

# Using ePEARL for Music Teaching: A Case Study

Rena Upitis, Philip C. Abrami, Julia Brook, Meagan Troop, & Laura Catalano

**Abstract** —The electronic portfolio, ePEARL, is one of a suite of web-based tools used to promote self-regulated learning. ePEARL has been used in classrooms in Canada, the United States, Portugal, and Australia. The present study focuses on another educational context: the private music teaching studio. The research reported here was designed to determine the extent to which ePEARL promoted self-regulated learning in private music lessons taken in addition to the music that is part of the school curriculum. Data were comprised of a pre-and post-study student questionnaire; studio observations; the e-portfolios themselves; and an exit interview with the studio teacher. The present paper creates a rich picture of how ePEARL was used by one student, although eight students and three teachers took part in the project. Overall, it was found that ePEARL was an effective way to archive musical interests and accomplishments. Further, students were able to solicit and incorporate feedback from their teachers, peers, and parents regarding their musical activities, and this feedback supported their learning strategies. Students enjoyed using the tool, and ePEARL was effective in helping set goals in the context of learning to play an instrument.

**Index Terms** — e-instruction, e-learning in face-to-face environment, music

---

## 1 INTRODUCTION

Often learning to play the piano is a mechanistic endeavor, leaving many students disengaged, disenchanted, and unlikely to continue to play after lessons are over. Even students who diligently take lessons throughout their schooling years do not necessarily play the piano for pleasure in their adult lives, becoming fundamentally disengaged from the lessons they took in their youth [1]. Part of the reason for this disengagement may be that students are rarely invited to take an active role in directing their music learning. Another possible reason is that learning to play the piano is not explicitly linked to other music-making activities students undertake, such as playing with a band, music they listen to on personal electronic devices, and music they share with their friends. As Lucy Green has stated, “Music education has had relatively little to do with the development of the majority of those musicians who have produced the vast proportion of the music which the global population listens to, dances

to, and enjoys [2, p. 5]. The research study described here documents the results of a teaching approach that was designed to close the gap between learning to play the piano in a studio context and other forms of music making, through the use of an electronic portfolio, ePEARL. This was accomplished in the hands of independent studio teachers open to a variety of creative ways of teaching and learning.

## 2 LITERATURE

### 2.1 Electronic portfolios and ePEARL

An electronic portfolio is a digital container for storing and organizing visual and auditory content, including text, images, video and sound. Electronic portfolios may also be learning tools when they are designed to support learning processes and assessment [3]. Further, electronic portfolios that are web-based provide remote access that encourages learning in any number of learning environments, making it easier for peers, parents, and educators to provide input and feedback in home settings as well as in the music studios themselves.

The use of portfolios has become commonplace, and even a requirement in some educational jurisdictions. Research has demonstrated that when students use portfolios, they assume more responsibility for their learning, better understand their strengths and limitations, and learn to set

- 
- *R. Upitis is a Professor of Arts Education at Queen's University, Kingston, ON, Canada E-mail: [rena.upitis@queensu.ca](mailto:rena.upitis@queensu.ca)*
  - *P. C. Abrami is the Director of the Centre for the Study of Learning and Performance, Concordia University, Montreal, QC E-mail: [abrami@education.concordia.ca](mailto:abrami@education.concordia.ca)*
  - *J. Brook is a doctoral candidate at Queen's University, Kingston, ON, Canada E-mail: [julia.brook@queensu.ca](mailto:julia.brook@queensu.ca)*
  - *M. Troop is a doctoral at Queen's University, Kingston, ON, Canada E-mail: [6mact@queensu.ca](mailto:6mact@queensu.ca)*
  - *L. Catalano is a graduate student at Concordia University Email: [I\\_catala@education.concordia.ca](mailto:I_catala@education.concordia.ca)*

goals [4]. Self-regulation refers to a set of mental behaviours that include monitoring, guiding, and evaluating one's own learning. Students who are self-regulated are active participants in their own learning [5] and may demonstrate better academic performance [6]. The active use of electronic portfolios not only contributes to a student's ability to self-regulate his or her learning, but may also enhance literacy and communication skills [7,8]. Another advantage of using electronic portfolios is that they provide a way of storing work that is less cumbersome than traditional music portfolios, a relevant aspect of the current study since the use of ePEARL enables students to self-assess their music making skills over time.

ePEARL serves as the core of a suite of learning tools called The Learning Toolkit because of its focus on developing student self-regulation. Three levels of ePEARL have been designed for use in early elementary (Level 1), late elementary (Level 2) and secondary schools (Level 3). In the present study, Levels 2 and 3 of ePEARL were used by the students in the studios to personalize their portfolios; set both general and task-specific goals; create new work; reflect, edit, and share work; and react to feedback from teachers, peers, and parents.

## 2.2 Metacognition and the arts

Self-regulated learning (SRL) is widely recognized as a core feature of metacognition. The extent to which a person recognizes what enhances his or her learning and how he or she consciously chooses strategies to learn more effectively marks the degree of self-regulation present in the learning process [5]. Three cyclical phases of SRL include both metacognitive and motivational components. The forethought phase includes task analysis, goal setting, and strategic planning. In the performance phase, attention, self-observation, and various task strategies are foregrounded. The third phase, self-reflection, includes self-judgment and self-reaction [9]. These three phases are embedded in the structures of the ePEARL tool under the titles *planning*, *doing*, and *reflecting*.

Researchers have demonstrated how the pursuit of music, visual arts, drama, and dance, guided by teachers well versed in self-regulatory practices and the arts, can support the development of students' self-regulation in arts education and beyond. Baum, Owen, and Oreck [10] determined that self-regulation in the arts includes paying attention, using feedback effectively,

problem-solving in a curricular context, asking questions, taking risks, cooperating, persevering, and setting goals. In a follow-up study, Oreck and his colleagues [11] found that the development of resilience, self-regulation, and general habits of practice, focus, and discipline transferred to other contexts when the teaching of self-regulatory behaviours was an explicit instructional objective.

## 2.3 Connecting informal music making with music lessons in the studio and music at school

Research about informal learning in music describes how musicians develop musical skills by learning from peers, or by listening to various recordings or clips [2, 12]. While much can be gained in this type of learning setting, there are definite limitations inherent in this type of learning approach. First, this approach requires learners to find available resources, time, and expertise in order to accomplish their educational goals. Second, this type of learning approach works best with students who already possess considerable knowledge within the domain, along with a level of maturity and self-regulation which would allow them to uncover relationships, patterns, and themes amongst the dense content to be covered. In order for informal learning environments to work effectively, learners must be able to structure and organize their work in a manner that enables them to hone their artistic craft with accuracy, consistency, and a strong sense of musicianship. In our experience, the web-based approach provided by ePEARL can enable students to find these relationships and patterns by interacting and supporting one another, along with the support of their studio teacher and parents.

But while ePEARL can support the informal music learning that goes on in students' lives—the music learning that includes improvisation in garage band ensembles or learning the lyrics and melodies of popular music—ePEARL can also support the formal instruction that students receive through private music lessons. Further, it can serve to link students' musical worlds, so that the music that they listen to on their personal entertainment devices is no longer separated from the practice that they do in the early morning at home as they learn to master an instrument.

Just what is private music instruction, also referred to as studio teaching, in the Canadian context? Studio teaching refers to learning to play an instrument through private

or studio lessons, one-on-one, with a music teacher whose practice includes a community of 15-20 students. In Canada, many of these teachers are registered with the provincial and regional branches of the Canadian Music Teachers Association, and have completed pedagogical and performance certification through The Royal Conservatory (RCM). Some are also associated with the public school system, but many are not. Many independent studio teachers prepare their students to play the piano through the RCM exam system.

One of the shortcomings of this system is the overriding emphasis on technique and repertoire, with little or no attention given to sight-reading, improvisation, composition, ensemble playing, and overall musicality. Nevertheless, some independent studio teachers successfully incorporate these latter aspects into their teaching, while also preparing students for exams. In so doing, these teachers help students set learning goals and objectives, and work more holistically with the students as developing musicians. It is this type of approach to studio teaching that most closely matches the goals of using ePEARL to enhance the studio experience through the development of self-regulatory strategies.

Yet a third form of music learning is what transpires in school music classrooms. Many music classrooms are structured around predetermined objectives, measurable outcomes, and a teaching approach that follows a top-down transmission model [13, 14]. These formal sessions are most often teacher driven in terms of repertoire selection, technical development, listening content, and performance venues [15, 16]. All too often there is a lack of interaction amongst the students in the inherently social setting that is the classroom. Students may develop musical competencies, but may still lack the specific musical skills for other types of music that interest them. Through their formal learning experience they may become disinterested in music and may not pursue it beyond this often mandatory formal education [17]. While the present study does not focus on the music classroom *per se*, the students taking part in the study were encouraged to weave their experiences with school music into their ePEARL portfolios so that the emergent picture includes all three types of music learning: informal learning with peers and friends, learning through private music lessons with the studio teacher, and learning music in the classroom.

#### **2.4 Creativity and the use of ICT in music**

##### **education**

Numerous studies have demonstrated that students' explorations in music can be enriched by the use of Information and Communications Technology (ICT) [18, 19]. A recent UK study by Ward [20] showed that music students were more inventive and motivated when they were given the opportunity to use ICT in their creative work. Ward found that as students created their compositions using MIDI technology and sequencing software, they could "hear the piece as it [was] being invented, [and] the creative process [was] made transparent. Pupils [were] motivated to continue by instant feedback, and [could] capitalize on spontaneous and accidental action" (p. 155).

In a study conducted by Savage [18], perceived benefits of using music technology, by students aged 11 through 16 years, included more active involvement in music making on the part of students, as well as an increase in pride, motivation, and enthusiasm for their music learning. In turn, changes in the curriculum were made by teachers to render it more stimulating and relevant. Other important findings focused on the ease with which students approached technology, new approaches students used in their compositions, and an increase in interest in pursuing further musical studies. Finally, Savage found that students' musical abilities were enhanced through the use of ICT, and that their creative processes flourished.

Despite the acknowledged benefits of using ICT in the music education context, it is not unusual to meet resistance on the part of music teachers as they begin to incorporate ICT into their teaching. There are two major causes of this resistance. First, tools like ePEARL support a student-centred and creative approach to music teaching, challenging the traditions of the practice as described in the previous section. In addition, teachers may struggle with using the technology itself, even though their students find the tools relatively easy to use.

Recognizing that ICT can be used to extend traditional approaches to music may mean embracing a cultural shift in music teaching. Indeed, some scholars have argued that to "move music education into the 21<sup>st</sup> century. Teachers need to ... embrace a new world of music performance and composition. This will be achieved as more teachers recognize the potential of new technologies to reach new musical content in new ways" [18, p. 74].

In order for ICT to be effective, teachers need to have ready access to technological

resources, receive appropriate technical support as they require it, and also have multiple opportunities to develop their professional skills [20]. The lack of such support can easily prevent teachers from being enthusiastic about including technology in their teaching practices. In the present study, all of the studio teachers received training on the use of ePEARL before using it with their students. In addition, the tool itself contains many multimedia tools and support materials designed for teachers and students.

Another issue identified by Crawford [19] and Sutherland et al. [21] is that students often have more fully developed ICT skills than their teachers because they have considerably more exposure to the web and to multimedia tools. They may also have easier access to mobile devices and music software, and have a different range of knowledge and awareness about musical styles than their teachers. In the hands of a teacher who is ready to capitalize on these student strengths, with the support of web-based tools, these student characteristics can serve to strengthen students' music-making activities, potentially engaging them more deeply in their studies and avoiding the pitfalls described in the introductory paragraphs of this paper—namely, treating the learning of a musical instrument as a mechanistic endeavour and becoming entirely disengaged from the process during lessons and in later years.

## 2.5 Research questions

We had four research questions, all of which we explored with three independent studio teachers and a sample of their students. For the purposes of the present case study, detailed descriptions are only given for one student's work, although eight students overall were involved in the study.

The research questions pertaining to the case study are as follows: (a) How did a student and her music teacher use ePEARL to support music learning over a six-month period? (b) How did the student use ePEARL for other aspects of her music making, including informal music learning and school music? (c) How did the student communicate with her parents, peers, and teachers using the ePEARL tool? and (d) To what extent did the student become more metacognitively engaged as a result of taking part in this creative pedagogical approach?

## 3 METHODOLOGY

### 3.1 Selection of the studio teacher

Based on the review of the literature, it is apparent that the pedagogical approach embedded in the ePEARL tool is one that fosters student-directed learning. Thus, the main criterion for selecting the studio teachers for the study was that they would be willing and able to explicitly teach SRL skills. Another criterion was that the teachers would be willing to learn to use the ePEARL tool, and then apply it creatively in the studio setting.

One of the universities involved in the study, Queen's University, is located in Kingston, Ontario. For this reason, we selected Kingston as the city in which the study would take place. In addition, Kingston has an active music community: there are approximately 30 music teachers registered with the local music association.

After describing the study to the Chair of the Kingston Branch, several potential participants were identified. One of these teachers began working with ePEARL with her students in January, 2010, with two others beginning in April, 2010. All three teachers will continue for the 2010–2011 academic year. In this first phase of the study, eight students took part.

The present paper focuses on the teacher who first began using ePEARL in her studio, and her interactions with one of her students, a nine-year-old girl best described as an advanced beginner. Other participants in the case study included the mother of the student, colleagues of the studio teacher, and the studio music teacher herself.

### 3.2 Data collection

Several sources of data were used to describe the case study. Most important was the portfolio itself. Portfolio data included (a) the student-teacher-parent-peer interactions on the home page and throughout the portfolio, (b) the recorded artifacts of the student's playing over a six-month period, (c) the recorded demonstrations by the studio teacher, (d) photographs and scanned documents related to the student's music-making both within the context of lessons as well as music-making at school and at home that was not specifically related to the lessons, and (e) the student's self-declared general goals, specific strategies, reported motivational levels, and reflections contained throughout the portfolio.

Studio observations were also made by one of the authors of the paper. These observations occurred twice a month over a six-month period. During these observational sessions, the researcher interacted informally with the teacher and student, asking to see various parts of the portfolio, and listening to the lesson. These observations were captured through field notes and still photography.

A third source of data was the administration of the Student Learning Strategies Questionnaire (SLSQ), developed by members of the Centre for the Study of Learning and Performance (CSLP) at Concordia University [22] and used in several previous research studies. The Student Learning Strategies Questionnaire (SLSQ) was designed to validate the occurrence of self-regulation processes and portfolio use as observed in classrooms and studios. The SLSQ contains several open-ended questions and 20 close-ended Likert scale questions designed to determine the use of self-regulatory strategies based on Zimmerman's research [5] (see Appendix A). The SLSQ was administered before the study began and again at the end of the six-month period.

The final source of data were two interviews, one with the parent of the child in the case study, and the other with the studio teacher (see Appendix B). Interview questions were constructed around two general themes: the technical use of the ePEARL tool and the effectiveness of the tool as a vehicle for enhancing music-making experiences. The parent and teacher were interviewed individually by one of the researchers, and the interviews were transcribed verbatim for analysis.

### 3.3 Data analysis

The analysis took place in two phases. First, we focused on how the group of eight students used ePEARL for musical activities. This included using ePEARL to archive their works as well as the ways in which they solicited and incorporated feedback from teachers, peers, and parents through the use of the web-based tool. As a result of this first phase of analysis, the authors selected one student's portfolio to highlight for the purposes of the case study. This portfolio was selected because it contained examples of all of the ways in which the portfolio was used across the student body, and had the most fully developed teacher-parent-student interactions available for analysis. The portfolio analysis was supplemented by field

note observations, interview data from the teacher, and informal comments made by the mother of the student in the portfolio and during lessons.

In examining the portfolio, we analysed each artifact related to the music lessons themselves, as well as the artifacts relating to music that the student listened to for pleasure, her music activities at school, music she shared with peers, and her ensemble choral performances.

We also explored the extent to which all of the students involved in the project enjoyed using the tool, and whether the use of ePEARL helped students set their own goals in the context of learning to play an instrument.

Qualitative data were analyzed by the researchers according to established protocols [23].

## 4 FINDINGS

The findings are discussed in terms of the four research questions outlined earlier in the paper.

### 4.1 Use of ePEARL to support learning in music lessons

One of the key features of ePEARL is that students are expected to set general learning goals for an extended period of time. In the portfolio that is being highlighted for the purposes of the present paper, the student set five general goals: (a) do my first exam in June, (b) learn more pop songs, (c) do more theory, (d) sing in the festival, and (e) make up some music. Of particular relevance is the student's first goal, as it was in the context of exam preparation that the portfolio was utilized most by the student and her teacher.

There were three distinct ways in which the portfolio enhanced the music lessons. First, the teacher used the homepage, nearly every lesson, to communicate with the student regarding the weekly assignments. In addition, she set mid-week expectations for the student, indicating when she would be checking the portfolio between lessons. In this manner, the student and teacher wrote back and forth to one another between lessons. In addition the student's mother used the homepage to communicate with both the teacher and the student. This involvement on the part of the parent was welcomed by both student and teacher, as it enabled the student to progress more quickly than without the support of the portfolio. In the words of the teacher, "I also use the

[feedback] feature to e-mail with Elza's mother (who is very supportive of Elza's ePEARL use). We use this feature to communicate about what has been worked on in both the lesson and at home. This is similar to a paper and pencil dictation book, but seems to be a medium that Elza's mother and I find easier to use."

The second way that the student and teacher used the portfolio to support lessons was through the use of teacher-recorded demonstrations. As the student began to learn her exam repertoire, the teacher made sample recordings of the music the student was to learn. Sometimes these recordings were of an entire piece of music. At other times, the teacher simply played a phrase or passage that the student found challenging. Then, the student could listen to these demonstration segments as she practiced during the week.

The third function of the portfolio in support of music lessons was as a recording tool for the student. As soon as the student was able to play portions of a piece, she created an "artifact" for the piece. The artifact included specific goals related to the piece of music, as well as strategies she planned to use in completing the task. The student was also able to indicate how motivated she was to learn each piece, how difficult she thought the task would be, and how likely she was to perform the piece well. The artifact also included a recorded segment of the piece. These recordings were most often made with the built-in ePEARL recorder (14/19 recordings used the built-in recorder). However, the student sometimes used recording devices such as the GarageBand software, an iPod, or a Flip recording device, the latter of which produced both an audio and video record of her playing. That said, these devices were used less frequently than the built-in recorder because they involved an extra step or two and required more memory space.

Once the student created an artifact for each of her pieces, she made recordings of subsequent versions as the term progressed. This enabled her to listen to how her playing had evolved, and proved to be especially useful when she became discouraged, thinking that she was not progressing as quickly as she wished. Another enabling function of making recordings was that the student did not wish to add a recording to her portfolio that was not of high quality. Thus, she would often practice the piece of music six or seven times before making a recording—more often than would have been

the case had she not had the incentive to provide a good recording for her teacher. As the teacher noted in the interview, "Elza doesn't simply record any old thing and post it. Rather, she practices a passage until it's her best and makes sure that she has a recording that represents her best playing."

#### **4.2 Use of ePEARL to support other aspects of music making**

All of the students involved in the study were encouraged to bring a broad variety of their music interests to the portfolio environment, so that their formal piano lessons were no longer separate from the music they listened to on their MP3 players and iPods. Consequently, many of the students created folders of their favourite music selections, often linking the selection with a YouTube video. The student involved in the case study created such a folder, and archived pieces that she enjoyed at the beginning of the term. Once archived, the artifacts were rarely accessed by the student. However, her peers and parents examined the pieces in the folder and commented on the music. As Elza's mother noted, "I had no idea what Elza was listening to on the radio and on YouTube. By examining her portfolio, we were able to engage in discussion about the music that she likes most—as well as talking about the appropriateness of the lyrics!"

There were other ways that the portfolio was used for archival purposes for music unrelated to private lessons. For example, a scanned copy of a Christmas Choral Concert was added as a document, as were scanned versions of practice sheets from earlier lessons. Photographs of the student playing the piano with her teacher were also archived.

Two more active uses of the portfolio, not related to music lessons, were also employed. First, the student was attempting to learn a piece of choral music for her school choir. She entered the lyrics for the piece into her portfolio, and then made several recordings to help her refine her singing. At one point, her mother (a singer) sang portions of the song in duet, and both mother and daughter reflected on how enjoyable the process had been, and that they would not have undertaken such a process without the support of the portfolio. She wrote in the portfolio, in response to her daughter's reflection, "I agree—it was VERY fun to do. And I love knowing that we can listen to you sing this again and again. You have such good pitch and clear tones, it's a real

pleasure to listen to you sing solo. I like your version much better than the YouTube one that you've linked to the URL on your school music folder."

Another active use of the portfolio was with the student's brother, also a musician with a portfolio of his own. One afternoon, the two siblings spent several hours creating a composition with GarageBand, and this piece was archived in both children's portfolios.

#### **4.3 Communication between the student and peers, parents, and teacher**

One of the most powerful uses of the portfolio was as a means of communication amongst students, teachers, parents, siblings, and peers. Students involved in the project used the portfolio to set goals with their teacher, to reflect on their learning, and to document the strategies that helped them to achieve success. Because the portfolio has features that mirror a social networking system, the students were attracted to using the system, and shared their work and interests with other musicians, as indicated in the example above where a brother and sister worked jointly on a composition and shared it across their portfolios. Like other social networking systems, students have the ability to choose with whom they will share their work, and can decide to share some or all of their artifacts with some or all of their friends.

Because ePEARL is a web-based tool, independent studio teachers involved in the project, as well as parents and students, reported that it was easy to access the tool and use it conveniently in the studio, in the office, and at home. As predicted by the literature, students found it relatively easier to use the tool than adults. But the adults quickly became adept at using the tool, especially when they enlisted the help of the students and as they became convinced of its value in the studio context. As noted by one of the studio teachers, "I found ePEARL to be pretty straightforward to use. You need to spend a little time acquainting yourself with the features and the vocabulary, which is true of all software."

The parent of the student described in the case study reported that her involvement with her child's music lessons was more meaningful and frequent when ePEARL was introduced as a learning tool. While the parent had always monitored her child's practicing, she became more aware of the intricacies of her learning and was able to support her learning more directly as a result of the tool, offering specific strategies when

her child encountered difficulties or felt unmotivated to try an exceptionally difficult assignment.

The studio teacher reported that she came to rely more on the ePEARL tool as the term progressed, particularly when she had to travel for several weeks at a time and was unable to give the weekly lessons. When the teacher was away, she interacted regularly with the case study student through ePEARL, providing assignments and feedback through the various features of the portfolio.

Finally, it should be noted that the studio teachers, students, and parents came to use ePEARL almost exclusively as a communication tool, replacing email and telephone conversations with ePEARL communications. While email was still used occasionally, having a way to communicate through the portfolio itself meant that the portfolio came to be used for communications of all forms, including simple matters like changing lesson times.

#### **4.4 Metacognitive engagement and a general music education**

Perhaps the most promising finding in the case study was the degree to which the use of ePEARL engaged the student more deeply in the practice of learning to play an instrument. Indeed, the very act of being asked to set general goals for the term motivated the student to decide to practice for an exam on her instrument, something she had previously not been interested in attempting.

In comparing the pre-study and post-study results on the SLSQ, it became apparent that what had been observed in lessons and on the portfolio itself, regarding motivation and the ability to set goals, was also reflected in the student's own assessment of changes in her abilities. Both her teacher and her mother noted that she became more willing and more able to engage in discussions around strategies for learning to play difficult passages in her music. One of the reasons that this may have occurred was that the reflections offered by both parent and teacher offered clear directions for how to proceed, and continually supported the student in her endeavors.

The studio teacher noted the potential for both broadening and deepening music education through ePEARL. She stated, "I've always wondered how I can balance a general music education, including composition, history, and theory, with the specifics of developing piano technique. In

the past, I've had students make posters about their pieces, or research a composer. I've had more difficulty working improvisation and composition into the lesson. While time and interest still remain issues, I think that ePEARL may be part of a solution. In the future, I would like to get my students to develop an ePEARL artifact that's history-based using web resources. The ePEARL artifact can provide a place where students can feature their ideas and can also share them with others in the studio. Similarly, using music software may help in the composition process and ePEARL can be the interface that supports this."

## 5 CONCLUSIONS

The ePEARL portfolio enabled students to archive their work through various recording features, which in turn enabled them to listen to how their playing evolved as the term progressed, making critical reflections and changes to their playing as a result. They also used the portfolio to effectively set goals with their teachers—often during the lesson but also during the week between lessons. Because the portfolio has features that mirror a social networking system, the students were attracted to using the system, and shared their work and interests with other musicians. In addition, because the students were encouraged to bring all of their music interests to the portfolio environment, so that their formal piano lessons were no longer separate from the music they listened to on their MP3 players and iPods.

Even though there was universal praise for the ways in which ePEARL enhanced music teaching and learning, teachers, students, and the mother of the case study student all identified ways that ePEARL could be enhanced for use in the music studio context. These included a more interactive chat function, a way of date-stamping or flagging new additions to the portfolio, and adding a video annotation feature to the tool. These suggestions, and others, will be incorporated in the next phase of ePEARL design.

Perhaps the most promising aspect of using ePEARL to support music learning was that it appears to serve as a tool that allows a community of learners to form around their shared musical interests. In that context, the data indicated that students were able to develop skills that suited and challenged their musical tastes and interests in an enriched learning environment, which in turn fed their interests in music. This web-based tool also

allowed for the emergence of new musical ideas, as evidenced in the peer improvisations. Equally important was the fusing of the informal with the formal, yielding both a rich archive and rich learning process for music-making.

## 6 APPENDICES

### 6.1 Appendix A: Student Learning Strategies Questionnaire

This questionnaire is part of the study that you have been involved with this year with your piano teacher. We would like to know more about how you are learning. This questionnaire will help us learn about the strategies you are using during lessons and at home to develop your musicianship.

Please answer the following questions. There are no right or wrong answers. Your answers are confidential (no one that you know will be told what you answered). Your experiences and opinions are important, and will help us understand your point of view.

#### Part 1: Personal information

- *Name:*
- *Gender:* Boy \_\_\_\_\_ Girl \_\_\_\_\_
- *Piano level:* \_\_\_\_\_
- *Years taking lessons:*
- *Other instruments I play:*

#### Part 2: Music lessons

Please circle the best response when answering the questions (the actual questionnaire has a five-point Likert scale that is not reproduced here, including the responses *strongly disagree*, *disagree*, *undecided*, *agree*, *strongly agree*).

#### In my piano lessons...

1. I set my own learning goals (I decide what I need to learn).
2. I set my own process goals (I list what I need to do to achieve my goals).
3. I identify strategies for achieving my goals.
4. I revise my goals when necessary.
5. I really want to learn to play the piano.
6. I can describe what my music teacher wants me to do when I finish the lesson.
7. I can list the steps that will help me complete my work.

8. I check my progress towards achieving my goals.
9. I modify (correct) my actions on my own to achieve my goals.
10. I change (correct) strategies that are not helping me achieve my goals.
11. I give feedback to other people who play the piano.
12. I use feedback from my piano teacher to improve on my playing.
13. I use feedback from other people who play the piano to improve my playing.
14. I reflect on the strategies I use to achieve my goals.
15. I evaluate my own playing (I listen carefully to see if it is good or needs improvement).
16. I know how I am being evaluated.
17. I make connections between the amount of time I spend on the piano and how well I play.
18. I work well with other music students.
19. I use feedback from my family to improve my playing.
20. I practice regularly to improve my playing.

### Part 3: Open ended questions

*Space was provided for open-ended answers to the following questions:*

1. I liked using ePearl in because...
2. I did not like using ePearl because...
3. ePearl helped me learn how to...
4. I would like to use ePearl again next year because...
5. I do not want to use ePearl again next year because...
6. What I liked the most about using ePearl is...
7. What I liked the least about ePearl is...

### 6.1 Appendix B: Excerpts from the studio teacher exit interview protocol

The goal of this interview protocol was to explore how ePEARL was used by the studio music teacher as well as how the use of ePEARL impacted the studio music teacher's understandings of SRL, and how they taught aspects of SRL and the portfolio process.

1. If you were to sum up your use of ePEARL with your students this year in a few words, how would you describe it?
2. What were your expectations about using ePEARL this year?
3. What did find was most valuable about using ePEARL?

4. What did you find the most frustrating or difficult?
5. How long have you been teaching with ePEARL?
6. Does using ePEARL influence your studio teaching in any way?
7. How has your use of ePEARL changed since you first started?
8. What was different in your studio practice this year as a result of using ePEARL?
9. Could you give an example of how you used ePEARL in your studio this year?
10. Did ePEARL help you work towards particular curricular goals?
11. Could you describe some goals you have or current areas you are working to improve in your teaching? Does teaching with ePEARL help you move towards any of these goals?
12. Can you talk about your level of comfort with the technological aspects of ePEARL? The pedagogical aspects of ePEARL?
13. What did you like about the ePEARL software? What did you dislike?
14. What would you say is the most important thing for a new user to have in order to successfully integrate ePEARL in their studio teaching? (materials, supports, training, networks, etc.)
15. Is there anything else that you would like to add about using ePEARL with your students this year?

### 7 ACKNOWLEDGMENTS

The authors thank the studio teachers and their students who took part in the research, as well as Ingrid Astudillo, Wynnpaul Varela, and Yuxi Zhang, three of the graduate students who contributed to the literature review. This work was supported in part by a Standard Research Grant from the Social Sciences and Humanities Council of Canada, by the Royal Conservatory, by Concordia University, and by Queen's University.

### 8 REFERENCES

- [1] R. Uptis. *This Too is Music*. Portsmouth, NH: Heinemann, 1990.
- [2] L. Green, *How Popular Musicians Learn: A Way Ahead for Music Education*. Burlington, VT: Ashgate, 2002.
- [3] P.C. Abrami and H. Barrett, "Directions for Research and Development on Electronic Portfolios," *Canadian J. of Learning and Technology*, vol. 3, no. 1, pp. 1–15, Mar 2005.
- [4] B. Riedinger, "Mining for Meaning: Teaching Students How to Reflect," *Handbook of research on e-portfolios*, A. Jafari and C. Kaufman, eds., Hershey, PA: Idea Group, pp. 90–101, 2006.

- [5] B. J. Zimmerman, "Attainment of Self-regulation: A Social Cognitive Perspective," *Self-regulation: Theory, Research, and Applications*. M. Boekaerts, P. Pintrich, and M. Zeidner, eds., Orlando, FL: Academic Press, pp. 13–39, 2000.
- [6] D. Rogers and K. Swan, "Self-regulated learning and Internet search," *Teachers College Record*, vol. 106, no. 6, pp. 804–824, Dec. 2004.
- [7] E. Meyer, P.C. Abrami, A. Wade and R. Scherzer, "Electronic Portfolios in the Classroom: Factors Impacting Teachers' Integration of New Technologies and New Pedagogies," *Technology, Pedagogy, and Education*, submitted for publication.
- [8] A. Wade, J. Sclater, & P.C. Abrami, "An Electronic Portfolio to Support Learning," *Canadian J. of Learning and Technology*, vol. 31, no. 3, pp. 33–50, available at <http://www.cjlt.ca/index.php/cjlt/issue/view/13>, 2005.
- [9] B. J. Zimmerman and K. E. Tsikalas, "Can Computer-based Learning Environments (CBLEs) be used as Self-regulatory Tools to Enhance Learning?" *Educational Psychologist*, vol. 40, no 2, pp. 267–271, Feb. 2005.
- [10] S. Baum, S. Owen, and B. Oreck. "Transferring individual self-regulation processes from arts to academics," *Arts Education Policy Review*, vol. 98, no. 4, Oct. 1997.
- [11] B. Oreck, S. Baum, and H. McCartney, "Artistic talent development for urban youth: The promise and the challenge," *Champions of Change: The Impact of the Arts on Learning*, 76. Washington, D: The Arts Education Partnership, The President's Committee on the Arts and Humanities, 1999.
- [12] S. Jaffurs, "The Impact of Informal Music Learning Practices in the Classroom, or, How I Learned to Teach from GarageBand," *International J. of Music Education*, vol. 22, no. 3, Oct 2004.
- [13] L. S. Siskin, "Outside the Core: Accountability in Tested and Untested Subjects," *The New Accountability: High Schools and High-Stakes Testing*, R. Elmore and L.S. Siskin, eds., New York: Routledge, pp. 87–98, 2003.
- [14] H. Gaunt, "One-to-one Tuition in a Conservatoire: The Perceptions of Instrumental and Vocal Teachers," *The Psychology of Music*, vol. 36, no. 2, June 2008.
- [15] R. Kennell, "Systematic Research in Studio Instruction," *The Handbook of Research in Music Teaching and Learning*, R. Colwell and C. Richardson, eds., New York: Oxford University Press, pp. 243–256, 2002.
- [16] J. Sloboda, "Emotion, Functionality, and the Everyday Experience of Music: Where Does Music Education Fit?" *Music Education Research*, vol. 3, no. 3, pp. 243–252, Oct. 2001.
- [17] W. Bowman, "Educating musically," *The Handbook of Research in Music Teaching and Learning*, R. Colwell and C. Richardson, eds., New York: Oxford University Press, pp. 63–84, 2002.
- [18] J. Savage, "Reconstructing music education through ICT," *Research in Education*, vol. 78, no. 1, Feb. 2007.
- [19] R. Crawford, "Secondary School Music Education: A Case Study in Adapting to ICT Resource Limitations," *Australian J. of Educational Technology*, vol. 25, no. 4, pp. 471–488, Sept. 2009.
- [20] C. J. Ward, "Musical exploration using ICT in the middle and secondary school classroom," *International J. of Music Education*, vol. 27, no. 2, pp. 154–168, May 2009.
- [21] R. Sutherland, V. Armstrong, S. Barnes, R. Brawn, N. Breeze, M. Gall, S. Matthewman, F. Olivero, A. Taylor, P. Triggs, J. Wishart, and P. John, "Transforming Teaching and Learning: Embedding

ICT Into Everyday Classroom Practices," *J. of Computer Assisted Learning*, vol. 20, no. 4, pp. 413–425, Oct. 2004.

- [22] P. C. Abrami and O. Aslan. *The Student Learning Strategies Questionnaire (SLSQ)*. Montreal, QC: Centre for the Study of Learning and Performance, Concordia University, 2007.
- [23] M. Patton, *Qualitative Research and Evaluation Methods (3<sup>rd</sup> ed)*. Newbury Park, CA: Sage, 2002.



**Rena Upitis** has degrees in Psychology (BA 1980), Law (LLB 1981), and Education (MEd 1982, EdD 1985). She is a musician (ARCT, Piano Performance, 1975; ARCT Vocal Performance 1993) and holds a diploma in Architectural Technology (2006). She served as a Postdoctoral Fellow at the Massachusetts Institute of Technology (MIT) from 1984-1986, before securing her current position at Queen's University where she has been a Full Professor since 1995. She has received several Canadian and US best paper awards and has had over \$4 million dollars in research funding from government, foundations, and businesses. She has authored or co-authored six books and has published over 50 papers in peer-reviewed journals. Her most recent book, *Raising a School* (2010) is published with Wintergreen Studios Press.



**Philip C. Abrami** has degrees in Social Psychology (AB Honors 1972, MA 1975) and Social/Instructional Psychology (PhD 1978). He is a Concordia University Research Chair and the Director of the Centre for the Study of Learning and Performance. His awards include: CADE Award of Excellence in Research, the W.J. McKeachie Career Achievement Award, the Vineberg Research Prize in Psychology, and the CSSHE Research Award. He has authored several books and has published dozens of book chapters and journal articles in leading educational and psychology journals. His current work focuses on research integrations and primary investigations in support of applications of educational technology in distance and higher education, in early literacy, and in the development of higher order thinking skills.

**Julia Brook** has an MA in Music (2007), as well as a Masters in Piano Performance and Literature (2001). She also has a teaching degree (BEd 2003) and an undergraduate degree in music (BMus 1999). She is a third year doctoral student at Queen's University.

**Meagan Troop** has a Masters in Curriculum Studies (MEd 2008), a teaching degree (BEd 2003), and an undergraduate degree in music (BMus 2002). Meagan is a first year doctoral student at Queen's University.

**Laura Catalano** has a degree in Psychology (BA 2008). She is currently a Concordia University graduate student, completing her Masters in Educational Technology.