

KEYS TO SUCCESS

UNIVERSITY OF OTTAWA RESEARCHERS MAKE LEARNING TO PLAY THE PIANO MORE SUCCESSFUL THROUGH THE ANALYSIS OF TEACHING TECHNIQUES.

By Tim Lougheed



PROJECT

Few musical performances compare to watching an accomplished pianist warm up by whisking through several scales. But such an intricate ballet of fingers, hands, and arms sounds a warning for University of Ottawa music professor Gilles Comeau [1].

Comeau and his research colleagues strongly believe that scales and similar technical drills are among the most physically taxing of piano exercises. After carefully analyzing detailed multimedia of pianists' movements—including infrared scans that reveal the stresses imposed on muscles and joints—Comeau and biomedical engineers Monique Frize and Christophe Herry found that the movements required for what is supposed to be a gentle introduction to a practice session are anything but. Rather than preparing the body, the playing of scales actually increases the risk of serious strain or even injury, like a torn ligament. Comeau maintains that scales should be played to conclude a practice, instead of as an opening, as pianists have traditionally been taught to do.

For Comeau, this new perspective is typical of the work emerging from the university's Piano Pedagogy Research Laboratory. Inspired to found the facility two years ago, Comeau firmly believes that by better understanding how to teach and learn the playing of the piano, more people would experience success with this instrument. That would be good news for legions of hopeful young players who often find little more than frustration at the keyboard and simply give up.

Other researchers from disciplines as diverse as engineering, psychology, and neuroscience, are also seeing implications in the research coming from the lab that extend into health sciences as well as the physical and mental components that go into piano playing. Above all, Comeau regards the lab as a challenge to the many widely held notions about the nature of music and musical talent, raising questions that have seldom been asked by authorities in the field.

"A lot of the writing about piano pedagogy has been based on experience, on tradition, on master teaching," he says, describing the entrenched, highly subjective approach to teaching. "In many cases, it has worked well, but a lot of the time, we didn't know why we encountered problems. We still don't know why it doesn't work with everyone, and we don't know

how to teach children and adults to play the piano using 21st century techniques."

Teaching theories need to be assessed scientifically to determine if they are in fact effective, rather than continuing with them simply out of tradition and a lack of new methods, he says. The piano lab, a former cafeteria now packed with state-of-the-art multimedia hardware, offers a place for such evaluation. At the heart of the lab sits a professional recording studio outfitted with two grand pianos wired to record not just the music, but details of the physical effort that goes into creating it.

One piano is surrounded by an elaborate scaffold supporting eight video cameras that record a player's movements and the resulting music from different angles. Measurements of how the human body behaves at a keyboard when playing are then processed by graduate students at the university's School of Information Technology and Engineering under the supervision of Pierre Payeur. This is the first time such information has been systematically collected. The goal is to use the data to establish good and efficient postures, arm and hand positions, and general playing styles that could minimize injuries and improve effective piano playing.

The lab's resource centre houses what may be the world's most diverse and complete collection of children's music teaching handbooks, enabling comparison and critique as never before. Comeau has already been surprised by what a simple review of teaching literature revealed. He looked at how many musical symbols a student must recognize to read music and found a remarkable range of answers. Some books suggested as few as 78; others as many as 325.

To address this discrepancy, Comeau and colleague Ramesh Balasubramanian plan to apply techniques that educators use to understand how children learn to read conventional texts, such as eye-tracking systems that follow the pattern readers use to examine a page. His research will help scientifically verify the number of symbols that must be recognized in order to be musically literate.

This work may sound far removed from helping kids enjoy the piano, but the tools being created and tested at the laboratory ultimately serve that purpose. Comeau expects to learn a great deal more about the mechanics of music-making, and is confident that this new-found knowledge will not taint the romance surrounding innate musical talent. "Music can stay mysterious," he insists. "But the learning of it can be scientifically studied."

BENEFITS

The Piano Pedagogy Research Laboratory has laid the foundation for graduate, undergraduate, and certificate programs in this largely unexplored academic discipline. "Our biggest contribution so far is to make piano pedagogy a research field," says Gilles Comeau. But will the facility also produce better concert musicians?

For Comeau, the issue isn't a lack of outstanding performers, but rather in finding ways to improve the teaching and learning process. "It's all the others who didn't make it," he says. "The intermediate-level people that play but maybe could play a lot better if there had been a different approach. It's all the children who stop at a very young age and were convinced that they didn't have what it takes. You cannot, after one year, be convinced for the rest of your life that you didn't have the talent. Every child can go further than that."

Outfitted with elaborate video conferencing capabilities, the lab has also conducted research with children who do not have immediate access to a piano teacher. As part of an effort to develop technology for distance learning, Comeau, in collaboration with the National Research Council, demonstrated the potential of video conferencing through a project with young players in Canada's Arctic. Through the power of virtual reality, instructors based in Ottawa taught piano to the students. Despite the distance, the teachers were able to virtually deliver exercises, correct mistakes, and offer accurate assessments. "Suddenly we were pushing the frontier of what kind of distance teaching you can do," Comeau says.

At the same time, detailed multimedia exchanges have been held with the United States and Finland, expanding the worldwide network of researchers who share Comeau's passion for understanding how we learn to make music. Carleton University musicologist Elaine Keillor [2] is one of these like-minded researchers. Through the piano lab, she looks forward to resolving long-standing debates about the most effective and appropriate style of playing. For example, she points out that piano instructors continue to differ fundamentally on whether students should be trained to rely primarily on their fingers to press the keys or to incorporate the weight of their arms in the process.

Each method can have distinctly different consequences in how muscles and joints are used, along with the potential for injuries. However, she notes that these effects have never been studied in any systematic way. The whole area of piano pedagogy has been riddled with varying schools of thought.

LEARN MORE

Visit the official site of the [Piano Pedagogy Research Laboratory](http://www.piano.uottawa.ca/) for a complete overview of projects, participants, and partners in the lab.

<http://www.piano.uottawa.ca/>



PARTNERS

The Piano Pedagogy Research Laboratory has attracted the interest of a broad constituency, including scientists and medical researchers, piano manufacturer Yamaha, and the International Centre of Chamber Music of Finland. Visitors to the facility itself include distinguished international musicians and political dignitaries with a dedicated taste for music.

Research possibilities could also soon extend to medical applications. Investigators with the University of Ottawa's School of Information Technology and Engineering and Carleton University's Department of Systems and Computer Engineering are developing sophisticated techniques for monitoring piano players' movements in real time. Even more detailed imaging can look for "hot spots" on the body—sites marking disease or injury. By marrying up these two approaches, the result could serve as a new diagnostic tool for joint ailments, such as rheumatoid arthritis.