

# **Toodlee-Doo: Effective Interactive Musical Instruction Across The Internet**

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## **Abstract**

Historically, music has been an integral part of most cultures. Within many current societies, music has been traditionally considered an art form which should be mastered through individualized study with prominent music educators and professional musicians. Economic, location, and scheduling factors often play extensive roles in achieving successful contact with favoured mentors. With the rapid growth of the internet, the universal sharing of knowledge has been radically transformed. The ability to expand globally the scope of qualified music educators for private lessons is now at hand. Data compression streaming technology will continue to be enhanced to possibly yield real-time interactive internet teleconferencing which can accommodate the high standards of video and audio clarity demanded within the private instrumental music lesson scenario. Therefore, this paper will examine three selected issues within a proposed comparative study of interactive internet technologies for the effective delivery of private instrumental music lessons.

1. Why private music lessons on-line?
2. Can current and proposed technology provide the necessary tools to deliver the appropriate requirements to achieve success?
3. What hardware, software, systemic and pedagogical issues are raised through the advent of such a specialized curriculum delivery system?

## **Why Private Lessons On-line?**

The concept of private lessons is as old as Socrates. It dates back to the very foundations of our current western educational system. Before public education became wide-spread, generations of people learned through instruction from within their own families. In the centuries since the ancient Greek and Roman civilizations, the concept of private

instruction has maintained a constant position within many societies. The philosophy of apprenticing embraced fully the doctrines of private instruction as the exclusive and complete source of education within a particular field. With the advent of modern public education, private tutoring did not disappear; rather its form changed to accommodate various curricula.

Dependent on the subject matter, private tutelage today usually performs a complimentary or supplementary supportive role within the educational system. Computer technology has allowed teachers the flexibility of offering students a wide array of learning choices ranging from remedial repetitive tasking software to research options through use of the world wide web. To this end, the advent of an on-line version of private instrumental instruction through the technological advances of the late twentieth century would simply allow the student greater flexibility in the selection of the teacher best suited for their needs.

Within Canada, traditional core subjects such as math, languages, social sciences and empirical science have been frequently emphasized in the last twenty-five years. However, there exists a perception that a Fine Arts education was banished to the educational hinterland with the onset of the economic upheaval of the mid-1980's. As the public focus shifted heavily to the discussion of economic matters, and in particular the debt loads incurred by the national and provincial governments of the day, the resurrection of the three R's interpretation of education became paramount. Fine Arts education appeared to be relegated to a substantially lower priority on the agendas of many school boards.

More than once, music educators like myself, have been made aware that a vocal segment of the public believe that education tax dollars should not have to pay for superfluous educational subjects, ie: music education. Ironically, true "public" education is the key to ensuring the demise of this "frills" argument (Spisto & Boston, 1992). This flawed perspective is the antithesis of the intrinsic arts experience as defined within the philosophy of "education" since Plato (Bruhn, 1992).

For purposes of clarity, this paper will deal primarily with issues associated with musical instruction, particularly those associated with instrumental music. Attributes of arguments made in this area, however, may certainly transfer to other areas of study within the Fine Arts as a whole. Care should be taken to differentiate the perceived need of culture versus the want of society. Confusion of the two leads to a rather cumbersome and illogical stalemate.

Many people have broached the question, "What is music?" Simply put, music is an art. But it encompasses a vast realm of other academia. Music simultaneously comprises scientific, linguistic, mathematical, historical and physical pedagogical disciplines, which when combined, create human emotion, or, in short, humanism (SBA, 1990). Without music education, society essentially draws perilously close to a form of cultural suicide (Spisto & Boston, 1992). Since music is innate to every living human being by virtue of the rhythm of their beating heart, the Arts are inherent to the existence of every soul.

As stated in the abstract, music has been historically an integral part of most cultures. Within many present day societies, music has been traditionally considered an art form which should be mastered through individualized study with prominent music educators

and professional musicians. The potential for Canadian students is now greater than ever to study with some of the world's finest musicians and music educators. With the advent of the internet and global satellite technology, the entire reserve of world knowledge has been essentially reduced to a mere seven second time delay between any two points on the globe. The potential for intelligence networking theoretically approaches infinity. Consequently, the neglected cultural need for music education and Fine Arts education, in general, has the potential to be fulfilled incomparably through the plethora of global knowledge suddenly available for use.

Culturally empowered individuals make the world a better place in which to live. They must be given the opportunity to be all that they can be; to do the best work they can do; to use their intellect and their creativity and their desire; to significantly contribute to the overall effort; and thus, contribute to a higher standard of living socially and give meaning to society (Monica, 1997). The disciplines as outlined by Peter M. Senge (1990) illustrate the complexity that culture plays within the learning organization. Beginning with personal mastery, the individual student becomes devoted to the realization of matters closest to their *raison d'etre*. In doing so, they become committed to a process of lifelong learning. Once the inner being is firmly established, mental models and dialogue form the basis for team learning. Eventually, a shared common vision can be built into the conceptual framework of administrative systems thought.

For a moment, let us assume that a balanced psyche is crucial to the proper development of every human being. Logically, it would be critical that their true potential be fully realized through all available means. Therefore, from an Arts Education perspective, private instrumental lessons essentially create an intensive, motivational environment within which many skills of the aforementioned academic disciplines can be developed and enhanced (Swanson, 1964). Much literature has been produced by the Musical Educators National Conference (MENC) in the United States and the Canadian Band Association (CBA) in Canada to illustrate the productive, critical thought, aesthetic and discernment dimensions available through musical study. Overt and subtle communicative, creative and translational skills derived from musical study are direct contributors to the final personality of the student.

## **Technological Requirements**

Given the above advocacy for instrumental music education and the inaugural impact of the internet, what aspects of an instrumental distance education curriculum can be delivered via the standard TCP/IP internet connection? To begin with, all instrumental music curricula provide opportunity to study the following three major areas: theory, history and performance. In the last two decades, many theoretical and historical interactive computer software programs have been written and marketed to help students in their quest. However, it is only within the last four years that the possibility of performance based video conferencing has surfaced for those not regularly connected to ISDN or Ethernet lines.

Within the framework of any instrumental performance music lesson, the most crucial element is the concept of tone production. Factors which directly affect tone production include embouchure, breathing, posture, attitude, and tonguing. Many instructors will walk around their students to fully assess each of these elements. Therefore, both visual

and audio cues are essential for an instructor to properly critique a student. Consequently, any adequate recreation of a private instrumental lesson must employ interactive, real-time video and audio. While the video component may vary in quality, it is crucial that the highest audio clarity in reproduction be achieved.

Current distance education classes or business meetings that require real-time multimedia video conferencing primarily employ high band-width technologies. Specialized codecs, largely based on various International Telecommunications Union (ITU) specifications (Horn, 1998), allow for video and audio information to be passed freely with marginal interruption, dependent on band-width. The vast majority of desktop teleconferencing research and development has been targeted towards the business audience. Consequently, most companies offer video conferencing products which are ISDN based or better. Many manufacturers of video conference packages potentially view the use of IP networks solely as extensions to organizations who use ISDN technology (Copeland, 1998).

Initially, users of web based video programs such as CU See ME had to ensure that both the sender and receiver were using the same platform. In an article by Michael Desmond (December, 1996), Microsoft Corp. and Intel Corp. released versions of compatible video conferencing software that were based on H.323 (ITU) specifications. The compatibility factor helped alleviate at least one problem with connection; inter-operability was now feasible. The article further suggests that video conference transmission over traditional analog telephone lines would continue to suffer from poor video quality. In addition, audio quality deteriorates rapidly to an unacceptable level of clarity necessary for a instrumental lesson. Therefore, ISDN lines, coax cable and fibre optic links will doubtless remain the conduits of choice.

Ethernet LAN or ISDN connections are usually chosen to carry video conferencing data, since they can physically provide a larger and faster pipeline for packets of transferred information. Physically, IP network infrastructures may not be ready to tackle the burden of heavy video traffic without extensive renovation (Copeland, 1998). Thus, very little video conferencing research and development has been going into the traditional lower end modem transport of the IP market. According to an article by Paul Heltzel (February, 1997), Motorola, was one of a few select companies apparently designing streaming software for lower bandwidth and slower modems. Since then, Picture Tel, Microsoft Inc., Intel, Zydacron, Whitepine, and VTEL are but some of the companies actively engaged in promoting video conference software packages which can bridge to other vendor's products through IP connections. In addition, companies such as RADVision are introducing hardware technologies which are compliant with IP networks without affecting ISDN capabilities (RADVision, 1998).

Many comparative investigations have been initiated over the last three years to test various categories of what may be identified as an industry standard for video conferencing. For example, a team of researchers from the Applied Research Institute of Ball State University stated inter-operability, ease of use, documentation, technical support, features and H.320 compliance as the testing standard for their 1997 video conferencing Windows 95/NT product comparisons (Hibner, 1997). J.W. Davis conducted a similar review of Mac compatible programs and discussed the results in a 1997 Macworld article. Combined with AT&T's announcement of ISDN broadcast video capability and the United States government's plan to build a proprietary second internet (1998), desktop video conferencing has the potential to expand exponentially.

The gap between television and internet video conferencing may be getting smaller. Microsoft previewed a new multimedia browser technology code-named Chrome on March 26, 1998. According to an article by Brian McWilliams (1998), high fidelity audio and 3D animation are much better than other technologies currently available. Regardless, the hardware needed to run the Chrome will not be released until at least the fall of 1998. If Chrome does prove to be the missing link, then the potential exists for smaller band-width transmissions of volumes of video conferencing data. Interactive video conferencing across the internet for those of us with "older" technology will have to rely on upgrades to existing hardware and software components.

Consequently, it is conceivable that the video conferencing tools necessary to deliver an appropriate private lesson for a performance based instrumental education are within reach. The audio clarity demanded within the realm of a private music lesson may soon be delivered over IP networks in conjunction with decent video quality. Whilst a video broadcast standard rate of 30 fps would be ideal, most instructors would probably adjust comfortably to a 10 fps presentation. However, the audio quality must be impeccable. Time and the marketplace will tell.

## **Issues**

As alluded to earlier, the demand for perfect audio is the key to success when attempting a private instrumental music lesson. Artificial noise interference, signal breakup or bad tonal characteristics automatically defeat any successful attempt. Video needs are somewhat less demanding, but are still required for a complete student appraisal. Demonstrations by the instructor must be able to be properly interpreted by the student. Incorrect habits attributed to posture or breathing may be easily corrected with video conferencing. However, without the benefit of exquisite audio reproduction, any band student wishing to improve their sound via video conference would do well to immediately stop the transmission and find a local instructor, rather than risk irreparable harm to their embouchure. This is the chief pedagogical concern.

Hardware and software concerns often relate primarily to issues of compatibility and congruity. Currently, many desktop conferencing programs are incompatible with the majority of others on the market. Industry standards implemented within the last year seem to be improving this issue. Related to this compatibility problem is the non-congruous relationship between various software packages and available hardware. In some instances, camera packages are sold either without the appropriate video capture cards, or are sold with cards that require some coercion to implement properly (Davis, 1997). One potential solution is being offered by Whitepine through the release of their new distance learning "Class Point" desktop conferencing product (Whitepine, 1998).

Finally, there is one major systemic issue that must be dealt with in the near future. The actual physical internet infrastructure may be approaching the breaking point, given the exponential increase of net traffic in recent years. Given that any electronic chain is only as strong as its weakest link, a high demand for video conferencing may result in the demise of the internet system as an efficient carrier of information. Routing problems may likely always be a constant joy for end users, but if all possible nodes are

plugged, the system breaks down. In what may be deemed a preemptive strike, the scientific and military communities in the United States have recently announced via the media their willingness to create a second internet for selected users.

Combined with prospective technological improvements in data compression for video conferencing, the future looks bright.

## Conclusions

The ability to expand globally the scope of qualified music educators for private lessons is, indeed, at hand. It is my prediction that educational music departments and instrumental specialists may soon be able to offer suitable private lesson services to clientele all over the world from their desktop at an affordable price. Currently, many of the desktop video conferencing programs are in a state of relative infancy, and as such, cannot fully meet the technological demands for delivery of a proper instrumental music lesson. However, as data compression improves and distance education video conferencing software expands in the marketplace, the internet infrastructure will hopefully remain intact, and the consumer will be the eventual winner by simple virtue of choice.

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