and listen to the tapes." In order to assess the frequency of recording as well as the goal directed behaviours commensurate with the feedback attained from those recordings, the item was modified to read, "I frequently record myself in order to detect and correct errors in my performance." In addition, because previous measures included either no items related to self-efficacy and motivation (Hallam et al.), or included motivational items related only to self-efficacy (Miksza), several items from Arajuo's measure were used to provide balance within the motivation dimension for the IMSSRM. While Miksza chose to omit the dimension of physical environment from his measure, based on the rationale that the participants in his study were too young to exercise control over this aspect, this dimension was included in the IMSSRM because the participants were considered mature enough to be capable of exhibiting control over their practice enviroment. This element was assessed by including the item, "I structure the physical space to make the most of my practice," which was an altered form of Araujo's item, "I organize the physical environment of my practice sessions." In addition, McPherson and Zimmerman's method and behaviour dimensions were consolidated into one dimension based on Miksza's previous findings suggesting this combination as a more parsimonious model.

**Practice Reflection Questionnaire**

During the instructional period, all participants responded weekly to four practice reflection questions (see Appendix C) . These questions, based on McPherson and Zimmerman's

(2002) self-regulation model, asked participants to describe the following: (a) what you do when you practice (your method of practice), (b) your practice environment (where you practice), (c) a brief assessment of your practice (the quality of your practice), and (d) how many minutes did you practice on the following days.

Data were coded and analysed using the Computer Assisted Qualitative Data Analysis Software NVivo Starter 11 for Windows. Individual participant cases were created and each participant's data was aggregated into a single file. Nodes were created as topologies for collecting coded entries and sub-nodes were created for collected emergent themes and patterns. Participant files were read and salient quotes were coded to the appropriate nodes. Annotations for each coded entry were also created within the software program.

The six dimensions of self-regulation identified by McPherson and Zimmerman (2002) were used a priori as topologies (LeCompte & Preissle, 1993) for coding the data. Emergent themes associated with each topology were arrived at inductively. Data analysis was conducted using the following nine steps: (a) topologies were chosen, (b) data was read and entries related to topologies were coded, (c) data were summarized by the researcher, (d) patterns, relationships and themes within the topologies were developed, (e) data was read and coded according to the identified patterns, (f) a search was conducted to determine if the patterns were supported (or not supported) by the data, (g) relationships among patterns were identified, (h) patterns were written as one-sentence generalizations, (i) selected data excerpts that supported these generalizations were chosen for inclusion in the study. Participant quotes were identified by participant number, treatment condition (experimental or control group), and the week the quote was submitted.

## Procedure

Data collection for the study took place in the fall of 2016. The instructional treatment was delivered over the course of 12 research sessions, each approximately 60 minutes in length. The instructional materials utilized in this study were obtained from Guitarcurriculum.com, and were created by the Education and Outreach Branch of the Austin Classical Guitar Society. The Society allows subscribers unlimited printing and distribution rights. The Guitarcuriculum.com method is specifically designed for the classical guitar, is arranged for three guitar sections (bass, tenor/alto, and soprano), and assumes no prior guitar playing or music reading ability. The curriculum focuses on expressive music making by incorporating dynamic contrasts, flexible tempo, and rhythmic accenting within original compositions and arrangements of global dance and folk music, all within a tightly sequenced set of technical and note reading constraints. The curriculum includes detailed written and on-line video tutorials that describe and illustrate the core technical components involved in the set up and positioning of the instrument, as well as the proper positioning of the body, arms, hands, and fingers while performing.

The instructional treatment (see Appendix D) utilized repertoire spanning the first four of nine levels represented in the method. Level one introduces note reading on open strings, some simple left hand fretting, and right hand fixed "finger-to-string assignment," in which the fingers and thumb of the plucking hand are assigned to specific strings. Level two introduces note reading on the first three strings in the first position. Level three focuses on the alternation of index and middle fingers when plucking and string crossing (the technique in which the plucking hand fingers traverse across the six strings when plucking). Level four of the curriculum deals with note reading on all six strings in first position and a few simple chords. Because the majority of participants had no previous experience playing the guitar, some instructional time

also focused on learning the anatomy of the instrument. Participants learned several pieces from each level of the curriculum over the course of instruction. The researcher/instructor used the sequencing document included with the curriculum to describe and model new musical or instrument-specific concepts. Participants performed en masse or individually as the situation required. Assignments to specific guitar sections (bass, tenor/alto, soprano) were rotated ensuring that all students learned and performed each of the three guitar parts within each piece.

Prior to beginning instruction, all participants completed an initial administration of the Instrumental Music Student Self-Regulation Measure (IMSSRM). Participants were also instructed to submit the Practice Reflection Questionnaire (see Appendix C) each week during the course of instruction. As part of the experimental design participants were randomly assigned to either a control ($n$=13) or an experimental group ($n$=12). Each week during the instructional period members of the experimental group were asked by a research assistant to submit a self-recorded video consisting of a short performance excerpt from repertoire covered during the previous week's lesson. The researcher or external adjudicator did not assess these videos, nor were participants told that the videos would be assessed. As part of the instructional procedures in the class, a copy of the Classical Guitar Performance Rating Scale (CGPRS) was distributed to all students to communicate important elements of exemplary classical guitar performance. Members of the experimental group were additionally asked to use the CGPRS to self-evaluate each of their weekly recorded performances and to submit these evaluations along with their videos. At the conclusion of the instructional period, all participants from both the experimental and control groups submitted a video recording of themselves performing a 16-measure excerpt of the melody from "Ode to Joy" by Beethoven (see Appendix D). All participants also completed the IMSSRM for a second time. Throughout the study all video recordings, self-

evaluations, and practice questionnaires were uploaded to a secure DropBox folder monitored by a research assistant so that the researcher/instructor could remain blind to the participants' group membership.

The final video recordings from both groups were compiled, randomized, and placed in a separate DropBox folder. Data regarding the dependent variable of performance achievement were obtained by having a senior guitar specialist from the College of Examiners at the Royal Conservatory of Music assess each of the final videos using the Classical Guitar Performance Rating Scale (CGPRS). Before beginning the evaluations, the judge underwent a brief training session regarding the use of the measurement instrument. The judge and the researcher, who is also a senior guitar specialist from the College of Examiners at the Royal Conservatory of Music, independently assessed three performance videos using the CGPRS. These training videos were selected from the weekly videos that had been submitted as part of the experimental treatment and did not include any final post-instruction performances. Achievement scores from the expert judge and the researcher were compared and any points of discrepancy were discussed and resolved.

## Results

This study sought to understand whether adult beginner classical guitarists who self-assessed weekly video recorded musical excerpts would exhibit more self-regulated practice behaviour and greater levels of expertise than those guitarists who did not self-assess weekly video recorded musical excerpts. This chapter presents the analysis of data and results of the study. In preliminary analyses, internal reliability was determined for the self-regulation and performance achievement measures and interjudge reliability was calculated for the achievement assessment. Descriptive statistics were determined for all variables. Analysis of variance was used to compare pre- and postinstruction group means on the self-regulation measure, and an independent samples t-test was used to compare experimental and control group mean achievement scores.

### Measures of Self-Regulation

Cronbach's alpha internal reliability coefficients for the 25-item Instrumental Music Student Self-Regulation Measure (IMSSRM) were $\alpha = .837$ for the pre-instruction scores and $\alpha = .812$ for the post-instruction scores. A review of the data suggested that item 17, "I frequently play pieces from beginning to end without stopping," was inconsistent with the other items on the measure. With item 17 removed the internal reliability of the scale increased to $\alpha = .865$ for the pretest scores and $\alpha = .834$ on the posttest scores, indicating a high degree of internal consistency among scale items. Thus item 17 was removed from further analyses. One possible reason this question may have been ineffective is that many participants reported stopping to correct errors when practicing. This contrasts with the practice habits of children, whose primary practice strategy is to play straight through a piece without stopping (McPherson & Renwick,

2001). It is possible that the ceiling effect evident in the data prevented this question from providing any discriminating data.

Table 1 presents the descriptive statistics for the pre- and post-instruction administrations of the IMSSRM. The deletion of item 17 from the measure, as previously discussed, resulted in a maximum potential composite score of 168. The pre- and postinstruction composite mean scores for the control group were 115.69 and 113.76 respectively, indicating a slight decrease in reported self-regulation strategies. Standard deviations of 16.20 (preinstruction) and 13.98 (postinstruction) also indicated a slight decrease in variability of participants' scores. In contrast, the pre- and postinstruction composite mean scores for the experimental group were 116.41 and 118.66 respectively, indicating a slight increase in reported self-regulation strategies, with standard deviations indicating a slight decrease in variability.

Table 1

*Descriptive Statistics for Pre- and Post-Instruction Measures of Self-Regulation by Experimental Condition*

| | Control ($n$ = 13) | | | | Experimental ($n$ =12) | | | |
|---|---|---|---|---|---|---|---|---|
| | Preinstruction | | Postinstruction | | Preinstruction | | Postinstruction | |
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| **Motive** | 35.92 | 6.37 | 34.92 | 6.40 | 35.25 | 4.61 | 36.33 | 4.10 |
| I set specific goals when practicing | 5.00 | 1.08 | 5.00 | 1.08 | 4.66 | 1.07 | 5.00 | 1.27 |
| I evaluate the progress made toward my goals | 4.84 | 1.14 | 4.84 | 1.14 | 4.66 | 1.07 | 4.50 | 1.24 |
| I am able to achieve my practice goals satisfactorily | 4.86 | 1.06 | 5.00 | 0 .91 | 5.00 | 0.73 | 4.91 | 0.79 |
| I believe I can achieve my musical goals | 5.76 | 1.01 | 5.13 | 0.98 | 5.58 | 0.79 | 5.75 | 0.96 |
| I expect to do well in music in the future | 5.07 | 1.35 | 4.92 | 1.32 | 5.08 | 1.08 | 5.08 | 1.08 |
| I feel that I can solve most musical problems when practicing | 4.84 | 1.57 | 4.84 | 1.28 | 4.75 | 1.05 | 5.33 | 0.65 |
| I am confident of my ability to improve on my instrument | 5.53 | 1.19 | 5.15 | 0.98 | 5.50 | 0.79 | 5.75 | 1.13 |
| **Method/Behaviour** | 42.23 | 5.25 | 40.46 | 5.36 | 41.75 | 5.96 | 42.00 | 4.61 |
| I identify difficult sections and practice them first | 4.53 | 1.19 | 4.53 | 1.61 | 4.41 | 1.24 | 4.16 | 1.40 |
| I use specific strategies related to my practice goals | 4.61 | 1.55 | 4.92 | 0.64 | 4.66 | 1.23 | 4.83 | 0.71 |
| I practice difficult sections until they feel comfortable | 5.38 | 1.19 | 4.53 | 1.50 | 5.33 | 1.30 | 5.25 | 0.86 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| I try to get one section of music accurate before practicing the next | 4.84 | 1.40 | 4.30 | 0.85 | 4.66 | 1.30 | 4.41 | 1.56 |
| I mark trouble spots in the music when practicing | 5.30 | 1.03 | 5.38 | 1.32 | 5.00 | 1.53 | 4.58 | 1.44 |
| When I make mistake I often go back to the beginning of the piece and start again | 4.15 | 1.81 | 4.00 | 1.73 | 4.25 | 1.86 | 4.58 | 1.31 |
| I frequently record myself in order to detect and correct errors in my performance | 2.76 | 1.09 | 2.46 | 1.12 | 2.66 | 1.43 | 3.25 | 1.48 |
| I use strategies that have been effective in the past | 4.84 | 1.21 | 4.76 | 1.09 | 5.00 | 0.95 | 4.91 | 0.79 |
| I practise difficult sections slowly | 5.76 | 0.83 | 5.53 | 1.45 | 5.75 | 0.62 | 5.83 | 1.40 |
| **Time** | 19.31 | 3.66 | 19.46 | 3.55 | 20.33 | 2.99 | 20.58 | 3.90 |
| I schedule and organize my practice time | 4.84 | 0.68 | 4.30 | 1.18 | 4.66 | 1.23 | 3.91 | 1.37 |
| It’s easy for me to remain focused on my music when practicing | 4.92 | 1.18 | 5.46 | 0.96 | 5.50 | 1.08 | 5.66 | 0.77 |
| I am easily distracted when I practice | 4.69 | 1.18 | 4.53 | 1.19 | 4.91 | 1.37 | 5.16 | 1.46 |
| I often daydream when practicing | 4.84 | 1.46 | 5.15 | 1.21 | 5.25 | 1.21 | 5.83 | 1.69 |
| **Physical environment** | 10.31 | 2.06 | 11.08 | 1.66 | 10.25 | 2.42 | 11.08 | 2.39 |
| I practice in a quiet space away from distractions | 5.30 | 1.37 | 5.84 | 0.89 | 5.16 | 1.46 | 5.66 | 1.30 |
| I structured the physical space to make the most of my practice | 5.00 | 1.08 | 5.23 | 0.92 | 5.08 | 1.16 | 5.41 | 1.16 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Social factors** | 7.92 | 3.09 | 7.77 | 1.64 | 8.83 | 2.41 | 8.67 | 2.10 |
| I often practice with my peers | 2.84 | 1.99 | 2.53 | 1.19 | 2.91 | 1.78 | 2.83 | 1.64 |
| When I find something difficult, I seek help from outside resources | 5.07 | 1.49 | 5.23 | 1.01 | 5.91 | 0.99 | 5.83 | 0.93 |
| **Composite** | 115.69 | 16.20 | 113.76 | 13.98 | 116.41 | 13.55 | 118.66 | 12.09 |

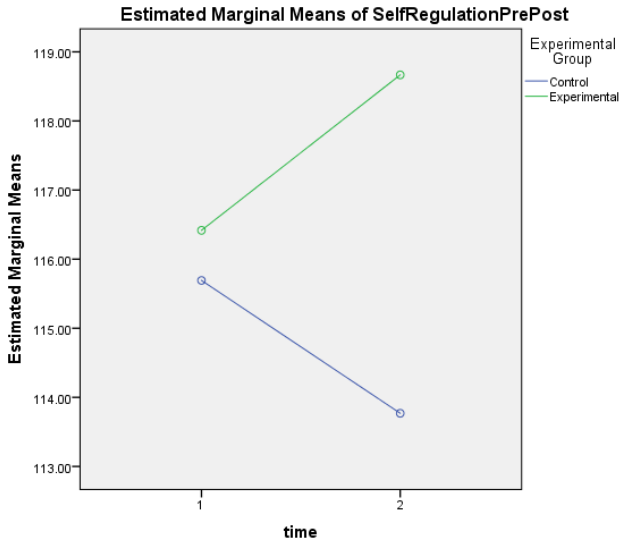
An examination of the scores uncovered some notable trends. Of the four items concerned with self-efficacy on the IMSSRM (items 1, 3, 9, 23) the experimental group score rose an average of 0.25 from 5.22 on the pre-test to 5.47 on the posttest, while control group scores dropped an average of 0.29 from 5.30 on the pre-test to 5.01 on the posttest. Scores for the third item in the methods/behaviour dimension of the IMSSRM, "I practice difficult sections until they feel comfortable," showed the most decline from pre- (5.38) to posttest (4.53) of all the nine items in this dimension for the control group. However, the experimental group mean average on the posttest was 5.25, the second highest score of the nine items. This may suggest that experimental participants repeated difficult sections more often than control group members.

In order to investigate the effect of experimental treatment (self-assessment of video performances) on self-regulation, a mixed design ANOVA was calculated to determine whether the preinstruction and postinstruction mean scores differed according to the between subjects factor of experimental group. An independent samples *t*-test revealed no significant difference ($t = -.121$, $p > .05$) in preinstruction self-regulation scores by instructional group. Levene's tests confirmed homoscedasticity for both pre- ($F = .068$; $p > .05$) and postinstruction data ($F = .256$; $p > .05$). Results of the ANOVA showed no significant interaction effect ($F = .436$; $p > .05$).

However, an examination of the plot of estimated marginal means (Figure 1) indicated a clear divergent trend between the two treatment groups, with experimental group means increasing while control group means decreased. The observed power for this analysis was .10, far below the generally accepted standard of .80. It is possible that the small sample size obtained for this study may have obscured a potentially significant effect.

Figure 1

*Plot of Estimated Marginal Means by Experimental Treatment Group*




**Measures of Performance Achievement**

Two members of the control group and one member of the experimental group failed to submit postinstruction video performances, thus the achievement results are based on the scores from 22 participants evenly divided between control and experimental groups. The Cronbach's alpha internal reliability coefficient for the 23-item Classical Guitar Performance Rating Scale (CGPRS) was $\alpha = .817$. A review of the data suggested that item 11, "backtracked often to correct earlier mistakes," was inconsistent with the other items on the measure. This may be

because participants did not understand the question properly. The qualitative data indicates that many participants stopped to repeat sections that they found difficult, however, it is possible that participants did not think of these as being earlier mistakes, but rather, present mistakes. Changing the wording of the item to "stopped to correct mistakes as they occur" may have changed the outcome of the results on this item.

With item 11 removed the internal reliability of the scale increased to $\alpha = .880$, indicating a very high degree of internal consistency among scale items. Thus, the decision was made to remove item 11 from further analyses. Scores on items representing each of the four performance dimensions were summed to provide a dimension score. Internal reliability coefficients were calculated for each of these dimensions, with results indicating moderate to high internal reliability for the interpretation ($\alpha = .770$), technique ($\alpha = .739$) rhythm ($\alpha = .899$) and tone ($\alpha = .705$) dimensions. All item scores were summed to provide a single achievement score. A Kolmogorov-Smirnov test confirmed normality of distribution ($p > .05$) for these composite scores.

In order to assess interjudge reliability, the researcher - also a guitar specialist from the College of Examiners at the Royal Conservatory of Music - assessed 30% of the performances. Reliability was assessed by examining Pearson Product Moment correlations between scores from the expert judge and scores from the researcher. Interjudge reliability for the individual items (Table 2) ranged from $r = .73$ (ns) to $r = 1.00$ ($p < .01$), while coefficients for dimension totals ranged from $r = .73$ (ns) to $r = .98$ ($p < .01$). The reliability coefficients for composite scores was $r = .97$ ($p < .01$) indicating very high reliability for composite achievement scores.

Table 2

*Interjudge Reliability for CGPRS Achievement Item, Dimension, and Composite Scores (N = 22)*

| Subscale | Item | *R* |
|---|---|---|
| Interpretation/musical effect | | .81* |
| | Performed dynamics as indicated | .88** |
| | Backtracked often to correct earlier mistakes | |
| | Performed correct pitches | 1.00** |
| | Notes connected in a smooth legato manner | .80* |
| | Notes plucked in a clear articulate manner (consistent weight and volume on each note) | 1.00** |
| Technique | | .98** |
| | Participant was seated correctly (shoulders and elbows symmetrical, spine aligned) | 1.00** |
| | Position of the guitar in relation to the torso is reasonable | .81* |
| | Angle of the fretboard is reasonable (45 degrees) | 1.00** |
| | Left forearm and hand were aligned | .93** |
| | Left hand fingers were curved and in their mid-way position | .73 |
| | Right forearm was placed in a reasonable position (mid-way between the wrist and elbow, above the bridge) | 1.00** |
| | Right forearm and hand were aligned | .80* |

| | | |
|---|---|---|
| | Right hand wrist was elevated from the body of the guitar | .89** |
| | Right hand fingers were curved and in their midway position | .81* |
| Rhythm/tempo | | .97** |
| | Performed with an appropriate tempo | 1.00** |
| | Performed with a steady tempo (not slowing down or speeding up) | .98** |
| | Performed tempo changes where indicated (ritards, accelerandos) | .83* |
| | Performed correct rhythms | .84* |
| | Performed with regularly reoccurring rhythmic accenting | .84* |
| | Performed fluidly and without hesitation | .94** |
| Tone | | .84* |
| | Participant “snapped” the strings often | .73 |
| | Performed with a warm, full-bodied tone | .96** |
| Intonation | | .73 |
| | Guitar was in tune | .73 |

| | |
|---|---|
| Composite | .97** |

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

Table 3 presents the descriptive statistics for the achievement scores on the final video submission as assessed by the expert judge. The deletion of item 11 from the measure, as previously discussed, resulted in a maximum potential composite score of 154. The composite mean score for the control group was 75.81 with a standard deviation of 14.81 indicating moderate variability of scores. The composite score for the experimental group was 87.64 with a standard deviation of 9.66 indicating less variability in scores. The overall low composite scores were unsurprising given the beginning level of the guitar student participants. Of note, the experimental group scored higher than the control group on all six items within the Rhythm/Tempo Dimension. The item, "Performed correct rhythms" displayed the largest difference in mean scores between the two groups, with the experimental group scoring higher (5.09) than the control group (3.72). The second largest difference in mean scores was found for the item, "Performed with regularly reoccurring rhythmic accenting," with the experimental group again scoring higher (3.90) than the control group (2.63), although both scores were low compared to the potential score (7). Experimental group means were also higher and showed less variance than control group means for item 15 ("Participant was seated correctly") and item 16 ("Position of the guitar in relation to the torso is reasonable"), both items dealing specifically with the positioning of the body and the positioning of the guitar in relation to the body. These results suggest that participants who video recorded and assessed their performances were better able to correct their posture and the positioning of the instrument.

Table 3

*Descriptive Statistics for Scores on the CGPRS by Experimental Condition*

| | Control Group ($n$ = 11) | | Experimental Group ($n$ = 11) | |
|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* |
| **Interpretation/musical effect** | | | | |
| Performed dynamics as indicated | 2.09 | 0.94 | 2.54 | 1.21 |
| Performed correct pitches | 5.36 | 1.12 | 5.54 | 0.82 |
| Notes connected in a smooth legato manner | 3.27 | 1.10 | 3.90 | 0.94 |
| Notes plucked in a clear articulate manner (consistent weight and volume on each note) | 3.63 | 1.12 | 4.18 | 0.98 |
| **Technique** | | | | |
| Participant was seated correctly (shoulders and elbows symmetrical, spine aligned) | 4.00 | 1.00 | 4.72 | 0.64 |
| Position of the guitar in relation to the torso is reasonable | 3.90 | 1.22 | 4.81 | 0.60 |
| Angle of the fretboard is reasonable (45 degrees) | 4.63 | 0.67 | 4.72 | 0.64 |
| Left forearm and hand were aligned | 3.54 | 1.50 | 4.45 | 1.21 |
| Left-hand fingers were curvered and in their mid-way position | 2.90 | 0.83 | 3.90 | 1.22 |
| Right forearm was placed in a reasonable position (mid-way between the wrist and elbow, above the bridge) | 4.36 | 1.20 | 4.27 | 0.90 |
| Right forearm and hand were aligned | 3.54 | 1.03 | 3.72 | 1.19 |
| Right hand wrist was elevated from the body of the guitar | 3.45 | 0.93 | 3.63 | 0.80 |
| Right hand fingers were curved and in their midway position | 2.90 | 1.22 | 3.27 | 0.78 |
| **Rhythm/tempo** | | | | |

| | | | | |
|---|---|---|---|---|
| Performed with an appropriate tempo | 3.72 | 1.79 | 4.36 | 1.20 |
| Performed with a steady tempo (not slowing down or speeding up) | 3.18 | 1.83 | 4.18 | 1.40 |
| Performed tempo changes where indicated (ritards, accelerandos) | 2.72 | 1.61 | 3.36 | 1.56 |
| Performed correct rhythms | 3.72 | 1.27 | 5.09 | 0.30 |
| Performed with regularly reoccurring rhythmic accenting | 2.63 | 1.74 | 3.90 | 1.57 |
| Performed fluidly and without hesitation | 2.90 | 2.11 | 3.36 | 1.62 |
| **Tone** | | | | |
| Participant "snapped" the strings often | 6.09 | 0.70 | 6.18 | 0.40 |
| Performed with a warm, full-bodied tone | 2.73 | 1.00 | 3.45 | 0.93 |
| **Intonation** | | | | |
| Guitar was in in tune | 4.90 | 0.30 | 4.36 | 1.02 |
| **Composite Scores** | 75.81 | 14.81 | 87.64 | 9.66 |

In order to investigate the effect of experimental treatment (self-assessment of video performances) on achievement scores an independent-samples t-test was calculated to determine whether the composite achievement mean scores of the two groups differed significantly. Levene's tests confirmed homoscedasticity for group scores ($F = 1.763$; $p > .05$). Results indicated a significant difference in achievement scores ($t(20) = -2.23$, $p = .037$) in favour of the experimental group.

**Practice Questionnaire**

All qualitative data were derived from weekly participant responses to four questions asking for descriptions of the following: (a) what you do when you practice (your method of practice), (b) your practice environment (where you practice), (c) a brief assessment of your

practice (the quality of your practice), and (d) how many minutes did you practice on the following days. The following section presents an analysis of the qualitative data received from participants over the course of the study period. The six dimensions of McPherson and Zimmerman (2002) self regulation theory were used as a priori topologies.

**Motive**

Grasping why some students decide to engage in an activity such as learning an instrument and practicing regularly while others do not, involves understanding various aspects of students' self-motivation such as goal setting and self-efficacy perceptions (McPherson and Zimmerman, 2002). Locke and Latham (2013) have defined a goal as "the object or purpose of an action, and may be, in the context of a work, a level of performance to be achieved" (p. 28). Data analyses revealed references to these aspects in participants' comments, particularly those made by experimental group participants. For example, Participant 58 described setting goals and choosing strategies for improving her rhythmic skills with the help of her son:

> This week decided on goal area, practiced the rhythm without guitar at length with Si's help, counting out aloud, then focused on bar 7 &8, 11&12 to try to get the emphasis at the right time. Easier on bar 13 when changing note. (Participant 58-Experimental-Week 6)

Participant 58 also commented on how she "spent 2 hours recording, watching, recording, then correcting mistakes to record again" (Participant 58- Experimental-Week 2) and the following week engaged in similar behaviour. "Sunday 3x ½ hour practicing recording, reviewing, recording and then recording again" (Participant 58- Experimental-Week 3). Comments made by Participant 18 indicated a mastery orientation towards the performance task, focusing on

achieving self-set standards. “This week, I practised fewer times than last week; but part of that was videotaping the same passage a few times to get it the way I wanted it” (Participant 18-Experimental-Week 2).

The comments of one experimental participant indicated more avoidance ego/goal orientation (Maehr et al., 2002, p. 361). Which is to say that his motivation sprang from a desire to avoid appearing incompetent relative to his peers (Pintrich, 2000c). This participant was focused on how his video submission would be judged; this extrinsic motivator produced an intensity in his practice behaviour.

> “I think knowing I have to record this makes a difference. Lots of do-overs on the video. It’s more of a performance than practice. This makes me feel more compelled to get it right. I have a private area and don’t have to worry about anyone hearing my mistakes. I would feel very self-conscious otherwise” (Participant 106-Experimental-Week 1).

In week two the same participant stated, “I did about six takes before this final one. If I make a mistake while making the video, I just start a new one so no one will see the mistake” (Participant 106-Experimental-Week 2). There was no evidence of avoidance ego/performance orientation in any control group comments.

Evidence of goal-oriented motivation was less frequent in the comments from members of the control group. An exception was found in the comments from Participant 5 who described how she assessed her playing, defined what was lacking, and set goals as a result. “My biggest obstacles in these pieces are the changing tempo in ‘Tango’ and the harmonics in ‘Beginnings’, and that was what I targeted during my practice” (Participant 5-Control-Week 12).

The role of self-efficacy perceptions was articulated in comments made by participants from both groups. For example, Participant 15 alluded to how feelings of self-efficacy led to an increased desire to practice more and to engage in increasingly difficult tasks. “I thought my practices went well, I especially enjoyed kicking it up a notch and trying to do double parts” (Participant 15-Experimental-Week 4). Participant 4 stated that “I believe the quality of my practice is better because now that I am becoming more familiar with the notes played on the guitar. I feel like practising more because it is more fun” (Participant 4-Control-Week 7).

**Time**

Education theorists (e.g., Zimmerman, 1994) posit that self-regulated learners are more efficient at self-planning and managing their use of time. In the present investigation participant statements indicated that, while they possessed ample levels of motivation and desire to practice, persistent disruptions hindered many from achieving their practice goals. These disruptions were often related to work or family commitments:

> Struggling to find the time on a regular basis and to remember to do it – because of new job and a new pace to life. I would like to be playing more, I think about it everyday but then time whooshes by and it’s late late late before I know it. (Participant 15-Experimental-Week 5)

> This week (am I not used to the time change yet?) I found myself very tired and did not practise enough. My grandson babysitting obligations have increased, and I am currently preparing for 2 saxophone ensemble performances and need to practise that music. I am afraid that practising guitar suffered, even though I am enjoying learning classical guitar. (Participant 18-Experimental-Week 10)

> “Second and third days - no such luck - previous commitments + unexpected time

> demands = constant interruptions. I resorted to leaving the guitar and music out in a handy spot for 'pick up and play when you get a chance'." (Participant 116-Experimental-Week 2)

Health issues were another disruption to the practice time of some participants. For example, Participant 116 noted "there is no possible practice strategy when you have the flu. You just hide out until you can stand on two feet again. This week began with a 3-day blank" (Participant 116-Experimental-Week 2). Participant 112 commented "not a good week - still under the weather with a nagging cough" (Participant 112-Control-Week 3). In addition, other general commitments also disrupted participants' practice time. "Again, the quality of my practice is pretty good, once I get down to it. I find that many other tasks and demands pull me away from practising" (Participant 18-Experimental-Week 11). "Poor practice this week as I was away at a conference during the week. I did do exercises for the right hand regularly though" (Participant 3-Control-Week 8).

Results indicated that when participants did find time to engage in practice, that time was spent in a very focused manner. For example, Participant 58 self-assessed her ability to remain focused and concluded that short practice sessions were optimal. "Practice is good, able to stay focused for 10 minutes at a time. Need frequent breaks" (Participant 58-Experimental-Week 1). Participant 3 narrowed her practice sessions, focusing on less repertoire per session. "This week I focused on just one or two songs per practice session rather than quickly go through all of them" (Participant 3-Control-Week 10). Indeed, a common pattern that emerged from the data was that practice sessions were short, focused, and usually associated with positive emotional valance:

> I am not going over all the material like I should, because I simply don't have enough time to practice for that long. For the time I have, I would say that I work very efficiently

and I practice things in order to better my sight reading and flexibility in playing the guitar. (Participant 57-Control-Week 3)

I thought my practice was good this week, I didn't practice as often as I liked but when I did it was good and I practiced till my finger tips were good and indented so I figure that's a good sign. (Participant 15-Experimental-Week 7)

Yay! I feel like I finally put in some consistent practice time!" (Participant 18-Experimental-Week 9)

**Method**

In order to understand the method dimension, Hallam (1997) suggests that it is important to consider the types of skills, knowledge, and understandings that allow participants to choose or adapt one particular method over another when engaging with music learning. An examination of the practice data revealed that participants developed certain specific methods of practice, particularly, although not exclusively, members of the experimental group. These approaches included the use of deliberate, informal, and distributed practice methods.

Nested within the method construct of self-regulation theory is the concept of deliberate practice. Ericsson et al. (1993) describe deliberate practice as "a highly structured activity, the goal of which is to improve performance" (p. 368). This type of practice is different from mere repetition, it involves "specific strategies designed to bring about change and reorganization in behaviour" (Tan, Fordresher, & Harre, 2010, p. 180). For example, Participant 15 commented, "I like to play the whole piece through making corrections along the way rather than restarting each time. Sometimes I repeat a part over and over again until I get it right and then carry on" (Participant 15-Experimental-Week 5). Participant 7 also described practicing in this manner:

> I played through each part of each piece we've done so far. I play any bars I screw up again until I get them right. I will also repeat certain more complicated bars over and over until they become familiar. (Participant 7-Control-Week 10)

Deliberate practice strategies were also used in relation to the positioning of the body and the setup of the instrument.

> This week worked on placement and positioning of guitar so that right shoulder was in neutral position, right hand, wrist and forearm better aligned. Used non slip mats on both thighs and found that the guitar was more stable and more able to focus on relaxing shoulders and more able to work on extending the elbow when changing strings. (Participant 58-Experimental-Week 7)

Participant comments indicated that often viewing the video recording served as the catalyst for engaging in deliberate practice. For example, Participant 58 stated, "Used video to self correct for position of right shoulder and right elbow. Left foot is lower so less stress on the left hip" (Participant 58-Experimental-Week 7). Comments made by Participant 106 showed how viewing the weekly videos resulted in a developmental change in his approach to practicing. During week one he commented, "Lots of do-overs on the video," (Participant 106-Experimental-Week 1) while during week two he "did about six takes before this final one. If I make a mistake while making the video, I just start a new one so no one will see the mistake" (Participant 106-Experimental-Week 2). However, during week 4 he remarked, "I did many run-throughs this time before making the video and had fewer takes" (Participant 106-Experimental-Week 4), indicating that he was attempting to correct errors in advance of recording, and thus engaging in more self-regulated and deliberate practice behaviour.

While participants demonstrated deliberate practice behaviours throughout the study, data also indicate that there was a pattern of informal practicing as well. In contrast to deliberate practice, informal practice refers to practice time not spent on assigned exercises and pieces, but on 'playing for fun' (Sloboda et al., 1996). Included in this category of practice are playing by ear, improvising, playing popular music, and experimenting with sounds and motor patterns (Tan et al., 2010). In contrast to deliberate practice, the goal of informal practice is simply to enjoy the activity.

> This week I've been playing around a lot, figuring songs/rifts out by ear and making up things for a while before I actually open the book to play. I also started doing some of the finger exercises that I probably should have been doing all the way along. (Participant 15-Experimental-Week 7)

For many participants, it seemed that deliberate and informal practice were not opposed, but rather were complimentary to one another. For example, Participant 5 commented on how both formal and informal practice styles were integrated into daily practice in a seamless fashion.

> I worked toward playing all the way through but also took time to isolate troubled areas like the run at the end of *Respiration*. I've also been working on learning the picking for "House of the Rising Son" by the Animals. I previously had strummed all my songs on guitar and want to focus on finger work. (Participant 5-Control-Week 2)

Participant 18 highlighted a highly developed deliberate practice style partnered with informal methods of harmonic elaboration, singing, and learning repertoire by her favorite performers by ear.

> First, I run through the new music, fixing errors, getting the notes and finger positions straight, and replaying sections until I feel that I am playing the piece properly with

> dynamics, steady speed, and appropriate emphases. Then, I run through the older music, following basically the same procedure. Third, I play some pieces by ear. I'm trying to learn how to play pieces I sing not just by strumming, but by playing some melodies and harmonies as well – more in a classical style, I guess. I try to pick out pieces as I hear them played by some of my favourite artists, Steve Bell, for instance. (Participant 18-Experimental-Week 3)

Later during week eight this same participant appears to be engaged in compositional activities. "I continue to play through assigned pieces, especially the newer ones or ones I like best. Then I work on my own pieces and play by ear" (Participant 18-Experimental-Week 8).

There is considerable debate in the literature concerning which type of practice produces more expertise. Ericsson describes informal practice by saying, "this state of diffused attention is almost antithetical to the focused attention required by deliberate practice to maximize feedback and information about corrective action" (Ericsson, 1993, p. 368). Yet students are more likely to play 'with feeling' when less focused on the technical aspects of performance (Sloboda, 2005, p. 270), and improvising has been linked to good sight-reading ability by developing auditory imagery (Kopiez & Lee, 2006). Present research seems to suggest that deliberate and informal practice activities develop different aspect of musical proficiency, and that a combination of both may produce the most well rounded musician. (Hallam, 2013; Miksza, 2012).

Another pattern related to the method factor of self-regulation that emerged from the data suggested that most participants engaged in distributed practice as opposed to massed practice. The issue of distributed verses massed practice refers to whether practice time is divided into several short sessions (distributed) or concentrated into a single massed session (Tan et al., 2010). Oxendine (1984) has shown that distributed practice throughout the day shows greater

benefits in many types of motor skill learning than massed practice. Ericsson et al.'s., (1993) study of elite violinists showed that the best violin students distributed their practice into three to four practice sessions per day and usually took two breaks within each session. Data indicated that participants in the present study generally practiced in short intervals either due to disruptions in practice or to increase focus while practicing. For example, Participant 116 stated, "Over the first 3 days I allotted specific time (15-20 minute intervals) and accumulated about 90 minutes" (Participant 116-Experimental-Week 6). Participant 5 stated, "I normally practice when I get a moment in my living room" (Participant 5-Control-Week 1) and "Spent time over the last week both in a quiet area and just picking up my guitar whenever I had a moment" (Participant 5-Control-Week 5). Participant 15 wrote, "I felt it was good [practice], brief again but good. I found more chances to practice this week so I feel more confidence in my performance" (Participant 15-Experimental-Week 6). Comments by Participant 1 during weeks eight and nine illustrated how she chose to practice in short intervals to better attend to her task and to encourage accuracy.

> Each day that I practiced I tried to work on one piece for about 15 minutes. I have been trying to review measures where I am having problems and then I go on to playing the piece. Then I break for a while and then do another session with a different piece. (Participant 1-Control-Week 8)

> When I understand what I am doing and it is not too difficult my practice time is productive. When I get frustrated I stop and try to figure out what is going on. I do not practice for more than ½ hour at a time. Anytime more than this I usually start making too many mistakes. (Participant 1-Control-Week 9)

### Behaviour

At the core of the behaviour dimension of self-regulated learning are metacognition skills. These skills relate to an individual's ability to self-monitor, self-evaluate and self-teach. Boud (2005) argued that one of the most important skills musicians can develop is self-assessment, "the ability to regulate one's own learning through diagnosing problems in individual performance, and prescribing solutions" (as cited in Silveira & Gavin, 2015, p. 2).

Results of data analyses revealed a theme related to metacognition skills. This theme encompassed participants' references to self-monitoring, self-assessment, and prescription of learning strategies. For example, while monitoring herself during practice Participant 3 noted that maintaining correct rhythms and an appropriate dynamic profile while playing correct pitches required more psychomotor resources than merely performing correct pitches alone. In an effort to remediate her situation, the participant decided to take notes in class and refer to them at home. Finding success with this strategy she increasingly relied on it to achieve her goals.

> Some sections are a bit more tricky for me. I find that I'm having to concentrate more on what I'm doing beyond the notes as I'm becoming more conscious of the rhythm and volume in my effort to 'bring it all together.' I am also relying more and more on the notes I take during class as I practice. (Participant 3-Control-Week 5)

Having realized that she was not practicing enough, Participant 5 reasoned that it must be because her guitar was out of sight, locked in her guitar case. Her simple solution successfully matched with her goal to practice more often. "I made sure this week that I put my guitar out on a guitar stand rather in the case. That makes a huge difference on how often I picked it up". (Participant 5-Control-Week 6)

Self-monitoring has been described as having 'reactive' effects (Kazdin, 1989), because people often react to such monitoring by changing their behaviours. This implies that learners compare their behaviour to a predetermined standard. The following quote from Participant 57 highlights this idea:

> The last 2 bars of Blue Zone are quite challenging because they introduce more chromaticism and therefore create new patterns of notes using frets we are less comfortable with. I drilled these bars many times in each part in order to feel comfortable with it. (Participant 57-Control-Week 4)

In this statement, the participant monitored her behaviour and observed an anomaly in the piece (chromaticism). Her reaction to this anomaly was to segment the section. She had a predetermined idea of what 'comfortable' looked/felt like, and then repeated the passage (presumably using tactile feedback to modify the repetitions) until she assessed that the predetermined goal and the choreography of her motor movements matched.

References to self-regulatory behaviours such as self-monitoring, self-assessment, and self-teaching were even more pronounced among experimental group participants. For example, Participant 58 "spent 2 hours recording, watching, recording, then correcting mistakes to record again" (Participant 58-Experimental-Week 5). Comments involving video recording comprised 34% of the data provided by Participant 12, whose descriptions served to highlight the variety of ways that video playback was used to monitor, self-assess, and to self-teach.

> When watching the videos, I do sound better, I believe. I practiced my part only of *Respiration*; unfortunately, I will try get to other parts this week. My practice lasted about 20 min before I was recorded. I learned from watching the video that I have a habit of strumming the guitar in front of the hole, rather at the tip of the rose[ette]. I also have to

> fight the urge to rest my ring and pinky fingers on the guitar. (Participant 12-Experimental-Week 2)

In this case self-assessment of the video performance indicated to the participant both that he was improving and that there were technical issues that required further attention. The participant may not have been conscious of these technical issues while performing, but was able to use the video performance to identify and correct these deficits. In subsequent weeks the same participant commented:

> I learned from watching the video that I have corrected where I need to strum the guitar. For some reason I am having issues plucking the strings and keeping fluid. I might have been rushed. I practiced the song much better before filming, but I wanted to use this to look at my mistakes. (Participant 12-Experimental-Week 3)

> I struggled with the Harmonics. I just don't know how to rest my finger on fret 12. I place too much pressure on it. From watching the video: I think my fingernails are too short. I feel like I am stumbling over the notes. I also struggle with dynamics with this piece. I also really struggle with the Harmonics. I wanted to keep up with this piece because it challenges me, I did Guitar 3 in class and was not challenged. (Participant 12-Experimental-Week 4)

The participant's comments indicate that he used the video as a teaching tool, monitoring his progress on various musical and technical issues from week to week.

**Environment**

Self-regulated learners understand that their physical environment plays an important role in their learning process. These individuals attempt to structure and control their learning

environments in ways that are conducive to maximal learning. Data indicated that many participants exhibited high levels of planning, evaluating, and managing their practice environment. For example, Participant 13 commented, "In the dining room again because there is space for the chair and music stand and to set up the computer for recording. Also the light is better there" (Participant 13-Experimental-Week 2). "I continue to practice in my family room; but am thinking I may need to change my location. Maybe a better chair. I do like the lighting in this area though." (Participant 12-Experimental-Week 4)

While many participants were able to structure their practice surroundings, for some participants disruptions seemed unavoidable.

> In the living room, amongst the craziness. I've given up trying to find a quiet spot, the kids just follow me there. Luckily I can usually block out what they are doing and focus on the music. This week the dog decided that he needed to sleep on my feet as well while I was playing. (Participant 15-Experimental-Week 7)

> This week has been a total write-off for practising. My youngest daughter came home with us from Ottawa to stay for the week, and thus a busy December week became tremendously busy with a very full house. When we have a guest, I lose my study, and that makes my life a little more challenging. (Participant 18-Experimental-Week 12)

When faced with learning difficulties participants often used tools within their environment to self-generate instructional artifacts for self-teaching. Such strategies may be viewed within the framework of distributed cognition (Clark & Chalmers, 1998) as these artifacts provided opportunities for cognitive offloading. A number of participants engaged in creating self-teaching resources salient to their individual developmental needs. For example, Participant 4 stated "I was having trouble reading the notes and knowing what fingers to use for

each note so I made a chart that shows me. I also made some notes above the notes on the music sheet (Participant 4-Control-Week 4). Participant 3 used her self-created artifact in a scaffolding manner and then attempted to wean herself from her own resource. "I've been writing down the actual notes or finger positions on the sheet music to help me along and am now trying to memorize the actual notes rather than transcribe info onto the sheet music" (Participant 3-Control-Week 10). The same participant also created flashcards to use as a self-teaching tool. "I'm also starting to use flash cards I made to help me remember the names and finger positions of the notes" (Participant 3-Control-Week 11). Participant 8 deliberated between reaching out to the instructor and creating her own resource with paper and pencil:

> I seemed to have a difficult time with the tango, in part from knowing I was unable to practice regularly this time, thereby feeling some panic. I considered emailing Patrick for help but decided I'd learn better figuring it out on my own. I ended up going through the tango lesson and writing each note down using previous lesson notes when needed. I realized I was trying to read music, which I don't know, and was thinking of the lines as if they were guitar strings, which they are not the same. (Participant 8-Experimental-Week 5)

Some participants used electronic tools within their environment. These learning artifacts included YouTube videos and smartphone applications, acquired with smartphones and computers. For example, one member of the experimental group, Participant 58, downloaded two smartphone applications, one a note trainer to assist with reading, and the other a rhythm trainer to assist with rhythms. The participant used these gamified educational tools intermittently throughout the day; "Monday through Friday practice note learning and rhythm apps 5 minutes 2-3 times a day. Use apps to learn music notes and rhythms throughout week when I have spare

5 minutes" (Participant 57-Experimental-Week 5). Participant 12 struggled with an assigned piece so he decided to search YouTube for an aural representation of the piece:

> I spent an hour on YouTube listening to this song, and it's a popular song, but the Malaguena we are learning is not the one you find on YouTube. There are many tutorials for it as well, but it again, our arrangement is very different. (Participant 12-Experimental-Week 9)

**Social Factors**

The social factors dimension of self-regulation addresses how individuals actively reach out for help from peers or knowledgeable others as part of the learning process. Data analyses revealed that participants in the study rarely discussed actively seeking help from the course instructor when faced with difficulties. However, a noticeable theme emerged involving participants seeking out internet-based resources when faced with challenges. For example, Participant 12 wrote about having difficulties with a particular chord and searching online for a solution. "I tried to look up on the internet what a G# chord looked like and it was not what we were taught, so I am unsure if I am doing it right or not" (Participant 12-Experimental-Week 11). Participant 18 sought out additional resources over the internet to supplement course materials. "This week, I printed some free beginner classical guitar pieces from the Internet and have been playing through those after practising" (Participant 18-Experimental-Week 4). Some participants practiced with 'virtual peers.' For example, Participant 58 described how he "played along with the video of tango to match rhythm and speed without messing up, continuing to play even if made mistake" (Participant 58-Experimental-Week 12). In some cases, individuals also practiced with their own recordings. "I worked on each guitar part individually. Then to see how things

sounded, I would record one part and then play along with my recording. This has been an effective method for me this week" (Participant 5-Control-Week 5).

# Discussion

The discussion chapter is organized into the following categories: (a) creation of a classical guitar performance achievement measure, (b) effect of experimental treatment on performance achievement, (c) performance achievement and deliberate practice, (d) effects of experimental treatment on self-regulated learning behaviour, (e) disruptions during practice, (f) limitations, (g) significance of study, and (h) protection of human participants.

## Creation of a Measure of Classical Guitar Performance Achievement

The present study used five dimensions to assess the aural and visual achievement levels of adult beginner classical guitarists. The dimensions used were borrowed from Russell's (2010) Guitar Performance Rating Scale and include Interpretation/Musical Effect, Technique, Rhythm/Tempo, Tone, and Intonation. Once these performance dimensions were identified, appropriate items were then chosen that represented these dimensions. The scale construction was similar to the facet factorial methods that have been used successfully to construct rating scales for a number of instruments including woodwind (Abeles, 1973), strings (Zdzinski & Barnes, 2002), jazz guitar improvisation (Horowitz, 1994) and general guitar performance (Russell, 2010). To date, no dimension based rating scale has been created specifically for the classical guitar. The present Classical Guitar Performance Rating Scale (CGPRS) remediated this deficit by including items that were specific to classical guitar technique. Delineating the specific type of guitar performance was an attempt to counter the more general guitar measures of Russell (2010) and Horowitz (1994). Further, the majority of instrumental rating scales in the literature focus exclusively on the aural aspects of music performance. The inclusion of visual items assessing the positioning of the body and instrument when in playing position was also an

important contribution to this study. Technical issues are often at the root of aural shortcomings during guitar performance, particularly with respect to tone and articulation. These visual items assessed aspects of performance that had a direct effect on the musical sounds produced. They also provided information that could be used to further future musical development. As such, these items have implications for improved assessment during private and classroom classical guitar instruction settings. For example, performers who snap their strings often do so because their plucking hand wrist is too close to the guitar soundboard; this could be empirically verified by seeing the performer's wrist. Thus, educators could use the results from these visual items diagnostically to prescribe solutions to faulty technique. Finally, the CGPRS could also be used as a tool to address accountability issues inherent in the assessment of public school and university classical guitar programs.

**Effect of Experimental Treatment on Performance Achievement**

Within the Interpretation/Musical Effect dimension, mean scores for all items were higher for the experimental group, indicating that experimental participants performed more musically than the control participants did. This dimension contained the greatest overall range of scores among items (Experimental: 5.53; Control: 2.09). The magnitude of this range is considerable: 2.09 represents 29.85% of the maximum score (7), while 5.53 represents 79% of the maximum score. The control group registered the lowest score on the entire measure (2.09) for the question "performed dynamics as indicated". There was also an interesting terraced effect between scores of the same items in both groups (Experimental: 5.54, 4.18, 3.90, 2.54; Control: 5.36, 3.63, 3.27, 2.09). These data clearly indicate a developmental skills hierarchy in adult beginner classical guitarists within this dimension.

Left hand items showed greater variance (Experimental: 4.45, 3.90; Control 3.54, 2.90) than right hand items (items 20, 21, 22, 23) in the Technique dimension. Thus, the experimental group appeared to possess a more refined left hand technique than the control group. There was also large variance between conditions on the two items dealing with positioning of the instrument and body (Experimental: 4.81. 4.72; Control: 3.90, 4.00). Data indicated that the experimental group positioned their guitar and body in a manner more consistent with common practice norms than the control group. This is consistent with the qualitative data that shows that experimental group participants often assessed the visual aspects of their videos and corrected their errors. Evaluating technical aspects through video recording was not without challenges however. When viewing the videos, it was difficult to perceive if a participants' right hand wrist was elevated from the guitar sound board. It was also difficult to perceive if participants right hand fingers were in their mid-way position when performing. This difficulty was often due to the distance of the camera from the participant and the angle at which the performance was recorded. In general, those questions that involved the assessment of fine motor skills were more difficult to discern than those that assessed larger muscle groups. Future research should include instructions on how far video cameras should be placed from participants, what angle cameras should be placed at, and what physical aspects should be clearly visible during recording.

The experimental group scored higher than the control group on all items within the Rhythm/Tempo dimension. This is consistent with the qualitative data the indicated that experimental group participants regularly assessed aural aspects of their videos and corrected their errors. The experimental group received the highest mean score in this dimension and the lowest standard deviation score on the entire measure for the item "performed correct rhythms" (experimental: 5.09, SD 0.30; Control: 3.72, SD 1.27). This item also displayed the largest

difference in mean scores between treatment groups on the entire measure (1.37). These data suggest that the experimental group performed with a consistently higher degree of rhythmic accuracy than the control group. Like the Interpretation/Musical/Effect dimension (though less pronounced) the overall ranges of scores between items in this dimension were considerable (Experimental: 5.09; Control: 2.63). In general, the more intricate aspects of tempo and rhythm, such as the use of flexible tempo, playing with regular rhythmic accenting, and performing without hesitations, showed relatively low scores. In a similar manner to the Interpretation/Musical Effect dimension, these data highlight the developmental skills hierarchy inherent in adult novice musicians.

Acquiring a consistently even tone is perhaps the most difficult aspect of classical guitar playing. The most defining factor of tone production on the guitar is the right hand fingernails. Professional guitarists spent an inordinate amount of time filing, shaping, and buffing their nails in order to create a beautiful warm tone. The fingernails must also attack the string on an oblique angle in order to activate the midrange frequencies required for an evenly distributed tone. However, novice guitarists generally do not begin using nails until the positioning of the instrument and body and the proper movement of the fingers are secure. Participants in this study did not use their nails to the pluck the strings, only the flesh of the fingertips. Mean scores for the item "performed with a warm, full bodied tone" were low (Experimental: 3.45; Control 2.73), presumably due to this reason. The highest score on the measure was registered for the item "Participant 'snapped' the strings often" (Experimental 6.18; Control 6.09). The scores for this item were reversed. The high scores indicate that participants' fingers followed through into the palm of the hand when plucking the strings of the guitar and not away from the sound board (thus creating an unpleasant snapping sound). The experimental group received higher scores

than the control group on both items in the Tone dimension. This may indicate that experimental group participants performed with a more refined tone than control participants. This finding is consistent with the qualitative data that shows that experimental group participants often assessed the aural aspects of their videos and corrected their errors.

On the guitar, intonation is primarily decided by the tuning mechanism and to a lesser extent by string quality. As such, it is not necessarily reflective of the performers' ability to create an appropriate pitch, as is the case with wind and non-fretted string instruments. Beginner guitar students generally do not possess the requisite aural skills to tune the guitar by ear. To address this issue some participants downloaded tuners on their smartphones. It is difficult to know which participants used tuners and which tuned their guitar by ear. This may have produced a confound in the sole question in the Intonation dimension "guitar was in tune". The control group scored higher than the experimental group on the item (Experimental: 4.36; Control: 4.90). For the reasons mentioned above (string quality and tuners), this item does not seem to fit well within the Intonation dimension. Future classical guitar scales should consider replacing the Intonation dimension with a Tuning dimension, or eliminate the item altogether.

Experimental participants scored higher on all items in the Interpretation/Musical Effect, Rhythm/Tempo and Tone dimensions. They also scored higher than the control group on eight of the nine items in the technique factor (item 20 had a difference of 0.09 in favour of the control group). This suggests that the experimental group performed more musically, with better tone, greater rhythmic precision and with a more secure technical foundation than the control group. The control group appeared to be superior to the experimental group at tuning their instrument.

Results from the CGPRS show a considerable range of scores across the measure (Control: 2.09 – 6.09; Experimental: 2.54 – 6.18). In general, these high and low scores mapped

onto the same items for both groups. The magnitude of this range is considerable: 2.09 represents 29.85% of the maximum score (7), while 6.18 represents 88.28% of the maximum score. These data indicate a clearly delineated developmental skills hierarchy within each of the five dimensions of the CGPRS. The quantitative and qualitative data both suggest that adult novice classical guitarists find it difficult to perform with excellent tone, dynamic contrasts, flexible tempo, and exemplary legato note connection. These aspects are usually associated with musicians who have played for a number of years. Quantitative data also suggests that there are developmentally appropriate tasks that novice musicians find easier to achieve; these include performing correct pitches and rhythms as well as some aspects of technique. Future guitar performance scales should could consider identifying the developmental level of the participants being assessed. Researchers could then limit the number of items within each dimension to those representative of the skills expected of a particular musical demographic.

**Performance Achievement and Deliberate Practice**

Statistically significant group differences were found for the variable of performance achievement as defined by the CGPRS. It may be conjectured that experimental participants performed better because their practice was more deliberate in nature. Deliberate practice behaviours markedly resemble the task oriented, mental, and self-instruction strategies of the methods and behaviour dimension of McPherson and Zimmermann's (2002) self-regulation theory. These practice behaviours may be seen as manifestations of domain specific strategies (Araujo, 2016). Ericsson et al., (1993) posited four prerequisites for deliberate practice. The most cited condition concerns one's motivation to attend to a task and to exert effort to improve their performance. Drawing on pre-existing knowledge is also understood to be a prerequisite for deliberate practice, however participants in the present study were novices with few musical

skills to draw upon. A third prerequisite is that performers should receive immediate informative feedback and knowledge of their performance. The final prerequisite for deliberate practice is that one should repeatedly perform the same or similar tasks (p. 367). With the exception of pre-existing knowledge, both qualitative and quantitative data from the experimental group participants map onto these deliberate practice pre-requisites in a convincing manner. Qualitative data highlights that video recording engaged participants motivationally, both intrinsically and extrinsically. Participants received immediate informative feedback through their video recordings, at times with information that would not have been available to them while performing. Participants also repeatedly recorded musical passages until their self-set goals were reached. Thus, video recording appeared to elicit responses that aligned well with three of the four prerequisites of deliberate practice.

Relevant feedback delivery to participants may be seen as the core pedagogical affordance within the video recording process. This may be because feedback is delivered to participants when they are not engaged in the act of performing. Miller (1956) has concluded that a limited number ($7 \pm 2$) of items can be held in short-term memory. Performing and assessing oneself simultaneously requires a high level of cognitive resources, potentially resulting in cognitive overload and an inability to simultaneously perform and reflect upon elements of that performance. Qualitative data indicated that the act of cognitive redistribution, through video recording, allowed participants to take a more neutral stance toward their work, allowing them to repeatedly view their performance, self-assess, and self-instruct. While not being an explicit form of self-regulated learning intervention - such as Dorrenbacher and Perels (2016) self regulated learning program - video recording allowed many participants to engage in metacognition through a more implicit means of intervention.

**Effects of Experimental Treatment on Self-Regulated Learning Behaviour**

The hypothesis that video recording would result in increased levels of participant self-regulation was not supported by the quantitative results of the study. However, Figure 1 (see Results section) shows a divergent trend in the data. Cumulative self regulation scores of participants in the experimental group increased over the course of the study while the overall scores of participants in the control group decreased over the course of the study. This trend may indicate that the experimental group had become more self-regulated by the end of the study period. Several of the items in the IMSSRM support this conjecture. The mean score for item 9, "I feel that I can solve most musical problems when practicing," remained stable (4.84) for the control group from pre- to postinstruction. The mean score for the experimental group on the same item rose from 4.75 to 5.33, and contained the lowest standard deviation in the motivation dimension (0.65). This finding indicates that the experimental participants perceived themselves as better and more consistent musical problem solvers than control group members. A similar trend was found in item 23, "I am confident of my ability to improve on my instrument." On this item the control group mean score decreased from 5.53 to 5.15, while the experimental group mean score rose from 5.50 to the highest score in the dimension, 5.75. This result suggests that feelings of self-efficacy increased for the experimental group participants over the study interval, but decreased for control group participants.

Statements from the qualitative data also indicate a trend towards more self-regulated learning behavior in experimental group participants. For example:

> I think knowing I have to record this makes a difference. Lots of do-overs on the video. It's more of a performance than practice. This makes me feel more compelled to get it right. I have a private area and don't have to worry about anyone hearing my mistakes. I would feel very self-conscious otherwise (Participant 106-Experimental-Week 1)

"Used video to self correct for position of right shoulder and right elbow. Left foot is lower so less stress on the left hip" (Participant 58-Experimental-Week 7).

> From watching the video: I figured out the correct fingers for me… I am using I and A for fretting as that is more comfortable with my fingers. Because this piece primarily uses the thumb, I noticed that my other fingers were not properly positioned but were resting on the guitar. I think it sounds ok. But there is something going on with my plucking of the strings because I cannot control the vibrations of this piece. I am plucking at the right spot by the rose[tte] (Participant 12-Experimental-Week 5)

The data from the IMSSRM shows movement in a positive direction for the experimental group and in a negative direction for the control group. The small sample size may have influenced these results. There may not have been enough power in the sample size to generate statistical significance. Based on Cohen's (1992) guidelines, in order to achieve the recommended power of .8 when using the standard α-level of .05, 85 participants would be required to detect a medium effect size and 28 participants to detect a large effect size.

Therefore, based on the trends indicated in both the quantitative and qualitative data and the small sample size future research with a larger sample is warranted.

**Effects of Experimental Treatment on Motivation**

Information related specifically to weekly video recording processes was not requested from experimental participants during their weekly questionnaires. It was felt that the qualitative data would be more valid if the researcher did not specifically request this information. Many participants however did address the video recording processes in their weekly reflections. These data provided an important view into the variety of ways that participants reacted to the recording process. Video recording seemed to foster an increased motivational response in some participants. A number of participants reported practicing longer, in a more deliberate manner, and with more intensity than during regular practice time. There appeared to be a trend in the qualitative data toward behaviours associated with intrinsic motivational constructs, particularly mastery orientation (e.g., participants 5, 12, 13, 18, 58). Because motivation plays such an integral role in the learning process, future studies should include questions aimed at clarifying the motivational profiles of participants, including choice and preference, intensity, persistence, and quality. Inclusion of specific motivation related items may shed light on whether video recording encourages certain types of motivational responses in participants, or if video recording heightens pre-existing motivational orientations. It may also be possible to measure how much the video recording process affects these four action patterns. Using a within subject design researchers could potentially detect differences across these four motivational indicators by having participants engage in regular practice and also in practice while attempting to video record musical excepts. Researchers could then assess whether differences in motivation exist between the two treatment conditions.

**Disruptions During Practice**

In their study, Roulston and Jutras (2015) attempted to examine novice instrumentalists under the age of 60, yet two-thirds of their participants were over 60 years of age. The main challenges these participants faced included issues with manual dexterity and hand-eye coordination; the cognitive processes of learning to read music were also described as physically and mentally challenging (p. 329). While some of these challenges apply to participants of the present study - particularly the cognitive challenges inherent in the process of learning to read music – others do not. The weekly self-report data from this study indicates that persistent disruptions hindered many participants from achieving their goals. These disruptions centred around commitments to family, work, domestic duties, as well as health related issues, and affected their ability to successfully manage their practice time and environment. It may be conjectured that the difference in age between Roulston and Jutras's (2015) participants and the present study's participants may be partially responsible for these divergent results. Most participants in the present study were third stage adults (under 60 years old). Further research is needed in order to understand the life stage challenges faced by adult learners when beginning instrumental music lessons. Methods of instruction could then be devised that would take into consideration these challenges. For instance, most participants in the study appeared fluent with online resources and used them in a variety of ways to support their classroom learning experience. With this in mind, instructors might devise ways to capitalize on the natural affinity that adults show for online resources. Instructors could supplement face-to-face learning with YouTube tutorials. These tutorials could address a variety of topics including positioning of the instrument, tonal production, and technique. Instructors could also demonstrate challenging aspects of the repertoire through video modelling and detailed explanation. Within classroom

settings, the inclusion of online forums would allow busy adults to connect to the curriculum and to the social learning aspects inherent in group classes. Finally, students could perform with 'play-along tracks'. These tracks could include full ensemble, separate parts, and flexible performance tempos. They would give participants an aural representation of the piece and would serve to develop confidence and continuity in student performance. Perhaps the most important aspect of these online resources would be their convenience; they would be available at all times and places, provided that internet connectivity was available. These musical recordings would act to scaffold student learning and would help ameliorate the effects of continued disruptions associated with the third phase adult life stage.

**Limitations**

Due to the inherent differences in adjudication between the differing styles of guitar playing (i.e., plectrum, compared to finger-style) and because of the disparate musical styles afforded the instrument (i.e., jazz, heavy metal, folk, punk etc.), non-classical guitar styles were purposely excluded from this study. This was done to delineate and to measure more precisely those aspects specifically related to classical guitar technique and repertoire.

The use of weekly self-submitted questionnaires to collect data presented limitations. Questionnaires do not allow for clarification or further dialogue with participants. Follow up interviews would have been beneficial to clarify aspects of the qualitative data that were unclear. For instance, participants often lacked the requisite language to describe musical terminology such as legato note connection, rhythmic accenting, and sound/tone quality. They also had difficulty describing physiological movement and principles such as uniform direction of joint movement or mid-range function of movement when practicing. Having the opportunity to

clarify precisely what a participant meant in their reflective statements would have added precision to the study.

Video recording participants in their natural practice environment, although time intensive to analyse, would have provided a richer, more nuanced set of data with which to assess the self-regulated learning behaviour of all participants.

The instructional period of the study was only 12 hours in length. This short time period made it difficult for some participants to progress. This was particularly true for those participants whose practice patterns were often disrupted by work, family commitments, or illness.

Group instruction, as opposed to one to one instruction, was also a constraint. During one to one instruction there is the opportunity to adjust the speed of the curriculum delivery to that of the learning pace of the student. In a large group setting it was challenging to balance the learning needs of the various participants.

Meeting only once a week was challenging for most participants. Having online resources available in between lessons (note and rhythm trainers, fretboard charts etc.) would have helped those who had difficulty grasping the musical notation symbol system.

**Significance of study**

Hallam et al. (2012) has concluded that there are strategies related to practicing that learners adopt infrequently. These strategies include using recordings of their own playing to enable them to assess their performance more objectively (p. 286). Similarly, McPherson and Zimmerman (2002) have noted that self-recording is rarely used by musicians, yet is an effective way to monitor one's progress (p. 342). In contrast to musicians, athletes have used video

recording as a means of intervention since the early 1980's (Liebermann et al., 2002, p. 756). Given that it would be desirable for certain manifestations of self-regulation and expertise to be more widespread than they are, the adoption of recording technologies may offer significant advances in the developmental learning opportunities for instrumental music students at various levels. For instance, studio music instructors could give students video recording assignments to be completed during weekly practice time. These recordings would provide immediate feedback through video playback and would allow students the ability to self-assess their performance in a more objective manner. Tan (2007) suggests that self-assessment develops students' critical thinking skills, self-directed learning, and responsibility for learning that leads to lifelong learning. Student and instructor could also engage in analysis of recorded weekly video performances during private lessons. In this way students could gain insight into the metacognitive processes involved in expert level assessment. Instructors could also scaffold these metacognitive processes as a way to develop them in their students. From another perspective, self recorded videos could be used within individual or group guitar classes as a way to encourage self-regulation skills via peer assessment. Exposure to peers' work is said to encourage deeper analysis of one's own work after seeing and commenting on what others have written on the same topic (Sims, 1989). This principle may also apply to musical performance. The process of peer evaluation also has the potential to teach students how to provide feedback properly (Bloxham & West, 2004).

From a higher education perspective, it has been noted that non-music disciplines tend to use well-established assessment tools such as essays and written examinations that can be graded with clearly defined criteria. However, musical performance assessment has remained problematic (Zhukov, 2015). Typical performance assessment in university settings consists of

an instrumental teacher's grade and a year end performance jury. However, reliability among adjudicators is sometimes low and significant biases often influence results (McPherson & Thompson, 1998, p. 12). Student submitted video recordings may allow for increased diagnostic accuracy during formative assessment through the ability to repeatedly view a performance. These recordings could also be used for accountability purposes within summative assessment. Should a disagreement regarding performance grades arise between student and instructor, these videos could be used to confirm the validity of a given grade.

**Conclusions**

Despite the aforementioned limitations of this study, important contributions to the literature have been made in a number of ways. To date, no performance achievement measure for the classical guitar has existed. The present study remediated this deficit with the creation of a five dimension 23-item scale. There was a very high degree of internal consistency among scale items, and the interjudge reliability was likewise high.

The creation of a reliable self-regulation scale for instrumental musicians was also an important contribution from this study. While other similar musical scales have been created based on McPherson & Zimmerman's (2002) theory of self-regulation, this scale incorporates all their six dimensions and possessed a high degree of internal consistency among scale items.

The Classical Guitar Performance Rating Scale was used to assess the effects of the experimental treatment (self-assessment of video performances) on achievement scores. Results indicated a significant difference in achievement scores in favour of the experimental group. Results of the pre and posttest scores on the Instrumental Music Self-Regulation Measure showed no significant interaction effect. However, the estimated marginal means indicated a

dissimilar trend between the two treatment groups, with experimental group means increasing while the control group means decreased. The qualitative data also supported this supposition. It is possible that the modest sample size obtained for this study may have obscured a potentially significant effect.

Finally, qualitative data revealed that third phase adults who begin studying the classical guitar encountered specific life stage disruptions that hindered them from achieving their goals. Pedagogical solutions were offered to counter the effects of these disruptions. These solutions drew upon the penchant for online supplemental materials that this age demographic displayed.

## References


Abeles, H. F. (1973). Development and validation of a clarinet performance adjudication scale. *Journal of Research in Music Education, 21*, 246–255.

Araujo, M. V. (2016). Measuring self-regulated practice behaviours in highly skilled musicians. *Psychology of Music, 44*, 278-292.

Back, D. (1995). Creative teaching techniques with young students. *Soundboard, 22*(2), 27-33.

Bandura, A. (1986). Differential engagement of self-reactive influences in cognitive motivation. *Organizational Behaviour and Human Decision Processes, 38*(1), 92-133.

Barry, N. H., & Hallam, S. (2002) Practice. In R. Pamcutt & G. E. MacPherson (Eds.), *The science and psychology of music performance-creative strategies for teaching and learning* (pp. 151-165). New York, NY: Oxford University Press.

Bellhauser, H., Losch, T., Winter, C., & Schmitz, B. (2016). Applying a web-based training to foster self-regulated learning - effects of an intervention for large numbers of participants. *Internet and Higher Education, 31*, 87-100. doi:10.1016/j.iheduc.2016.07.002

Bergee, M. J. 1987. An application of the facet-factorial approach to scale construction in the development of a rating scale for euphonium and tuba music performance. Ph.D. diss., University of Kansas, https://www.lib.uwo.ca/cgi-bin/ezpauthn.cgi?url=http://search.proquest.com/docview/303578078?accountid=15115 (accessed April 28, 2017).

Bergee, M. J. (1993). A comparison of faculty, peer, and self-evaluation of applied brass jury performances. *Journal of Research in Music Education, 41*, 19-27.

Bloxham, S., & West, A. (2004). Understanding the rules of the game: Marking peer assessments as a medium for developing students' conceptions of assessment. *Assessment & Evaluation in Higher Education, 29,* 721-733.

Boud, D. (2005). *Enhanced learning through self-assessment.* New York: Routledge Falmer.

Clark, A. & Chalmers, D. (1998) The Extended Mind. *Analysis*, 58, 7-19.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*(1), 155–159.

Creech, A., Hallam, S., McQueen, H., &Varvarigoou, M. (2013). The power of music in the lives of older adults. *Research Studies in Music Education, 35,* 87-102.

Creech, A., Hallam, S., Varvarigou, M., McQueen, H., & Gaunt, H. (2013). Active music making: A route to enhanced subjective well-being among older people. *Perspectives in Public Health, 133*(1), 36-43.

Cremaschi, A. (2012). The effect of a practice checklist on the practice strategies, practice self-regulation and achievement of collegiate music majors enrolled in a beginning class piano course. *Research Studies in Music Education, 34,* 223-233.

Deniz, J. (2012). Video recorded feedback for self-regulation of prospective music teachers in piano lessons. *Journal of Instructional Psychology, 39,* 17-25.

Dignath, C., Buttner, G., & Langfeldt, H. P. (2008). How can primary school students learn self regulated learning strategies most effectively? A meta-analysis on self-regulation training programmes. *Educational Research Review, 3*(2) 101-129.

Dorrenbacher, L., & Perels, F. (2016a). More is more? evaluation of interventions to foster self-regulated learning in college. *International Journal of Educational Research, 78*, 50-65. doi:10.1016/j.ijer.2016.05.010

Dorrenbacher, L., & Perels, F. (2016b). Self-regulated learning profiles in college students: Their relationship to achievement, personality, and the effectiveness of an intervention to foster self-regulated learning. *Learning and Individual Differences, 51*, 229-241. doi:10.1016/j.lindif.2016.09.015

Dror, E. & Harnad, S. (2008). *Cognition distributed: How cognitive technology extends our minds*. Amsterdam: John Benjamins Pub. Co.

Duke, R. A., Simmons, A. L., & Cash, C. D. (2009). It's not how much; it's how. Characteristics of practice behavior and retention of performance skills. *Journal of Research in Music Education, 56*, 310-321.

Duncan, T. C. &, McKeachie, W. J. (2005). The making of the motivated strategies for learning questionnaire. *Educational Psychologist, 40*(2), 117-128.

Ericsson, K. A., Krampe, R. T., & Tesch-Römer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review, 100*, 363-406.

Fautley, M. (2013). The potential of audio and video for formative assessment purposes in music education in the lower secondary school in England: Issues arising from a small-scale study of trainee music teachers. *Journal of Music, Technology & Education, 6*(1), 29-42.

Fink, Philip, H. (1973). *The development and evaluation of instrumental materials for a beginning class in heterogeneous strings including guitar* (Unpublished doctoral dissertation). University of Miami, Coral Gables.

Gooding, Lori, F. (2009). *The effect of behavioural contracting on the acquisition of guitar performance skills in a college-level bginning guitar class.* (Unpublished doctoral dissertaion) Florida state University, Tallahassee.

Grayson, D. (2004). Some myths and legends in quantitative psychology. *Understanding Statistics, 3*(1), 101-134.

Gruson. L. (1988). Rehearsal skill and musical competence: Does practice make perfect? In J. A. Sloboda (Eds.), *Generative processes in music; the psychology of music performance, improvisation and composition* (pp. 91-112). Oxford: Clarendon Press.

Hallam, S. (1997). Approaches to instrumental music practice of experts and novices: Implications for education. In H. Jørgensen & A. C. Lehmann (Eds.), *Does practice make perfect? Current theory and research on instrumental music practice* (pp. 89-108). Oslo, Norway: Norges musikkhøgskole.

Hallam, S. (2011). What predicts level of expertise attained, quality of performance and future musical aspirations in young instrumental players? *Psychology of Music 41*, 267-291.

Hallam, S., Rinta, T., Varvarigou, M., Creech, A., Papageorgi, L., Gomes, T., & Lanipekun, J. (2012). The development of practice strategies in young people. *Psychology of Music, 40*, 652-680.

Hambrick, D., Oswald, F., Altmann, E., Meinz, E., Gobet, F. & Campitelli, G. (2014). Deliberate practice: Is that all it takes to become an expert*? Intelligence, 45,* 34–45

Hattie, J. A., Biggs, J., &Purdie, N. (1996). Effects of learning skills interventions on student learning: A meta-analysis. *Review of Educational Research, 66*(2). 99-136

Hewitt, M. P. (2011). The impact of self-evaluation instruction on student self-evaluation, music performance, and self-evaluation accuracy. *Journal of Research in Music Education, 59*(1), 6-20.

Horowitz, R. A., (1994). The deveopment of a rating scale for jazz guitar improvisation performance. *Dissertation Abstracts International, 55*(11A), 3443.

Kazdin, A.E. (1974). Reactive self-monitoring: The effects of response desirability, goal setting, and feedback. *Journal of Consulting and Clinical Psychology, 42,* 704-716.

Kim, J. *Discover psychology: Essential readings for psychology*. Vol. 2. Toronto: Nelson Education ltd. 2015. Print.

Kopiez, R., & Lee, J. (2006). Towards a dynamic model of skills involved in sight reading music. *Music Education Research, 8,* 97-120.

Lee, Martin. (2011) *The use of video feedback as a performance analysis coaching tool in amateur ice hockey.* (Unpublished doctoral dissertation). Haaga-Helia, University of Applied Sciences, Helsinki, Finland.

Liebermann, D., Katz, L., Hughes, M., Bartlett, R., McClements, J., Franks, I., (2002). Advances in the application of information technology to sport performance. *Journal of Sports Sciences. 20,* 755-769.

LeCompte, M. D., & Preissle, J. (1993). *Ethnography and qualitative design in educational research.* San Diego: Academic Press.

Locke E., & Latham, G. (2013). *New developments in goal setting and task performance.* New York, NY: Routledge.

Maehr, Martin, A., Pintrich, Paul, R., Linnenbrink, Elizabeth, A. (2002). Motivation and achievement. *The new handbook of research on teaching and learning: A project of the music educators' national conference. (PAGE#)* Oxford University Press.

McCormick, J., & McPherson, G. (2003). The role of self-efficacy in a musical performance examination: An exploratory structural equation analysis. *Psychology of Music, 31*, 37-51.

McPherson, G. E., & McCormick, J. (1999). Motivational and self-regulated learning components of musical practice. *Bulletin of the Council for Research in Music Education, 141*, 98-102.

McPherson, G. E., & McCormick, J. (2006). Self-efficacy and music performance. *Psychology of Music, 34,* 322-336.

McPherson G. E., & Renwick J. (2001). A longitudinal study of self-regulation in children's musical practice. *Music Education Research, 3,* 169-186.

McPherson, G. E., & Thompson. W. F., (1998). Assessing musical performances: Issues and Influences. *Research Studies in Music Education, 10,* 12-24.

McPherson, G. E., & Zimmerman, B. J. (2002). Self-regulation of musical learning: A social cognitive perspective. In R. Colwell & C. Richardson (Eds). *The new handbook of research on music teaching and learning* (pp. 327-347). New York, NY: Oxford University Press.

Miksza, P. (2012). The development of a measure of self-regulated practice behaviour for beginning and intermediate instrumental music students. *Journal of Research in Music Education, 59,* 321-338.

Miksza, P., Prichard, S., & Sorbo, D. (2012). An observational study of intermediate band students' self-regulated practice behaviors. *Journal of Research in Music Education, 60,* 254-266.

Newman, S., Hatton-Yeo, A. (2008). Intergenerational learning and the contributions of older people. *Aging Horizons, 8,* 31-39.

Nielson, S. (2001). Self-regulated learning strategies in instrumental music practice. *Music Education Research, 3,* 155-167.

Oxendine, K. (1984). *Psychology of motor learning* (2nd ed.). New York: Appleton-Century-Crofts.

Pintrich, P. R. (2000c). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. Pintich, M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 451-502). San Diego, CA: Academic Press.

Pintrich, P., Smith, D., Garcia, T., & McKeachie, W. (1993). Reliability and predictive validity of the Motivated Strategies for Learning Questionnaire (MSLQ). *Education and Psychology Measurements, 53,* 810-813.

Renthungo, M. (2012). *A paradigm for effective pre-college classical guitar methodology: A case study of two models of effective instruction.* (Unpublished doctoral dissertation). University of Northern Colorado, Greeley, Colorado.

Renwick, J. M., & McPherson, G. E. (2002). Interest and choice: Student-selected repertoire and its effects on practicing behaviour. *British Journal Music Education,* 19, 173-188.

Russell, Brian. E. (2010). The development of a guitar performance rating scale using a facet factorial approach. *Bulletin of the coucil of music research in music education,* 184, 21-34.

Schmidt, R. Lee, T. (1999). *Motor Control and Learning.* Champaign, IL: Human Kinetics Publishers.

Shearer, A. (1990). *Learning the classic guitar part 1: Technique.* Pacific, Mo.: Mel Bay Publications.

Silveira, J., & Gavin, R. (2015). The effects of audio recording and playback on self-assessment among middle-school instrumental music students. *Psychology of Music, 43*, 1-13.

Sims, G. K. (1989). Student peer review in the classroom: A teaching and grading tool. *Journal of Agronomic Education (JAE), 18*, 105-108.

Sloboda. J., Davidson, J., Howe, M., & Moore, D. (1996). The role of practice in the development of performing musicians. *British Journal of Psychology, 87*, 287-309.

Stivers, J. (1972). *A reliability and validity study of the Watkins-Farnum Performance Scale.* (Unpublished doctoral dissertation).University of Illinois at Urbana-Champaign.

Uziel, L. (2007). Individual differences in the social facilitation effect: A review and meta-analysis. *Journal of Research in Personality, 41*, 579-601.

Tan, K. (2007). Conceptions of self-assessment: What is needed for long-term learning? In D. Boud &N. Falchikov (Eds.), *Rethinking assessment in higher education: Learning for the longer term* (pp. 114-127). Oxford, UK: Routledge.

Tan, S., Fordresher, P., & Harre, R. (2010). *Psychology of music: From sound to significance*. New York, NY: Psychology Press.

Watkins, J. & Farnum, S. (1954). *The Watkins-Farnum Performance Scale*. Winona: Hal Leonard.

Watkins, Rosemary, C. (1982*). The effects of Ausubel's organizer model on the acquisition of fundamental music concepts and skills by non-music majors*. (Unpublished doctoral dissertation). University of Texas, Austin.

Yarbrough, C. (1986). The relationship of behavioural self-assessment to the achievement of basic conducting skills. *Journal of Research in Music Education, 35*, 183-189.

Zdzinski, S.F., & Barnes, G. V. (2002). Development and validation of a string performance rating scale. *Journal of Research in Music Education, 50,* 245-255.

Zimmerman, B. J. (1986). Becoming a self-regulated learner: Which are the key subprocesses? *Contemporary Educational Philosophy, 11*, 307-313.

Zimmerman, B. J. (1990). Self-regulating academic learning and achievement: The emergence of a social cognitive perspective. *Educational Psychology Review*, *2*, 173-201.

Zimmerman, B. (1994). Dimensions of academic self-regulation: A conceptual framework for education, in D. H. Schunk & B. J. Zimmerman (Eds.) *Self-regulation of Learning and Performance: Issues and Educational Implications*. New Jersey: Erlbaum.

Zimmerman, B. J. (1998). Academic studying and the development of personal skill: A self-regulatory perspective. *Educational Psychologist, 3*, 73-86.

## Appendix A Instrumental Music Student Self Regulation Measure

We are conducting some research on instrumental practicing. We would be very grateful if you would complete this questionnaire. It will take you about ten minutes. Thank you for your time.

Please indicate in the table below how strongly you agree or disagree with the following statements. Write the number beside the question.

1) very strongly disagree, 2) strongly disagree, 3) disagree, 4) neutral, 5) agree, 6) strongly agree, 7) Very strongly agree,

**Questions**

1) I believe that I can achieve my musical goals _____
2) I set specific goals when practicing _____
3) I expect to do well in music in the future _____
4) I schedule and organize my practice time _____
5) It's easy for me to remain focused on my music when practicing _____
6) I identify difficult sections and practice them first _____
7) I often practice with my peers _____
8) I use specific strategies related to my practice goals _____
9) I feel that I can solve most musical problems when practicing _____
10) I am easily distracted when I practice _____
11) I practice difficult sections until they feel comfortable _____
12) I practice in a quiet space away from distractions _____
13) When I find something difficult, I seek help from outside resources _____
14) I try to get one section of music accurate before practicing the next _____
15) I mark trouble spots in the music when practicing _____
16) I evaluate the progress made toward my goals _____
17) I frequently play pieces from beginning to end without stopping _____
18) I often daydream when practicing _____
19) When I make a mistake I often go back to the beginning of the piece and start again _____
20) I frequently record myself in order to detect and correct errors in my performance _____
21) I use strategies that have been effective in the past _____
22) I am able to achieve my practice goals satisfactorily _____
23) I am confident of my ability to improve on my instrument _____
24) I structured the physical space to make the most of my practice _____
25) I practise difficult sections slowly _____

Thank you for completing this questionnaire…

## Appendix B Classical Guitar Performance Rating Scale

Please indicate in the table below how strongly you agree or disagree with the following statements. Write the number beside the question.

1) very strongly disagree, 2) strongly disagree, 3) disagree, 4) neutral, 5) agree, 6) strongly agree, 7) Very strongly agree

1. Performed dynamics as indicated _____
2. Participant "snapped" the strings often _____
3. Performed with a warm, full-bodied tone _____
4. Performed with an appropriate tempo _____
5. Performed with a steady tempo (not slowing down or speeding up) _____
6. Performed tempo changes where indicated (ritards, accelerandos) _____
7. Performed correct rhythms _____
8. Performed with regularly reoccurring rhythmic accenting _____
9. Guitar was in in tune _____
10. Performed fluidly and without hesitation _____
11. Backtracked often to correct earlier mistakes _____
12. Performed correct pitches _____
13. Notes connected in a smooth legato manner _____
14. Notes plucked in a clear, articulate manner (consistent weight and volume on each note)_____
15. Participant was seated correctly (shoulders and elbows symmetrical, spine aligned) _____
16. Position of the guitar in relation to the torso is reasonable _____
17. Angle of the fretboard is reasonable (45 degrees) _____
18. Left forearm and hand were aligned _____
19. Left hand fingers were curved and in their mid-way position _____
20. Right forearm was placed in a reasonable position (mid-way between the wrist and elbow, above the bridge) _____
21. Right forearm and hand were aligned _____
22. Right hand wrist was elevated from the body of the guitar _____
23. Right hand fingers were curved and in their midway position _____

## Appendix C Weekly Reflection Questions

For your weekly reflection, please provide/discuss the following:

(a) What you do when you practice (how you practice),

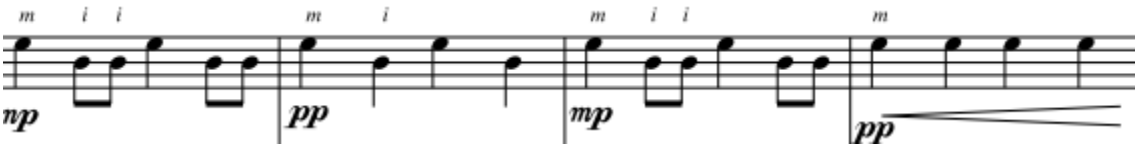
(b) Your practice environment (where you practice),

(c) How many days you practiced, how many sessions in each day and how long daily practice was.

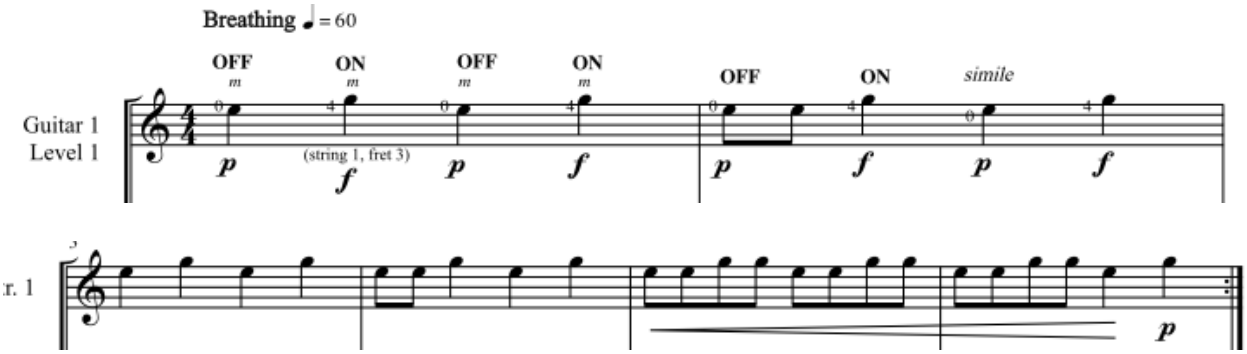
(d) A brief self-assessment of your practice.

## Appendix D weekly video recording musical excerpts

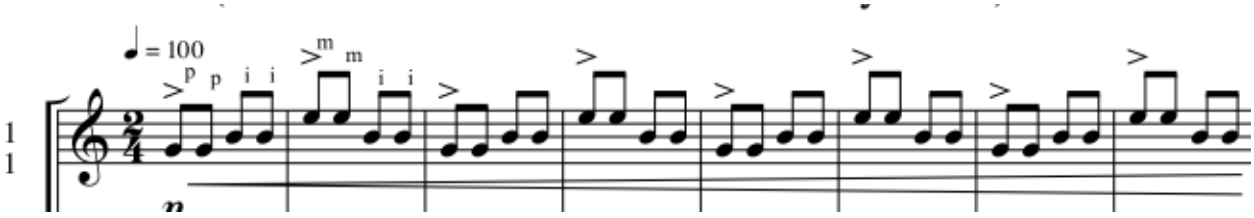
Week one video excerpt



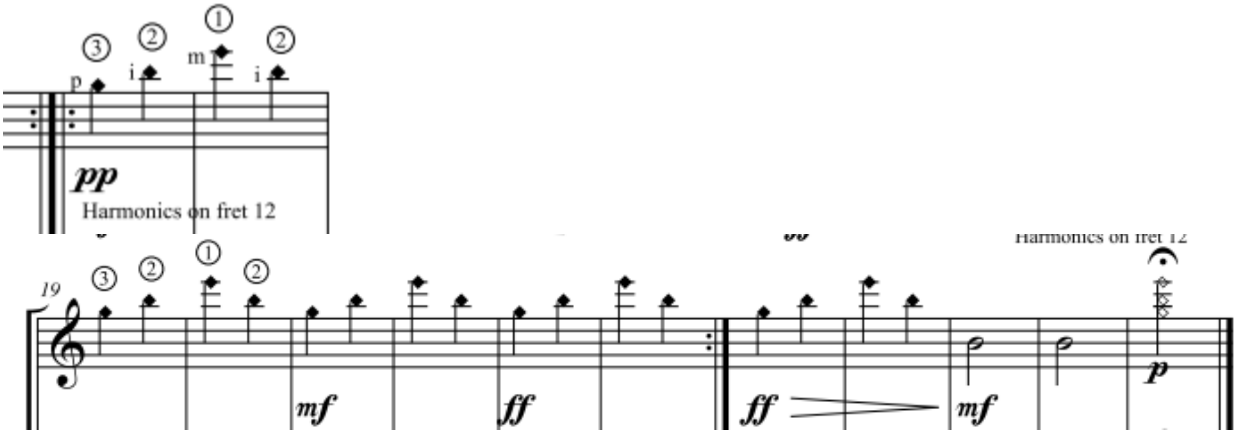

Week two video excerpt



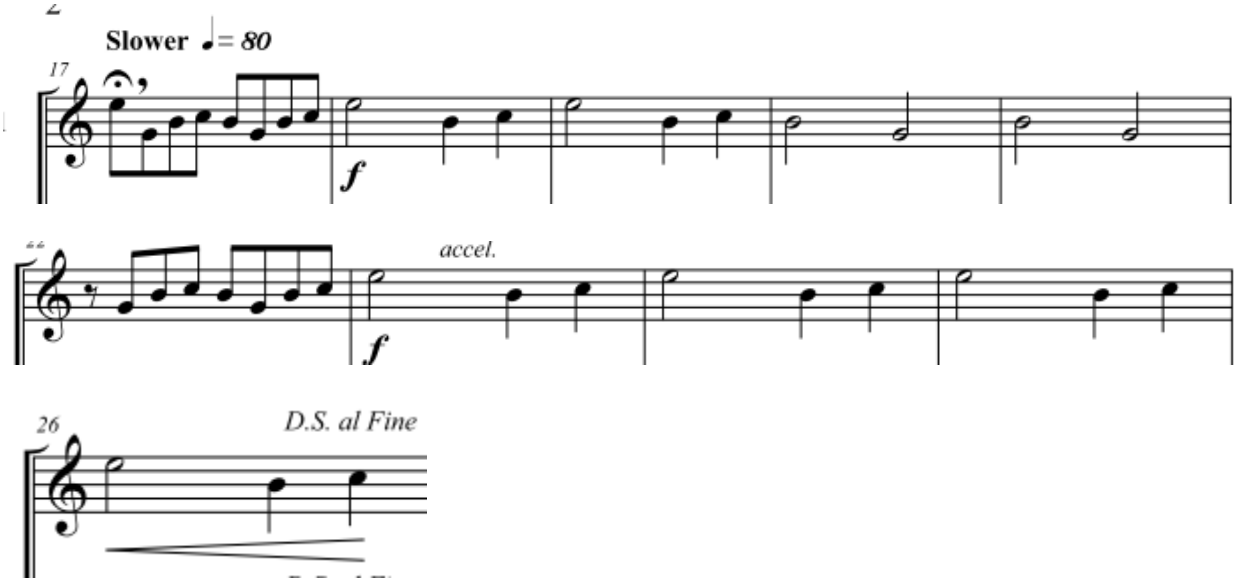

Week three video excerpt



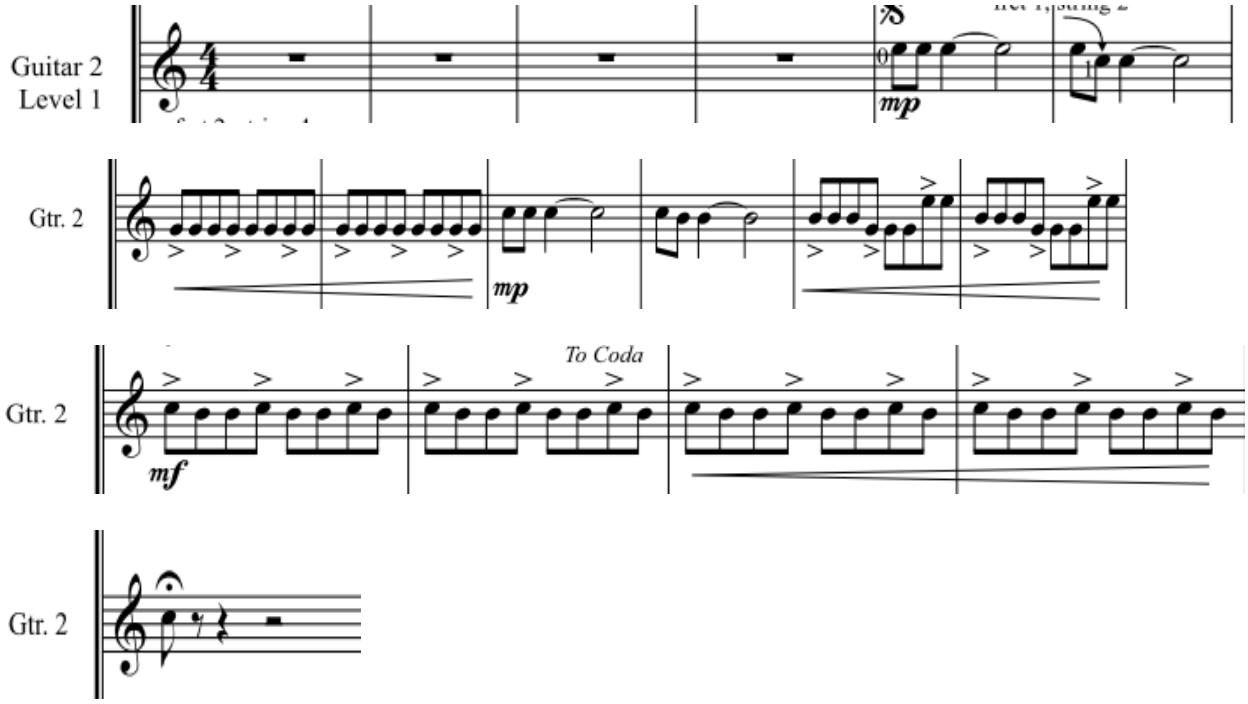
Week four video excerpt



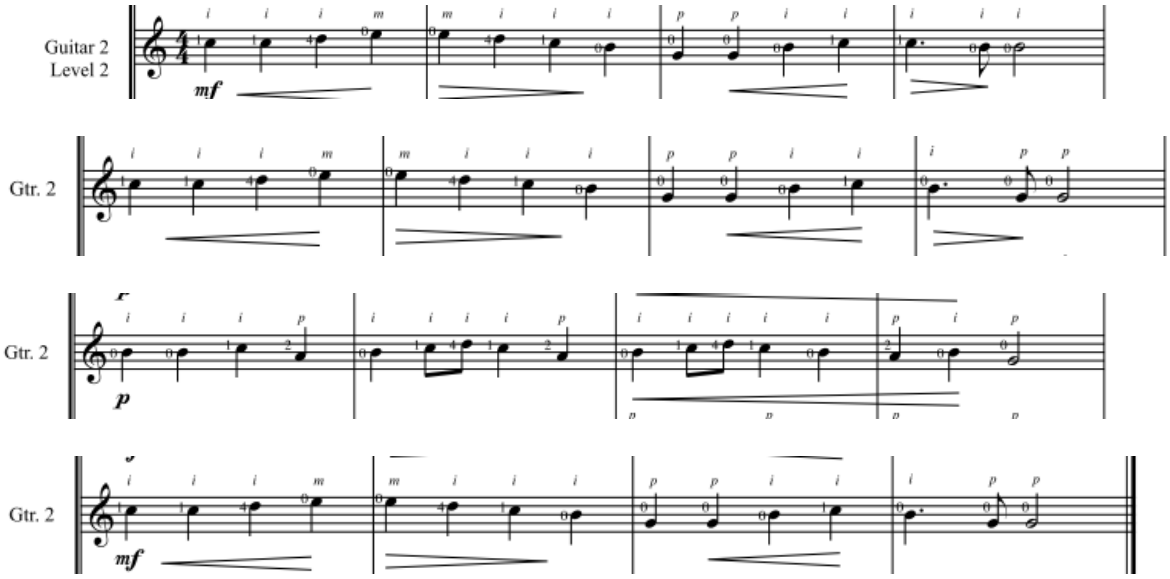

Week five video excerpt



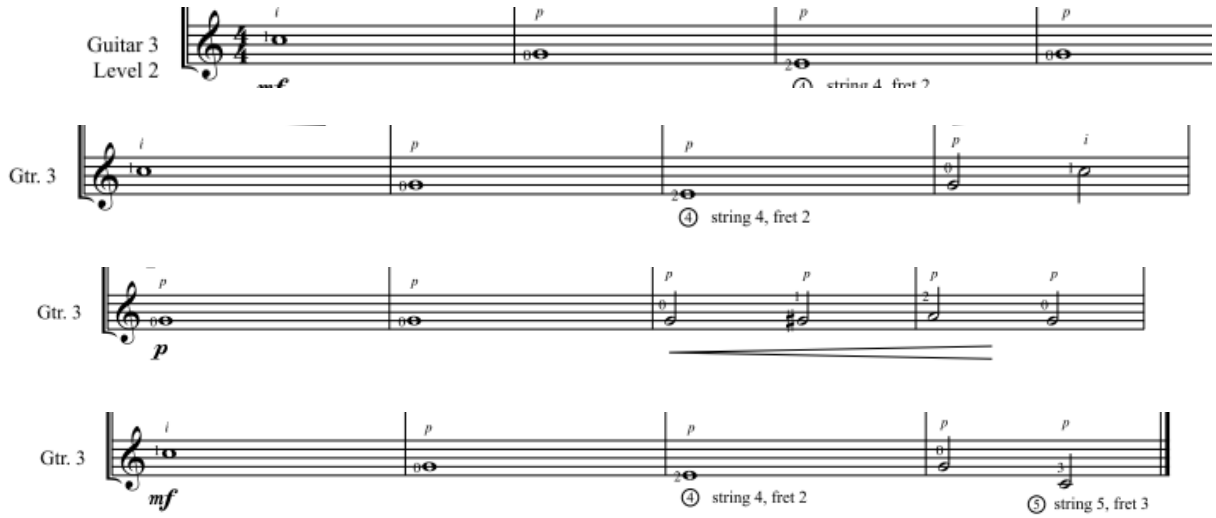
Week six video excerpt



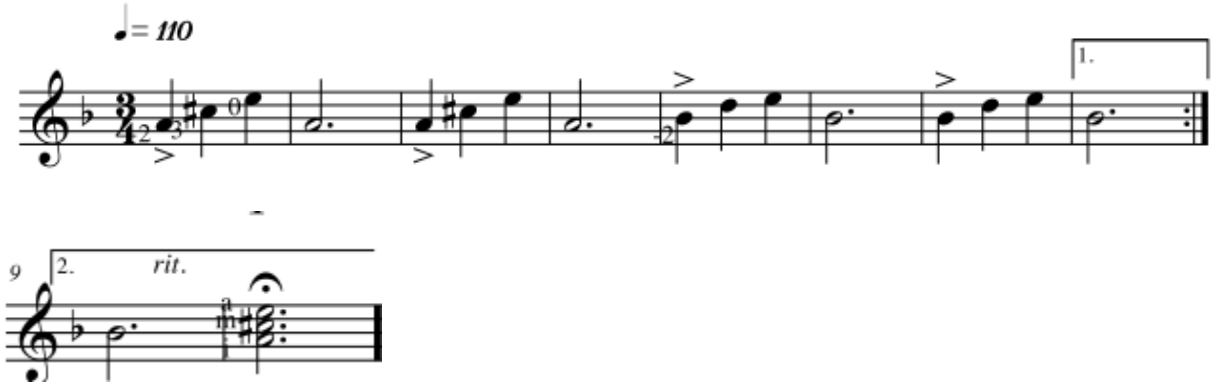

Week 7 video excerpt



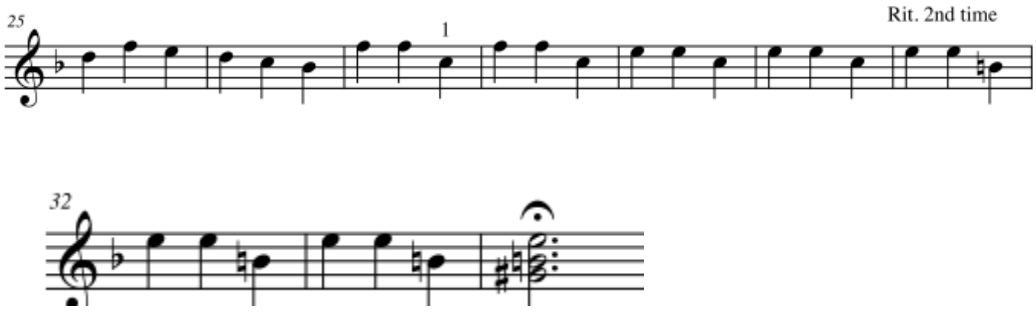
Week 8 video excerpt



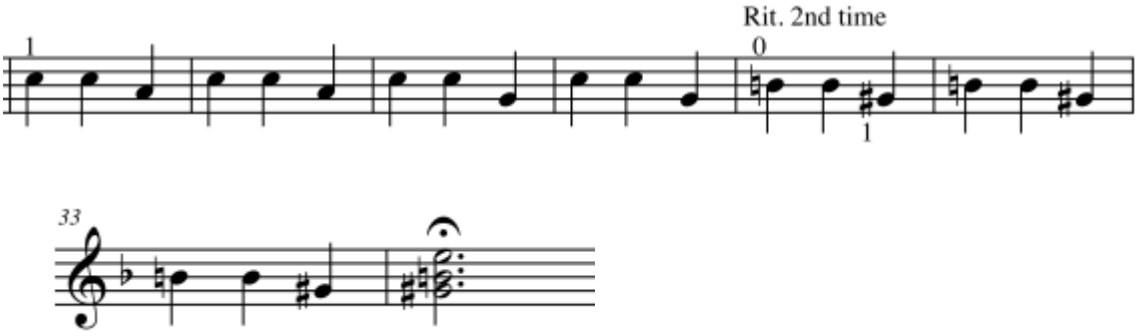

Week 9 video excerpt



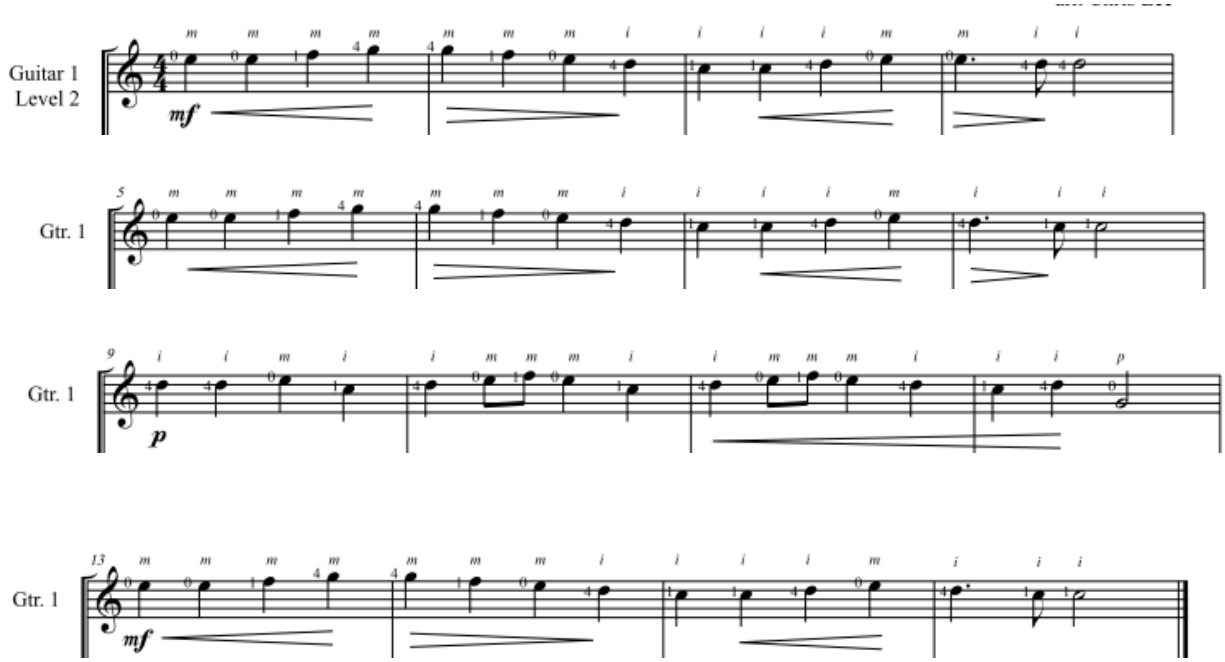

Week 10 video excerpt



Week 11 video excerpt




Week 12 – Final video excerpt recorded and submitted by both treatment groups.



# Curriculum Vitae

| | |
|---|---|
| **Name:** | Patrick K Feely |
| **Post-secondary Education and Degrees:** | McMaster University,<br>Hamilton, Ontario, Canada<br>1997-2000 B.Mus |
| | University of Toronto<br>Toronto, Ontario, Canada<br>2000-2003 M.Mus.Per. |
| | Royal Conservatory of Music<br>Toronto, Ontario, Canada<br>2004 ARCT Per.<br>2008 ARCT Ped. |
| | The University of Western Ontario<br>London, Ontario, Canada<br>2015-2017 M.Mus.Ed. |
| **Related Work Experience** | Sessional Faculty, guitar instructor<br>McMaster University<br>2008-Present |
| | Guitar Specialist, Examiner and Mentor College of Examiners,<br>Royal Conservatory of Music<br>2008-Present |
| | Founder, Artistic Director, Conductor, Guitar Society of Brantford<br>Brantford, Ontario, Canada<br>2011-Present |
| | Research Assistant, Musical Learning Across the Lifespan<br>The University of Western Ontario<br>Supervisors, Jonathan De Souza, Katie Overy<br>2015 |
| | Sessional Faculty, Guitar Instructor<br>The University of Western Ontario<br>2016 |
| | Research Assistant, Music Enrollment Trends in University<br>The University of Western Ontario<br>Supervisor, Betty Anne Younker<br>2016-2017 |