REFINING A NATIONAL SURVEY ON MUSIC TECHNOLOGY COMPETENCIES:

ACTIVE WAYS TO ENGAGE STUDENTS

- Peter R. Webster, Northwestern University, Emeritus
- David B. Williams, Illinois State University, Emeritus

NEED

- To our knowledge, no 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
- 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

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

2012 SAN DIEGO SURVEY

NEED

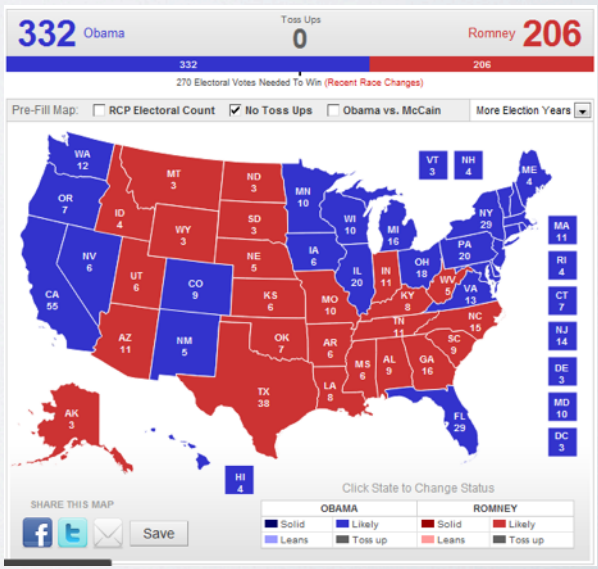
- Confirmation of the set of 8 core music technology competencies from 2011 survey
- Curricular options for learning music technology within an undergraduate music program
- Identifying strategies for integrating the acquisition of these competencies within music programs in general and within individual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

DESIGN

- Sought and received permission from CMS to use their membership database of music professionals
- Distributed survey (via Survey Monkey via Internet) to all CMS members whose professional area indicated "technology," "performance," or "department heads or chairs" with the request that individuals pass on the survey link to others who might be more able to answer
- Sent invitations to our own contacts within college music with request to share invitation with others
- Used ATMI listserv
- No follow-up was performed for non-respondents
- Two weeks time was given for response

RESPONDENTS

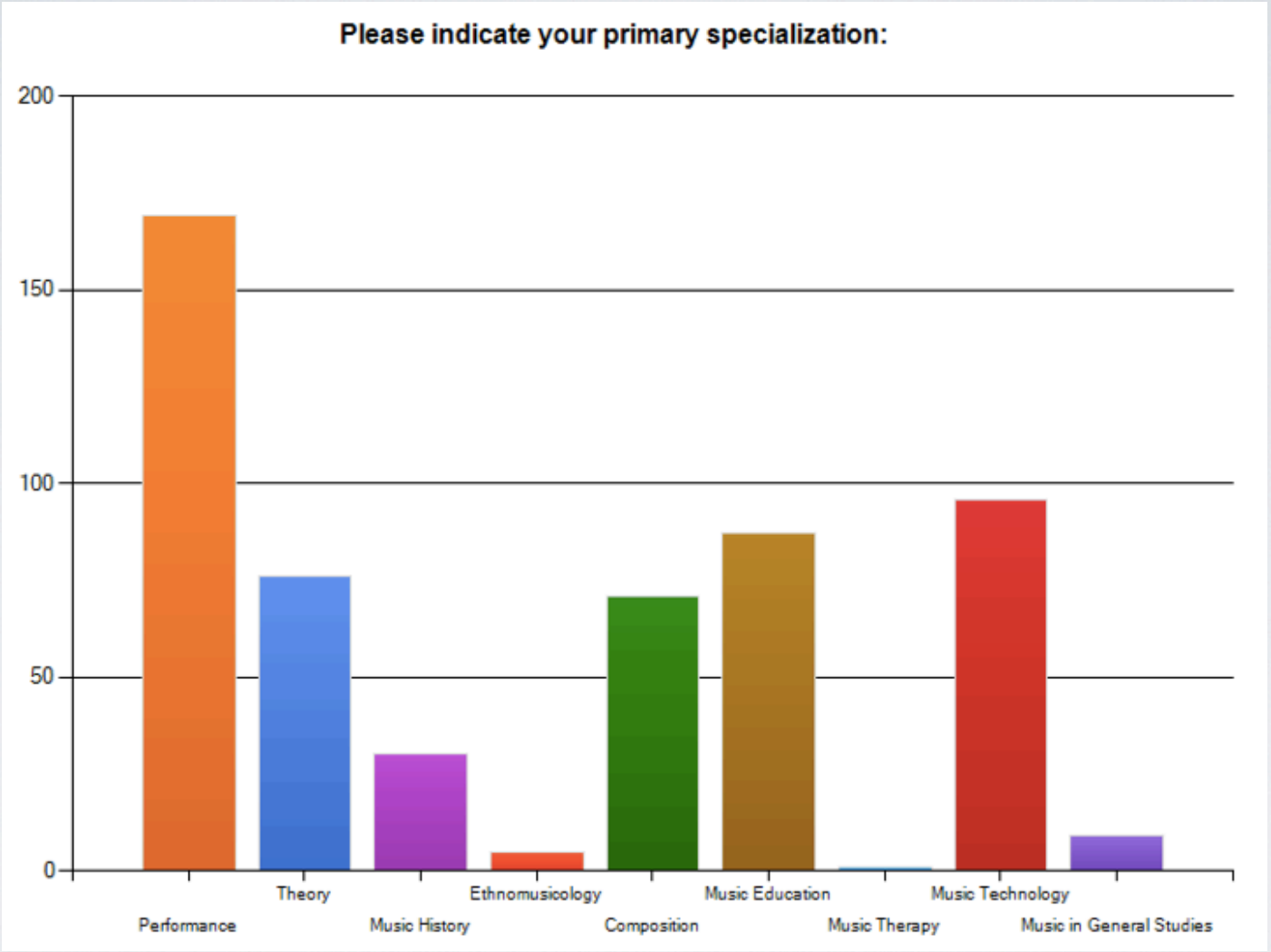
- N = 413 opened survey, N= 327 finished (80% finished)
- Representation 46 UNITED STATES (missing HI, AK, NM, and VT)--both Red and Blue states including OHIO
- States with the highest response: CA, TX, FL, NY, IL, MI, VA, OH
- 8 schools in CANADA
- Schools in UK, Greece, and Australia



2012 RESULTS PRESENTED TODAY

- Basic demographics
- Confirmation of core competencies
- Curricular options for learning music technology
- Program and individual examples of integrating competencies into classroom practice and learning
- Capstone experiences integrating technology

SPECIALIZATION



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

TYPE OF INSTITUTION

	Response Percent	Response Count
Private conservatory	3.4%	13
Music department within a liberal arts school	**49.7%**	**189**
Comprehensive school/department within a larger university	44.2%	168
Music education program within a college of education	2.6%	10
Other (please specify) Show Responses		36

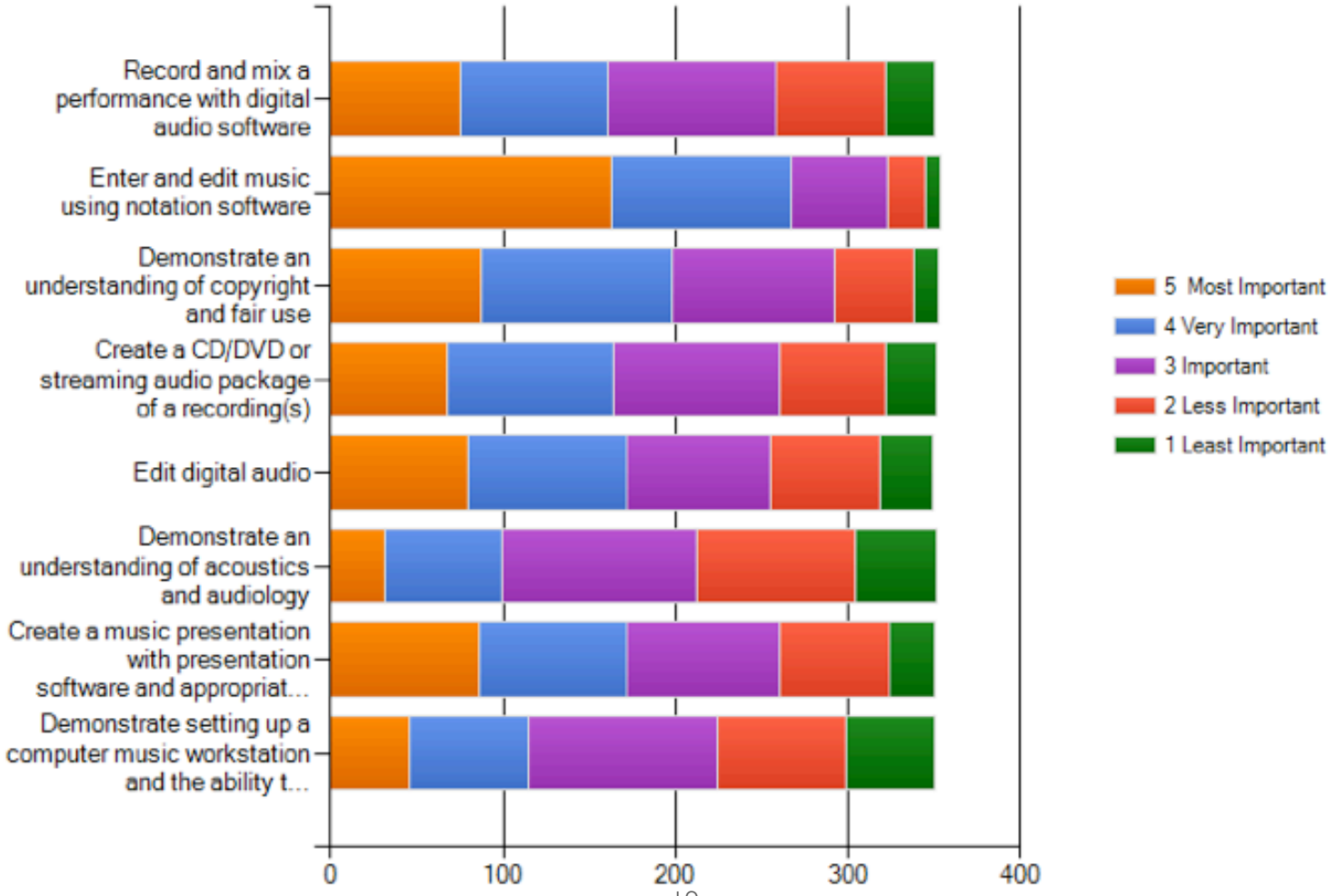
Others include 20 community colleges and a few variations on the categories above

SIZE OF INSTITUTION

	Response Percent	Response Count
Under 30	14.3%	58
31-60	19.0%	77
61-100	17.2%	70
101-150	13.3%	54
151-250	13.8%	56
251-500	16.5%	67
Over 500	5.9%	24
	answered question	406

CORE COMPETENCIES: FULL GROUP

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.



CORE COMPETENCIES: SUB-DISCIPLINE

		Performance	Theory	Music History	Composition	Music Education
Record and mix a performance with digital audio software	5 Most Important	14.1% (20)	14.9% (10)	13.0% (3)	**29.9% (20)**	20.0% (16)
	4 Very Important	25.4% (36)	16.4% (11)	8.7% (2)	23.9% (16)	26.3% (21)
	3 Important	**29.6% (42)**	**35.8% (24)**	13.0% (3)	26.9% (18)	**27.5% (22)**
	2 Less Important	19.0% (27)	23.9% (16)	**52.2% (12)**	13.4% (9)	20.0% (16)
	1 Least Important	12.0% (17)	9.0% (6)	13.0% (3)	6.0% (4)	6.3% (5)

CORE COMPETENCIES: SUB-DISCIPLINE

Enter and edit music using notation software	5 Most Important	**42.7% (61)**	**50.7% (34)**	**47.8% (11)**	**49.3% (33)**	**55.0% (44)**
	4 Very Important	32.9% (47)	32.8% (22)	30.4% (7)	29.9% (20)	30.0% (24)
	3 Important	16.8% (24)	11.9% (8)	13.0% (3)	16.4% (11)	7.5% (6)
	2 Less Important	4.2% (6)	1.5% (1)	8.7% (2)	3.0% (2)	7.5% (6)
	1 Least Important	3.5% (5)	3.0% (2)	0.0% (0)	1.5% (1)	0.0% (0)

CORE COMPETENCIES: SUB-DISCIPLINE

Demonstrate an understanding of copyright and fair use	5 Most Important	**30.8% (44)**	16.4% (11)	**26.1% (6)**	11.9% (8)	33.8% (27)
	4 Very Important	28.7% (41)	**44.8% (30)**	21.7% (5)	28.4% (19)	**40.0% (32)**
	3 Important	26.6% (38)	26.9% (18)	21.7% (5)	**34.3% (23)**	20.0% (16)
	2 Less Important	11.9% (17)	10.4% (7)	21.7% (5)	20.9% (14)	2.5% (2)
	1 Least Important	2.1% (3)	1.5% (1)	8.7% (2)	4.5% (3)	3.8% (3)

CORE COMPETENCIES: SUB-DISCIPLINE

Create a CD/DVD or streaming audio package of a recording(s)	5 Most Important	18.9% (27)	6.0% (4)	4.3% (1)	14.9% (10)	**30.0% (24)**
	4 Very Important	**27.3% (39)**	25.4% (17)	17.4% (4)	**28.4% (19)**	**30.0% (24)**
	3 Important	**27.3% (39)**	**35.8% (24)**	26.1% (6)	**28.4% (19)**	22.5% (18)
	2 Less Important	19.6% (28)	23.9% (16)	**39.1% (9)**	17.9% (12)	8.8% (7)
	1 Least Important	7.0% (10)	9.0% (6)	13.0% (3)	10.4% (7)	8.8% (7)

CORE COMPETENCIES: SUB-DISCIPLINE

Edit digital audio	5 Most Important	14.0% (20)	15.4% (10)	13.6% (3)	**35.8% (24)**	25.3% (20)
	4 Very Important	23.8% (34)	21.5% (14)	4.5% (1)	23.9% (16)	**31.6% (25)**
	3 Important	**28.0% (40)**	**27.7% (18)**	27.3% (6)	22.4% (15)	15.2% (12)
	2 Less Important	21.7% (31)	23.1% (15)	**40.9% (9)**	10.4% (7)	20.3% (16)
	1 Least Important	12.6% (18)	12.3% (8)	13.6% (3)	7.5% (5)	7.6% (6)

CORE COMPETENCIES: SUB-DISCIPLINE

Demonstrate an understanding of acoustics and audiology	5 Most Important	9.7% (14)	4.5% (3)	0.0% (0)	9.0% (6)	10.0% (8)
	4 Very Important	16.7% (24)	16.7% (11)	4.5% (1)	20.9% (14)	13.8% (11)
	3 Important	**34.7% (50)**	**37.9% (25)**	**45.5% (10)**	**31.3% (21)**	**37.5% (30)**
	2 Less Important	23.6% (34)	27.3% (18)	22.7% (5)	26.9% (18)	23.8% (19)
	1 Least Important	15.3% (22)	13.6% (9)	27.3% (6)	11.9% (8)	15.0% (12)

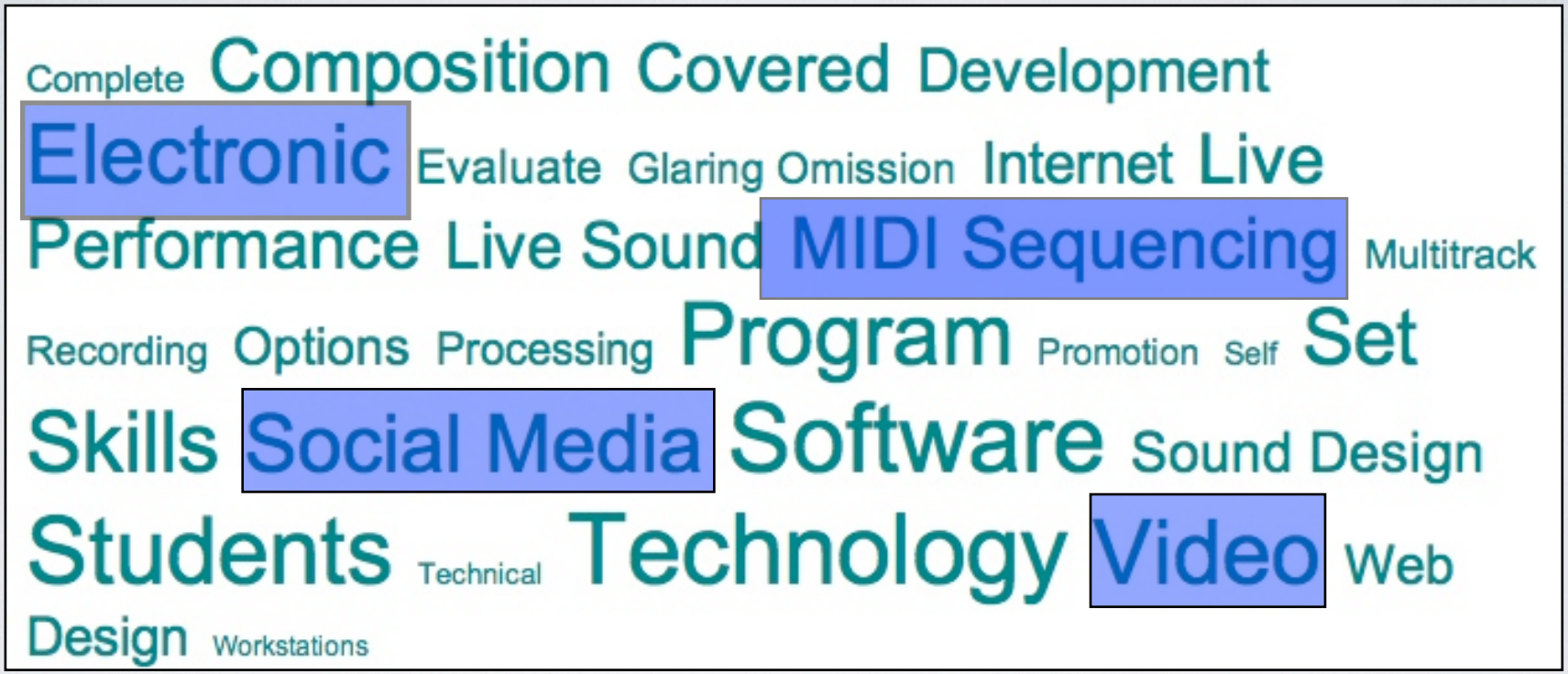
CORE COMPETENCIES: SUB-DISCIPLINE

Create a music presentation with presentation software and appropriate hardware	5 Most Important	20.4% (29)	10.6% (7)	30.4% (7)	14.9% (10)	**47.5% (38)**
	4 Very Important	21.1% (30)	25.8% (17)	**34.8% (8)**	16.4% (11)	27.5% (22)
	3 Important	**26.8% (38)**	**37.9% (25)**	17.4% (4)	**37.3% (25)**	12.5% (10)
	2 Less Important	21.8% (31)	16.7% (11)	8.7% (2)	23.9% (16)	8.8% (7)
	1 Least Important	9.9% (14)	9.1% (6)	8.7% (2)	7.5% (5)	3.8% (3)

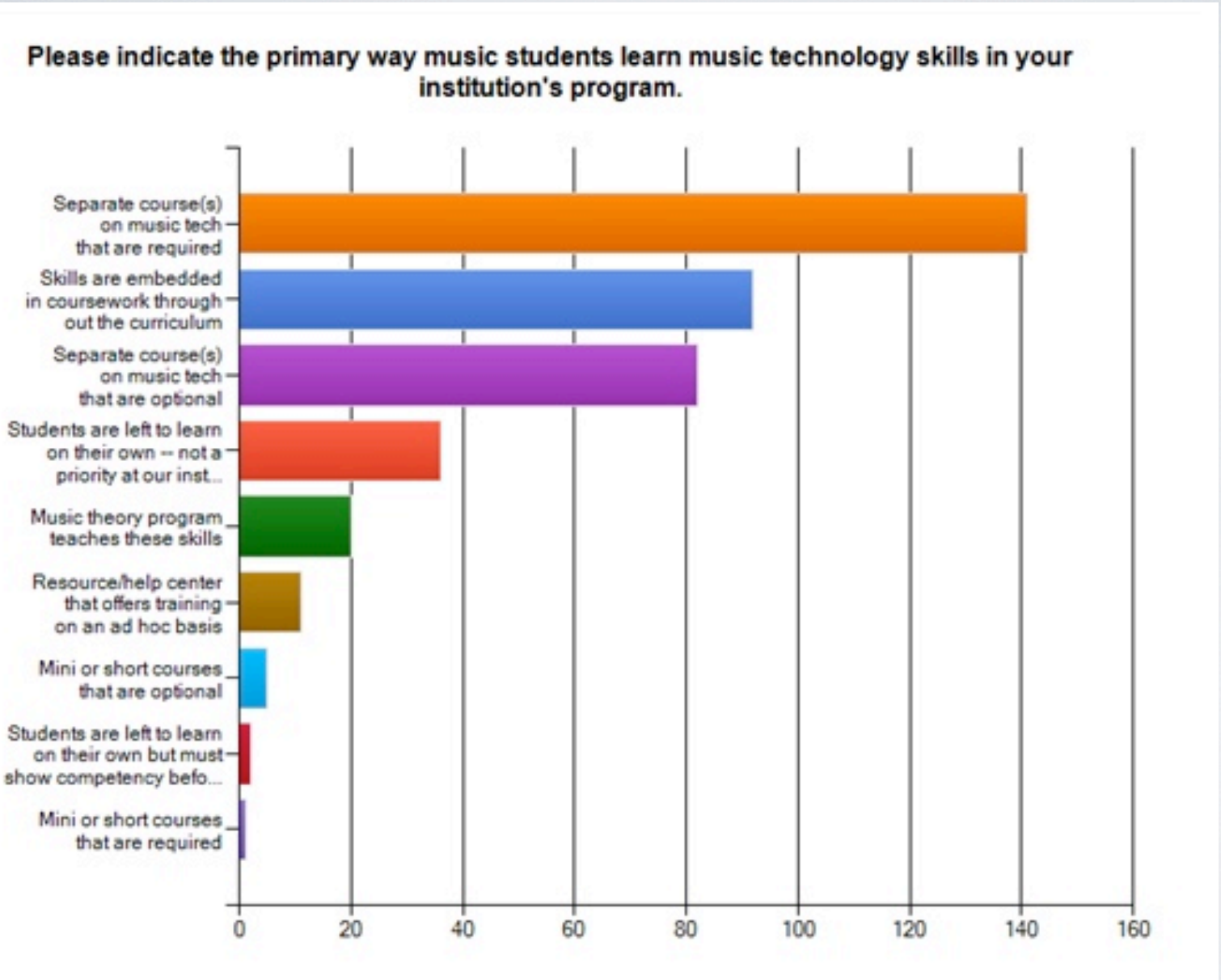
CORE COMPETENCIES: SUB-DISCIPLINE

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)

OTHER COMPETENCIES



OPTIONS FOR LEARNING: FULL GROUP



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

OPTIONS FOR LEARNING: SUB-DISCIPLINE

	Performance	Theory	Music History	Composition	Music Education	Response Totals
Separate course(s) on music tech that are required	**31.3% (50)**	**34.7% (26)**	**33.3% (10)**	**45.7% (32)**	32.5% (27)	**34.0% (110)**
Separate course(s) on music tech that are optional	22.5% (36)	18.7% (14)	30.0% (9)	24.3% (17)	13.3% (11)	20.7% (67)
Mini or short courses that are required	0.0% (0)	0.0% (0)	0.0% (0)	1.4% (1)	0.0% (0)	0.3% (1)
Mini or short courses that are optional	1.3% (2)	1.3% (1)	0.0% (0)	1.4% (1)	1.2% (1)	1.2% (4)
Resource/help center that offers training on an ad hoc basis	4.4% (7)	1.3% (1)	3.3% (1)	1.4% (1)	2.4% (2)	3.1% (10)
Music theory program teaches these skills	6.9% (11)	8.0% (6)	10.0% (3)	4.3% (3)	1.2% (1)	5.2% (17)
Skills are embedded in coursework through out the curriculum	20.0% (32)	22.7% (17)	20.0% (6)	14.3% (10)	**41.0% (34)**	24.4% (79)
Students are left to learn on their own but must show competency before graduation	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	2.4% (2)	0.6% (2)
Students are left to learn on their own -- not a priority at our institution	13.8% (22)	13.3% (10)	3.3% (1)	7.1% (5)	6.0% (5)	10.5% (34)
Other (please specify)	15 replies	12 replies	2 replies	10 replies	9 replies	48
answered question	160	75	30	70	83	324

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 Eduction 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

OTHER COMMENTS ON INTEGRATION

- It would be evident in the nature of instructors' teaching (their own modeling of use of cutting edge technologies) and also in what students are expected to do. (e.g., music education students are now learning to incorporate iPod ensembles into their teaching - because the teacher is using them in the methods course - and requiring one lesson that uses iPod technology.) Next year, it might be something else. It is the currency that is the issue - and the disposition of curiosity and creativity. To some extent, I would rather see a list of dispositions than a list of competencies. :)

- I think there should be a greater emphasis on concepts in your list: the application of concepts is very important and for students it solidifies what we teach, but the software that we use will either disappear in ten years or will be quite different. The underlying concepts will remain in place for much longer so we need to emphasize that, rather than just teaching students to master a series of steps.

- I also feel that the sound system has a place in this list, as it becomes more of a computer with each new generation.

- Webpage design; creating and posting Youtube or similar instructional video; creating podcasts; creating and using blogs; Managing Social Media

INDIVIDUAL INTEGRATION

1. For each of the competencies, please briefly describe one to three of the most effective activities YOU PERSONALLY use to teach this competency in your own courses. You may leave any competency blank if it is not relevant.

Download

	Response Percent	Response Count
Record and mix a performance with digital audio software Show Responses	57.1%	140
Enter and edit music using notation software Show Responses	**71.0%**	**174**
Demonstrate an understanding of copyright and fair use Show Responses	60.8%	149
Create a CD/DVD or streaming audio package of a recording(s) Show Responses	47.8%	117
Edit digital audio Show Responses	56.7%	139
Demonstrate an understanding of acoustics and audiology Show Responses	49.0%	120
Create a music presentation with presentation software and appropriate hardware Show Responses	53.1%	130
Demonstrate setting up a computer music workstation and the ability to problem solve common technical issues Show Responses	37.6%	92
	answered question	**245**

INDIVIDUAL INTEGRATION

Notation

Activity	Response Count
Composing/Arranging	45
Notate Assignments	40
Learn notation skills	26
Transcribe/edit music	20

INDIVIDUAL INTEGRATION

Recording

Activity	Response Count
Record/Edit Music Performance	40
Final Projects in Tech/ Recording Classes	7
Composing Projects	15
Recording Own Practice	6

CREATIVE EXAMPLES FOR RECORDING

- Create, Record and Edit Audio for a Video Track
- Create, Record and Edit Audio for a Commercial
- Contained within a methods sequence where students practice informal learning techniques while developing performance/creative musicianship skills in small groups using mainly popular music instruments.
- In theory II and theory IV, students compose complete works that may be scored in Finale--they use the mixer there to send in their audition recording for a competition. Many also add in vocals or instrumental lines.

INDIVIDUAL INTEGRATION

Presentation

- Present paper in a form other than a “term paper
- Final Paper in Prezi with lightning format

- Listening map animated in time with music
- Music theory students give presentations that have visuals and aural examaples
- Sophomore theory: create a "commercial" or PSA in GarageBand using music composed on a given harmonic progression with voice-overs
- Music Education: students create a multimedia production of their philosophies of music education

OTHER ACTIVITIES

- Composition (some with MIDI) (8)
- Web/Video Projects (examples in many sub-disciplines) (13)
- Others:
  - Collaborative Documents
  - Smartboard Presentations
  - Fact-finding Missions
  - Professional Use of Internet Research Tools
  - High Quality Audio
  - Sound Recording and Reproduction Techniques
  - Technology Used in Studio Teaching

COMMENT FROM ONE RESPONDENT

- activities are important (of course), but what you should really be asking is, "what type of learning is going on when students complete a specific activity". Study show us that students value an ability to "learn independently" and not only an ability to do certain tasks.

CAPSTONES

- Portfolios in Music Education and Music Technology
- NOTE: Most respondents reported NO Capstone Experience and used this question to suggest the weaknesses in their programs for music technology education.

FINAL THOUGHTS

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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

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- Encouraging data to demonstrate that the core competencies are reinforced through classroom experiences
- Notation software skills one of the more predominate competencies used in diverse classes for assignments and creative work (from simple to more advance projects)
- Outside of music technology classes, theory and music education classes carry the brunt of music technology integration.
- Presentation competency integrated in music history coursework
- Acoustics competency integrated in physics and psychology of music classes as well as music technology coursework
- 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

- Some interesting and creative uses of technology by a number of professors, perhaps not as many as we expected
- Competencies in the use of video, social media usage, web design/multimedia were noted
- Strong interest in the use of composition with technology across disciplines was encouraging
- Concern about real learning in using technology and students' disposition toward use
- 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

NEXT STEPS

- Examining competencies by music sub-disciplines
- Closer inspection of where and how a course(s) carries the main responsibility for teaching specific competencies and where we are missing opportunities
- More in depth analysis and reflection on the 2011 and 2012 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

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.