Hitting the right notes

New lab sets its sights on getting kids to stick with piano lessons

By Lisa D'Innocenzo

The scenario is familiar to many parents: after shelling out loads of cash for their child's piano lessons for the past year, the little one decides she's had enough. She drops out, and the piano in the living room is transformed into a dusty retreat for knickknacks that can't seem to find a home elsewhere.

Gilles Comeau, director at the Piano Pedagogy Research Laboratory which officially opened its doors last October, hopes to ultimately eradicate this tendency to quit.

Director Gilles Comeau officially opens the Piano Pedagogy Research Laboratory in October 2005.

"We are studying ways in which piano teaching can be more efficient and more successful for a larger portion of the population," he says. "Statistics show that the majority of students that begin piano lessons will drop out before they master the instrument, so in the very early stages."

Comeau believes the Ottawa-based lab is unique for a couple of reasons. First, there is not a tradition of scientific research in the field of piano pedagogy, which touches on various subject matters including piano performance, education, cognitive psychology, neuroscience, physiology and more. "What we did here was establish in a music department [at the University of Ottawa] a real scientific lab that benefits from the collaboration of many researchers in all scientific fields," explains Comeau, who has two years of post-graduate studies in piano pedagogy, a PhD in the foundations of music education, and a masters in education.

How does the lab work? Comeau explains that strategically placed cameras detect motion in players, while infrared sensors in the lab's two Disclavier grand pianos serve up a reading of the type of sound action produced on the keyboard. "We can look at all aspects of music playing—volume, duration, wrong notes, articulations and expressions. All of that can be studied."

timing in piano performance with a Vicon 3D motion capture system that tracks the movement of small reflective globes affixed to a player's hands, arms and head. The resulting data is used to investigate how technical movements are produced.

Along with finding a more "beneficial" and "efficient" teaching method to keep youngsters interested in piano, the lab will also attempt to solve several other pressing issues facing the discipline. Comeau, for instance, has a suspicion that some children might suffer from musical dyslexia that hinders their capacity to pick up the instrument. "In the last few decades, there has been a lot of research done to understand text reading dyslexia and schools are now better equipped to help those children," he notes. "We know very little about musical dyslexia. For now, we can only assume that the same kind of difficulty exists in the piano studio."

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As well, a psychometric scale has been created to measure motivational levels of students, in order to determine a correlation between desire and depth of involvement in piano studies. This research will include a cross-cultural analysis, including results from Canada, the U.S., Finland and China.

Meanwhile, another study specifically analyzes movement, force and

The lab also hopes to improve health problems that can stem from performing a repetitive physical activity, often under stress and tension. (These are similar problems to those experienced by people who sit at a computer for days on end.)

According to recent research, over 65% of musicians have medical problems and almost 17% of students will suffer pain related to playing the piano. The lab director believes these troubles stem from a player's early days of piano studies, but that they actually occur later on, when the student spends longer bouts of time practicing. "It's the way they approach the piano—the posture, the tension they have in their body when they play—and that is often in place in the early stages of music lessons."

To examine this, the lab is developing an electronic "Teacher Assistant" which measures the three-dimensional displacements of a student's upper body, arms and hands. This information is then keyed to the tactile and musical results provided by Musical Instrument Digital Interface (MIDI) data gleaned from the infrared sensors in the piano. In the end, researchers are able to achieve a quantitative assessment of the relationship between movement and quality of performance. Infrared thermography,

meanwhile, analyzes the impact of practicing on various parts of the body, by detecting very small changes in skin surface temperature, which can be related to inflammation or stress on the neuromuscular tissue.

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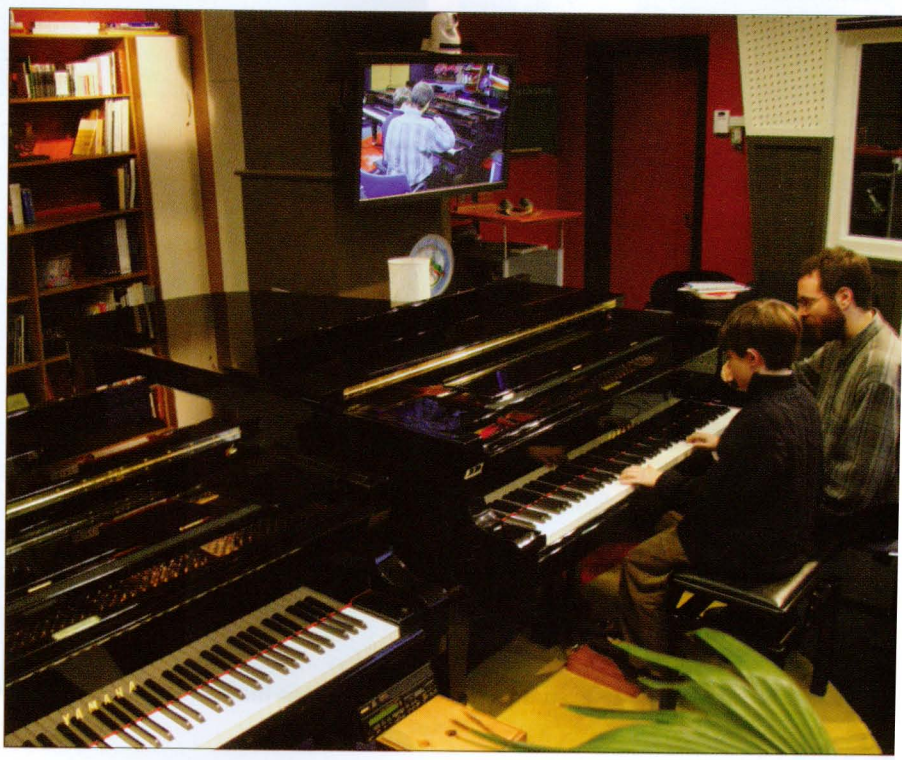
Another primary objective of the lab is to scrutinize the impact of distance learning. One of the university's graduate students has been teaching piano to eight Inuit children based in Kangiqsualujjuaq, Northern Quebec via broadband videoconferencing equipment. And Comeau himself is conducting an experiment with students in Finland, with special high-tech equipment. Sensors on his piano are connected through a special phone line to their instrument oversees, so that when he strokes the keys, the piano at the other end repeats his actions "like a ghost." This overcomes any sound transmission distortions, he says.

To support the distance education, researchers are utilizing "capturing and annotation" tools and methods based on MIDI and current video streaming formats, video indexing and linked audio and video material, as well as computational video analysis of hand movement. Using ACT-R cognitive architecture (a theory for simulating and understanding human cognition), they are also building cognitive models of piano learning.

So far, since its inception, the lab has mainly focused on developing the aforementioned measuring tools. "We have been experimenting with a lot of the equipment to see what can be used and what can be tested and we have been developing various measuring scales," explains Comeau. "This is a long and interesting process, because it opens up the ground for many types of research."

The lab's work has been made possible through $1.3 million in start-up funding—40% from the Canadian Foundation for Innovation, another 40% from the Ontario Innovation Trust, and 20% from the university and from companies like Yamaha in the private sector. But Comeau says that funding remains a challenge, and that he is looking at foundations, as well as private investors, for future support.



The studio uses high-end electronics and video technology to achieve quantitative assessments of the relationship between movement and quality of performance.

He adds: "Of the money available for research, the majority goes to the medical and scientific fields. In the humanities, there is a very small amount of money available, and it is hard to get."

In addition, the lab faces a stigma because the discipline of piano pedagogy is not often associated with scientific study, he admits. "Musicians are looking at us with interest and fascination, but also suspicion at times, and scientists often see us as musicians without a strong training in a specific scientific field.

"Even in the beginning, when we talked about implementing a piano lab, everyone was very surprised that the arts faculty would apply for a lab—the fact that the application came specifically from a music department made it seem very unlikely. So we always have to show that good research can be conducted in music and the education field."

Regardless of the obstacles, Comeau is determined to carry on, particularly since research has proven that piano, along with swimming, is the extracurricular activity most preferred by parents. And he doesn't want them to waste their money. LB