

# **The Use of Technology in Victorian Secondary Music Classrooms**

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# **The Use of Technology in Victorian Secondary Music Classrooms**

## **Abstract**

This paper will address how secondary music teachers feel about the increase in the use of technology in education, how equipped (or ill-equipped) they feel about making use of the various technologies available, the technological resources teachers have at their disposal, and how they are presently using technology in their classes.

Questionnaires were mailed to schools from the Catholic, Independent and Government systems in metropolitan Melbourne and in Gippsland. The responses received form the basis of the information presented in the research report. Metropolitan schools were compared with schools in Gippsland to see if there were any discernable trends and patterns. Specific quantitative data were compiled relating to teacher and student use of sequencers, use of aural training software, use of theory software, use of the internet (specifically the World Wide Web), preference for step-time or real-time MIDI data entry, and particular hardware and software used. Qualitative data were also compiled relating to teachers attitudes, frustrations and perceptions about using technology in the secondary music classroom.

The results indicate a substantial inequality between schools in rural and metropolitan areas in several key areas, significant frustration at the lack of resources available to many teachers, and point to the importance of further professional development and research to clearly establish and meet the needs of music educators throughout the state.

## **Research Method**

This descriptive research project falls into the category of a non-manipulative design (Casey, 1992, p. 69). The information sought focuses on teachers' attitudes and personal use of technology and the types of activities their students undertake in music classes at present.

Questionnaires, making use of Likert-type scale questions and 'open' and 'closed' response questions, were sent to 186 schools from the three major school systems - Independent, Catholic and Government. The schools were randomly selected from metropolitan and Gippsland regions.

## **Presentation and Analysis of Results**

50 completed questionnaires were returned, giving a response rate of approximately 27%.

Of the 50 responses forming the sample size of this research, Figure 1 (below) demonstrates the representation of each school system.

<b>School System</b>	<b>Responses Received</b>
Catholic	6
Independent	19
Government	23
Unknown	2

**Figure 1**

Responses were received from approximately 30% (37 of 124) of the metropolitan schools that were sent surveys, and 21% (13 of 62) of the rural/regional schools.

***Teacher attitudes to technology in music education***

The data generated by this research project show that 98% (49 of 50 respondents) believe that the use of technology can enhance teaching practice. This represents an extremely positive response from all school systems, and from both metropolitan and rural regions.

Respondents were asked to include reasons why they feel that technology can enhance teaching practice in music. Listed below are some of these comments.

- ‘Technology makes instant feedback possible, and students can create music at a more advanced level than they can actually play. This encourages growth and knowledge of music.’

- ‘Technology is a tool used in many aspects of life, including music. To make my teaching relevant and useful to students I believe technology needs to be utilised.’
- [Technology] ‘caters for a wider variety of learning styles/[can assist in the] development of literacy. [It is] Relevant to music industry practices. Aids in understanding and presentation of work’.

92% of respondents consider themselves to be (generally) computer literate.

68% of respondents are confident with the use of music technology.

The following table (Figure 2) presents the data relating to teachers’ attendance at professional development courses relating to the use of technology in education (generally) and the use of technology in music education (specifically).

**Figure 2**

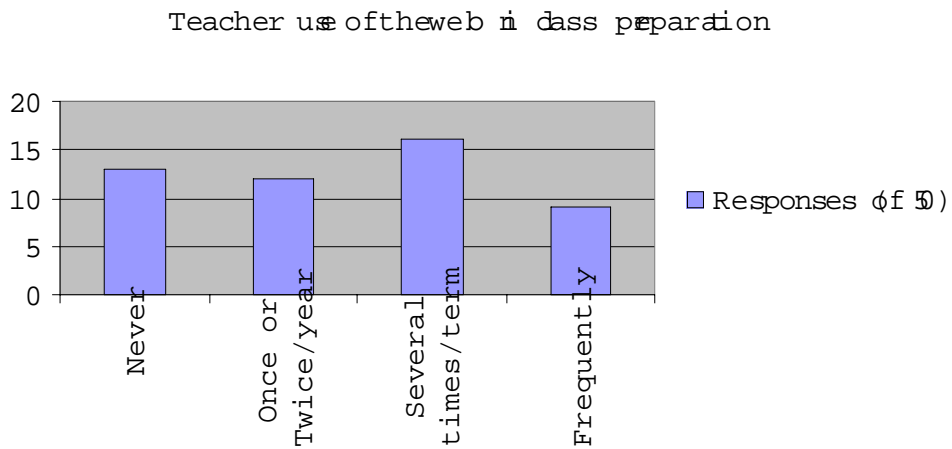
<b>Location</b>	<b>Technology in Education Course</b>	<b>Technology in Music Education Course</b>
Metropolitan (of 37)	33(89.2%)	30(81.1%)
Rural/Regional (of 13)	10(76.9%)	7(53.8%)

There is a noticeable (but not statistically significant) difference between attendance at professional development dealing with the use of technology in music education by teachers from metropolitan and rural/regional schools.

### ***Teacher use of technology***

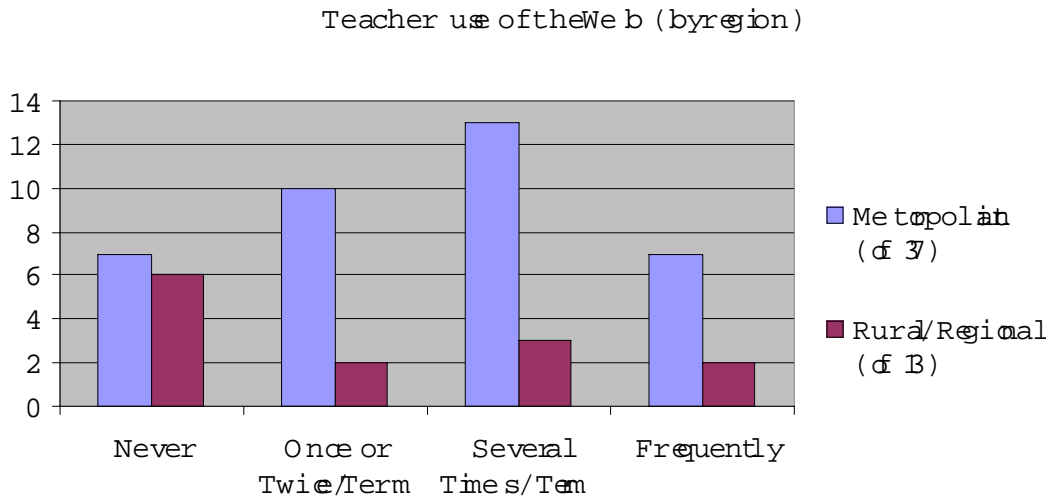
The use of the World Wide Web (the web) as an information resource is an area of life and education that is growing very rapidly in Australia and throughout the world. Figure 3 (below) presents the data collected relating to teacher use of the web in class preparation.

**Figure 3**



Below is a graphical representation (Figure 4) that gives information about teacher use of the web in class preparation, by region.

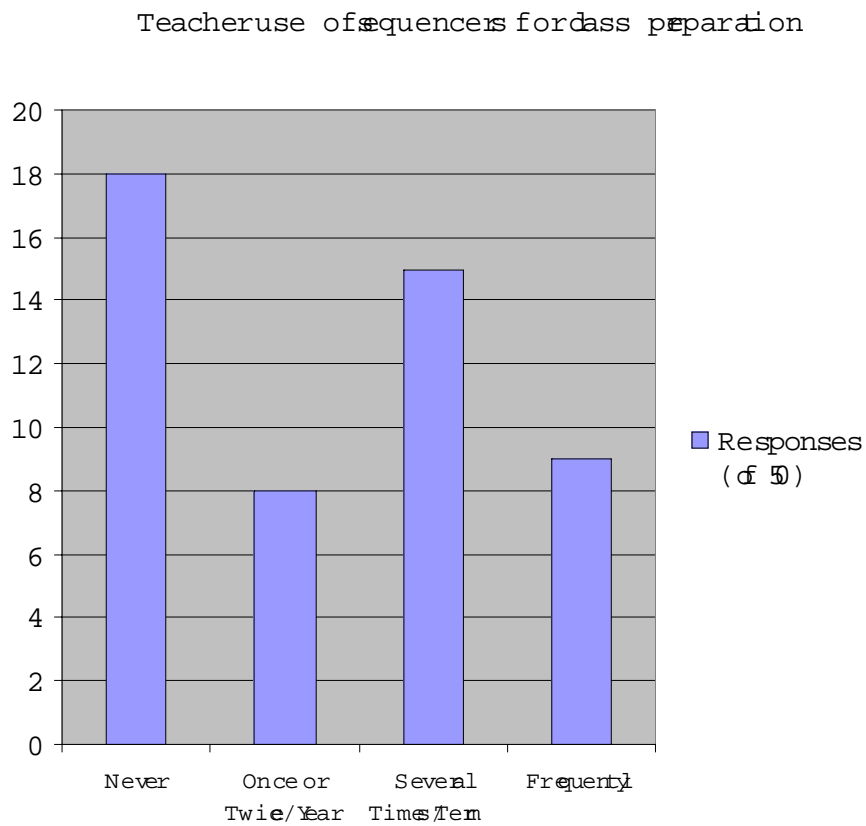
**Figure 4**



The small number of responses received (from some populations within the overall cohort) precludes the successful application of statistical tests to disprove the null hypothesis. However, it is noticeable that the largest group of respondents from the rural/regional group responded that they never used the Web, whereas the largest group of metropolitan respondents indicated that they use the Web several times per term.

One factor that may affect student use of sequencers in the classroom is the personal confidence that the teacher has in allowing or encouraging their use with students. If teachers are using sequencing technology for their class preparation, they are more likely to feel confident in students using them in their classroom. The following graph (Figure 5) displays the data pertaining to teacher use of sequencers in class preparation.

**Figure 5**



***Teachers and technology - training, attitudes and computer literacy***

Respondents in this research project varied considerably in terms of their teaching experience and the time since they completed their pre-service teacher education. Some respondents had just completed their university degree, while others had been teaching for over thirty years.

Interestingly, there appears to be no correlation between the time since pre-service teacher was completed and any of the following factors:

- attendance at professional development courses dealing with the use of technology in education
- attendance at professional development courses dealing with the use of technology in music education
- belief in the potential of technology to enhance teaching and learning in music education
- confidence in using technology in the classroom
- (self-evaluated) computer literacy

It appears that the most experienced practitioners are embracing the possibilities offered by new technologies with equal enthusiasm to recently qualified educators.

***Reasons for educators not using technology in music classes***

Teachers making little or no use of technology in their classes were asked to provide information about the main reasons for their decision not to employ technology in their classes. Listed below are some of the responses received.

- ‘Our school does not have the technology available for classroom music to engage in sequencing and similar activities, however, we have used the technology successfully in the past (*Atari Notator*)’.

- ‘Cost of software and computers and lack of money and support for the importance of technology in music from admin with regard to budget’.
- ‘LACK OF FUNDS. I get \$750 for the whole year to spend on classroom music’.
- ‘time taken to teach how to use complex programmes’
- ‘concern that music literacy will not be taught because [it is considered] not necessary’.
- ‘unfamiliarity with what is available in the market - what is good/bad/worthwhile/essential’.

Several themes emerge from the responses to this open-ended question. By far the most often repeated reason for not making use of technology in music classes was a lack of resources.

Some music teachers indicated that they were using computer laboratories in general areas of the school for musical purposes. Many of these teachers expressed frustration about inadequate access to such rooms. The majority of teachers were frustrated by inadequate budgetary allocations to allow the development of this area of the curriculum. It must be said that music teachers, and indeed all teachers, would rarely ever work in an environment where they considered they did have perfectly adequate resources. Schools always have far greater needs than budgets can meet. It also could be noted that virtually any budget allocation still requires that the necessary equipment be given a high priority by those charged with spending it.

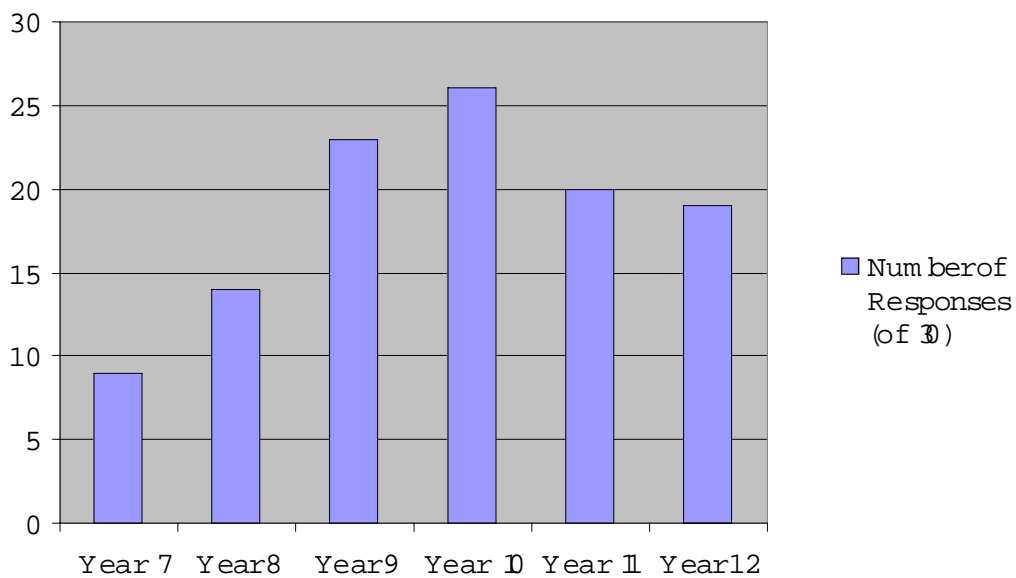
It must be conceded that most technological equipment (including sequencers, samplers, computers with internet access, mixing desks, public address systems, etc) are quite expensive and, if budgetary allocations are very small, it is quite impractical to spend one's entire budget allocation on technology at the expense of instruments, recorded music and various other 'essential' pieces of equipment.

*Student use of technology in music classes*

30 respondents (60%) indicated that students in their classes make use of sequencers. The following table (Figure 6) shows the year level distribution of sequencer use amongst these responses.

**Figure 6**

Year level distribution of student sequencer use



Of the 30 respondents who reported using sequencers in their classes, 24 were at schools in the metropolitan area. In percentage terms, slightly over 81% of metropolitan schools report using sequencers in their classes and approximately 46% of rural/regional schools reported using sequencers in their classes.

The peak period of sequencer use in both metropolitan and rural/regional schools is in year 10. There may, of course, be many reasons for this fact. Small enough class sizes to permit use of sometimes limited resources, considerable amounts of time devoted to the subject at this year level, the absence of rigorous VCE Music Performance Unit 3 and 4 CATs (Common Assessment Tasks) in the area of creative organisation, allowing more time to be given to technology generally.

Another factor apparent in the data relating to the use of technology, which may be related to lack of resources in schools, is the apparent correlation between teacher use of sequencers in class preparation and student use of sequencers in music classes.

Out of 50 respondents, there were:

- 18 teachers who responded that they **never** used sequencers in their class preparation and, 13 of these teachers indicated that students did not use sequencers in music classes

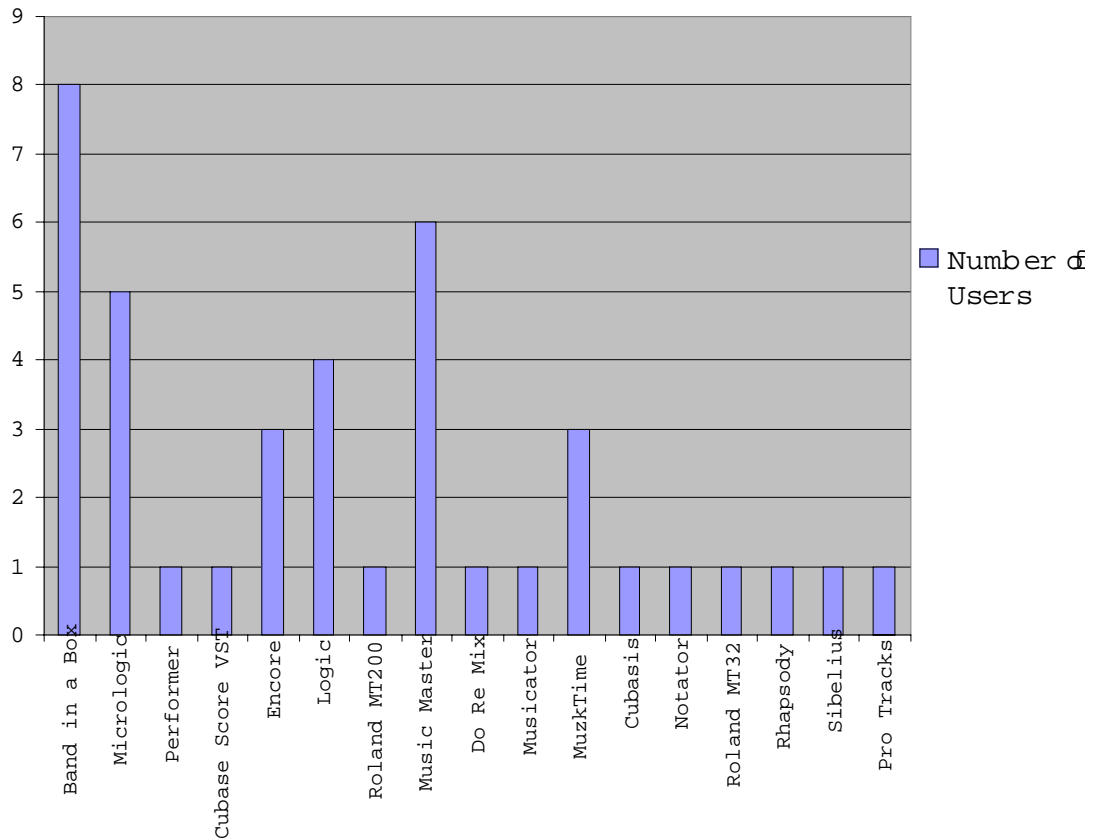
- 8 teachers who responded that they used sequencers **once or twice a term** in class preparation and, 4 of these teachers indicated that students did not use sequencers in music classes
- 15 teachers who responded that they used sequencers **several times a term** in their class preparation and, 1 of these teachers indicated that students did not use sequencers in music classes
- 9 teachers who responded that they used sequencers **frequently** in class preparation and, 2 of these teachers indicated that students did not use sequencers in music classes.

To express this in another way, 85% of students not using sequencers in music classes are being taught by teachers who make little or no use of sequencers in class preparation.

There is a very large number of software and hardware sequencers on the market, and a considerable number are being used in Victorian secondary schools according to my data.

This graph (Figure 7 below) lists all the software and hardware products listed in response to a question on the survey seeking specific names of software used by respondents.

**Figure 7**



The two most widely used pieces of software in the above figure are quite different in their intent. Band-in-a-Box is a very sophisticated auto-accompaniment tool. The user inputs the chord sequence and the software devises and plays an accompaniment using the desired chords in one of hundreds of pre-set styles. Band-in-a-Box has been on the market for a considerable time and this is possibly one of the reasons it is so widely used. Another possible reasons for its widespread use, is the relatively small price of this software. Interestingly, Band-in-a-Box is not, principally, a sequencer, although there is some provision for this.

Music Master is a piece of Australian made software that is becoming increasingly popular in Australia and beyond. Its success is possibly due, in part, to effective marketing to the education market (particularly in lap-top computer schools), and the excellent product support, compared with many of the other (usually imported) products. It is also a powerful and relatively easy to use product.

### *Student use of aural training software*

Perhaps the area of music education that has the longest association with computer technology, is aural training. The 'drill and practice' mode of instruction is well suited to the training of these particular skills.

25 respondents (50%) are using software to assist their students in the acquisition of aural comprehension skills.

24 of the 30 respondents making use aural-training software use *Auralia*, making this product, by far the most widely used in Victorian secondary schools. *Auralia*, is produced by Rising Software; being an Australian-produced program, it appears to suit the requirements of local curriculum, particularly the specific aural-comprehension tasks of Victoria's VCE Music Performance courses.

Not surprisingly, given the huge focus on aural comprehension skills in the VCE (Victorian Certificate of Education) Music Performance study design, the use of aural training software is concentrated in the final three years of secondary education. Only five respondents (10% of the overall sample and 20% of respondents using aural training software) reported using aural training software with year 7 and 8 students. One possible reason for the small number of respondents using aural training software in year 7 and 8 is that teachers may feel that aural training skills for students of this age, many of whom will not pursue music in later years or as a practical study (through instrumental lessons) do not need or want aural comprehension skills.

***Student involvement in various classroom activities employing technology***

Data was sought on student involvement in a number of possible activities employing technology in the music classroom. Following is a table of activities (suggested by the author), and the percentage of positive responses received, by location of schools:

**Figure 8**

**Student involvement in various activities using technology**

Activity	% of Rural/Regional Schools	% of Metropolitan Schools
Edit (in any way) MIDI files supplied by you	15	32
Transcription of music using sequencing and/or notation software	31	49
Transposition of an existing melody using computer software	23	54

Composition of melodies	69	78
Composition of 2/3/4 part compositions using a sequencer or sequencing software	46	57
Composition of contemporary pop music using a sequencer or sequencing software	46	46
Arrangement of existing composition that the students input into sequencer themselves (eg from sheet music)	54	38
Downloading and editing MIDI files from the Web	15	16
Hard-disk audio recording (eg using <i>Logic Audio</i> or <i>Cubase Audio</i> )	23	19
Sampling and/or manipulating sampled sounds	15	16
Activities involving the operation of a multi-track recording device	23	35
Activities involving the operation of a mixing desk	23	35
Using effects devices of any kind	31	30

None of the above results would be considered statistically significant because of the closeness of the results (in some cases) and the small rural/regional sample size. However, it is noticeable that, in most cases, a higher proportion of students attending metropolitan schools are engaging in the types of music technology tasks listed above.

## **Presentation and Discussion of Findings**

### ***Introduction***

The findings produced in this research project can only provide an insight into trends or apparent correlations. The relatively small number of responses from rural/regional teachers makes some comparisons problematic. Some of the findings, however, despite not being statistically significant, nevertheless give a clear indication of noticeable differences between teachers working in rural/regional schools and metropolitan schools.

The overall trend to employ new technologies in the delivery of education at all levels and in all school systems means that all practising educators will almost certainly be exposed to professional development dealing with the use of technology in education, in a general sense. It is therefore essential that all educators have a clear picture of the current state of hardware and software development, and this picture needs to be refreshed regularly. The only way that this will occur is if a large number of music educators attend professional development courses that concern the use of technology in music education.

The relatively small proportion of rural/regional teachers who attend such courses should be addressed as a matter of some urgency. Several possibilities exist to improve the present situation:

- Offering professional development courses on-site at schools in rural/regional areas
- Touring with a technology show to rural/regional areas
- Discounted rates for rural/regional teachers at professional development courses
- Targeted and thorough advertising to rural/regional schools to ensure that all music educators are familiar with what professional development courses are available.

These and other measures may make a difference to the current situation. We owe it to rural and regional students to try to improve the situation that exists in the interests of equity and equality of opportunity.

It was obvious from the responses received that there is substantial support for the use of technology in music education as a desirable and potentially powerful tool to meet educational goals. One limitation of this research is the self-selecting nature of the final sample for this research project that has the potential to produce biased results. Many of the teachers who did not respond to the request to be involved in this research project may have made that decision based on a lack of interest in the general field - although it should be said that there are many other potential reasons for why educators may not have participated.

It was pleasing to note that responses were received from a number of teachers who had little or no experience with modern technologies in the music classroom. 30% of responses were from teachers who did not classify themselves as being confident in the use of technology in the classroom. It was, therefore, not just those teachers with a strong background in using technology in the secondary music classroom who responded. Nor was it only those teachers who have adequate equipment in the school who responded. Again and again, respondents expressed their frustration at the lack of resources at their disposal.

The diversity of experience of the teachers, and the obvious range of available resources in respondents' schools (from schools who commit \$750 to the whole music program, to one school that had just made a \$100, 000 investment in the area!) gives the author confidence that the final sample does represent the overall population of secondary music teachers to a substantial extent.

An observable trend, which has serious implications, is the apparent link between whether or not teachers make use of sequencers as a class preparation tool and student use of sequencers in the classroom.

As previously noted, of the total number of students making no use of sequencers in class, 85% were being taught by teachers who make little or no use of sequencers as a class preparation tool.

The most obvious reason for this is simply related to availability of equipment. If teachers do not have any of their own equipment, the schools' lack of resources accounts for both the teachers' lack of use of sequencers in class preparation and the students' lack of sequencers in class.

Whether this trend is due to equipment availability, or some other reason (or set of reasons), it is also probably true to state that if teachers are not using sequencing technology (or indeed, other forms of technology) on a regular basis, they are much less likely to feel confident and comfortable in employing these technologies in the classroom.

This phenomenon means that a lack of resources in schools can be a self-perpetuating phenomenon. A lack of teacher experience and expertise, relating (in part) to a lack of school resources, may lead to teachers who are less aware of the potential benefits of using new technologies in music education. These teachers are possibly less likely to make the acquisition of technological resources a high priority. The data give hope that this is not likely to occur. Virtually all respondents were desirous of greater access to sequencing and other technologies and expressed frustration that this equipment was, at present, out of their schools' financial reach.

Only 25 respondents (50%) indicated that students in their classes use aural comprehension software. This was a surprising finding given the long association of technology in this area of musical skill acquisition. 38% of rural/regional respondents use aural training software, compared with 54% of metropolitan respondents. There are a number of possible reasons for both the (relatively) low level of use of aural comprehension software and the greater use of this software by metropolitan respondents than rural/regional respondents. Many respondents may not be familiar with the software available in this area of music education, possibly, teachers are solely employing traditional techniques to teach these aural comprehension skills as they do not know what the technology could achieve. Another possible reason is, access to equipment. Some respondents reported very limited access to computer hardware and software, it simply may not be practical, therefore, for some educators to make use of computer technology in their classes.

Further research, and more detailed information, will be required to ascertain that the phenomenon of greater use of the Web is made by metropolitan teachers than their rural/regional colleagues truly exists and, if it does, to draw conclusions about what factors gave rise to it.

In response to questions about teacher use of the Web, informants were asked to indicate the extent to which they used the Web as an information resource in class preparation. The largest group of rural/regional respondents indicated that they “never” used the Web. The largest group of metropolitan respondents indicated that they used the Web, several times a term. The World Wide Web can potentially assist schools in rural/regional areas by facilitating effective communication and giving access to a wealth of resources, previously unavailable outside capital cities. Given the power of the resource, and the increasingly important part it is playing in most people’s lives, it is of concern that rural/regional educators are not making significant use of the Web as an information resource.

A larger sample and more detailed questionnaire would be required to discover the types of uses sequencing technology is being put to at various year levels, and the amount of time it is being used for.

The data shows that the peak use of sequencers is at Year 10. The reasons for this and, more importantly, the reasons for the lower levels of use at other year levels, requires more research. The data shows that there are an enormous number of sequencing products presently being used in Victorian secondary classrooms, and this fact makes it difficult to draw conclusions about the appropriateness of software for various year levels.

### ***Conclusion***

The field of technology in music education is an exciting and rapidly changing one. It is hoped that in very few years, this descriptive research will be rendered out of date, as new technologies are made available to schools on a more fair and equal basis, and all secondary students in Victorian schools, and their teachers, can make extensive use of the most appropriate technological tools to reach the goals of music education.

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