

DEFINING UNDERGRADUATE MUSIC TECHNOLOGY COMPETENCIES AND STRATEGIES FOR LEARNING:

A FOURTH-YEAR FOLLOWUP-EXEMPLARS

CMS/ATMI St. Louis, 2014

- **Peter R. Webster, University of Southern California**
- **David B. Williams, Illinois State University, Emeritus**



Slides available at:

<http://peterrwebster.com>

<http://teachmusictech.com/resources.html>



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NEED

- Help create national data on music technology competencies for undergraduate music majors in general
- This, despite the fact that technology now plays a critical role in music teaching, learning, performing, and composing
- Results of such a survey of music faculty and administrators in college/university/conservatory music units in the North America would prove useful in curriculum planning
- Help in guiding the preparation of professional, instructional, career guidance materials, etc.



BACKGROUND



- Discussion at CMS/ATMI Conference in 2010 that a listing of competencies may be useful; Webster study of faculty opinions at Northwestern
- NASM decision to relax requirement for a specific course
- Technology standards for state and national accreditation of teachers
- Long-term efforts by TI-ME to identify competencies at the K-12 school level
- Webster & Williams 2011 Richmond CMS/ATMI survey presentation defining a core set of undergraduate music technology competencies
- Panel discussion on competencies in Richmond
- Williams & Webster 2012 San Diego CMS/ATMI survey report looking at implementation by music disciplines and confirmation of 2011 key competencies
- Williams & Webster 2013 Cambridge CMS/ATMI survey probing new technologies and searching for suggestions on advocacy
- <http://teachmusictech.com/resources.html>

2011 RICHMOND SURVEY



DESIGN

- Based on our years of experience in teaching college-level technology courses, development of our own materials, and in discussion with a number of colleagues, we arrived at a set of 51 competencies in 7 families:
 - Physics of Sound
 - File and Disk Formats
 - Digital Audio/Recording and Editing
 - Notation
 - Teaching, Collaboration, Distance Learning
 - Multimedia
 - Digital Citizenship and Historical Trends

COMPETENCIES FOR ALL AND FOR DIFFERENT FIELDS OF STUDY

- We asked respondents to first indicate which of the 51 competencies were important for ALL students graduating with an undergraduate degree in some field of study in music
- We also asked if any competencies were important for particular fields of study:
 - Performance
 - Education/Therapy
 - Music Theory
 - Music History
 - Composition
 - Technology



RESEARCH QUESTIONS

Global

- What are the most frequently marked competencies in each “family”
- What are the most frequently marked competencies overall

Specified Fields of Study

- What competencies may be unique to a field of study
- Cross tabulations by size of institutions across competencies for families and global

RESPONDENTS

- **N= 276** total responses from approximately 2,699 emails (731 opened email, 306 clicked on link)
- Representation from all states and Canada with the exception of Alaska, Delaware, Hawaii, New Mexico, Rhode Island
- Highest response rates: California (24), Texas (19), Florida (13), New York (13), Illinois (12), Michigan (10), North Carolina (10), Virginia (10), CANADA (10), Minnesota (9), Ohio (8), Georgia (7), Alabama (6), Connecticut (6), Massachusetts (6) South Carolina (6), Wisconsin (6)

TOP 70% ACROSS ALL FAMILIES (23 ITEMS)

Answer Options	Response Percent	Response Count
Describe what an overtone series is how it relates to instrument timbre.	94.0%	235
Show how to use a digital audio program to record a music performance and save the file for listening.	93.9%	216
Create a musical score with a notation program that includes expressions, articulations, and appropriate music notation conventions.	93.9%	216
Describe the concept of “fair use” and how it relates to music use in teaching or creative work.	93.5%	203
Describe under what circumstances both printed and recorded music can be copied and distributed.	87.6%	190
Demonstrate how to edit a score with a music notation program, including transposing parts, copying and pasting notation, and saving scores in different formats	85.7%	197
Show how to burn an audio or a data CD with a computer.	83.3%	204
Demonstrate how to edit a sound file by cutting, copying and pasting portions and add simple effects such as loudness control and fade in and out.	80.4%	185
Understand the capabilities of different levels of music notation software, include options for online notation.	80.4%	185
Describe the difference between digital audio and MIDI sound files.	79.6%	195
Describe what a compressed audio file is and be able to create one for distribution on the Internet.	79.6%	195
Presentation software to support a presentation about music that uses text, animation, digital audio, video, and graphics.	79.1%	159
Show how to use an aural skills/music theory fundamentals software program.	78.2%	176
Describe the basics of how sound is perceived by the ear and understood by the brain.	77.2%	193
Explain the difference between analog and digital sound.	76.8%	192
Show how to extract digital audio from an audio CD to a computer.	74.7%	183
Distinguish between what is represented by these commonly encountered file formats: wav, .aif, .mid, .mov, .doc, .pdf,	74.3%	182
Explain the functions of a basic digital music keyboard and show how to attach one to a computer.	73.9%	170
Describe how to setup a music workstation that might include a computer, music keyboard, mixer, headphones, amplifier	71.7%	165
Demonstrate use a computer or other digital device to control a video projector, “smartboard” projection system	71.6%	144
Describe how hardware and software might be used to assist in improving music performance skills.	71.6%	161
Explain the basic functions of an audio mixer.	70.4%	162
Show how to troubleshoot a problem with audio in and out on a computer when recording.	70.0%	161

OVERARCHING COMPETENCIES

(PRIORITY ORDER)

1. Record and mix a performance with digital audio software
2. Enter and edit music using notation software
3. Demonstrate an understanding of copyright and fair use
4. Create a CD/DVD or streaming audio package of a recording(s)
5. Edit digital audio
6. Demonstrate an understanding of acoustics and audiology
7. Create a music presentation with presentation software and appropriate hardware
8. Demonstrate setting up a computer music workstation and the ability to problem solve common technical issues

- N= 276 total responses from approximately 2,699 emails

2012 SAN DIEGO SURVEY



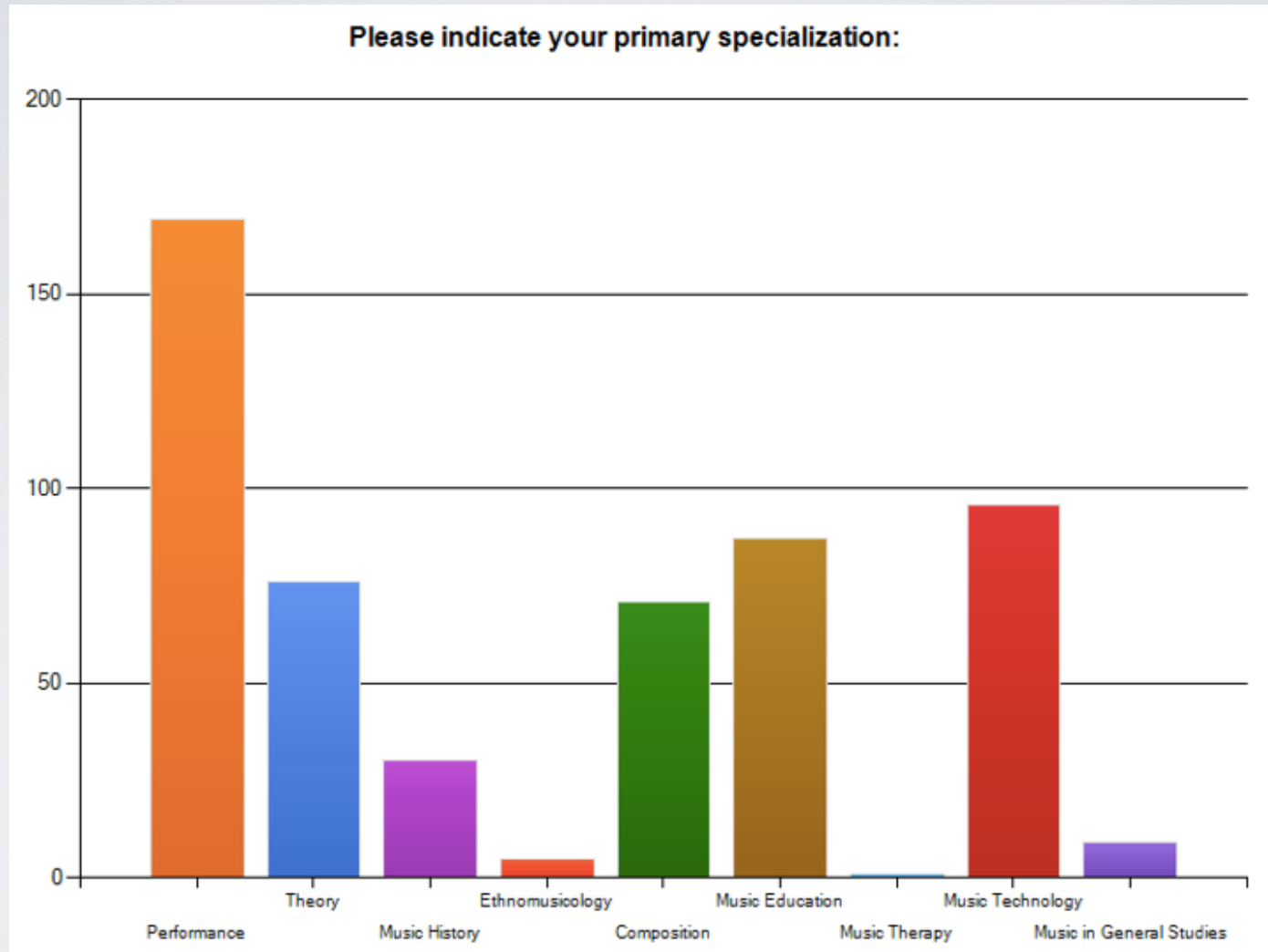
STRATEGY FOR 2012

- Confirmation of the set of 8 core music technology competencies from 2011 survey
- Curricular options for learning music technology within an undergraduate music program
- Identifying strategies for integrating the acquisition of these competencies within music programs in general and within individual instructor's teaching
- Identifying capstone experiences that integrate competencies and provide exemplars for synthesis of music learning

RESPONDENTS

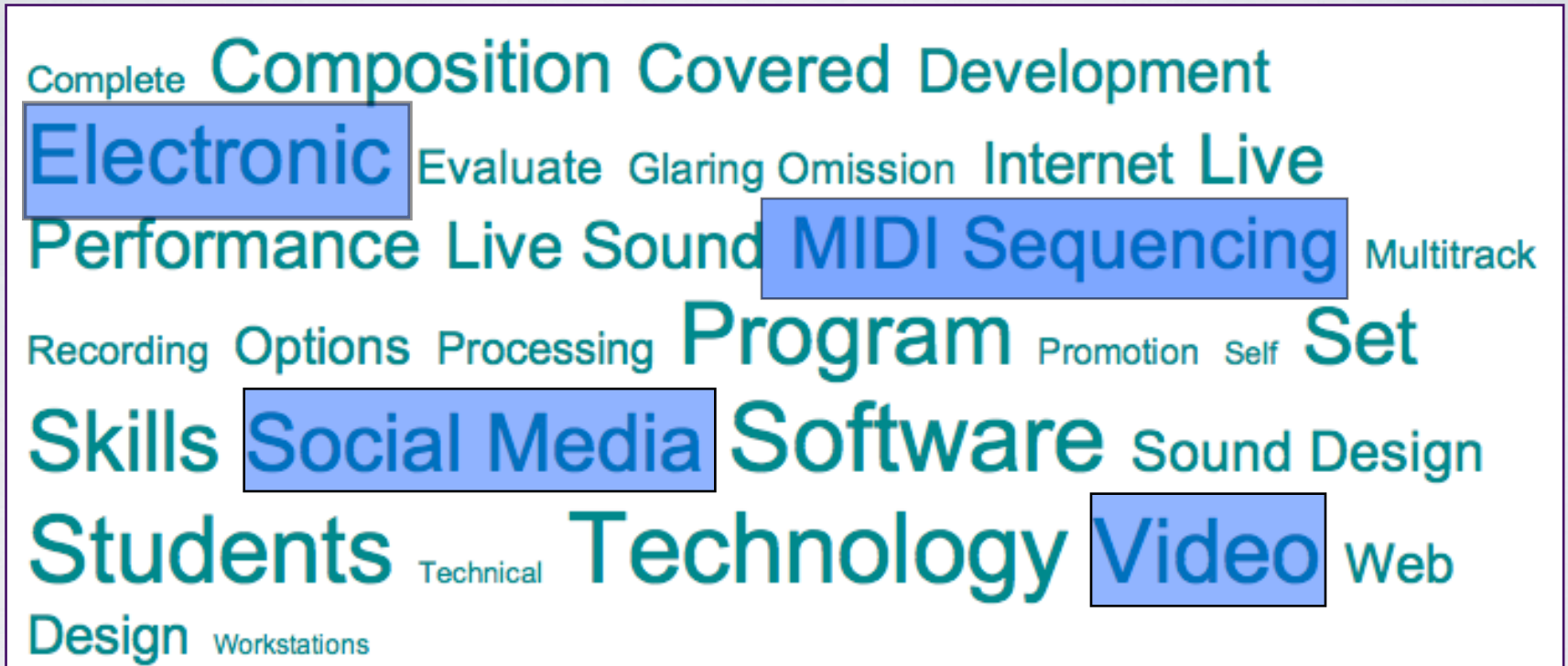
- N = 413 opened survey, N= 327 finished (80% finished)
- Representation 46 UNITED STATES (missing HI, AK, NM, and VT)--both Red and Blue states including OHIO
- States with the highest response: CA, TX, FL, NY, IL, MI, VA, OH
- 8 schools in CANADA
- Schools in UK, Greece, and Australia

SPECIALIZATION



Other includes music business & industry, administration,
music in general studies

OTHER COMPETENCIES



CORE COMPETENCIES: SUB-DISCIPLINE

		Performance	Theory	History	Composition	Mus Ed
Demonstrate setting up a computer music workstation and the ability to problem solve common technical issues	5 Most Important	12.7% (18)	10.4% (7)	0.0% (0)	11.9% (8)	15.2% (12)
	4 Very Important	19.0% (27)	16.4% (11)	13.6% (3)	13.4% (9)	36.7% (29)
	3 Important	23.2% (33)	35.8% (24)	40.9% (9)	35.8% (24)	27.8% (22)
	2 Less Important	28.2% (40)	19.4% (13)	22.7% (5)	20.9% (14)	8.9% (7)
	1 Least Important	16.9% (24)	17.9% (12)	22.7% (5)	17.9% (12)	11.4% (9)
1 Least Important	12.0% (17)	9.0% (6)	13.0% (3)	6.0% (4)	6.3% (5)	

SUMMARY POINTS

- Data upheld the set of core competencies across diverse school settings and academic specializations (others suggested were MIDI & MIDI sequencing, video, and social media)
- Notation skills endorsed by all sub-disciplines
- Very high endorsements:
 - Composers for Recording and Editing Digital Audio
 - Music Educators for Creating DVD and Presentation
 - Music Historians for Presentation
 - Performers and Historians for Copyright
- 57% of schools offer either a required (35%) or elective (22%) course in music technology
- 22% of programs integrate technology competencies into the curriculum with 8% specifically noting music theory classes

- Outside of music technology classes, theory and music education classes carry the brunt of music technology integration.
- Recording competency is viewed by many as a higher-end skill relegated to recording classes, rather than the intended impromptu recording from a laptop, iPhone, portable recording device with a microphone
- Competencies in the use of video, social media usage, web design/multimedia were noted
- Lack of capstone experiences with technology and a general sense that we have a ways to go in real music technology integration into college music instruction

LET'S HOPE IT DOES NOT COME TO THIS
ONE COMMENT FROM A RESPONDENT

“Students pick it up on their own, and
sometimes teach us faculty.”



2013 CAMBRIDGE SURVEY

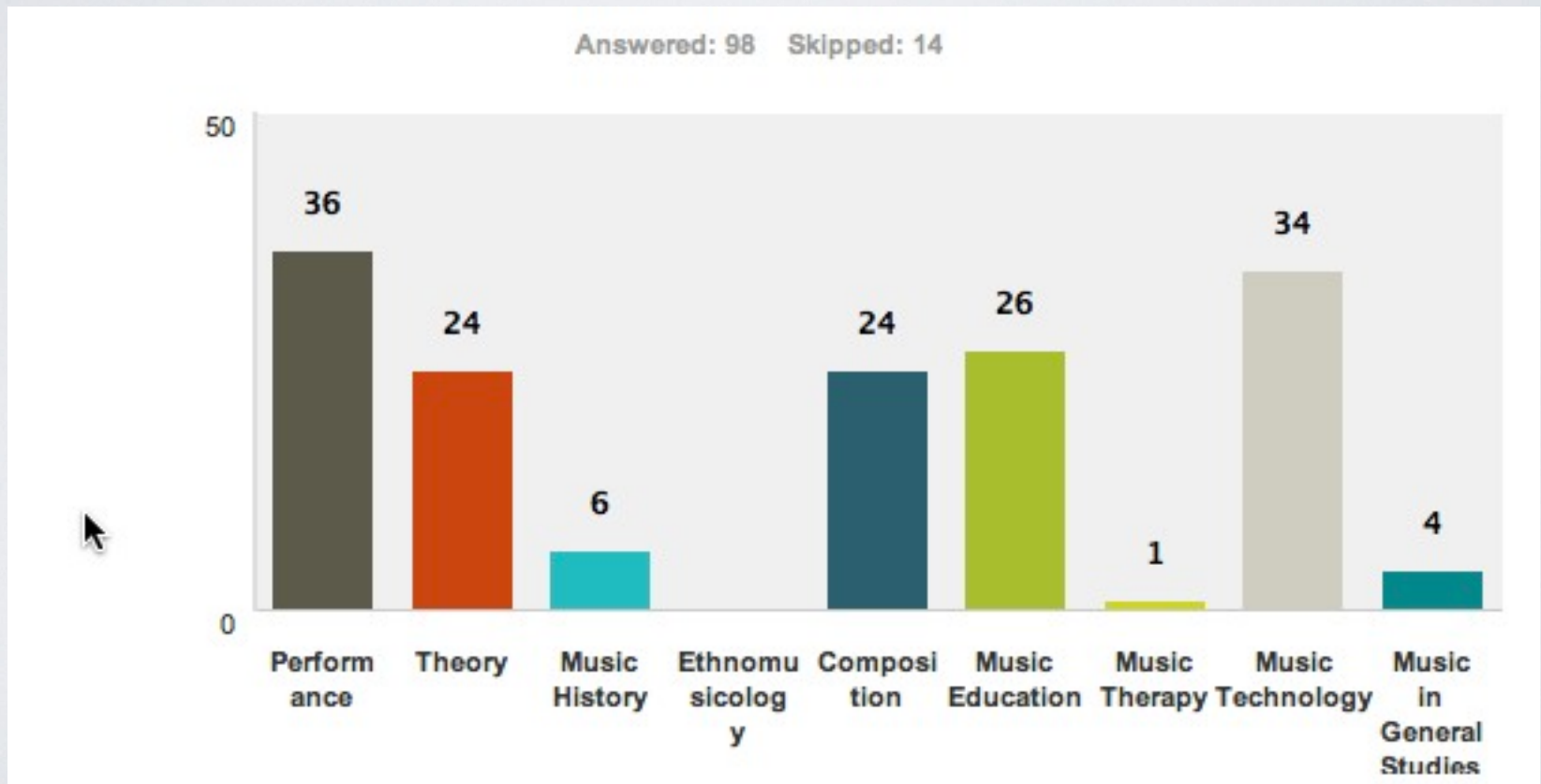


STRATEGY FOR 2013

- Confirmation of a modified set of 8 core music technology competencies from 2012 survey plus 3 additional competencies
- Looking for more open-ended responses to provide further insight into 2012 issues concerning implementation
- Seeking sense of direction with the impact of new technologies with cloud computing, social networking, MOOCs and distance learning, etc.
- Looking for suggestions for advocacy to promote these competencies and implementation strategies on a nationwide level

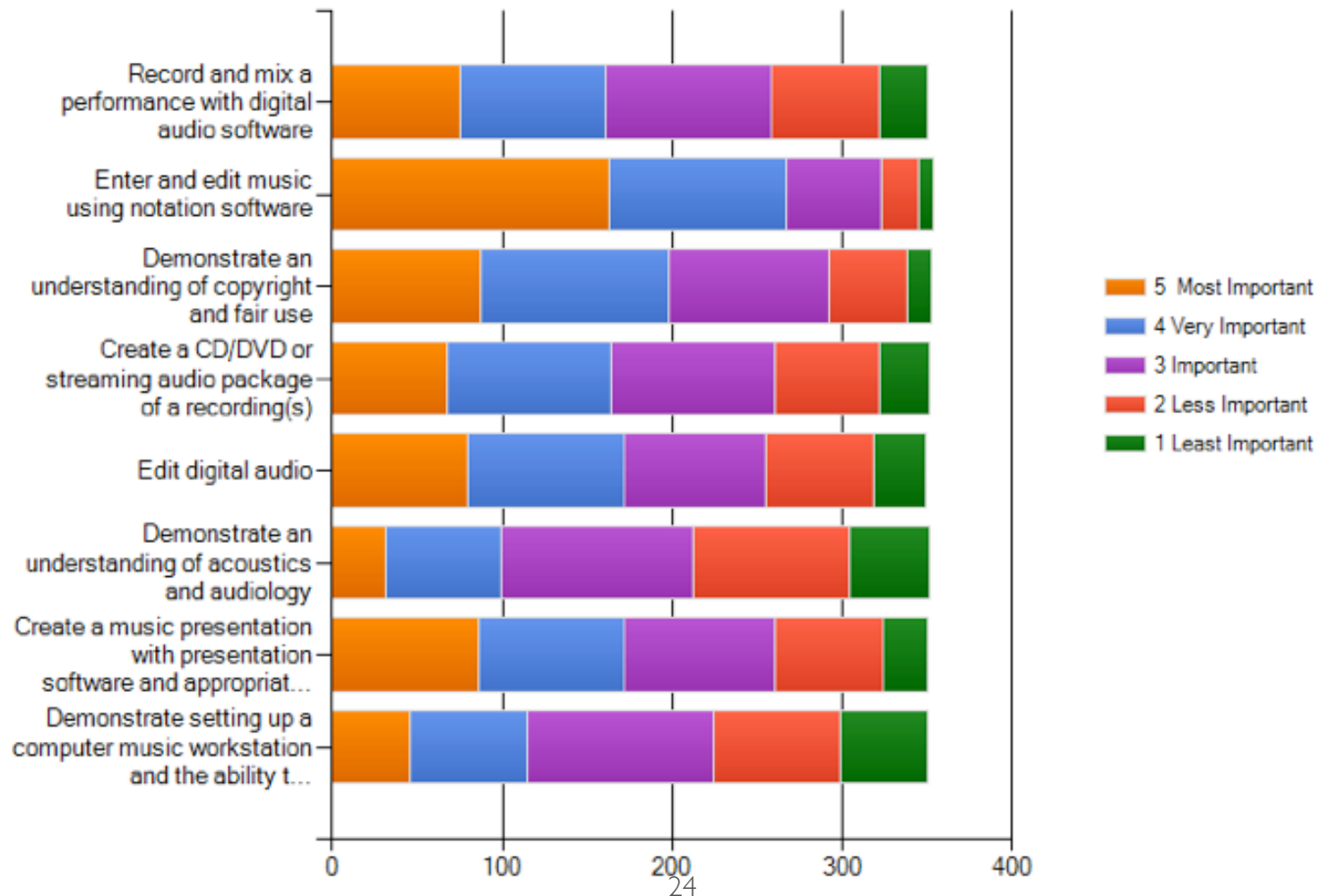
SURVEY DEMOGRAPHICS

113 respondents out of 399 email invitations sent
All invitations sent to 2012 respondents

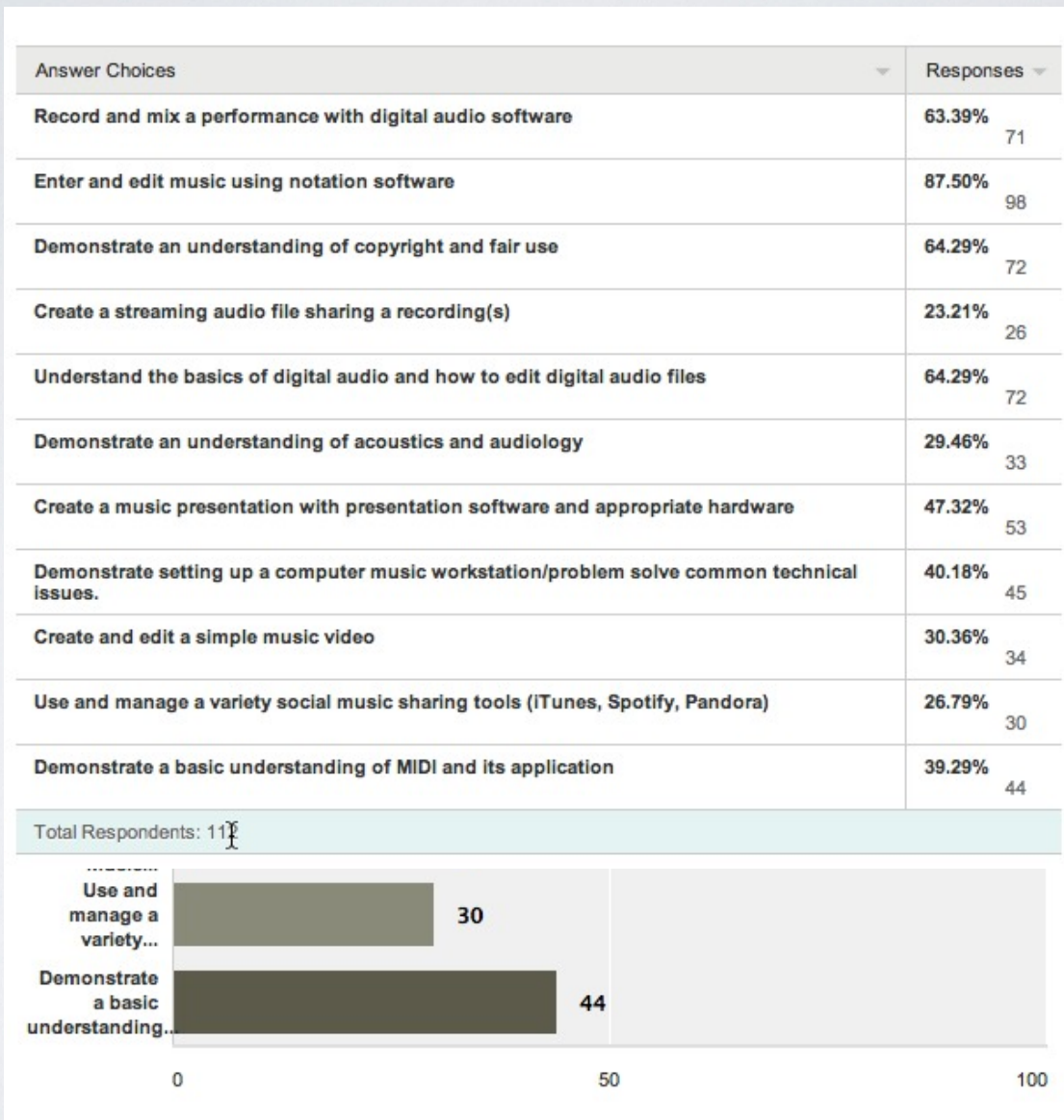


CORE COMPETENCIES: 2012

The 8 competencies that have been identified from our past surveys are listed below. Please rate the importance of each for your undergraduate music students on a scale from 5 to 1, with 5 as most important for your students and 1 as least important for your students.

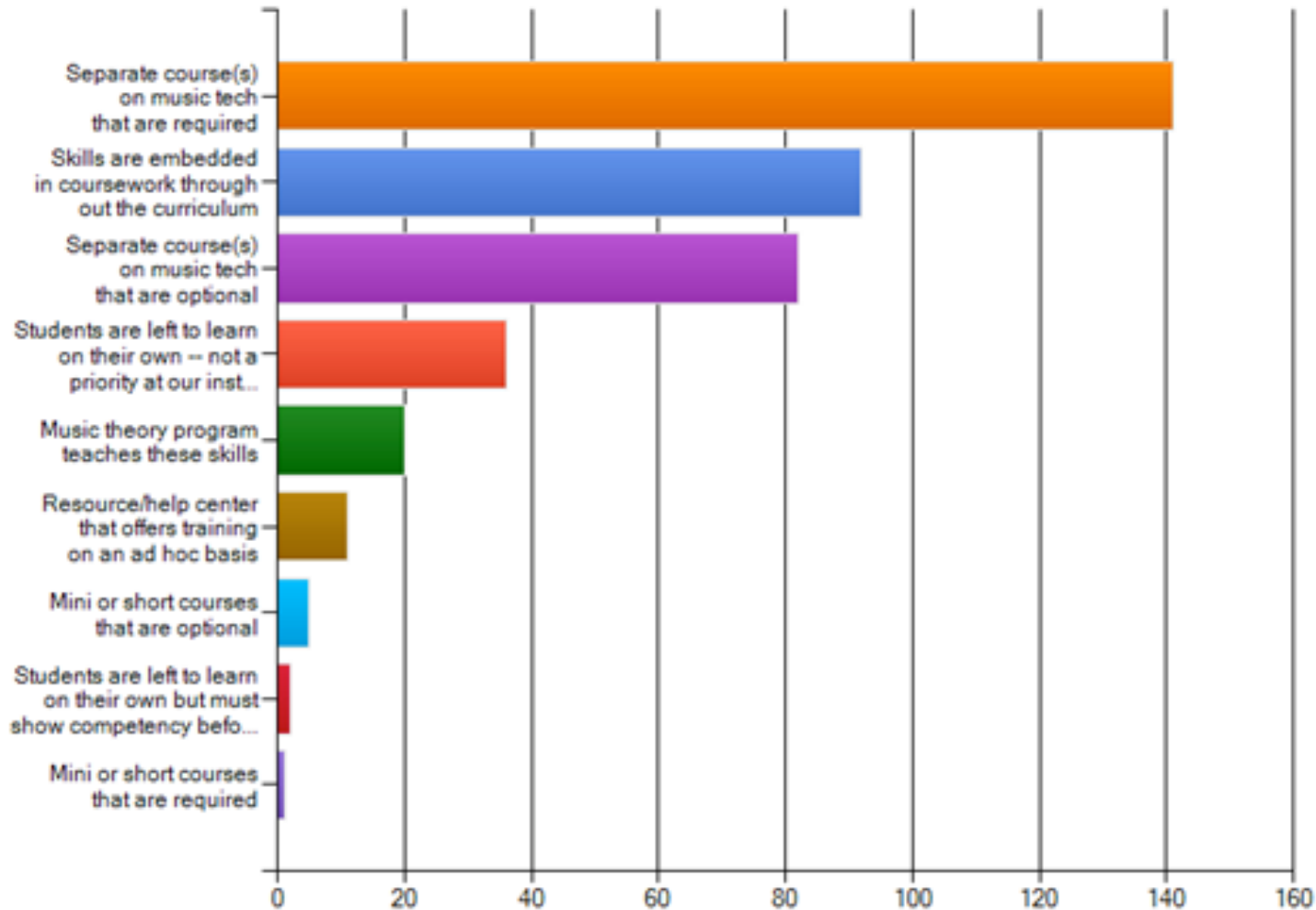


2013: SELECT THE TOP FIVE COMPETENCIES THAT YOU CONTINUE TO FEEL ARE THE MOST IMPORTANT FOR ALL UNDERGRADUATE MUSIC MAJORS



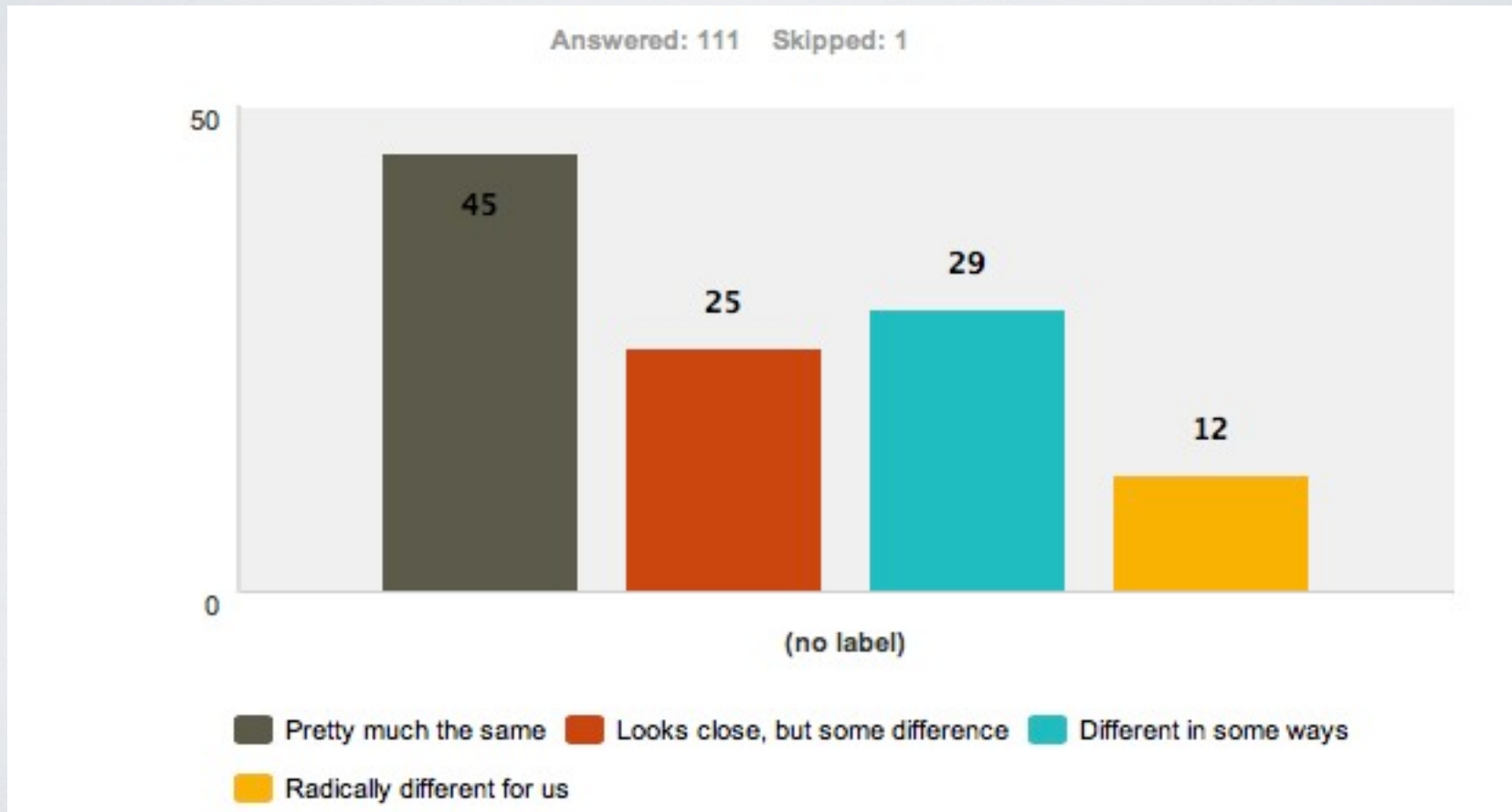
OPTIONS FOR LEARNING: 2012 DATA

Please indicate the primary way music students learn music technology skills in your institution's program.



Price & Pan
2002 found
39% elective
music tech
course and
30% required
for music ed
majors

2013: REVIEW SUMMARY OF LAST YEAR'S RESPONSE TO THE QUESTION OF WHERE THE PRIMARY PLACE WAS THAT MUSIC STUDENTS LEARN TECHNOLOGY SKILLS IN MUSIC UNITS. RATE THE EXTENT TO WHICH THIS REFLECTS YOUR CURRENT UNIT'S REALITY.

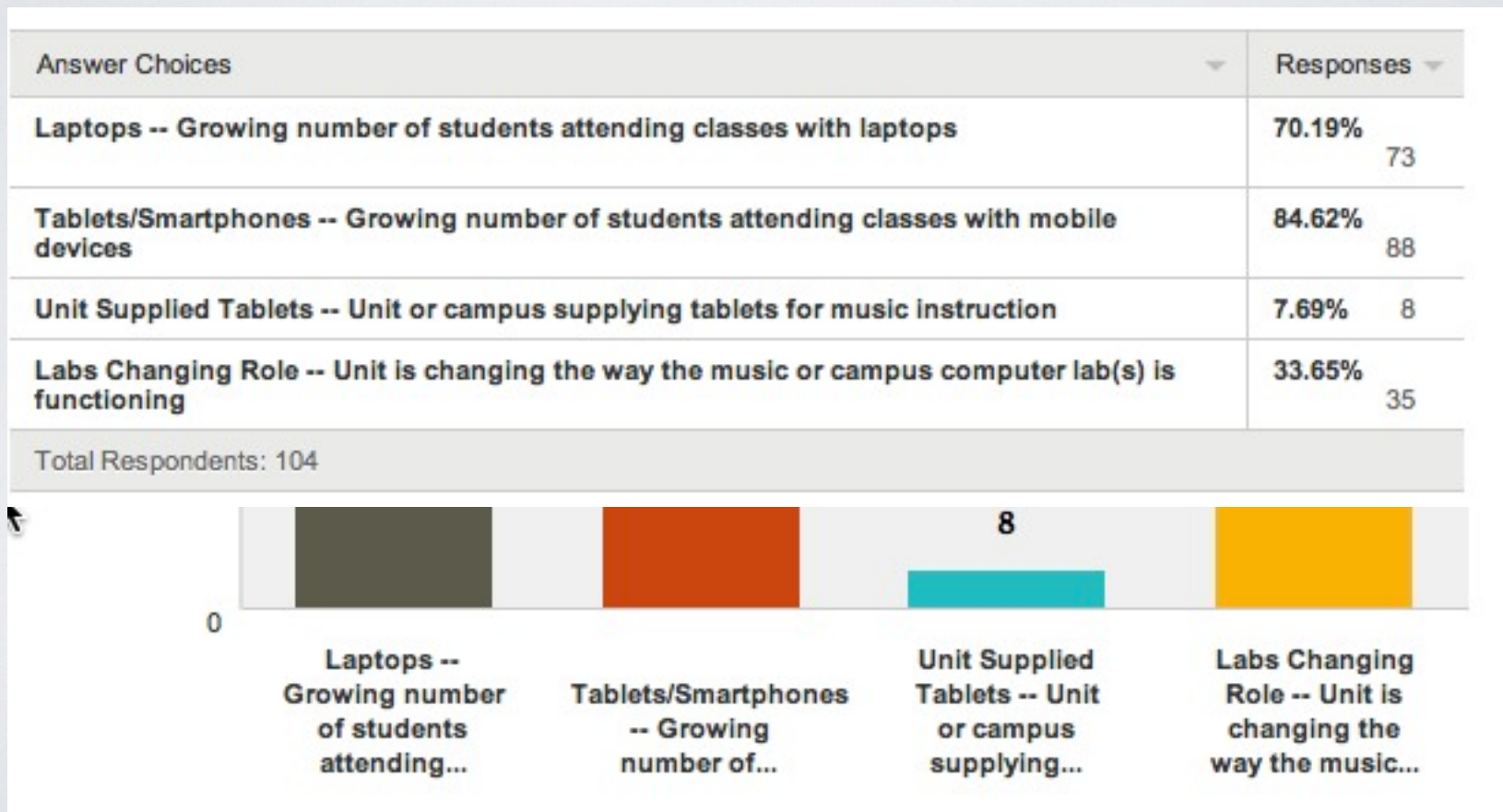


PROGRAM INTEGRATION

Who carries the burden?

- Recording Digital Audio: Intro Music Tech Classes, More Advanced Tech Courses
- Notation: Music Theory and Composition Classes, Come With Skill/On Own
- Copyright: Music Business Classes, Music Education Methods, Not Covered
- CD/DVD Production and Digital Editing: Come With Skill/On Own, Intro Music Tech Classes, Not Covered
- Acoustics: Voice Classes, Science Electives, Advanced Tech Courses, Not Covered
- Presentation Software and Computer Workstation: Music Ed Methods, Intro Music Tech Classes, Come With Skill/On Own, Throughout Coursework

2013: WE HAVE CREATED A SET OF DELIVERY CONDITIONS THAT YOU MAY SEE AS CHANGING DRAMATICALLY FOR YOU AND YOUR STUDENTS IN YOUR UNIT. PLACE A CHECK MARK NEXT TO THOSE CONDITIONS THAT YOU SEE AS CHANGING YOUR UNIT'S THINKING ABOUT INSTRUCTIONAL DELIVERY



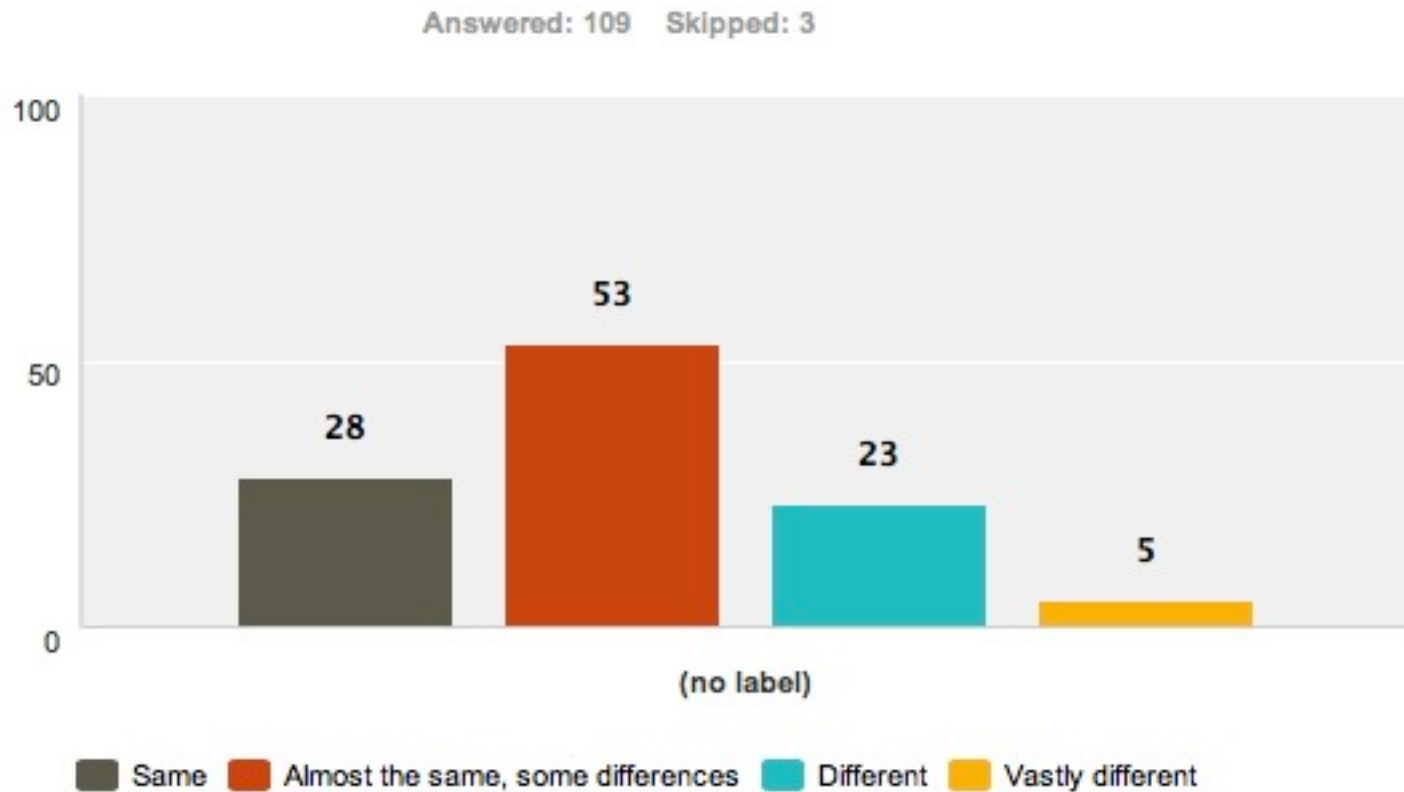
QUALITATIVE (N=37): DELIVERY

- Positive View (16%)
- Laptops (24%)
- Smartphones (24%)
- Tablets (14%)
- Flexible Spaces/Labs moving to BYOD (17%)
- Cautionary Concerns (10%)



- The technologies that we need most are classrooms equipped with tables for collaboration and small group discussion. And, power ports for mobile devices and computers. Not a specific computer/tablet technology, but tools for collaboration and interaction.
- Laptops (and other devices) have also made it possible for us to move increasingly away from such things as paper handouts.
- We've recently redesigned our lab to be more of a collaborative workspace rather than just a room filled with rows of computer workstations
- Somewhat problematic as standards of behavior with these devices are yet to be established

2013: REVIEW A SUMMARY FROM OUR 2012 SURVEY OF WHERE SPECIFIC COMPETENCIES ARE TAUGHT AND INTEGRATED INTO MUSIC CURRICULA. RATE HOW WELL THIS REPRESENTS YOUR UNIT.



2013: PLACE A CHECKMARK NEXT TO THE STATEMENT THAT BEST REFLECTS THE DISPOSITION OF YOUR MUSIC UNIT TO THE INTEGRATION AND DELIVERY OF MUSIC TECHNOLOGY ON CAMPUS.

Answer Choices	Responses
Integration and delivery are constantly addressed by our music unit and we have stayed on top of the curve for many years	12.96% 14
Discussed often by faculty and administrators and this has resulted in substantial changes in curriculum integration and changes in delivery in recent years	29.63% 32
Discussed some by faculty and administrators but little is being done to change the way we integrate or deliver	28.70% 31
Little interest in these matters by the music unit in general and what changes have occurred in integration and delivery are generally accomplished by individual faculty working on their own	25.93% 28
These things occur naturally with really little need for changing integration and approaches or delivery. Students will use tools they have to accomplish the goals and objectives of our curriculum.	2.78% 3
Total	108

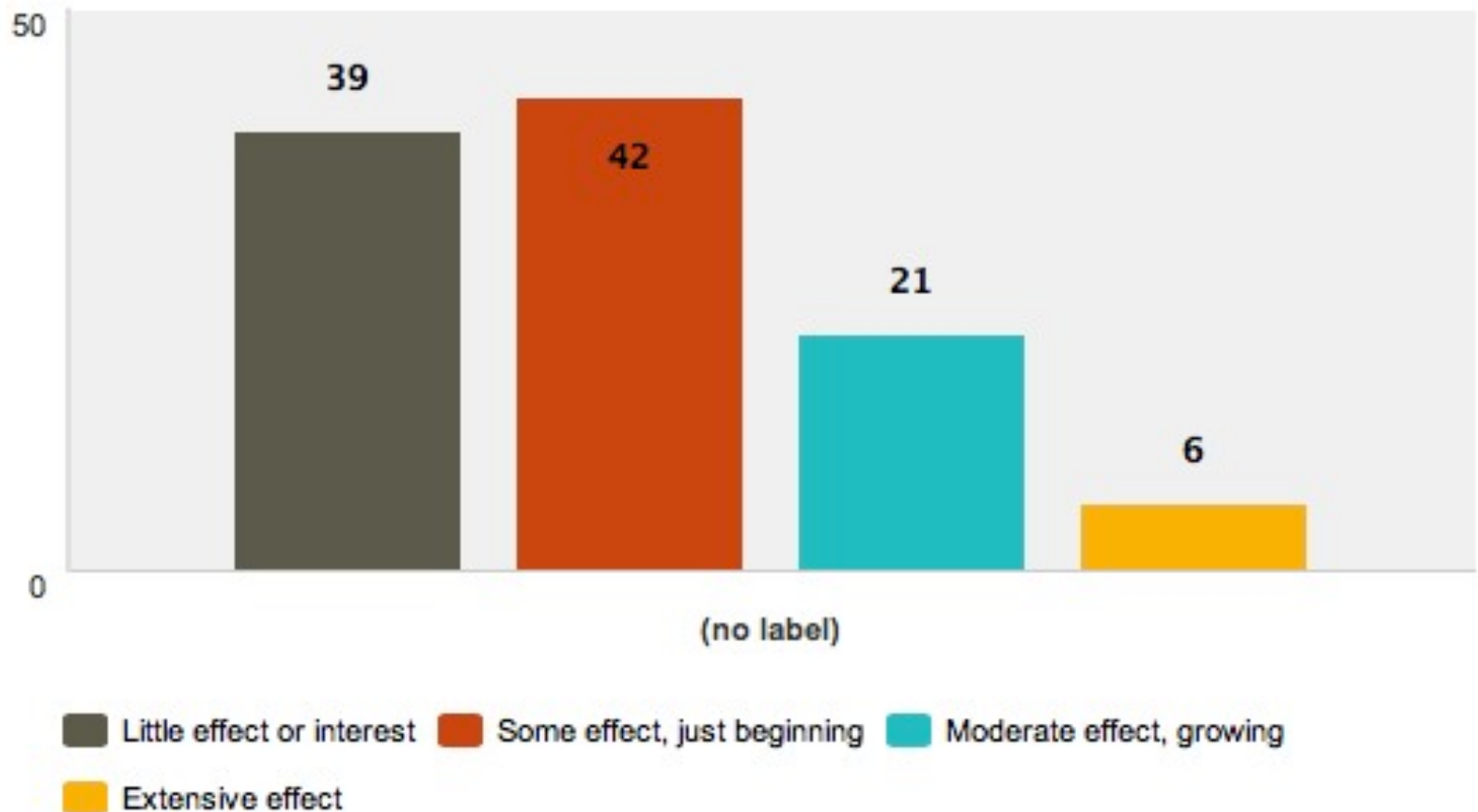
[Comments \(34\)](#)

INFLUENCE OF NEW TECHNOLOGIES



2013: RATE THE EXTENT TO WHICH ONLINE COURSE OFFERINGS OF ALL TYPES ARE EFFECTING INTEGRATION OF DELIVERY OF INSTRUCTION.

Answered: 108 Skipped: 4



QUALITATIVE (N=43): ONLINE COURSE OPPORTUNITIES

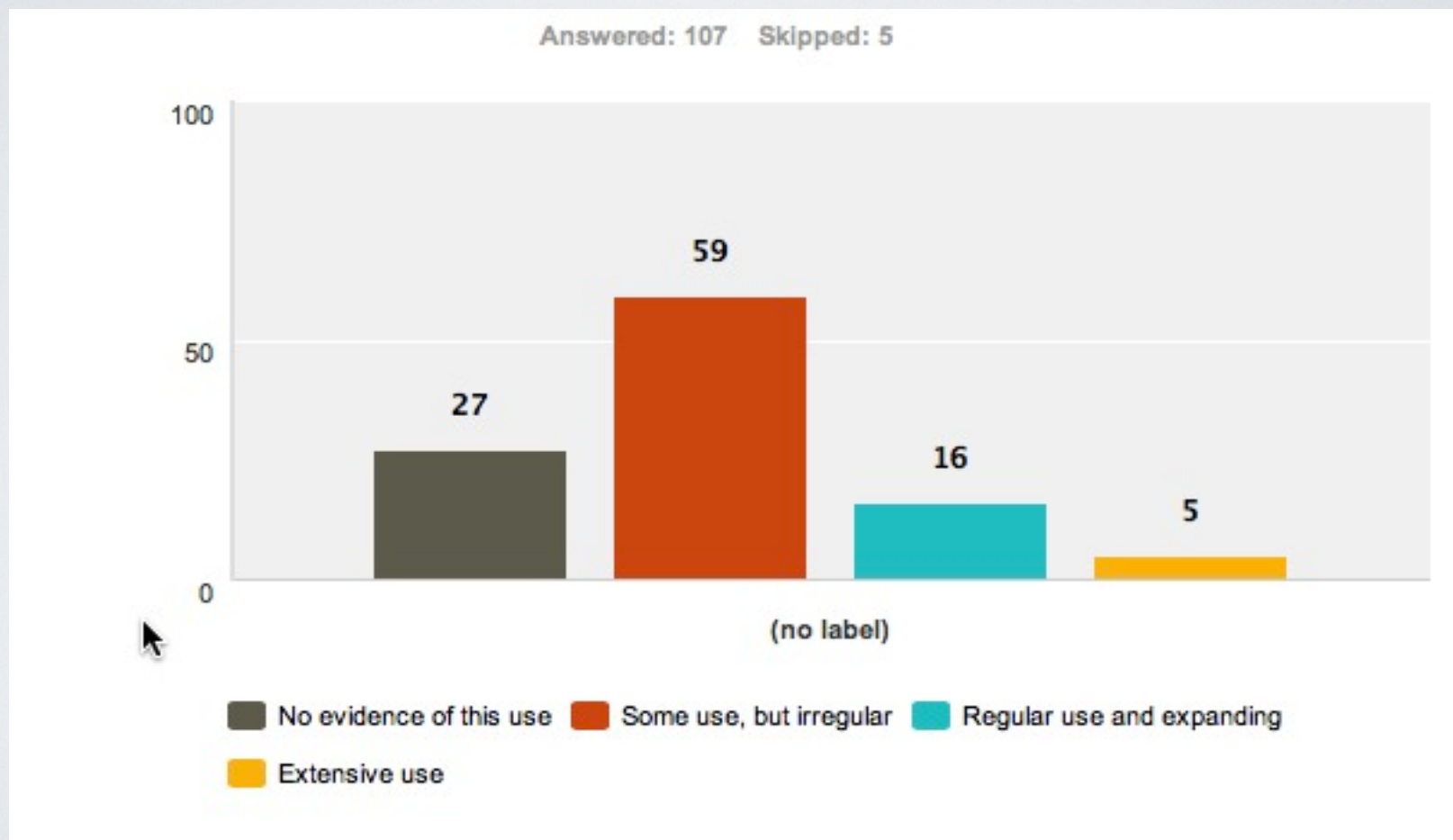
- A few online courses (14%)
- General education context (12%)
- Lack of engagement (14%)
- Little interest (19%)
- Little evidence of MOOCs



- We are using online teaching in some of our courses. **Where this has been done, the music department has been able to reach many students who would not have been able to participate in music classes previously.** However, only a few teachers are willing to take this step, and although there has been considerable support from college-level administration for such initiatives, **most faculty in the department are unwilling to employ online methods**
- **What little we have encountered (students transferring credits, etc.) have not been effective.** As an example, a student taking an on-line Music Fundamentals class was not able to pass our theory placement exam (even though the grade in the on-line class was good).

2013: RATE THE EXTENT TO WHICH YOUR UNIT IS USING THE INTERNET TO ENHANCE MUSIC TEACHING.

E.G., USE OF GUEST LECTURES VIA VIDEO CONFERENCING, EXCHANGES OF MUSIC PROJECTS WITH STUDENTS IN OTHER SCHOOLS, INTERNET-BASED PERFORMANCE OR COMPOSING EXPERIENCES, OR OTHER REAL-TIME REMOTE INTERACTIONS.



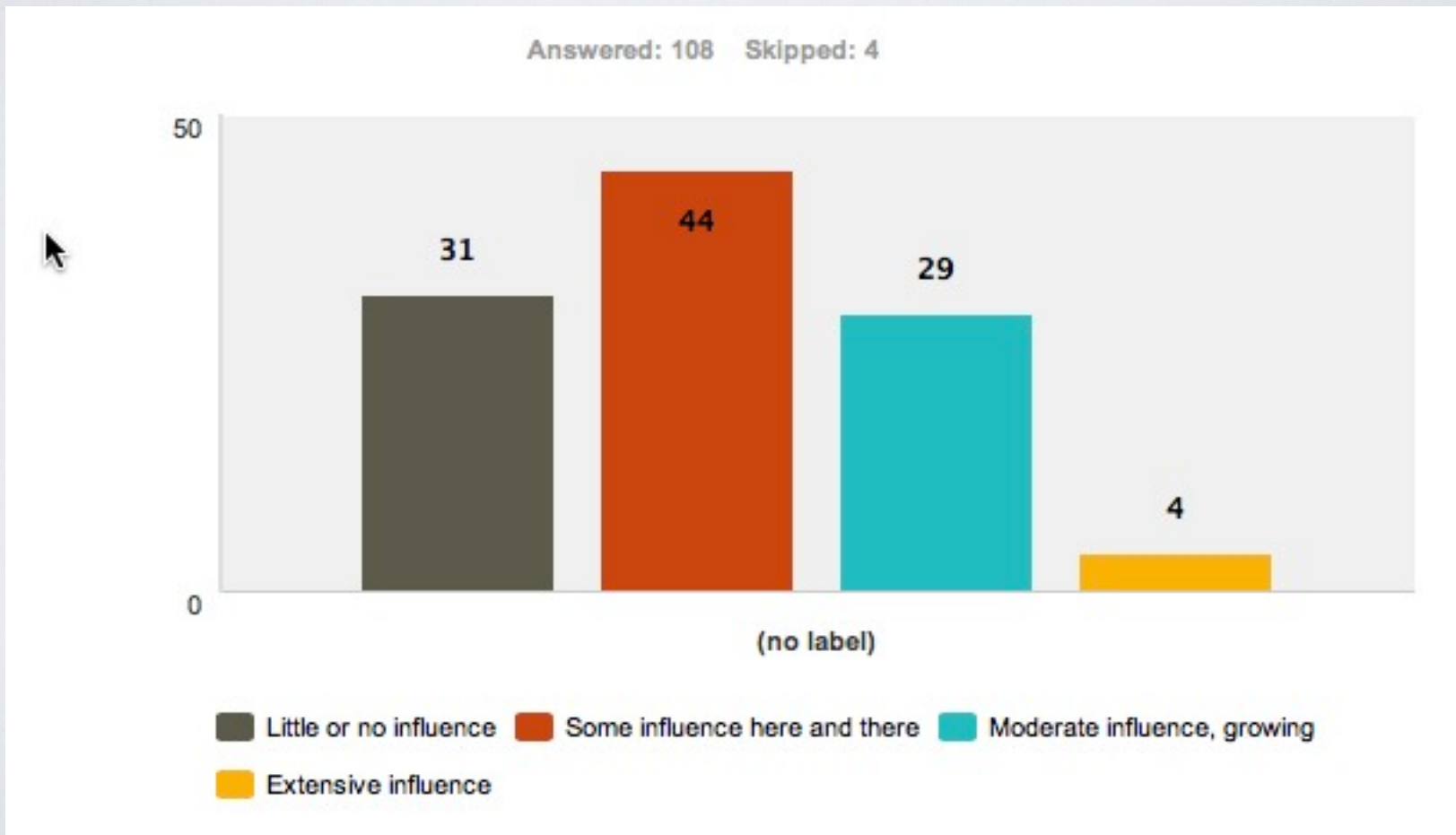
QUALITATIVE (N=36): INTERNET USE

- Video Conferences (35%)
- Performances (14%)
- Nothing/Little (14%)
- Frequently Mentioned Software
 - Skype (25%)
 - YouTube (11%)



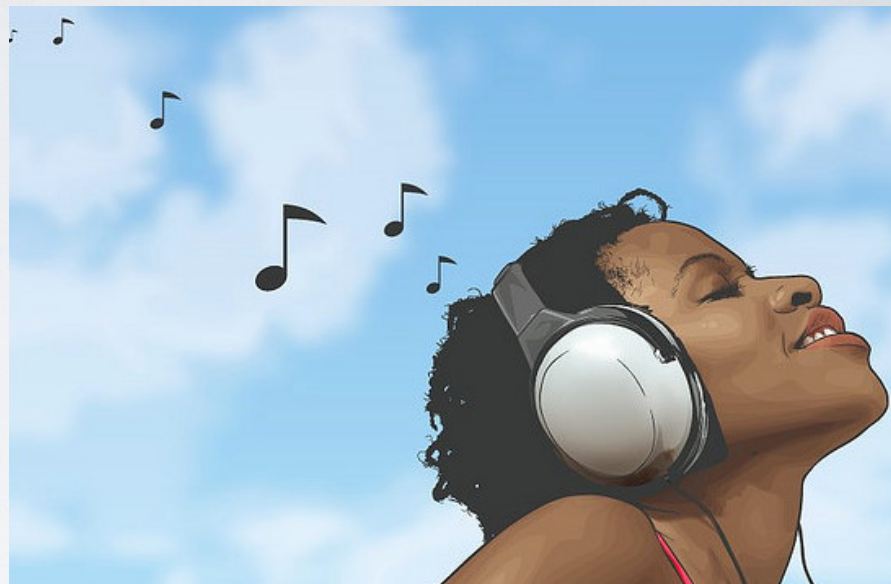
- All of the above regularly and routinely. We are in our 6th year of offering a mentoring program for high school composers as we enhance our music majors' experience ... Inside Music online as a curriculum to enhance and expand the teaching of composition in hopes that more high school teachers will participate.
- Last week, the band had a rehearsal with the composer of a piece they're preparing to perform. The composer and his students were in a faraway state and came to us through Skype or some other technology.
- Yet to be convinced but I do my meetings over Skype as it saves me journey time for mainly boring and irrelevant meetings.
- Most of the music faculty want little to do with technology.

2013: HAS THE RISE IN THE NUMBER OF OPPORTUNITIES TO USE THE CLOUD-BASED TECHNOLOGIES FOR SHARING MUSIC, SCORES, DOCUMENTS, PERFORMANCES, COMPOSITIONS, TEACHING MATERIALS ETC. INFLUENCED THE CURRICULUM AND ITS TEACHING WITHIN YOUR MUSIC UNIT?



QUALITATIVE (N=38): TO THE CLOUD

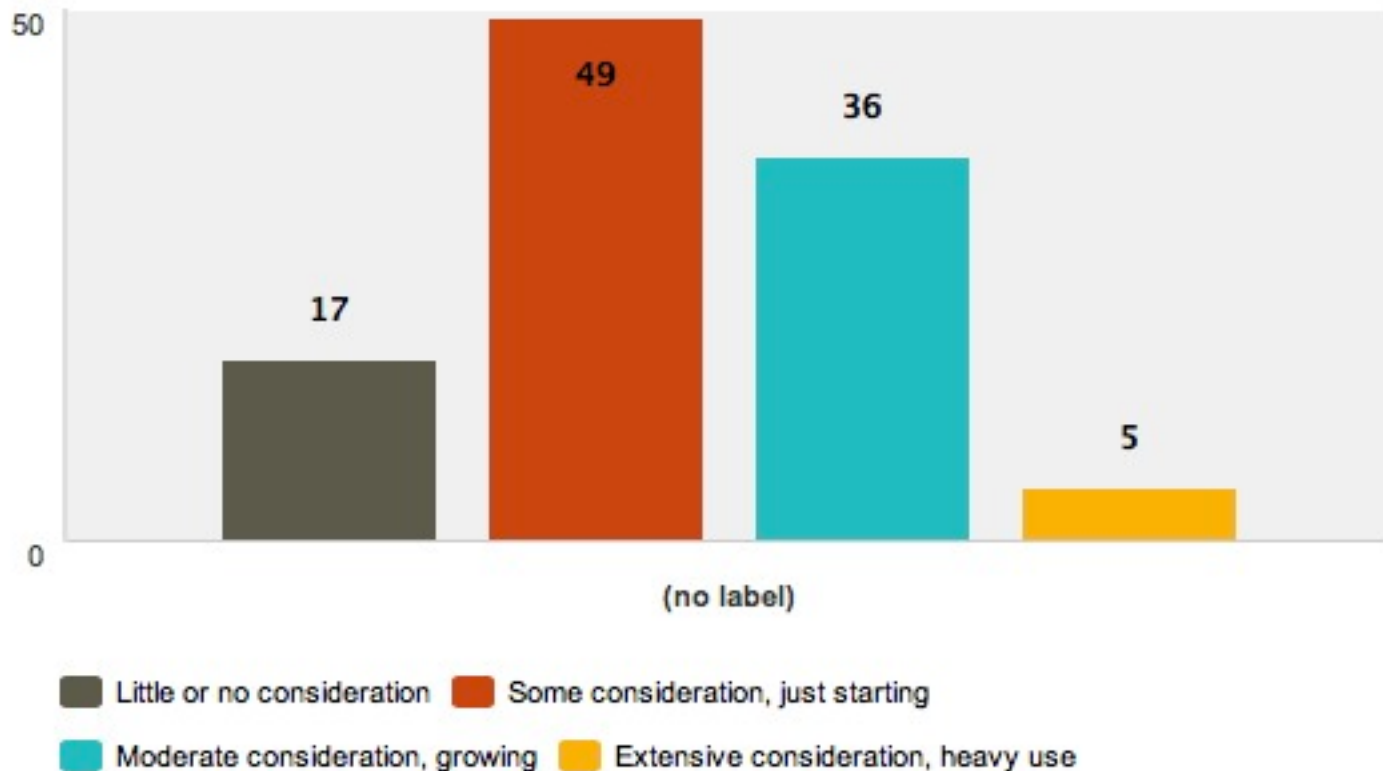
- Rising Use (11%)
- Just Beginning (16%)
- Nothing/Little (16%)
- Cautionary Concerns (13%)
- Frequently Mentioned Software
 - YouTube, Wikis, DropBox, Google Tools, iCloud , Sound Cloud, Blogs, IMSLP, Noteflight/InsideMusic, Auralia Cloud



- We are also using several cloud based software applications so our students don't need to be tethered to the music lab. It has also helped me to open up enrollment in my tech class beyond the 19 seats in the lab.
- Yes, we're using things like Mendeley, dropbox. Some instructors use cloud-based sites **instead of blackboard** for managing courses
- The hardest part about this is that most students still do not have access to cloud-based technologies. We fail to remember that students AND departments often don't have the money to keep up with all of the technology.
- I will never use Cloud-based computing and resources because of security issues and instances of the Cloud "going down," as well as data being lost.

2013: RATE THE EXTENT TO WHICH YOUR UNIT HAS CONSIDERED MUSIC TECHNOLOGY INTEGRATION IN YOUR CLASSES GIVEN THE RISE OF MUSIC'S PRESENCE IN THE SOCIAL MEDIA OF TODAY (FACEBOOK, INSTAGRAM, ITUNES AND ITUNES U, BLOGS, TWITTER, SPOTIFY, AND YOUTUBE/OTHER VIDEO SHARING SITES).

Answered: 107 Skipped: 5



QUALITATIVE (N=35): SOCIAL MEDIA USE

- Non-Instructional Use (31%)
- Student Use (11%)
- Nothing/Little (14%)
- Cautionary Concerns (9%)
- Frequently Mentioned Software
 - YouTube, Facebook, Tumblr, Twitter, Spotify, iTunes, Blogs



- I use social media in my music tech, conducting and music history courses. Some other instructors use a bit but slow to catch on.
- We encourage club involvement at the social media level, and we show them the opportunities available to them; however, we tend to leave social media to the students to figure out. Most of them know more than we (professors) do about social media, It is rarely something we need to teach them because they need us to teach them other things that they are NOT familiar with.
- Most students using social media during one of our classes are using them to engage in academic dishonesty. I'm sure there could be other uses, but I don't find myself able to imagine what they could be.
- YouTube is an incredible resource of illegal uploads.

FINAL THOUGHTS



NEXT STEPS



- Focus on exemplars for music teaching that use competencies
- More in depth analysis and reflection on the 2011-2013 survey data and publication of the findings and directions
- Encourage a more proactive stance on music technology inclusion on the policy level perhaps in conjunction to real reform in how we teach music in college

2014 SAINT LOUIS SURVEY



COMPETENCIES



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
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 (e.g. iTunes, Spotify, Pandora)

PARTICIPANTS

- N=399 contacted across all sub-disciplines in music that participated earlier in the 2011, 2012, and 2013 surveys
- Responders could reply either by email return or by using a Survey Monkey link.
- N=5 responded via Survey Monkey
- N=17 responded via email
- Total of 22 respondents
- 20 seemed appropriate and their responses are summarized for today's presentation (see full spreadsheet at: www.peterrwebster.com or <http://teachmusictech.com/resources.html>)



▶▶▶▶▶▶ BEST PRACTICES FORM<<<<<<<<<<<<

Please provide the following details. Please feel free to duplicate this form below for a second project you would like to offer.

1. Your name, teaching institution, best way to contact you
2. Teaching context (kind of class)
3. Competencies that you have in mind that might be embraced by this project (use numbers above)
4. Project purpose and general description of what you have your students do
5. Prerequisite technology skills that may be required
6. Technology skills that you feel they need to learn in the process of completing the project
7. Time frame
8. End product(s) that are likely created and how they are evaluated
9. Any other comments that you might like to share

INCLUDE ANY ATTACHMENTS OR WEBLINKS

Final note: May we also have permission to use your responses and materials in our presentation?

May we use selected material in a publication of the overall research of our multi-year project?

In both cases appropriate credit will be given.

SOME CONCERN ABOUT RESPONSE RATE

- Open ended request may seem daunting to some
- Not enough time to respond – too busy to do this
- Unwillingness to share strategies/projects
- Did not feel that projects that use technology fit with competencies
- Few professors think about specific competencies in designing projects that teach music with technology content
- OR.....



- Pissed off at Webster and Williams and are tired of filling out these stupid survey requests every year

OVERALL NATURE OF RESPONSES

see Handout for shortened version of results, full version online at:
peterrwebster.com or teachmusictech.com/resources.html

- Reasonable variety of sub-disciplines
- All eager to share
- All competencies represented except for
 - 8. Demonstrate setting up a computer music workstation/problem solve technical issues
 - 9. Demonstrate an understanding of acoustics and audiology
- Some very creative and personally engaging exemplars

NEED MORE PLEASE

HIGHLIGHTS

- Kim McCord, Illinois State University: use of notation software for creation of music based on chant



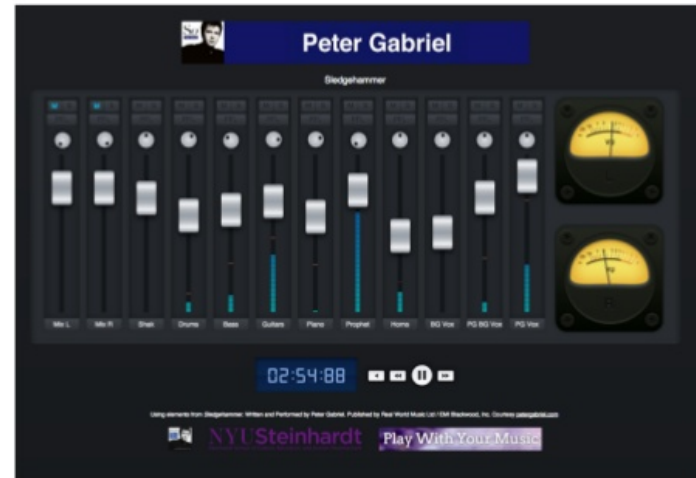
- Charles Menoche, Notation “performance”



- Alex Ruthmann, NYU: multitrack balancing and mixing- Peter Gabriel mixes; several projects within the Playwithyourmusic environment (www.playwithyourmusic.org/)

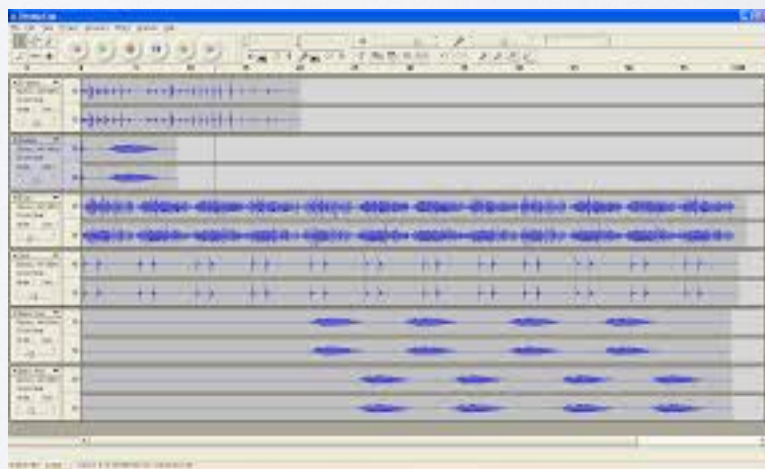
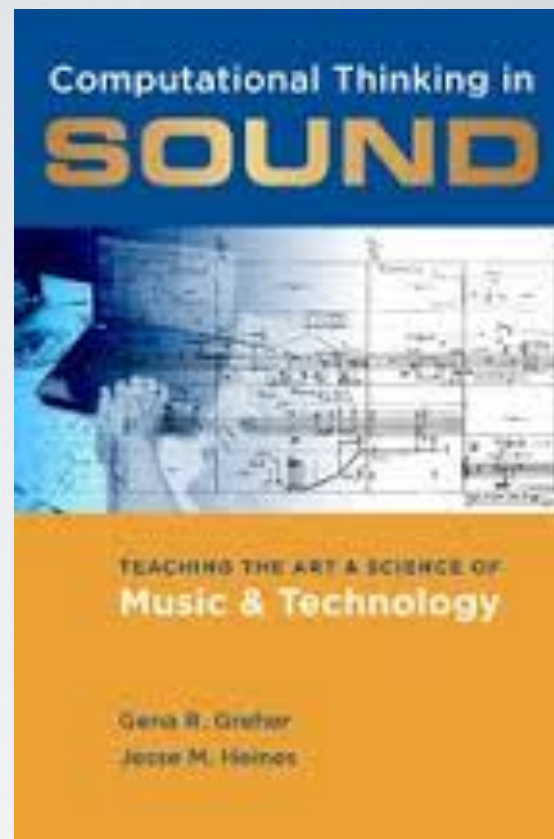


Multitrack Balancing & Mixing



Custom Online Multitrack Interface

- Gena Greher, Umass Lowell, Audio-ethnography



- Rick Dammers, Rowan University: iPad compositions and Video Clips of Students doing Rehearsals



- Sandra Stauffer, ASU: Hybrid ensembles of acoustic and digital "instruments"...(iPads, phones, laptops and various apps or software) to create new arrangements of familiar tunes



- Timothy Nord, Ithaca College: music composed to accompany story



- Ray Riley, Alma College: Petrucci Music Library and work with MIDI file data



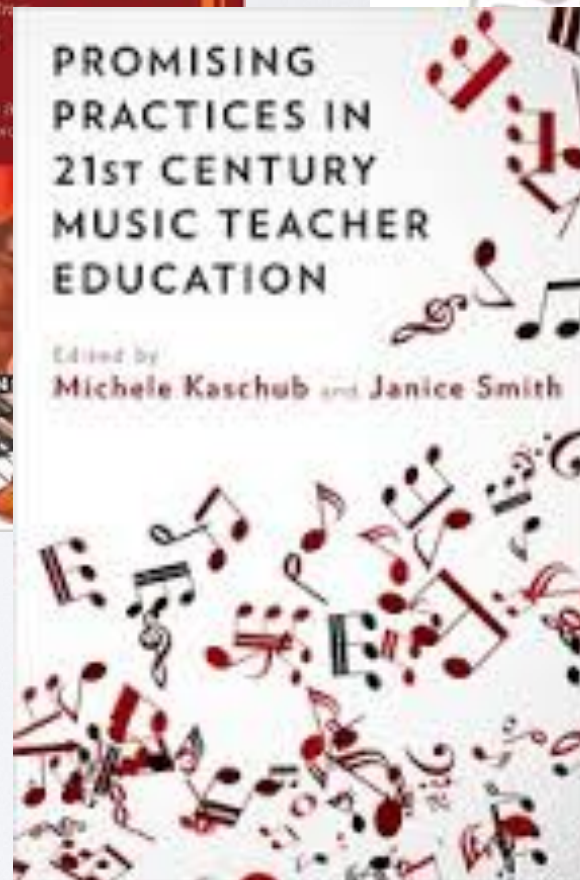
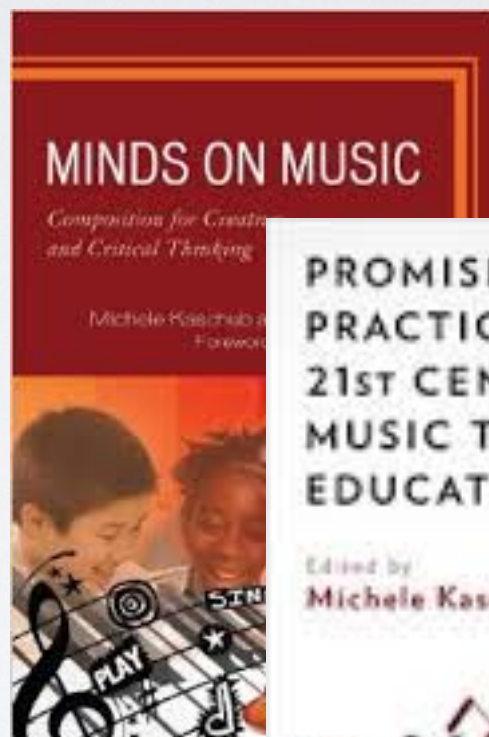
- Jennifer Amaya, Cal State Polytechnic: in-service work with college students working in schools



- Francesca Arnone, Baylor: Record rehearsals, practice sessions, performances, teaching demonstrations



- Michele Kaschub, University of Southern Maine: Pop song composition/Social Media



CONCLUSIONS

- Reasonable start toward a showcase of exemplars but more variety is needed -- Ready to receive more ideas
- Embedding technology within courses and rehearsal/studio experience can be an exciting and AUTHENTIC WAY to engage college students in gaining the kind of competency for which he all hope
- Still a case can be made for a more focused course on music technology, but with music making as a focus and perhaps in shorter, more focused time frames such as 2, 4, or 8 week courses
- Room for continued thinking about core technology competencies that make more effective use of multimedia, distributed learning, social media,

NEXT STEPS

- Publication of the complete series of survey studies as a Monograph published by CMS (we hope this will be approved)
- More focused articles in the Instructional Strategies and Methodologies section of the CMS Symposium
- Core incorporation of work into a new edition of *Experiencing Music Technology*, 4th edition
- OR

NEXT STEPS

- Really retire to a Santa Barbara winery with frequent trips to St. Johns in the American Virgin Islands where sailboats and nice scenery will be found in some abundance.



DISCUSSION

