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Enhancing Music Learning With Digital Tools: A Case Study of a Student Using iSCORE

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iSCORE is a digital tool, available without charge, which was designed for students who take lessons from independent music teachers. One of the challenges of this learning format is that students must develop strategies to practice on their own between lessons. iSCORE can help meet that challenge by supporting students as they develop strategies for self-regulation to enhance their goal-setting, practice strategies, and abilities to reflect and critique their progress. This paper describes a case study of a 15-year-old pianist who learned to play a difficult piece of repertoire by using iSCORE to archive and compare performances, develop strategies, and reflect on his learning.

Keywords: self-regulated learning, music education, digital technologies

Introduction

Despite the wide body of literature that focuses on the benefits of student-directed learning, and the numerous advances in teaching methods and music technology, young students of independent music teachers often have difficulty learning to play their instruments. Millions of children take weekly lessons and yearly conservatory examinations throughout the world, but many of these students stop taking lessons before they become proficient at their instruments (McPherson, Davidson, & Faulkner, 2012). There is evidence that suggests that students with high levels of self-regulation experience deep fulfillment as musicians (McPherson, Davidson, & Faulkner, 2012). But in order to develop as self-regulating musicians, students need guidance as they learn to set goals and monitor, and reflect on, their progress. The present research study investigated how a web-based electronic portfolio, called iSCORE, served to enhance the learning of an adolescent pianist.

Literature

Since the invention of the printing press, new technologies have had an immense influence on how we teach music and on what music we teach. Likewise, the digital age presents myriad opportunities for teachers to use new tools to transform their teaching. It also—sometimes painfully—causes teachers to critically examine the approaches they take to teaching music, including their pedagogical approaches and musical core content.

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It is commonly acknowledged that most, if not all, of our students are digital natives; that is, they have only lived in a world with Google searches, emails, and iPods (Prensky, 2001). Conversely, many teachers are digital immigrants, meaning that their original resources for learning and communicating were hard copies of music scores and face-to-face interactions with students, parents, other teachers, and musicians. Consequently, most studio teachers have entered the digital world as newcomers to a strange land. Like other immigrants, digital immigrants wish to become more proficient with technologies and to develop their expertise in ways that will allow them to work effectively to the digital age. However, the challenge to enter a digital world is made more formidable by the isolation that often characterizes the work context of the studio music teacher, as most of these teachers work independently in their studios and rarely interact with other teachers (Feldman, 2010).

Another crucial difference between studio music instruction and classroom instruction is that students of independent music teachers are expected to practice without their teacher's presence, applying, at home, the ideas demonstrated and discussed during lessons. Often, they do this without help from an adult. These students must prioritize the ideas presented at their lessons, clarify their goals, execute strategies to meet these goals, and reflect on their progress. Thus, self-regulatory behaviours are particularly important for students who learn music through the studio lesson tradition.

Researchers have found that self-regulation is an important component of effective learning in general (Zimmerman, 2000; Zimmerman & Schunk, 2011). Self-regulation is especially important for effective practice of musical instruments (Bartolome, 2009; McPherson & Renwick, 2001; 2011). Less-skilled musicians have not developed the self-regulatory habits of advanced musicians (McPherson & Zimmerman, 2011; Nielsen, 2001; Oare, 2011) and often do not know how to structure their practices between lessons (McPherson & Renwick, 2001; 2011). McPherson and Zimmerman (2002) name six student characteristics that support self-regulated learning in music: (a) Students are motivated to set goals; (b) students possess methods to practice on their own; (c) students plan and manage their time; (d) students self-monitor and evaluate their performance behaviour; (e) Students structure physical environments for optimal learning; and (f) students use social connections to seek help.

A more nuanced way of characterizing the learning that occurs both during the lesson and between lessons is found in Sameroff's (2010) "transactional regulation" model. Under this model, it is suggested that co-regulation, that is a combination of self-regulation and other forms of external regulation, such as the support provided by music teachers, is necessary to support music learning, towards the ultimate goal of developing independent musicianship. Drawing on Sameroff's theory of transactional regulation, McPherson and his colleagues claim that in music learning we do not move linearly from other regulation to self-regulation, but rather, self-regulation includes other elements of regulation, just as other regulation is tempered with self-regulatory abilities (McPherson, Davidson, & Faulkner, 2012; Sameroff, 2010). Other regulation includes the input of ideas and strategies not only from teachers during lessons, but also from parents and peers in the time between lessons. McPherson, Davidson, and Faulkner (2012) followed 157 students in Australia over a 14-year period, and found that environmental factors, such as having supportive parents, performance opportunities, and positive peer interactions, served to regulate and enhance student learning.

The premise for our long-term research program is that specially designed technological tools can reduce the isolation experienced by teachers and can also support the development of lifelong musicians. We have formed a tri-institutional partnership amongst Queen's University, the Centre for the Study of Learning and Performance at Concordia University, and The Royal Conservatory in order to develop software and to conduct

research on how 21st century learners involved studio music instruction can benefit from interactive online tools.

The present paper focuses on the use of iSCORE, one of the digital tools we have developed to support independent music instruction. iSCORE is an online learning portfolio that was created to enhance students' ability to self-regulate. It contains features to support students as they develop effective practice strategies and learn to reflect on their progress. In addition, iSCORE's web-based platform allows for both asynchronous and synchronous interactions among students and teachers. iSCORE is available without charge from The Royal Conservatory (Retrieved from www.rcmusic.ca). Teaching support and samples of student work appear on a supporting website: www.iscorenews.com.

To date, we have conducted a series of studies involving over 30 teachers, 50 parents, and over 150 music students (e.g., Brook, Troop, & Upitis, 2011; Upitis, Abrami, Brook, Troop & Varela, 2012; Upitis, Brook, & Abrami, 2012; Upitis, Brook, Abrami, Varela, & Elster, 2012). Data sources have included interviews, observations, surveys, and iSCORE portfolio data. This particular paper describes a case study of one student's work to show how it helped this student accomplish a challenging music assignment.

Method

Data for the case study of one student's use of iSCORE were gathered and analyzed according to conventional case-study protocols (Yin, 2009). The student was a 15-year-old pianist who had been using iSCORE, and its predecessor ePEARL, since he was 12 years of age. His task was to learn a "quick study" piece for a local music festival. This entailed learning a 20th century Bagatelle by Alexander Tcherepnin (Opus 5, No.4) to a performance standard in a 48-hour period. At the time of the quick study competition, the student's regular music teacher was out of town. Consequently, he sought the assistance of two other music teachers who were available to help him master the piece. He also elected to use iSCORE to support his learning. Both of his supporting teachers are authors on the present paper.

Data included direct observations and interactions with the student for six hours on the first day and four hours on the second day. These observations and interactions were made by the supporting teacher-researchers, both of whom are music pedagogues and educational researchers. Quotations from these observations are marked O1 (Observations, Day 1) and O2 (Observations, Day 2). Interactions included helping the student directly with notes and interpretation, as well as offering suggestions and strategies for mastering the piece. One of the researchers was present at the performance of the piece on the morning of the third day. In addition, the student's archived performances of the piece, links to other performances, the strategies he employed to learn the piece, and reflections on his learning were available from the iSCORE portfolio and also served as data sources. A brief interview with the student after the performance (20 minutes) rounded out the data collection. Quotations from the interview are marked I1 (Interview 1). During the interview, the student was asked to comment on whether and how iSCORE supported his learning.

Results

The student began to learn the Bagatelle by attempting to sight-read the score in its entirety. When this proved to be beyond his abilities, he called upon one of the music teachers to play it for him. This gave him a sense of the piece, but did not provide something for further reference while he was practising on his own. Consequently, he began to shape his iSCORE project artifact by uploading links to YouTube videos of several performances of the work. The figure below shows the first entries that he made to his portfolio (see Figure 1).

After naming the project, he immediately clicked on the "doing" tab and entered the links that he had found, commenting, "I'll think more about the planning later. Right now, I just need to have these to listen to" (O1).

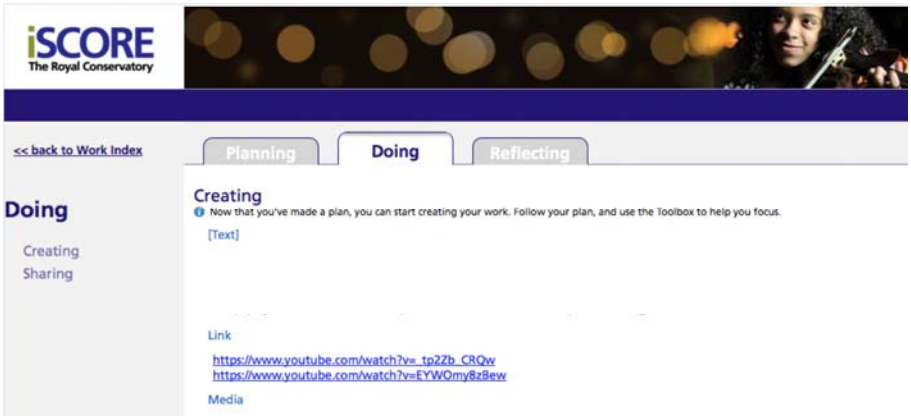


Figure 1. Links to YouTube videos of bagatelle Opus 5, No.4 by Alexander Tcherepnin.

After listening to the recordings several times, the student began to learn a figure in the left hand, which repeats several times throughout the work. This was a difficult figure to learn because it was unfamiliar in both sound and feel. The first interval was a solid major seventh—an interval rarely encountered in the piano repertoire. In fact, much of the technique was new and challenging: Quartal harmonies, meaning the use of fourths, rather than the familiar thirds, were prevalent, and an inner melody needed to be featured.

The student then began to systematically plan how to learn the piece in the 48 hours available to him. To do this, he went to the planning tab and identified specific goals and strategies that would help him master the piece. Some of these strategies, such as separating the right hand and left hand, were familiar ones that he had employed in learning other repertoire, and he offered these immediately as he began typing in the text. Others were new to him, and were suggested by one of the two teachers. In this way, there was transactional regulation evidenced: the student was able to be self-regulated with familiar approaches and techniques, and incorporated the strategies suggested by others to supplement what he already knew.

The figure below shows the filled out planning page (see Figures 2 & 3). Most of this was completed on the first morning of the first day, with more complex strategies (e.g., playing the landing chord of the four hardest measures) being introduced on the evening of the first day and morning of the second day.

One of the most important ways that iSCORE supported the student in learning the Bagatelle was the use of the annotation feature. The annotator allows the musician to upload an audio or video recording, and then to comment—in real time—on the recording. These comments can be made by the student, by teachers, by parents, and by peers. In this particular case, the student offered a number of comments himself, which helped guide the learning. Both teachers also offered comments, directly on the annotations and in other parts of the portfolio as well where sharing features are incorporated.

In addition to the comments that helped guide the learning, having several recordings of the Bagatelle at hand helped motivate the student to continue learning the piece within the very tight timeframe that he was given. When he became discouraged and said that he was "making no progress at all" (O2), he was advised to listen to one of the earlier recordings and could see and hear that he had improved considerably.

The student made eight annotated recordings in total, and kept three in his iSCORE portfolio. Two of the annotated recordings, with comments, appear in the figure below (see Figure 4). The vertical yellow marks

indicate where annotations have been made, and when the recording is played back in real time, these annotations appear to the right.

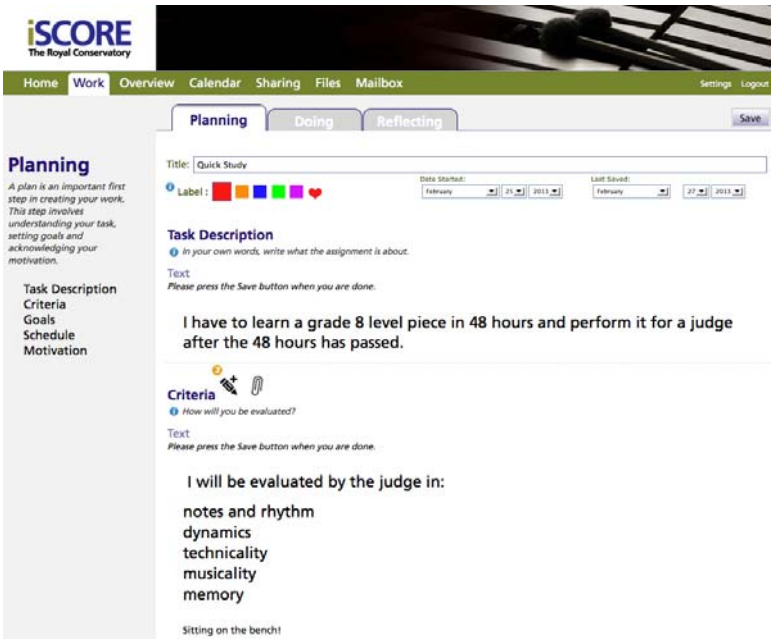


Figure 2. Planning page—task description and criteria.

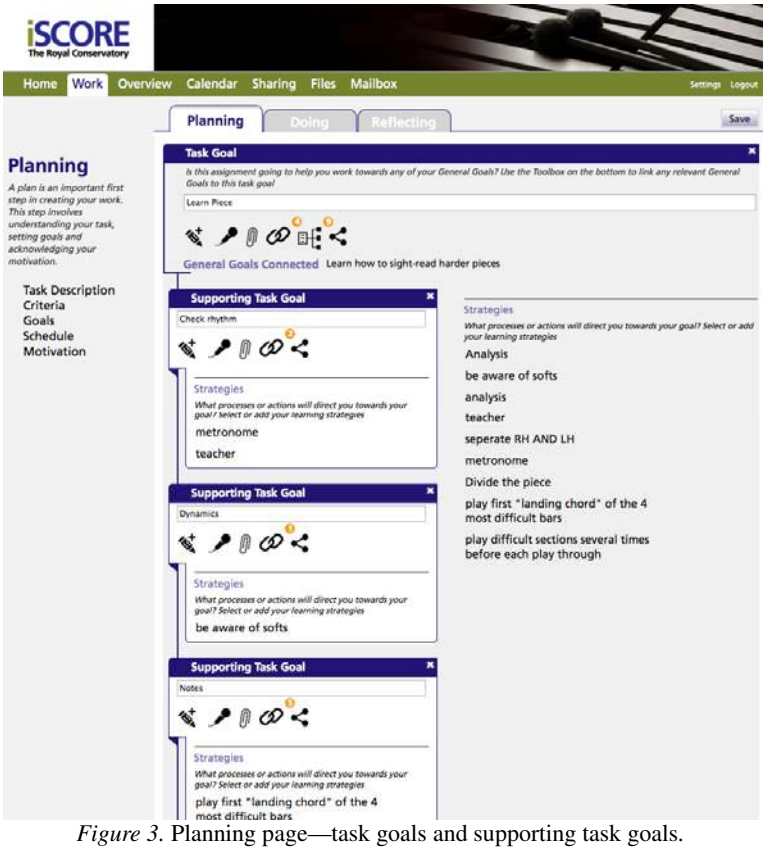


Figure 3. Planning page—task goals and supporting task goals.

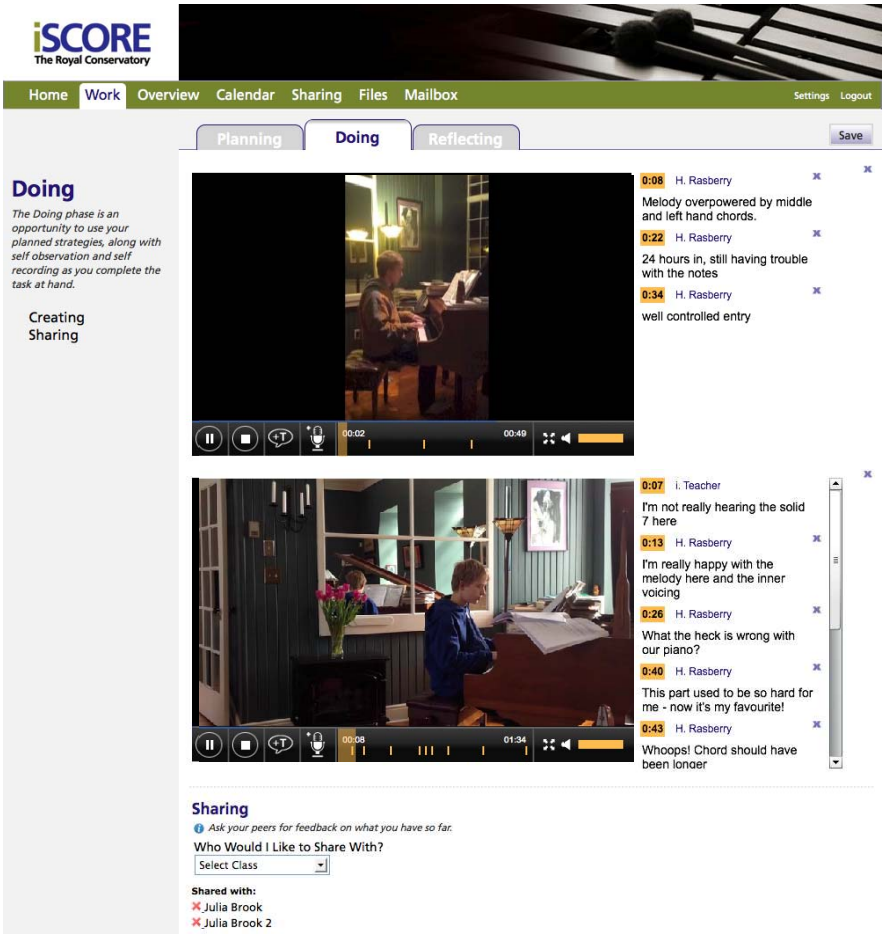


Figure 4. Two annotations of video recordings.

The student spent most of his iSCORE time using the annotation feature and checking back to the strategies section on the planning tab (see Figure 5). It was observed that he enlisted the strategies section when he was feeling that he was not making quick progress, or when his motivation to continue flagged. Remaining motivated to learn the piece was one of the most difficult aspects of the undertaking. On the evening of the first day, he considered dropping out of the class, stating, “Why am I doing this anyway? It’s just so stressful” (O1). When he was assured that he could still decline to perform, he approached the task with renewed vigour.

On the morning of the second day, his first performance was particularly good, and he was surprised to see that it had “improved in the night” (O2). One of the lessons learned through this process, was that leaving the piece for a few hours at a time (and sleeping!) made for better learning than continual practice for hours on end (see Figure 6).

Just before the performance on the morning of the third day, the student returned once more to his iSCORE portfolio to listen to the performances of the Bagatelle by other musicians. This gave him the opportunity to consider small changes in interpretation and dynamics and also assured him that he was ready for the performance. Indeed, the performance went very well; he sounded as if he had been playing the piece for months. In reviewing the post-performance interview, we were struck by his love for the music, and how much joy he experienced in performing a piece he had come to know in such a short period. In the months that have passed since the “quick study” took place, he has continued to play the Bagatelle.

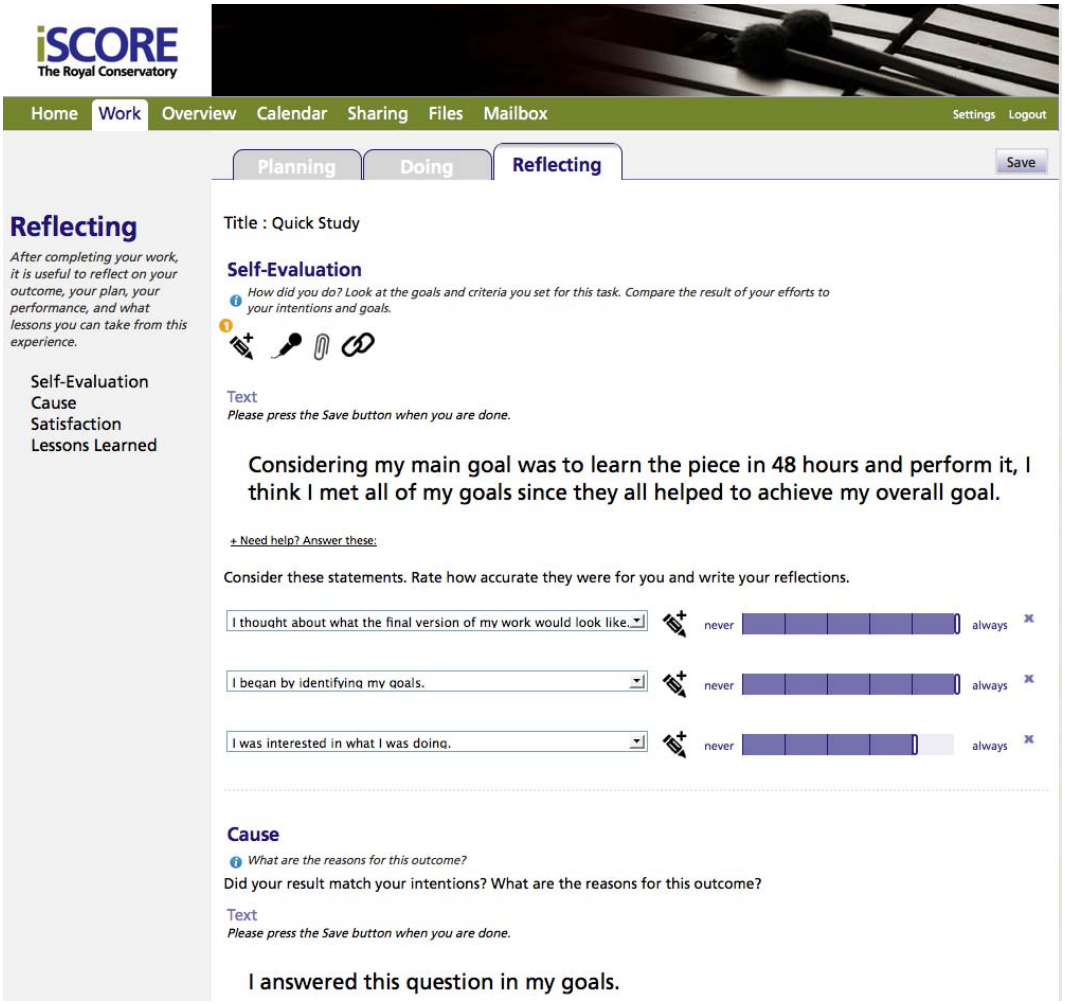


Figure 5. Reflections.

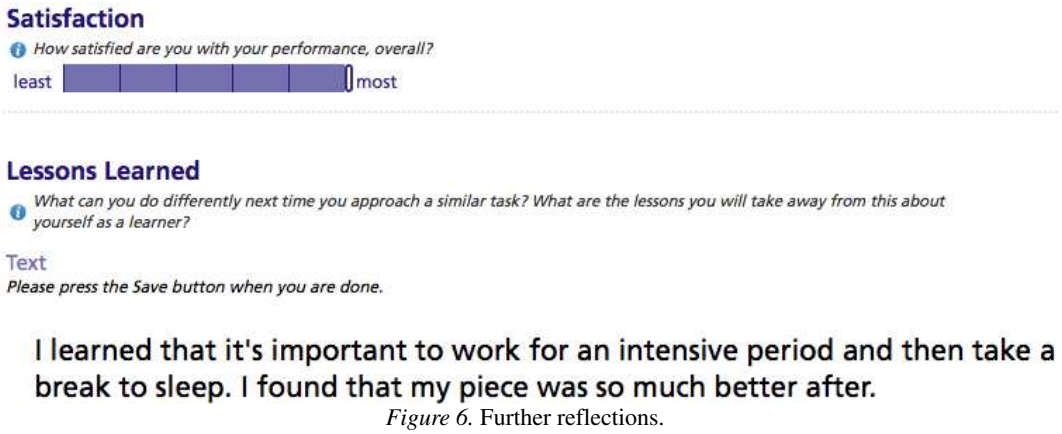


Figure 6. Further reflections.

When asked about the role that iSCORE played in his learning, he was able to articulate three important contributions that the portfolio made to his learning. The first was that he was able to track his use of strategies and refer to the strategy list when he needed a change in direction, something that we also observed during the practice sessions. The second was that the archived performances on the annotator provided him with the aural feedback he needed to improve the melody line and phrasing. Third, while he noted that, "I could have done all

of this using YouTube, Word, and my iPhone" (I1), he also acknowledged that, "With iSCORE, you can keep everything all in one place" (I1). He also made clear that the tool alone would not have given him the support he needed to learn the piece. The input from teachers as well as an impromptu performance for a group of adults late on the second day, was important, too, to the learning process. He also identified what he perceived to be some shortcomings of the tool. These included issues of sound quality on the built-in recorder, awkwardness in loading video, what he perceived to be an excessive amount of text and text boxes, and the inability to export his final work in an aesthetically satisfying form. However, the student also acknowledged that he understood iSCORE to be "for learning" and as a learning tool, iSCORE "does what it needs to do" (I1).

Interpretation and Conclusion

From the student's self-reflections on the portfolio itself, from verbal comments, and from the direct observations made by the researchers, it is apparent that iSCORE aided this student in accomplishing a challenging task. While it certainly would have been possible to learn the Tcherenpnin Bagatelle without the aid of iSCORE—as evidenced by the other students who learned the same piece for the quick study competition—iSCORE contributed to the process in positive ways. First, the tool helped the student remain motivated when his dedication to the challenge waned. Second, iSCORE enabled the student to critically assess his progress over the 48-hour period. By listening several times to the videotaped versions using the annotation tool, he was able to reflect on what aspects of the piece still needed work and where he was making clear improvements. Third, the annotation tool provided an archive of his progress over time. Fourth, iSCORE enabled the student to solicit feedback from the teachers when they were not physically present with him, thereby making it possible for him to ask for specific feedback during his practice sessions on a need-to-know basis. Fifth, iSCORE provided a virtual learning space that contained all of the student's planning, creations, practising sessions, and reflections in one location. Finally, by prompting the student to enter reflections about the learning, the student made observations and connections that he might not otherwise have made. For example, one of the important things that the student learned during the 48-hour period was the importance of punctuating dedicated practice sessions with breaks. He reports that continued to apply this principle in the time that has elapsed since the quick study took place.

Another development that has occurred in the time that has passed since the quick study exercise was undertaken is that the student has learned several new pieces of repertoire, among them another Tcherepnin Ballade from Opus 5. He has not, however, used iSCORE to help learn the new repertoire, at least not directly. iSCORE was an important tool for this student, an advanced musician, in approaching a new and particularly challenging task. But it is not a tool that he employs for regular practising where he has developed effective strategies that do not include the use of iSCORE. That said, the lessons learned through the quick study experience, including the use of particular strategies he learned in the process, are ones that he has continued to apply to new repertoire. In addition, after the quick study experience, he has made more use of other performances, comparing interpretations of other musicians in making his own musical choices.

Findings from this research also underscore the important role that transactional regulation, involving both self-regulated learning and regulation by plays in studio music instruction. At the time of the quick study competition, this student was highly motivated and already quite self-regulated as a musician. However, he also relied on the interactions between himself, the two available teachers, and the support of other musicians who served as audience in the process. Students develop self-regulation through the structured and purposeful

support of their teachers; that is, teachers who themselves model self-regulatory behaviours to facilitate student agency. This research also highlights the importance of having learning tools that support planning and provide ways of reflecting on sound, through sound.

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