

TECHNOLOGY'S ROLE IN ACHIEVING CREATIVITY, DIVERSITY, AND INTEGRATION IN THE UNDERGRADUATE MUSIC CURRICULUM: A SUMMARY REPORT

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ORGANIZATION

- Six Years of Data Gathering Regarding Undergrad Tech Competencies
- Results Viewed From Multiple Perspectives
 - “Pillars” of Curriculum: Creativity, Diversity, Integration: CMS Report
 - Diffusion of Innovative Technology Historically
 - Summary Results that Identified the Eleven Key Competencies
 - Creative Scenarios for Implementation
- Views of Next Steps

Wonderful Memories



US Department of Education Quotation

Technology also has the power to transform teaching by ushering in a new model of connected teaching. This model links teachers to their students and to professional content, resources, and systems to help them improve their own instruction and personalize learning (“Use of Technology in Teaching and Learning.” n.d.).

Use of Technology in Teaching and Learning. (n.d.). Retrieved February 17, 2017, from <https://www.ed.gov/oii-news/use-technology-teaching-and-learning>





This article offers a perspective on the role of technology in music teaching and learning in higher education highlighted by the many years of presentations by members of the Association for Technology in Music Instruction (ATMI) and the many journal publications found in such sources such as *Journal of Technology in Music Learning* (JTML), *Journal of Music, Technology and Education* (JMTE), and the *College Music Symposium: Instructional Technologies and Methodologies* among others.

Important new publications : *Music, Technology and Education* (Brown, 2016); *Oxford Handbook of Technology in Music and Education* (Ruthmann and Mantie, 2017) and *The Routledge Companion to Music, Technology, and Education* (Burn, McNicol, et. al 2017)

CMS TASK FORCE ON REDEFINING MUSIC STUDIES IN AN AGE OF CHANGE

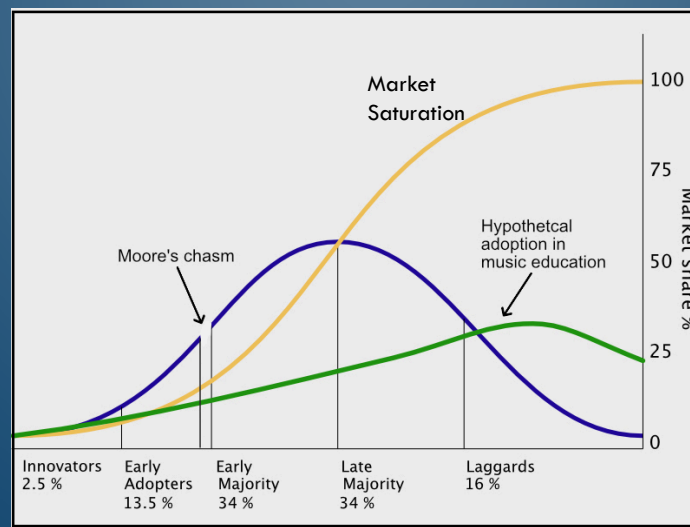
- Campbell notes: “If the preparation of undergraduate music majors is to become relevant to the work they will be required to do in the world, not only is a wholesale shift in music studies needed, but also in the deliberations that guide the change process” (Sarath, Myers & Campbell, 2016, p.1).



CICP (CONTEMPORARY IMPROVISER COMPOSER PERFORMER) MENTALITY AS OPPOSED TO A PERFORMER RE-CREATER CENTURIES-PAST MENTALITY

Technology, to name yet another pressing reform topic, similarly calls for more nuanced approaches and understanding that ground technological application in robust and deepened musicianship. Our position on technology is consistent with our position on all facets of musicianship: The establishment of creativity-based, CICP foundations will promote higher capacities for exploring, understanding, and critically examining the expressive and pedagogical capacities of technology amid the continuing line of technological developments that will undoubtedly continue to loom as prominent in 21st-century musical practice as life at large (Sarath, Myers, & Campbell, p. 148).

DIFFUSION OF INNOVATIVE TECHNOLOGY HISTORICALLY (MOORE, 2014; ROGERS, 2003)

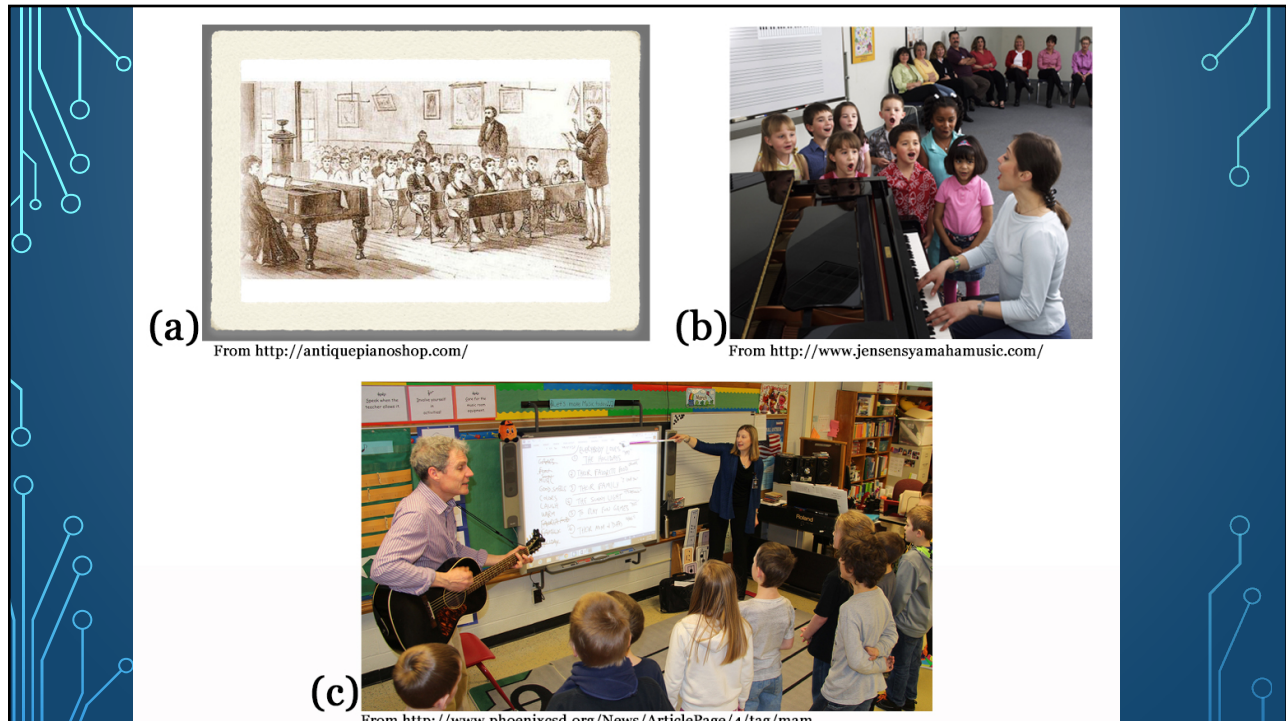


CATEGORIES OF MUSIC TECHNOLOGY OVER TIME: NORTH AMERICAN PERSPECTIVE

- **Computer-Based Music Instruction** (programmed instruction; HyperCard; standalone software; innovative portable delivery systems)
- **Interactive Multimedia** (Videodiscs; CD ROMs; web-based resources; game-based/virtual reality)
- **Portable Electronic Keyboards and Beyond** (Wurlitzer/Rhodes, Moog, MIDI, DX-7, Casio/Yamaha, Kurzweil (sampling), Computer-MIDI Keyboards, controllers of all sorts)
- **Music Notation** (mechanical typewriters, Xerox PARC, Postscript, WYSIWIG, MOTU Professional Composer, Finale, Sibelius, Notion, music XML, Noteflight, HTML 5, webMIDI, tablet-based solutions replacing paper)

CATEGORIES OF MUSIC TECHNOLOGY OVER TIME: NORTH AMERICAN PERSPECTIVE (CON'T)

- **Listening/Recording** (wax cylinders, phonograph recordings, LP, reel-to reel tape, cassette, CDs, Discman, MP3 players, portable players, cloud-based resources)
- **Music Creativity Tools** (Cakewalk, FruityLoops, Logic, Performer, ProTools, ACID, GarageBand, Loops, BIAB, Sketchpad, Ableton Live, Gestural tools (from Theremin to present-day performance-based controllers), web-based composition tools (Soundation, Soundtrap))
- **Social Networking Tools for Music** (BBS, AOL, CompuServe, Usenet newsgroups, Gopher, Listserv, Blogs, Twitter, Facebook, Pinterest, YouTube, Snapchat, Instagram, Facebook, SoundCloud, music-sharing tools)
- **Developments yet to be imagined** fully such as multi-dimensional, virtual-based environments



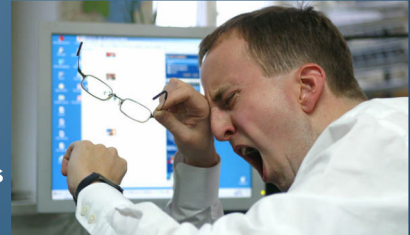
FOUR CHARACTERIZATIONS THAT SERVE TO SUMMARIZE THE *STATUS QUO* FOR MUSIC TECHNOLOGY IN EDUCATION

- Experimentation with applications, tutorials, and software development.
- Personal professional tools.
- Support of instruction, integration into teaching, the classroom, and the curriculum.
- Encouragement of student use of technology as integral to their learning & professional development.

Rich History Continues to Develop in Ways We Have Yet to Understand Completely

SUMMARY RESULTS THAT IDENTIFIED THE ELEVEN KEY COMPETENCIES

- 2011 CMS/ATMI Presentation, Richmond, Virginia
- 2012 CMS/ATMI Presentation, San Diego, California
- 2013 CMS/ATMI Presentation, Cambridge, Massachusetts
- 2014 CMS/ATMI Presentation, St. Louis, Missouri
- 2015 CMS/ATMI Presentation, Indianapolis, Indiana



5 studies over 6 years, 772 returned questionnaires, North America/Foreign Countries, consistent endorsement of 11 competencies, exemplars for application

ELEVEN COMPETENCIES

A final conclusion from our six-year series of studies suggests that the following eleven competencies make the most sense for the general population of music majors in undergraduate programs. No one way emerged in our work to best evaluate these competencies prior to student graduation; stand-alone music technology classes together with embedding skills in content areas seems most desirable.

- Enter and edit music using notation software
- Understand the basics of digital audio and how to edit digital audio files
- Record and mix a performance with digital audio software
- Demonstrate an understanding of copyright and fair use
- Create a music presentation with production software and appropriate hardware
- Create a streaming audio file (sharing recordings)
- Demonstrate an understanding of MIDI and its applications including performing with electronic, digital, and non-traditional instruments
- Demonstrate setting up a computer music workstation/problem solve technical issues
- Demonstrate an understanding of acoustics and audiology
- Create and edit a simple music video
- Use and manage a variety of social music sharing tools



USING MUSIC TECHNOLOGY IN CONTEMPORARY TEACHING PRACTICE: CREATIVE SCENARIOS

- Merging the current climate for undergraduate curriculum reform (heralded by the CMS Task Force work), the categories of music technology (noted historically above), instructional contexts, and our nearly six-year work on identifying competencies, we end with possible scenarios for the undergraduate curriculum that might be considered by the profession. **We hope that this final section serves to encourage further sharing of ideas in the many professional forums, articles, and books**
- **SEE HANDOUT FOR DESCRIPTIONS OF CREATIVE SCENARIOS!!**



Instructional Context

Competencies

Historical Categories

	Computer-Based Instruction	Interactive Media	Electronic Keyboards	Notation	Recording Listening	Creativity Tools	Social Networking Tools
Theory Composition Orchestration Arranging	6 9		7 8 9	1 A	2 B	3	11
Performance Improvisation Lessons/Recitals/ Ensembles	7	5	7 8 9 C	1	2 3 4	5 6 D	5 6
Music History World Music	6 E	5 F		1	3	5	5
Community Engagement/ Outreach Entrepreneurship		5 6		1	5 6 G	5 6 H	10 11
General Studies Interdisciplinary Studies	8	5 6 7	7	1	2 3 4 I	1 3 5 6 J	10 11
Technology Teaching/Learning Pedagogy	8 9	5 6 7 K	7 8	1 L	2 3 4	1 3 5 6	10 11 M
Final Capstone Experience	8 9	5 6 7 N	7 8	1	2 3 4	1 3 5 6	10 11 O

Note. Numbers refer to the eleven competencies noted below. Letters refer to the scenarios described.

1. Enter and edit music using notation software
2. Understand the basics of digital audio and how to edit digital audio files
3. Record and mix a performance with digital audio software
4. Demonstrate an understanding of copyright and fair use
5. Create a music presentation with production software and appropriate hardware
6. Create a streaming audio file (sharing recordings)
7. Demonstrate an understanding of MIDI and its applications including performing with electronic, digital, and non-traditional instruments
8. Demonstrate setting up a computer music workstation/problem solve technical issues
9. Demonstrate an understanding of acoustics and audiology
10. Create and edit a simple music video
11. Use and manage a variety of social music sharing tools

FINAL THOUGHTS: WHAT'S NEXT????

- Keep collecting creative scenarios
- Refine key competencies
- Work with our institutions to implement as many of the ideas in this presentation that make sense for your context
- Engage as many students as possible in the creative and musical use of technology to teach the art more effectively
- For Peter and Dave: FINISH THE FOURTH EDITION OF **EXPERIENCING MUSIC TECHNOLOGY**: OXFORD UNIVERSITY PRESS: 2019 (using as a base these key competencies with a multitude of projects, and entirely new exemplars to match our current age of computers, tablets and smartphones across multiple operating systems. Exciting times!!!)

