Research directions: Gender, technology and engagement in music

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Beyond sequencing and notation exercises, the traditional music teacher has been somewhat conservative in embracing technology. In a study on the attributes necessary to teach music effectively, pre-service and early-career music teachers did not mention skills and knowledge in technology as highly important (Harrison, 2004; Harrison & Ballantyne, 2005). Experienced teachers, however, acknowledge the need for skills in managing technology as one of the most important aspects of teaching in which proficiency is required (Harrison, 2004). Given that technology is a major part of current education and life practice and that the current cohort of school students has not known a world without technology, the perceptions of both music teachers and music students are worthy of investigation.

Technology is also perceived as a masculine pastime (Comber, Colley & Hargreaves, 1993). The review of the literature reported here indicates that engagement with technology in boys' schools is an area for future research. This paper describes a proposed project that examines preservice teacher motivation and confidence in the use of technology in schools and which will seek to provide a template for professional learning about music technology in pre-service and in-service phases.

Technology in the classroom

Technology experience is part of most students' life experiences in the 21st Century. A recent study conducted with students from diverse backgrounds (Messineo and DeOllos, 2005) found that most students were familiar with computers, with 99.6 percent having information technology experience. When asked to name all of the reasons they use a computer, 93.1 percent of respondents felt that they were "a tool to help them get things done". About 74 percent reported that the enjoyment of computers encouraged their use, while 76.4 acknowledged that courses that require the use of technology also serve as a motivation to learn. As most students have technology experience and find it a motivator within schools, the importance of technology in the classroom seems clear.

In a report highlighting the results of more than 300 recent surveys on education technology from professional journals, doctoral dissertations and other qualified sources, it has been argued that the use of technology in the classroom can enhance students' abilities to achieve in all subject areas at all levels and has a positive impact on student motivation and self-concept (Software Information Industry Association, 2000). Particular academic benefits are found in the areas of higher-order thinking and problem solving skills (Cradler, McNabb, Freeman & Burchett, 2002). Research (Newman, 2000; Software Information Industry Association, 2000, Henderson, 2000) also pointed to the key role that teachers play in ensuring these benefits are passed on to the students. In short, the presence of technology in a school or a classroom is not sufficient – teachers need to engage students in constructivist-style learning that utilizes technology in a meaningful way.

Technology in the music classroom

Music education has, over the millennia benefited from the use of technology to enhance students' understandings of musical concepts and development of musical skills (Webster, 2002). The definition of technology used in this paper is gleaned from Webster's (2002) treatment of the word, which refers to the use of applied science to aid communication and skill development. Whilst technology has developed over time from basic gears and levers in the 1600s to multimedia music experience software and composition programs readily found today, education philosophy has also developed over time, now tending to favour constructivist learning experiences over rote learning and memorisation (Webster, 2002). Music technology in the classroom has similarly developed – recently being used to allow students to construct their own understandings of musical ideas and feelings through interaction.

This development has been most noticeable in the area of composition (Beckstead, 2001), where the use of MIDI (Musical Instrument Digital Interface) and music notation computer programs has revolutionised the possibilities for student creativity.

Preliminary research

In a bid to explore whether the incorporation of technology may be an issue of importance in the music classroom, early-career and preservice music teachers were asked to list the valued attributes of early-career music teachers. It was found that both preservice and early-career music teachers valued:

- Pedagogical content skills and knowledge
- Planning skills and knowledge
- Contextual knowledge and skills
- Management knowledge and skills
- Repertoire and resource development
- Musical skills and knowledge (Harrison & Ballantyne, 2005)

It was notable that the ability to use technology in the classroom was *not* rated as very important by either preservice or early-career teachers.[1] Given the importance of technology in the lives of school students and the importance of technology in the classroom, this is surprising. In addition, with much literature in music education indicating that relevancy is a key component in maintaining student interest (Ballantyne, 2000; Wiggins, 2001), it seems that the incorporation of technology *should* be a concern of early-career and preservice teachers.

With this presupposition in mind, preservice students enrolled in *Studies in Music Education Technology* were asked the question "how would technology be used in your classroom?" Comments from this survey indicated that most students viewed:

- technology primarily in terms of compositional programs
- technology as a way to connect with students who were not necessarily competent in traditional musical knowledge and skills

These findings are consistent with previous research (Messineo & DeOllos, 2005; Newman, 2000), which points to the use of technology as a tool (in this case referring predominantly to notation and sequencing exercises). However, as noted by these preservice teachers, using technology as a tool within the music classroom enables students who are not able to engage with music in a traditional manner, to achieve quality learning. In this way, the use of technology can be seen to be situated within the category of pedagogical content skills and knowledge (Harrison & Ballantyne, 2005), although it was not explicitly mentioned in this context.

Most preservice teachers also acknowledged that their confidence incorporating technology in the classroom was largely influenced by their pre-existing skills and experience in music technology. This prior experience tended to rely on the resources/technology available on their practicum experiences, which resulted in great variation between preservice teachers. This is consistent with the findings by the Software Information Industry Association's research review (2000), which found that the extent of training and experience teachers have in technology use and integration is the greatest predictor of effective interaction and confidence using technology in the classroom. It does not, therefore, seem desirable for preservice teachers to rely solely on their pre-existing experiences in order to be qualified to teach effectively in music technology. Rather, preservice teacher education should enable teachers to develop the knowledge and skills required to successfully integrate technology within the music classroom.

It was particularly noticeable that gender was not mentioned by these preservice teachers as important in relation to technology. This was again surprising, given the strong findings in general education (Brooks, 1999).

Technology and Gender

Gender is an area of concern within technology education with particular equity concerns in relation to access, process and outcomes for girls (Volman & vanEck, 2001). Evidence from the literature indicates that school culture; classroom climate, traditional gender roles, and other societal pressures are responsible for this (Cooper and Weaver, 2003). The gender gap is maintained primarily by

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[1] It is interesting to note that Harrison (2004) found that technology is valued by experienced music teachers.

computer anxiety, social facilitation, stereotyping, and gender-based performance expectations. Boys tend to use computers for problem solving and programming (Cooper and Weaver, 2003), whereas girls tend to use computers for word processing. In addition, boys are far more likely to enrol in advanced computing courses and also have more experience with computers outside the classroom than do girls. The technology gap seems to widen as students move through the system, beginning in late elementary grades. By the time students reach tertiary level, most girls have opted out of computer science or engineering courses of study, which can lead to well-paying jobs in the future (Brooks, 1999). In a study of 24,768 computer and information sciences degrees conferred in the 1996 –1997 academic year, Gorski (2002) found that fewer than 7,000 of these degrees were earned by women. This is a concern for equity, because female students are therefore less likely to be able to take advantage of the benefits that technology has to offer. Stepulevage (2001) concluded that there needs to be an analysis that considers the interrelationship between computing and gender and heterosexuality in the classroom to help broaden our understanding of how girls and women might develop knowledge and skills in locations that are gendered masculine.

Gender in the music classroom

The study of gendered musical participation dates back more than a century. At the end of the 19th century, the article "Is the musical idea masculine?" (Brower 1894) appeared in the *Atlantic Monthly*. In a wide range of studies conducted between 1978 and 2001 (Abeles & Porter 1978; Koza 1993; Fortney, Boyle & DeCarbo, 1993; Delzell & Leppla 1992), the existence of a stereotypical gender bias in music was established - males tend to restrict themselves to a relatively small group of activities with performance on drums and lower brass being popular choices. Females' choices ranged more freely across a wider range and there is clear evidence that females were also assuming musical roles traditionally associated with males. More recently, Adler (1999, 2001) Harrison (2001, 2003, 2004, 2005), Hall (2004, 2005) and Collins (2005) have explored methods of examining gendered participation in music, with emphasis on a *critical genderist* thinking and action. This term describes the process of examining issues of gender across the entire gender spectrum. It allows for the examination of the experiences of individuals or groups regardless of gender or gender bias, illuminating the interconnectedness of differing experiences. While Adler and Harrison (2004) provide the philosophical framework for this examination, Collins (2005) has provided a practical framework for motivating and engaging students in musical activities through overcoming stereotypical gender models and involving students through hands-on activities. This approach incorporates teaching strategies, culture, character, relationships, peers, parents and role models in school policy and practice.

Previous studies exploring gender and technology use in the music classroom have had various findings. Whilst Newman (2000) found that "students did not recognise gender as being a factor in their ability or inability to be successful using music technology" (abstract), Henderson (2000) found that gender was a factor in the use of music technology in schools. Regardless, with the strong research background suggesting that gender is an issue of concern in relation to technology use, it seems timely to explore music technology through the context of gender in order to improve the preparation of music teachers in this area. This is an area where very little research appears to have occurred.

Proposed Methodology:

This research will be used to provide a proforma for professional development/preservice professional learning that would enhance teacher motivation and confidence to engage with technology in the music classroom. In particular, the exploration of a case study in boys' schools will provide a starting point for comparative research in girls' schools, using Collins' (2005) framework as a starting point for comparisons.

Research Questions:
1. How do teachers engage with technology (or not)?
2. Why do teachers engage with technology (or not)?
3. Why are there similarities and differences between teachers' and students' perceptions of technology use in the music classroom?
4. How should technology in the music classroom be best addressed in preservice teacher education?

Method:
This study will be conducted in two stages using a range of methods:

1. *Questionnaire survey of music teachers and music students* (focussing on research question 1 and 2).
2. *Semi-structured interviews with music teachers* (focussing on research question 3 and 4).

Research settings

The research is to be conducted in participants' own schools. Both are private boys' schools.

School A is an independent Catholic college for boys located in south-east Queensland, catering for boarding and day students from Years 5 to 12. There are approximately 330 students in the primary school and 1200 students in the secondary school, of whom 300 are boarders. The college was established in 1940. The college has a strong tradition of academic and sporting excellence. Approximately 500 students are involved in music at the college and technology is a major part of learning in music, with human and physical resources invested in this aspect of the curriculum.

School B is an independent Anglican school for boys located in south-east Queensland, catering for boarding and day students from Years Prep to 12. There are approximately 330 students in the primary school and 1200 students in the secondary school, of whom 150 are boarders. The college has a strong tradition of sporting excellence. Approximately 300 students are involved in music at the college and technology has become major part of learning in music, with a new music laboratory installed in 2004 and staff undertaking further study in this field to enhance the learning experiences of the students.

Questions for music education

This review of the literature and preliminary research into the area of music technology and gender in the classroom raise many questions – if early-career and preservice teachers do not see this as an area of importance on its own, should it still be considered important in preservice teacher education and professional development? Is it possible that although technology is important in the generalist classroom, it is undervalued in the music classroom? Is it possible that despite much research indicating that gender equity is a large issue in music education, this is not the case when referring to technology in the music classroom?

Teacher quality is largely dependent on the provision of quality preservice teacher education (Committee for the Review of Teaching and Teacher Education, 2003; Darling-Hammond, 2000). It seems that the incorporation of technology in the music classroom *should* be a concern of early-career and preservice teachers. Perhaps because music teachers have traditionally been conservative in their approaches towards technology in the classroom, teacher education has, in most instances, not embraced technology in pedagogy or curriculum. It also seems timely to explore whether the use of technology in the music classroom is influenced by gender differences in both students and teachers. This is arguably an area that needs further exploration, for the future of music education in the classroom and for the future of gender equity in the music classroom.

About the authors

Julie Ballantyne is a Lecturer in Music Education at the Australian Catholic University. Her doctoral studies explored the effectiveness of music teacher education programs in Queensland, and she has recently published in the areas of teacher education, music education and music teacher education. Current research interests include music teacher identity, music education for generalist primary teachers and the impact of gender on technology use in classrooms.

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