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## On Chunking, Simples, and Paradoxes: Why Jeanne Bamberger's Research Matters

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What does it mean to make an "appropriate hearing" of a work, and how, indeed, is it possible to describe another's hearing of a work at all? The questions raise a cluster of rather knotty problems. An individual's hearing is, perhaps paradoxically, a silent affair, so how can anyone know--how can we hear the hearing another has made? (Bamberger, 1994, p. 80)

The quote above is typical of the types of questions that drive Jeanne Bamberger's research. Most schooling focuses on the learning of facts, imparted by the teacher for students to memorize and retrieve. Many teachers and professors assume that they have done their jobs if the students can pass memorization exams. The onus is on the student to learn these facts with little regard for a student's particular learning strengths, prior understandings, and intuitions; if a student "doesn't get it," it is the student's problem. This exemplifies what many know as "the deficit model" of instruction and reading. Bamberger's research makes clear that early on she saw something was amiss with this approach. A great number of "under-performing" or "at-risk" students were actually quite skilled and clever, but they could not demonstrate this within the narrow parameters that generally frame the education system's approach to evaluation.

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Students often sit in classes as the teacher drones on about something with great passion and they wonder what the information has to do with anything beyond passing the upcoming test. Frequently students have thoughts such as “well, I must not be smart enough--everyone except me seems to understand what the teacher is saying and seems to hear what the teacher hears.” As educators, it is important to consider how many students sit in class with these exact same thoughts.

Seymour Papert (1980) made clear that dissociative learning, the type of learning experiences usually practiced in school settings where learning takes place in isolation from other activities, is at odds with how children naturally acquire their understanding of the world. Papert (1980) commented, "Piagetian learning is deeply embedded in other activities-the infant does not have periods set aside for 'learning talking.'" (p. 48) This displays the holistic approach to learning that served as the theoretical underpinnings of his work with children and computers. As with Papert, Bamberger's colleague at MIT's Artificial Intelligence Lab, Bamberger recognized the limitations built into the education system early on in her teaching career. As a researcher, she did not treat her research participants as objects. She interacted with them to better understand the disconnect between the behaviors she observed in the children she worked with and the educational labels that pegged these students as problems and got in the way of these students' abilities to progress.

### **Historical Context**

Bamberger's research in music cognition came about during a time of a resurgence of holistic thinking in music learning. In reaction to the scientific turn of the 1950s and early 1960s, specifically atomism as a response to Sputnik, and the over-

reliance on intelligence tests espoused by behavioral psychologists, educators began turning to the ideas of John Dewey and drawing on the humanist as well as the developmental and cognitive theories of Piaget and Bruner. Among those who feared the advent of programmed instruction and advocated emphasis on creative thinking within the school curriculum, the following sentiment by Judith Groch (1969) gets to the core of the thinking underpinning much Bamberger's work:

The chief objection to programmed instruction is that it discourages imagination and creative thinking, has no tolerance for doubt, and distorts its subject matter by squeezing the material into the arbitrary format of questions whose answers are unequivocally right or wrong. The student cannot speculate on solutions which did not occur to the designer of the program, nor can he entertain ideas which attract because they are vivid or intuitively compelling, not because they are next in sequence. (p. 204)

Pogonowski (2001) suggests the launching of Sputnik focused attention on America's lack of competitiveness and the need to concentrate on the development of higher order thinking skills in education. A variety of symposia and projects formed in both the general education population and among musicians and music educators to re-evaluate what students needed to learn to be considered "well educated." The emphasis on developing critical and creative thinking skills in future generations of citizens threw the spotlight on the arts as a means to accomplish this task. This was a moment in time when composers, conductors, performers, theorists, musicologists, and educators all came together to re-think music and music teacher education (e.g., Choate, 1968; Dello Joio et al., 1968; MENC, 1973). The Young Composers Project, the Contemporary Music Project for Creativity in Music Education, and the Manhattanville Music Curriculum Project were funded research projects that examined the integration of composition,

improvisation, and critical listening into a more comprehensive approach to the music education curriculum.

The Young Composers Project, funded by the Ford Foundation in the late 1950s to explore the ways in which the arts and artists could enrich communities, placed young composers in schools throughout the country to compose music for, and subsequently work with, student orchestras. While its many participants considered this project quite successful, it exposed areas of musicianship that music teacher education programs were not adequately addressing. Specifically, those areas of musicianship included understanding how to embed musical concepts in a more comprehensive manner within the context of music literature as well as the ability to address a constantly changing musical landscape. There was a belief that in order to serve the needs of the ever-changing population, music teachers needed to develop understanding and comfort with a variety of contemporary musical genres and not just focus on the musical traditions of the past (Dello Joio et al., 1968; MENC, 1973).

The Contemporary Music Project for Creativity in Music Education developed as an outgrowth of the Young Composers Project. Additional Ford Foundation Funding brought together composers, universities, and school districts throughout the country to develop curriculum, seminars, and workshops to educate a new type of music teacher. There was an emphasis on composing, performing, improvising, and analyzing in all aspects of the music classroom (Dello Joio et al., 1968). As suggested by Norman Dello Joio, the chair of this project, “The student in effect is expected to function as a practicing musician in a real world of music in an educational setting” (Dello Joio et al., 1968, p. 63).

In this same milieu of developing critical and creative thinking skills by situating the arts closer to the educational core, the Manhattanville Music Curriculum Project (MMCP) began in the 1960's as a reaction to the more traditional teacher centered approach to music education. The hope of the MMCP was to infuse music education with discovery and inquiry-based learning using Bruner's spiral curriculum as a pedagogical foundation. Like the Contemporary Music Project, the MMCP placed students at the center of their learning by engaging them as musicians through musical materials such as listening, thinking, performing, composing, and improvising. According to Pogonowski (2001), the MMCP was focused on helping teachers overcome their "reluctance and fears" (p. 27) about implementing creative strategies in the classroom as well as developing a relevant learner-centered music curriculum. As she explains, "The creative classroom functions optimally when the teacher, as well as each student, is involved in creative discovery, forming a community of musical inquirers" (Pogonowski, 2001, p. 26).

### **Bamberger's Contributions to Music Education**

Bamberger was one of the music teachers involved with the Contemporary Music Project for Creativity in Music Education. She developed a more comprehensive approach to engaging her students in musical thinking and doing. Taking the time to figure out the various ways students actually hear a musical passage and decoding how students hear musical boundaries are among the major contributions Bamberger has made to the field of music education. It is telling to consider whether music educators design musical experiences towards understanding what students are hearing or if they design them to produce the response they are looking for. Both approaches may in fact elicit a

variety of expected and unexpected responses. However, the latter approach will only acknowledge the validity of the teacher's expected response determined at the outset, in effect missing opportunities for teachers to understand how students are hearing, thinking, and learning.

Another important contribution is Bamberger's cognitivist approach to music software use and design. At a time when behaviorist skill and drill approaches to educational software were popular, she innovated a new way forward through designing musical microworlds for children to explore and problem solve in musical sound. The design of *Music Logo* and *Impromptu* affords teachers the ability to engage in a more process-oriented constructionist pedagogy and as a research tool to inquire into students' internal musical thinking and representations. Her materials illustrate myriad ways that computers can play an essential role in gaining insight into students' music learning processes.

In analyzing the various activities she has developed over the years for *Impromptu* (Bamberger, 1999; *Developing musical structures*, 2002), Bamberger has always reinforced that both pedagogy and curriculum should draw upon students' musical intuitions. These activities engage students in reflective practice by design. Her work also serves as a model for observational, action research into students' musical cognition and learning. In particular, her use of thick-description and qualitative observational research serves as one of the earliest exemplars of qualitative research in music education. In fact, Bamberger helped develop descriptive assessment competencies as part of her role on one of the assessment committees for the Institutes for Contemporary Music Education (Dello Joio et al., 1968).

### **Building on Bamberger's Work**

In thinking about Bamberger's contribution to music education, we, the authors, have identified the following insights that are particularly relevant to our work with pre-service music educators:

1. Assessing students' natural strengths by making their ways of thinking audible and visible, rather than imposing "methods" upon them.
2. Engagement in developing theory with and from practice: a "holistic" approach through analysis of teaching and music at the broad, middle, and micro levels.
3. Exploring musical structural simples, rather than the smallest parts.
4. Chunking--exploring and experiencing music from the middle-level.
5. Applied research with children--inquiring into musical intuitions.
6. Harnessing the potential of technology to make multiple perspectives and musical representations visible.
7. Wrestling with paradox, challenging pre-service students coming from traditional performance-based schooling with complex musical problems.

These insights, directly inspired by Bamberger's extensive body of writing and research spanning over 40 years, continue to be relevant in 21st century music teacher preparation. We have found these helpful in guiding and "de-schooling" our students in reconnecting with their inner, intuitive musician-selves and adopting the disposition of a curious practitioner or researcher rather than following the tradition of the authoritarian conductor or methodologist. These insights have coalesced to inform a "relational pedagogy" (Ruthmann & Dillon, in press) through which pre-service music educators explore the relationship between their musical selves, their students, technology, and



music in order to become more aware of their voice as a musician and teacher while using that to develop the musical voices of their students.

More specifically, the activities we use with our students build on many of the principles that Bamberger pioneered first with her development of *Music Logo* and later with *Impromptu*. Though one of our goals is to help our students gain fluency in a variety of music technologies, they also need to know how to draw on their lived experiences with these tools inside and outside of our classes to create similar musical experiences for their students. Rather than explain each new software program they encounter, we develop projects and experiences based around musical problem solving and problem posing. We design these assignments to allow students to demonstrate their understanding of a musical concept, explore the affordances and constraints of a software program, and learn how it works and how to interact with it in the process.

We then ask students to reflect on this whole process and analyze their own learning experiences with regard to challenges and issues needing consideration when developing assignments for future students. Among the many issues they may think about are the ways in which one translates an open-ended activity that allows for divergent outcomes into a technology based activity or software application. Another includes the ways in which our students might develop projects in support of peer-to-peer collaboration. In many instances, our students work directly with local school students to further enhance their own understanding of how to facilitate technology experiences in the classroom in ways that are relevant to and drawn from the musical intuitions and interests of school-age children.

Technology plays an important, embedded role in all of the classes we teach. In making decisions around how to best integrate technology in our own teaching, we are careful to focus on broad musical and learning concepts first, which can then support student exploration and learning through the use of technological tools. For instance, to help reinforce listening skills, we may ask students to explore several playrooms in *Impromptu* and make observations regarding the design and organization of the various “tuneblocks” to better help them make sense of the tune structurally. We may then ask them to take an existing song of their choice and re-create this song using *Impromptu*’s editing features, much in the same manner Bamberger has “chunked” a variety of simple tunes. This has served as an instructive evaluative tool. Once our students have had an opportunity to explore and familiarize themselves with the software, this exercise becomes a window into how they are hearing musical boundaries and perceiving or not perceiving musical patterns. We, in turn, share these insights with our students as a model for how they can design similar experiences for their students.

One of the challenges for our pre-service music teachers is to think about how to enter into meaningful musical activities with students who may not have the same schooled, formal knowledge of music our students have acquired in their own education. Ingrained habits of mind are difficult to change. Our music education students constantly grapple with the disconnect they experience between their formal musical knowledge and training and the reality of working with students who have not followed a similar music education pathway. Our students, who have spent most of their formal schooling in musical experiences that reify the importance of traditional notation-based music

learning, find making the leap to intuitive and sound-focused musical thinking particularly difficult.

To us, the most important insight from Bamberger's corpus of research is the importance of discovering, exploring, and honoring the musical knowledge and understanding students bring into the classroom. Her research provides music educators with a compelling model for the design of exploratory musical experiences as opportunities to learn more about how students make sense of sound. These experiences engage students with multiple paths for representing their understanding of musical sound through visual, kinesthetic, and technologically-mediated means. Music educators can all be inspired by Jeanne Bamberger's career-long dedication to designing and inquiring into engaging music-making experiences that promote, rather than stifle, children's musical curiosity.

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