Music lessons via satellite

Dr Alan Anderson
The University of Newcastle, Australia

Abstract

An Australian Research Council Linkage project is investigating people’s use and experience of a satellite-supported interactive computer and video communications system that delivers lessons to isolated students in NSW and the NT. One aim of the research is to determine what teaching and learning practices emerge from the use of the system. Focusing on music teaching and learning in a NSW public school of distance education, this paper reports emerging practices and teachers’ perceptions of the challenges and benefits of providing music lessons taught via satellite.

INTRODUCTION

The importance of providing children with meaningful music appreciation and music making activities in school continues to be upheld by Australian state and territory departments of education. However, following through in practice presents a number of challenges. A national review of music education indicated that in general, primary school teachers lack confidence to teach music (Broad, 2007). Meanwhile teachers in schools of distance education have always faced the physical challenges of trying to teach music to students in geographically dispersed and isolated communities. Paradoxically, therefore, in the course of developing pedagogical and technical strategies for teaching via satellite, distance education schools are now modeling flexible, networked learning in ways that could in turn assist primary teachers in mainstream schools.

The implementation of a Satellite Interactive Distance Learning system to replace former School of the Air (SOTA) radio networks began in 2003 and was completed in 2006. The service is known as the Satellite Education Program (SEP) within New South Wales schools, but IDeL for TAFE NSW and Northern Territory schools. It provides satellite-supported two-way broadband voice, Internet and one-way video for school-age and adult distance education in NSW and NT (Crump, Tuovinen and Simons, 2005).

NSW technical support is provided by staff of the Department of Education and Training (DET) Distance and Rural Technologies (DRT) based in Dubbo. Their Web site provides details of three main technology solutions employed to deliver interactive learning.

Each solution is carried by:

- NSW DET broadband terrestrial Wide Area Network which connects approximately 2,500 schools, TAFE campuses and administrative offices
- 2-way satellite services to 52 remote schools and 235 isolated home sites

The solutions include:
Onetouch™ employed to deliver primary and TAFE education services throughout NSW.

Polycom IP Video Conferencing

Bridgit™ web conferencing for data collaboration

Technicians install a full range of interactive tools in students’ homes, including:

- GILAT 360 modem
- PC with TFT/LCD monitor
- wacom graphics tablet
- flatbed scanner
- KODAK Easyshare C310 camera
- headset with built in microphone
- bubble jet printer (generic ink compatible)
- electrical power conditioning units with UPS.


The Satellite Interactive Distance Learning system is not seen as a standalone solution. It has been described as ‘part of a comprehensive strategy to merge the ongoing paper and post distance education with the immediate and visual interaction provided through IDeL’ (Crump, Tuovinen and Simons, 2005, p.22).

An Australian Research Council Linkage (ARCL) project titled ‘Interactive Distance e-Learning for Isolated Communities: Opening Our Eyes’ is investigating people’s use and experience of the Satellite Interactive Distance Learning system (known as the Satellite Education Program (SEP) within NSW schools, but IDeL for TAFE NSW and NT schools). Based on a mini case study within the parent ARCL project, this paper explores some data on music teaching via satellite in more detail than otherwise possible. Focusing on a dual campus public school of distance education in NSW, this paper reports emerging practices and teachers’ perceptions of the challenges and benefits of providing satellite-assisted music lessons.

**Music teaching and distance education**

Some music skills and knowledge such as the conventions of reading and writing music notation, music history and the like can be acquired through reading books and listening to music. Learning to play a musical instrument can also be a largely self-taught process but one that is prone to pitfalls such as developing poor technique and posture that limits proficiency and at worst lead to repetitive strain injury (Brandfonbener, 1995). In general, learning to play an instrument is reliant on the teacher’s ability to demonstrate at close quarters (Hoffer, 1989). Naturally this presents challenges for teaching music in a distance education context.

Prior to the satellite education program, distance education students could not see their teachers other than an occasional complementary home visit or mini-school program (residential) if the student(s) and study supervisor (typically parent or guardian) were able to travel to the school. For many, attending a mini-school program could (and still does for many) mean a trip of hundreds of kilometers over rough terrain from their isolated homestead to the school.

**METHOD AND DESIGN**
Designed as a mini case study within the larger ARCL project, the purpose has been to ‘drill down’ at the level of a particular subject, namely music teaching via satellite, in more detail than otherwise possible. “A form of qualitative descriptive research, the case study looks at an individual or small participant pool, drawing conclusions only about that participant or group and only in that specific context … case studies are the preferred strategy when how or why questions are asked” (Yin, 1993, cited in Colorado State University, 2008, p. 1). In the present mini study, ‘how’ relates to how music teachers teach via satellite. The ‘why’ relates to why teachers choose to use various technology solutions and/or teaching strategies over others.

**Purposive sampling**
Decisions concerning the site and participants were based on a purposive sampling approach. Neuman (1997) and Berg (1989) advocate the use of purposive sampling in cases where the researcher’s purpose warrants the use of their knowledge or expertise of or about some group or individuals displaying certain attributes (i.e. distance education teachers giving music lessons via satellite) are included. The purpose is less to generalise than to gain a deeper understanding of the types of cases under investigation (Berg, 1989). Similarly, Dumas (1999, p. 237) notes advantages of a small group of participants in evaluations of new technologies. “You do not need large numbers of people to participate to feel confident that you have seen problems that need to be fixed” (Dumas, 1999, p. 237).

**Data collection**
Field research visits to each campus (A & B) of the school were undertaken between October 2007 and February 2008. These included three one-day visits to campus ‘B’, and two, two-day visits to campus ‘A’.

Data was collected via:

- On-site observation of lessons via satellite (researcher in the studio with teachers)
- Semi-structured interviews followed observations
- Teachers were asked about the challenges and benefits of teaching music via satellite
- Additional questions were asked about satellite-assisted teaching in general
- Discussions with teachers not regularly involved in teaching music but regular contributors to music activity such as singing at assembly via satellite.
- The school Web site featuring examples of student work

Observations were followed by semi-structured interviews with each teacher. The purpose was to ask follow-up questions about teacher-student interactions, valued working practices, learning processes, learning outcomes, and teacher behaviours. The names of the teachers have been coded to help preserve their anonymity as per guidelines of the parent ARCL project (University Research Ethics Committee, Approval No. H-245-0606).

**Analysis**
A comparative method outlined in Maykut and Morehouse (1994) was adopted for the analysis of qualitative data collected. Transcripts of interviews and observation notes were divided into individual units of meaning. A unit of meaning could be a paragraph, sentence, phrase or keyword, the meaning of which could be understood without additional information other than the focus of the study. The successive stages of analysis involved:
• Inductive category coding and simultaneous comparing of units of meaning across categories
• Refinement of categories
• Exploration of relationships and patterns across categories
• Integration of data yielding an understanding of people and settings being studied
(Maykut & Morehouse, 1994, p.135).

SATellite MUSIC Teaching in a School of Distance Education

Analogous to the situation described in Broad (2007) and Jeanneret (1996) most of the music teaching in this dual campus school is done by two teachers (Teacher A and Teacher B).

Teacher B: It has come about because I was a kindergarten teacher and really like teaching music as well, so it was an additional lesson I offered kindergarten in the week. When I became non-teaching, I asked the kindergarten teacher is it OK that I keep in touch with the kids and with the [satellite] system, and they all jump at that because they are not, you know, musically inclined. Teacher A’s [recorder group] came about because teacher A didn’t have a satellite class. So to keep in touch with the satellite technology, teacher A asked, ‘could I take a recorder group and that way I get to run a satellite lesson and don’t lose touch.’ Teacher A has chosen to keep it up this year.

Researcher: And of course these lessons service the other campus of the school as well.

Teacher B: Music seems to be one of those areas where people either have a genuine interest and confidence … but it’s really the only component of a KLA that is taught by a one person specialist across the school.

Teacher A: It is hard, especially when a relatively small school … you might not find anyone who is keen on playing any instrument … let alone recorder. Every student in the school, either campus, can come together. One recorder group can expand from here to the border! Like the technology lessons that teacher ‘C’ runs, people might not be confident in doing that and it’s easy duplicating it for other audiences.

Clearly a number of positive outcomes stem from these teachers taking on the bulk of responsibility for music taught and performed in the school. Firstly, students benefit as a result of their teachers’ confidence to teach music. Secondly, since the satellite connectivity makes it possible to broadcast these interactive lessons to students of both campuses, it cuts down on duplication. Thirdly, for these teachers in particular, it allows them an opportunity to keep in touch with teaching via the satellite system.

Like their teachers, students learning in this satellite-assisted school environment become proficient at a wide range of computer skills.

Researcher: I noticed a recorder student featured on the school Web Site, an audio file of the student playing recorder. How do they get the skills to do that?

Teacher B: It happens in two ways. It may be a skill that a teacher required of them so they’ve taught them. We have technology lessons and … we’re just about to do a joint project with [another school] … because they’re doing the same
thing. So instead of us duplicating it, we’re talking about how we can make that a joint lesson across the school.

Teacher A explained in more detail how the audio examples of student music performances came to be on the school Web site, furthermore, how recorder students learn some fundamentals of microphone technique, digital recording, file formats and settings to compress files for distribution, presentation and storage.

Teacher A: I told them it needed to be a song, proficiency standard for their level, that they might need to do more than one recording … telling them about [avoiding] background noise for a cleaner recording.

Researcher: What sort of software do they use to record and compress audio files?

Teacher A: They know with the voice recorder you can pick the quality. The sound file changes in size, just select [compression settings]. You don’t get a massive file out of it then.

Teachers were asked what music content is taught at the school (in terms of practical and theoretical aspects).

Teacher A: All the aspects of music: the tone, volume, performance outcomes. I have the recorder group years three to six. You can do some basic musicianship. We go through writing staves and how to draw treble Clefs so they know how to identify music notation, a note, that sort of thing. They learn to hold their hands in the right position sitting properly. The recorder group is voluntary so while I report certain outcomes back to their teachers it’s not something they are all reliant on in terms of curriculum content or taking things out of their students work. Teacher B does kindergarten music, glockenspiels, percussion, other things … they do a bit of singing.

Basic percussion instruments [that is, tuned instruments such as glockenspiel and untuned such as tambourine, triangle] are supplied for students to use at home. Students are also encouraged to find creative ways to use a host of household items as instruments.

Teacher B: Everything from kitchen utensils percussion to body percussion with Kindergarten. … We go into pitch using glockenspiel.

Teachers were asked what aspects of the recommended music syllabus material they are able to teach via satellite.

Teacher B: What happens is I base my lessons on the materials but they go beyond what they can deliver remotely.

Teachers explained that the main stumbling block is the inability to sing or play in a duet or group situation via satellite due to audio delay in the system. This limits the number of activities they can do out of materials designed for face-to-face teaching in mainstream schools. Fortunately, periodic mini-schools (a form of residential known as ‘in-school’ in other regions) provide students with opportunities to perform together and pick up group ensemble skills they do not get a chance to develop when taking turns of playing via satellite.
Teacher A: Last mini school, our recorder group that had been practising for about eight months actually had their first performance together. That was a real exciting culmination of our practice. Other than the two siblings, none of the students had ever played with each other. Due to the time delay, you can’t get multiple participants playing at once. So they had all been learning in isolation and then to suddenly have them all physically together and for them to hear the dynamic. You know, sounds together and that sympathetic listening as you do when in a group. It was fun seeing all that unfold. We did a few songs at the presentation day together they could play those songs … they just hadn’t done it with anyone else before.

Technology tools and strategies for satellite-assisted music teaching

Clearly opposed to becoming unduly technology-driven for technology’s sake, the principal summed up the school’s philosophy on technology-assisted teaching and learning:

We choose not to say: This is the technology available so how will our lesson look? We choose to say: What do we want our lesson to do and now how will we make the technology work for our purposes?

This philosophy is reflected in the answers teachers gave about their use of the various technologies at their disposal.

Teacher B: I can honestly say that every lesson I have run this week has not required any electronic media. I’ve used the studio camera, the document camera, the remote microphone and the desktop. At assembly, the power point was the most sophisticated I’ve been this week!

Researcher: Yet another time you might use Bridgit and other things.

Teacher B: Yes Bridgit, Smart boards and everything. Just whatever I need.

Teacher B: I would rather not have to play with a lot of technology within my lesson. I’ll move the studio camera to where I walk again later but I’d rather not have to say hang on while I zoom it in. It’s easier to walk to the camera.

Researcher: Would the glockenspiel be one of the exceptions where you would have to sit down at a desk?

Teacher B: I hold it up to the studio camera, depends what we’re doing in the lesson but For the explanation of where to put their hand or hold or strike, I hold it up.

In contrast with Teacher B’s approach, Teacher A demonstrates playing recorder from behind the studio computer desk.

Teacher A: The main camera I put on myself as a kind of from the waste up so that they can see postural things, how to angle hands in relation to the instrument.

Teacher A frequently uses the document camera in a unique way to provide students with a close-up view of correct fingering over the holes of the recorder (fig. 1).
The document camera is also used for showing close up views of music notation, text, graphics, other instruments and objects.

Teacher A explained it is important to use an appropriate colour instrument. Not only the contrast between the instrument and its background colour, but indentations and shadows can make a significant difference to how clear an object appears on camera (fig. 2).

Whilst the dark recorder stands out against the white paper background, its holes are barely visible. In contrast, the white recorder is actually better for showing correct fingering because
the holes in the instrument appear as dark dots under camera.

Teacher B made a similar point about colour and contrast.

Teacher B: You have to be careful … we have some glockenspiels built into the case. It’s yellow … not really a good colour for the camera.

Sometimes due to a poor connection on the day, teachers will anticipate what the student is doing at the other end in a bid to keep the lesson moving, whilst encouraging the child to persevere.

Teacher B: As far as what the kids are doing with the instrument, I am making some assumptions that it is happening at the other end. So when I say are you ready to strike it three times for me, go! … I give the response of ‘excellent but make sure you’ve tucked this in.’ That’s because I know children don’t tuck their finger in, not because I can see anything. Parents often say: ‘How did you know?’ That’s just years of teaching that you’ve got to anticipate what’s happening at the other end. Are they holding it properly? I don’t know till after the event when a dutiful supervisor will take photographic evidence for me and email it in and then of course at mini school we demonstrate those skills.

Music teachers generally have ‘a good ear’ (aural perception skills) to hear the result of poor technique, however, in the case of satellite-assisted music teaching it seems they also need to develop an ‘ear’ for the sound of music via satellite system.

Teacher A mentioned an advantage of the system over face-to-face teaching of a small group or classroom full of music students.

Teacher A: Well an advantage is I can log them off and say you practice that for a couple of minutes while I listen to the next student. No one is disrupted by them playing. You can’t log off live students!

Overall teachers were glad to be teaching via satellite and had many positive things to say about benefits the system has brought to their school of distance education and others on the SEP network.

Teacher A: The difference is that I can show the children what I want them to do musically. I can show them the instruments, the fingering of instruments, notation; a whole lot of visual aspects and they can see me perform. We can learn to be an audience for each other … that’s very powerful!

CONCLUSION

Before SEP, teachers at this dual campus school of distance education had not attempted to teach the range of music content they now find possible via satellite. Clearly the introduction of SEP inspired these teachers to re-examine their previous assumptions about what aspects of music could be taught effectively via distance education. The teachers have developed strategies for teaching most of the essential aspects of music curriculum via satellite. Mini schools provide periodic opportunities for students to receive face-to-face tuition on aspects
more difficult to cover via satellite lessons or the school’s ongoing paper-post correspondence service. The recorder group stands as a useful example of how geographically isolated children can learn an instrument via satellite and months later meet in person to perform together in public for the first time as a group. In regard to the future of satellite assisted music teaching, the teachers interviewed said they would like a system with minimal delay and two-way video. Whilst there may be privacy issues to overcome in respect to two-way video, the teachers indicated these features could lead to a significant improvement in the standard of music teaching via satellite.

SEP makes it possible for primary teachers with confidence in teaching music to provide lessons across schools on the network. Besides helping to cut back on duplication, this could help to alleviate shortages of teachers with confidence to teach music. Such lessons need not be restricted to schools of distance education. Mainstream schools, given adequate equipment and permission to connect with the SEP network, could watch and interact with the distance education music teacher or visa versa.

REFERENCES


**Acknowledgement:** This research was conducted as a mini case study within an Australian Research Council Linkage Project (LP0562535) funded by the Australian government, the New South Wales government, the government of the Northern Territory, and Optus Singtel. Background data reported on in this paper involved contributions from current members of the research team: Stephen Crump, Chief Investigator, University of Newcastle; Brian Devlin, Chief Investigator, Charles Darwin University; Kylie Twyford, Senior Research Associate, University of Newcastle; Lorraine Towers, Research Associate, University of Newcastle; Alan Anderson, Research Associate, University of Newcastle, and Amy Hutchinson, Research Assistant, Charles Darwin University. The views expressed in this paper are those of the author, Alan Anderson. Special thanks goes to the teachers whose names are coded in this paper as per guidelines of the parent ARCL project (University of Newcastle Research Ethics Committee, Approval No. H-245-0606).