Music Technology Skills and Conceptual Understanding for Undergraduate Music Students: A National Survey

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

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
- Efforts by TI-ME to identify competencies at the K-12 school level

Need

- To our knowledge, no national data on generally acknowledged competencies in music technology for undergraduate music majors
- This, despite the fact that technology now plays a critical role in music teaching and learning
- Results of such a survey of music technology professors and administrators in college/ university/conservatory music units in the North America would prove useful in planning curricular
- Help in guiding the preparation of professional materials

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

Procedures

- Sought and Received IRB approval at Northwestern
- Sought and Received Permission from CMS to use their database of professors
- Distributed survey to all professors whose professional area included “technology” and to add all music executives (dean, chairs, directors) of record
- Used the online SurveyMonkey service with emails sent from CMS with a link to the survey
- Only 1 email was sent and no follow-up was performed for non-respondents prior to the present time
- Three weeks time was given for response

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)

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

Additional Interests

- Relation to studies at Northwestern (2011) and at USC (2008)
- What ways might competencies be addressed
- Possible next steps

Results
Global Ratings

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

Comparison to Northwestern Pilot Top 70% (11 of 12 are same)

34	Describe what an overtone series is how it relates to instrument timbre.
34	Describe under what circumstances both printed and recorded music can be copied and distributed.
33	Show how to burn an audio or a data CD with a computer.
33	Show how to extract digital audio from an audio CD to a computer.
32	Describe the concept of "fair use" and how it relates to music use in teaching or creative work.
31	Explain the difference between a DVD disc and a CD disc. NOT FOUND IN THIS STUDY
30	Describe what a compressed audio file is and be able to create one for distribution on the Internet.
30	Understand the capabilities of different levels of music notation software, include options for online notation.
30	Distinguish between what is represented by these commonly encountered file formats: wav, .aif, .mid, .mov, .doc, .pdf, .html, and .jpg.
29	Create a musical score with a notation program that includes expressions, articulations, and appropriate music notation conventions.
29	Show how to use a digital audio program to record a music performance and save the file for listening.
28	Describe the basics of how sound is perceived by the ear and understood by the brain.

Midrange Across All Families (21 items)

Create and upload a simple website that features musical content.	68.7%	138
Show how notation software might be used to create worksheets and other teaching materials for music.	67.6%	152
Create a simple composition with a multi-track recording program that uses loop-based sound files, live recordings	67.4%	155
Explain “hertz” and “decibel scales” as measures of pitch and loudness.	66.4%	166
Show various ways to embed music notation into a webpage, word processing file, or presentation software.	65.7%	151
Explain the options for attaching a microphone to a computer for sound recording.	64.8%	149
Describe typical software licensing agreements for the legal purchase and use of commercial music software.	64.5%	140
Know the difference between different cable types (e.g. 1/4” phono, RCA, mini stereo, XLR) often used in audio work.	63.9%	147
Describe the function of a typical multi-track recording software program and explain the types of audio that can be combined to form a composition.	63.5%	146
Describe how software and hardware might assist with collaborative learning and creative work.	61.3%	138
Describe a typical software program that assists with musical accompaniment.	60.9%	137
Describe the basic differences between types of microphones and how they might be used in different enviornments	60.4%	139
Explain recent developments in class management systems (e.g. Blackboard) and social networking environments	60.0%	135
Record, edit and produce a digital video on a music topic suitable for distribution on a video streaming site such as YouTube.	59.7%	120
Explain the difference between sampling rate (e.g. 22-, 44-kHz) and bit size (e.g. 8-bit, 16-bit) for a digital audio file	58.8%	144
Explain the difference between a DVD disc and a CD disc.	57.6%	141
Explain important historical trends in the development of music technology	57.1%	124
Create a DVD that contains artifacts of creative work for a digital portfolio.	55.7%	112
Explain what is involved in basic mixing and mastering of digital audio prior to distribution.	53.9%	124
Describe how smartphones, computer tablets, and other alternative music instruments might be used for creative work.	53.9%	124
Explain important criteria for selecting music teaching software for educational settings.	53.3%	120

Lowest Across All Families (7 items)

Show how to scan and then edit a printed score into a standard notation program.	49.1%	113
Show how typical plug-in effects can be used to edit sound files in multi-track recording.	48.7%	112
Describe a typical simulation software title that help students compose and/or improvise music.	46.2%	104
Know how to remove noise from a digital recording and do editing work such as adding equalization and reverb.	45.2%	104
Describe how software and hardware might assist with distance learning and creative work.	44.4%	100
Show how to create a synthesized sound by using a software program.	43.9%	101
Show how to adapt a computer to display information in ways that might assist users with disabilities.	32.9%	74

Global Results
By Families

1. Physics of Sound (click on all that apply)

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	Response Percent	Response Count
Explain "hertz" and "decibel scales" as measures of pitch and loudness.	66.5%	167
Describe what an overtone series is how it relates to instrument timbre.	**94.0%**	**236**
Describe the basics of how sound is perceived by the ear and understood by the brain.	77.3%	194
Explain the difference between analog and digital sound.	76.9%	193
	answered question	**251**
	skipped question	**26**

1. File and Disk Formats (click on all that apply)

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	Response Percent	Response Count
Describe the difference between digital audio and MIDI sound files.	79.7%	196
Distinguish between what is represented by these commonly encountered file formats: wav, .aif, .mid, .mov, .doc, .pdf, .html, and .jpg.	74.4%	183
Explain the difference between sampling rate (e.g. 22-, 44-kHz) and bit size (e.g. 8-bit, 16-bit) for a digital audio file and how these characteristics relate to quality of sound.	58.9%	145
Show how to burn an audio or a data CD with a computer.	**83.3%**	**205**
Show how to extract digital audio from an audio CD to a computer.	74.8%	184
Explain the difference between a DVD disc and a CD disc.	57.7%	142
Describe what a compressed audio file is and be able to create one for distribution on the Internet.	79.7%	196
	answered question	246
	skipped question	31

1. Digital Audio/Recording and Editing (click on all that apply)

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	Response Percent	Response Count
Show how to use a digital audio program to record a music performance and save the file for listening.	93.9%	217
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.	80.5%	186
Know how to remove noise from a digital recording and do editing work such as adding equalization and reverb.	45.5%	105
Describe the basic differences between types of microphones and how they might be used in different recording environments.	60.2%	139
Explain the options for attaching a microphone to a computer for sound recording.	64.9%	150
Show how to troubleshoot a problem with audio in and out on a computer when recording.	69.7%	161
Know the difference between different cable types (e.g. 1/4" phono, RCA, mini stereo, XLR) often used in audio work.	64.1%	148
Explain the basic functions of an audio mixer.	70.6%	163

Describe the function of a typical multi-track recording software program and explain the types of audio that can be combined to form a composition.	63.6%	147
Create a simple composition with a multi-track recording program that uses loop-based sound files, live recordings, and MIDI files.	67.5%	156
Show how typical plug-in effects can be used to edit sound files in multi-track recording.	48.9%	113
Explain what is involved in basic mixing and mastering of digital audio prior to distribution.	54.1%	125
Explain the functions of a basic digital music keyboard and show how to attach one to a computer.	74.0%	171
Describe how to setup a music workstation that might include a computer, music keyboard, mixer, headphones, amplifier and speakers.	71.9%	166
Show how to create a synthesized sound by using a software program.	44.2%	102
Describe how smartphones, computer tablets, and other alternative music instruments might be used for creative work.	54.1%	125
	answered question	231
	skipped question	46

1. Notation (click on all that apply)

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	Response Percent	Response Count
Understand the capabilities of different levels of music notation software, include options for online notation.	80.5%	186
Create a musical score with a notation program that includes expressions, articulations, and appropriate music notation conventions.	**93.9%**	**217**
Demonstrate how to edit a score with a music notation program, including transposing parts, copying and pasting notation, and saving scores in different printed and audio formats.	85.7%	198
Show how to scan and then edit a printed score into a standard notation program.	49.4%	114
Show various ways to embed music notation into a webpage, word processing file, or presentation software.	65.4%	151
	answered question	**231**
	skipped question	**46**

1. Teaching, Collaboration, Distance Learning, and Creative Work (click on all that apply)

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	Response Percent	Response Count
Show how to use an aural skills/music theory fundamentals software program.	78.3%	177
Describe a typical simulation software title that help students compose and/or improvise music.	46.5%	105
Describe a typical software program that assists with musical accompaniment.	60.6%	137
Describe how hardware and software might be used to assist in improving music performance skills.	71.7%	162
Explain important criteria for selecting music teaching software for educational settings.	53.5%	121
Show how notation software might be used to create worksheets and other teaching materials for music.	67.7%	153
Describe how software and hardware might assist with collaborative learning and creative work.	61.5%	139
Describe how software and hardware might assist with distance learning and creative work.	44.7%	101
Show how to adapt a computer to display information in ways that might assist users with disabilities.	33.2%	75
Explain recent developments in class management systems (e.g. Blackboard) and social networking environments (e.g. YouTube, wikis, blogs) that might aid in music learning and creative work.	60.2%	136
	answered question	226
	skipped question	51

1. Multimedia (click on all that apply)

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	Response Percent	Response Count
Demonstrate the ability to attach and use a computer or other digital device to control a video projector, "smartboard" projection system, or other display technology.	71.8%	145
Record, edit and produce a digital video on a music topic suitable for distribution on a video streaming site such as YouTube.	59.4%	120
Create a DVD that contains artifacts of creative work for a digital portfolio.	55.9%	113
Create and upload a simple website that features musical content.	68.3%	138
Use presentation software to support a presentation about music that uses text, animation, digital audio, video, and graphics.	**78.7%**	**159**
	answered question	202
	skipped question	75

1. Digital Citizenship and Historical Trends (click on all that apply)

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	Response Percent	Response Count
Describe typical software licensing agreements for the legal purchase and use of commercial music software.	64.7%	141
Describe under what circumstances both printed and recorded music can be copied and distributed.	87.6%	191
Describe the concept of "fair use" and how it relates to music use in teaching or creative work.	**93.6%**	**204**
Explain important historical trends in the development of music technology and explain how such trends might predict future development.	57.3%	125
	answered question	**218**
	skipped question	**59**

Results by Fields of Study Families

1. Physics of Sound (click on all that apply)

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	Performance (P)	Music Education/Therapy (E)	Music Theory (TH)	History (H)	Composition (C)	Technology (TE)	Response Count
Explain "hertz" and "decibel scales" as measures of pitch and loudness.	45.9% (73)	50.9% (81)	51.6% (82)	30.2% (48)	61.6% (98)	**96.9% (154)**	159
Describe what an overtone series is how it relates to instrument timbre.	78.2% (129)	72.7% (120)	76.4% (126)	52.1% (86)	77.6% (128)	**87.3% (144)**	165
Describe the basics of how sound is perceived by the ear and understood by the brain.	64.2% (102)	78.6% (125)	63.5% (101)	41.5% (66)	70.4% (112)	**83.0% (132)**	159
Explain the difference between analog and digital sound.	40.7% (68)	50.9% (85)	40.1% (67)	33.5% (56)	65.9% (110)	**96.4% (161)**	167

answered question	172
skipped question	105

2. File and Disk Formats (click on all that apply)

Create Chart | Download

	Performance (P)	Music Education/Therapy (E)	Music Theory (TH)	History (H)	Composition (C)	Technology (TE)	Response Count
Describe the difference between digital audio and MIDI sound files.	40.0% (66)	61.8% (102)	39.4% (65)	28.5% (47)	69.7% (115)	**95.2% (157)**	165
Distinguish between what is represented by these commonly encountered file formats: wav, .aif, .mid, .mov, .doc, .pdf, .html, and .jpg.	42.3% (69)	58.3% (95)	38.0% (62)	30.7% (50)	63.8% (104)	**96.3% (157)**	163
Explain the difference between sampling rate (e.g. 22-, 44-kHz) and bit size (e.g. 8-bit, 16-bit) for a digital audio file and how these characteristics relate to quality of sound.	28.4% (46)	35.2% (57)	27.8% (45)	16.7% (27)	48.1% (78)	**96.9% (157)**	162
Show how to burn an audio or a data CD with a computer.	71.4% (110)	77.3% (119)	59.1% (91)	53.9% (83)	75.3% (116)	**93.5% (144)**	154
Show how to extract digital audio from an audio CD to a computer.	58.9% (89)	73.5% (111)	55.6% (84)	49.0% (74)	66.9% (101)	**94.7% (143)**	151
Explain the difference between a DVD disc and a CD disc.	40.1% (57)	57.7% (82)	38.0% (54)	35.2% (50)	50.7% (72)	**93.7% (133)**	142
Describe what a compressed audio file is and be able to create one for distribution on the Internet.	53.8% (84)	62.8% (98)	32.1% (50)	30.1% (47)	64.1% (100)	**96.2% (150)**	156

3. Digital Audio/Recording and Editing (click on all that apply)

Create Chart | Download

	Performance (P)	Music Education/Therapy (E)	Music Theory (TH)	History (H)	Composition (C)	Technology (TE)	Response Count
Show how to use a digital audio program to record a music performance and save the file for listening.	76.9% (120)	78.8% (123)	44.2% (69)	37.2% (58)	74.4% (116)	**95.5% (149)**	156
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.	58.5% (93)	65.4% (104)	35.2% (56)	26.4% (42)	71.7% (114)	**95.0% (151)**	159
Know how to remove noise from a digital recording and do editing work such as adding equalization and reverb.	41.0% (66)	32.9% (53)	18.0% (29)	13.7% (22)	55.9% (90)	**96.3% (155)**	161
Describe the basic differences between types of microphones and how they might be used in different recording environments.	53.1% (85)	55.0% (88)	15.6% (25)	13.1% (21)	50.0% (80)	**96.9% (155)**	160
Explain the options for attaching a microphone to a computer for sound recording.	57.6% (91)	68.4% (108)	22.8% (36)	22.2% (35)	60.8% (96)	**95.6% (151)**	158
Show how to troubleshoot a problem with audio in and out on a computer when recording.	51.9% (82)	63.3% (100)	26.6% (42)	23.4% (37)	58.2% (92)	**97.5% (154)**	158
Know the difference between different cable types (e.g. 1/4" phono, RCA, mini stereo, XLR) often used in audio work.	44.5% (69)	58.1% (90)	22.6% (35)	20.6% (32)	52.9% (82)	**96.1% (149)**	155
Explain the basic functions of an audio mixer.	52.2% (82)	57.3% (90)	21.7% (34)	20.4% (32)	58.0% (91)	**97.5% (153)**	157

Describe the function of a typical multi-track recording software program and explain the types of audio that can be combined to form a composition.	35.7% (55)	44.2% (68)	24.7% (38)	14.3% (22)	67.5% (104)	**97.4% (150)**	154
Create a simple composition with a multi-track recording program that uses loop-based sound files, live recordings, and MIDI files.	33.8% (52)	56.5% (87)	27.9% (43)	16.2% (25)	81.2% (125)	**91.6% (141)**	154
Show how typical plug-in effects can be used to edit sound files in multi-track recording.	30.0% (45)	35.3% (53)	14.0% (21)	10.0% (15)	62.0% (93)	**98.0% (147)**	150
Explain what is involved in basic mixing and mastering of digital audio prior to distribution.	37.9% (58)	36.6% (56)	13.7% (21)	13.7% (21)	54.9% (84)	**96.1% (147)**	153
Explain the functions of a basic digital music keyboard and show how to attach one to a computer.	51.3% (79)	71.4% (110)	44.2% (68)	31.8% (49)	73.4% (113)	**94.8% (146)**	154
Describe how to setup a music workstation that might include a computer, music keyboard, mixer, headphones, amplifier and speakers.	46.8% (72)	75.3% (116)	37.0% (57)	29.9% (46)	72.1% (111)	**97.4% (150)**	154
Show how to create a synthesized sound by using a software program.	26.8% (40)	43.0% (64)	22.1% (33)	12.1% (18)	72.5% (108)	**96.0% (143)**	149
Describe how smartphones, computer tablets, and other alternative music instruments might be used for creative work.	41.3% (59)	72.0% (103)	34.3% (49)	30.8% (44)	66.4% (95)	**94.4% (135)**	143

4. Notation (click on all that apply)

Create Chart | Download

	Performance (P)	Music Education/Therapy (E)	Music Theory (TH)	History (H)	Composition (C)	Technology (TE)	Response Count
Understand the capabilities of different levels of music notation software, include options for online notation.	60.5% (92)	84.9% (129)	80.9% (123)	47.4% (72)	**92.1% (140)**	84.9% (129)	152
Create a musical score with a notation program that includes expressions, articulations, and appropriate music notation conventions.	60.4% (93)	83.8% (129)	82.5% (127)	51.3% (79)	**94.2% (145)**	82.5% (127)	154
Demonstrate how to edit a score with a music notation program, including transposing parts, copying and pasting notation, and saving scores in different printed and audio formats.	56.6% (86)	82.2% (125)	75.7% (115)	42.1% (64)	**91.4% (139)**	82.2% (125)	152
Show how to scan and then edit a printed score into a standard notation program.	45.7% (63)	72.5% (100)	63.0% (87)	43.5% (60)	79.0% (109)	**82.6% (114)**	138
Show various ways to embed music notation into a webpage, word processing file, or presentation software.	45.5% (66)	76.6% (111)	62.1% (90)	53.1% (77)	74.5% (108)	**89.7% (130)**	145

answered question	160
skipped question	117

5. Teaching, Collaboration, Distance Learning, and Creative Work (click on all that apply)

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	Performance (P)	Music Education/Therapy (E)	Music Theory (TH)	History (H)	Composition (C)	Technology (TE)	Response Count
Show how to use an aural skills/music theory fundamentals software program.	39.2% (60)	81.7% (125)	**86.3% (132)**	29.4% (45)	48.4% (74)	70.6% (108)	153
Describe a typical simulation software title that help students compose and/or improvise music.	32.2% (48)	**77.9% (116)**	54.4% (81)	14.1% (21)	73.8% (110)	75.8% (113)	149
Describe a typical software program that assists with musical accompaniment.	79.7% (118)	**82.4% (122)**	24.3% (36)	15.5% (23)	41.9% (62)	73.0% (108)	148
Describe how hardware and software might be used to assist in improving music performance skills.	**83.9% (125)**	79.9% (119)	27.5% (41)	18.1% (27)	33.6% (50)	74.5% (111)	149
Explain important criteria for selecting music teaching software for educational settings.	24.8% (37)	**96.6% (144)**	34.9% (52)	22.8% (34)	25.5% (38)	64.4% (96)	149
Show how notation software might be used to create worksheets and other teaching materials for music.	35.3% (55)	**95.5% (149)**	56.4% (88)	32.7% (51)	40.4% (63)	64.7% (101)	156
Describe how software and hardware might assist with collaborative learning and creative work.	39.6% (57)	**89.6% (129)**	39.6% (57)	29.9% (43)	56.3% (81)	70.8% (102)	144

Describe how software and hardware might assist with collaborative learning and creative work.	39.6% (57)	**89.6% (129)**	39.6% (57)	29.9% (43)	56.3% (81)	70.8% (102)	144
Describe how software and hardware might assist with distance learning and creative work.	33.1% (45)	**86.0% (117)**	37.5% (51)	29.4% (40)	47.8% (65)	75.0% (102)	136
Show how to adapt a computer to display information in ways that might assist users with disabilities.	21.7% (30)	**90.6% (125)**	29.7% (41)	23.9% (33)	26.1% (36)	70.3% (97)	138
Explain recent developments in class management systems (e.g. Blackboard) and social networking environments (e.g. YouTube, wikis, blogs) that might aid in music learning and creative work.	27.8% (40)	**90.3% (130)**	39.6% (57)	36.1% (52)	39.6% (57)	75.7% (109)	144

6. Multimedia (click on all that apply)

Create Chart | Download

	Performance (P)	Music Education/Therapy (E)	Music Theory (TH)	History (H)	Composition (C)	Technology (TE)	Response Count
Demonstrate the ability to attach and use a computer or other digital device to control a video projector, "smartboard" projection system, or other display technology.	36.4% (55)	**90.1% (136)**	46.4% (70)	41.7% (63)	47.0% (71)	84.8% (128)	151
Record, edit and produce a digital video on a music topic suitable for distribution on a video streaming site such as YouTube.	48.0% (71)	70.3% (104)	32.4% (48)	32.4% (48)	57.4% (85)	**89.2% (132)**	148
Create a DVD that contains artifacts of creative work for a digital portfolio.	61.3% (87)	70.4% (100)	35.9% (51)	35.2% (50)	73.9% (105)	**85.2% (121)**	142
Create and upload a simple website that features musical content.	54.9% (78)	73.2% (104)	43.0% (61)	43.0% (61)	67.6% (96)	**90.8% (129)**	142
Use presentation software to support a presentation about music that uses text, animation, digital audio, video, and graphics.	47.9% (69)	84.7% (122)	55.6% (80)	56.3% (81)	61.1% (88)	**88.2% (127)**	144

7. Digital Citizenship and Historical Trends (click on all that apply)

Create Chart | Download

	Performance (P)	Music Education/Therapy (E)	Music Theory (TH)	History (H)	Composition (C)	Technology (TE)	Response Count
Describe typical software licensing agreements for the legal purchase and use of commercial music software.	58.4% (87)	80.5% (120)	51.7% (77)	51.0% (76)	70.5% (105)	**91.3% (136)**	149
Describe under what circumstances both printed and recorded music can be copied and distributed.	71.7% (109)	**87.5% (133)**	62.5% (95)	64.5% (98)	78.3% (119)	86.8% (132)	152
Describe the concept of "fair use" and how it relates to music use in teaching or creative work.	72.5% (111)	**90.2% (138)**	63.4% (97)	65.4% (100)	80.4% (123)	88.9% (136)	153
Explain important historical trends in the development of music technology and explain how such trends might predict future development.	27.0% (40)	56.8% (84)	33.8% (50)	48.6% (72)	49.3% (73)	**95.9% (142)**	148

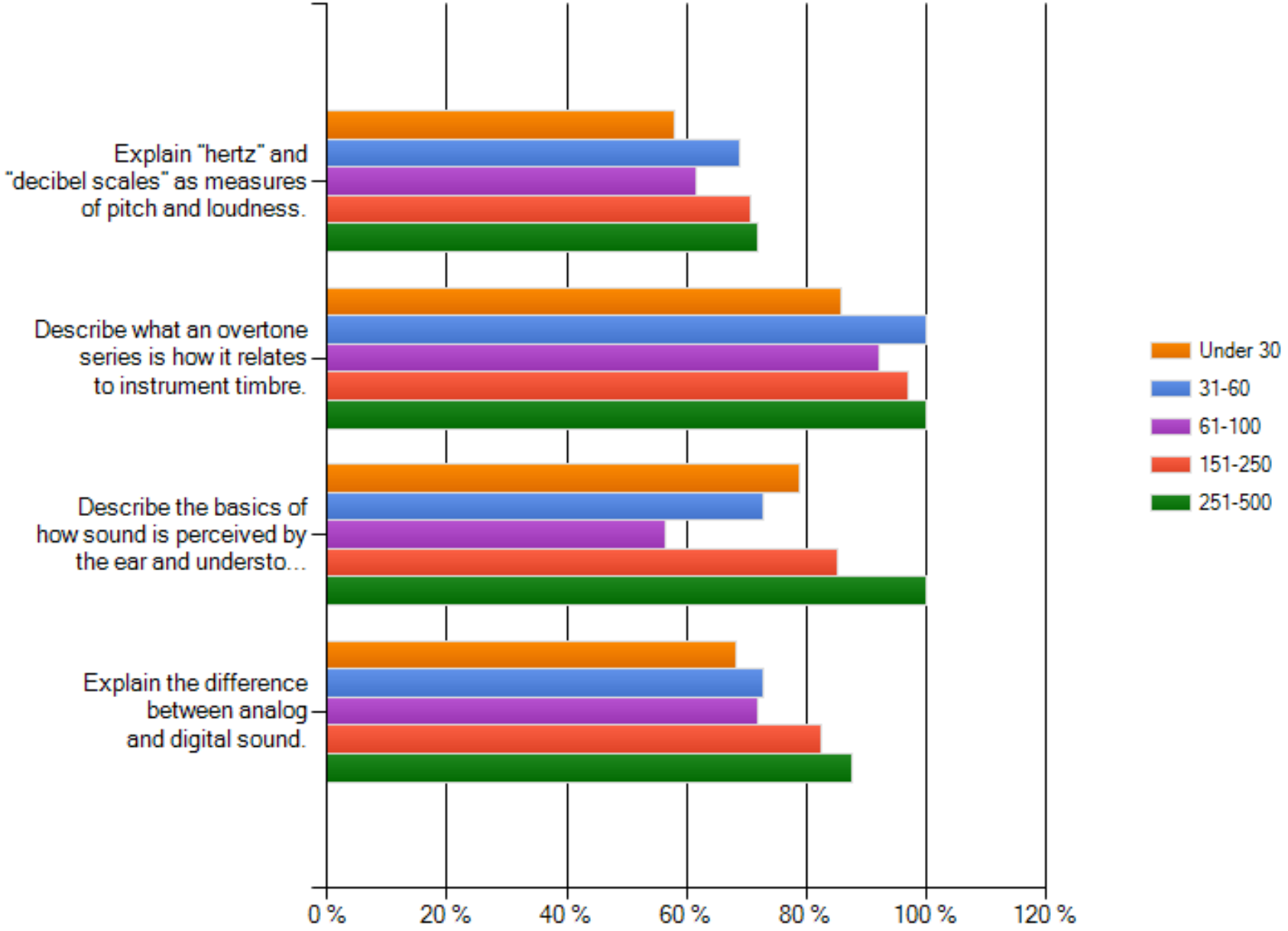
Cross Tabulation
Institutional Size x Families

3. Please select the range that best describes the size of your undergraduate music major population:

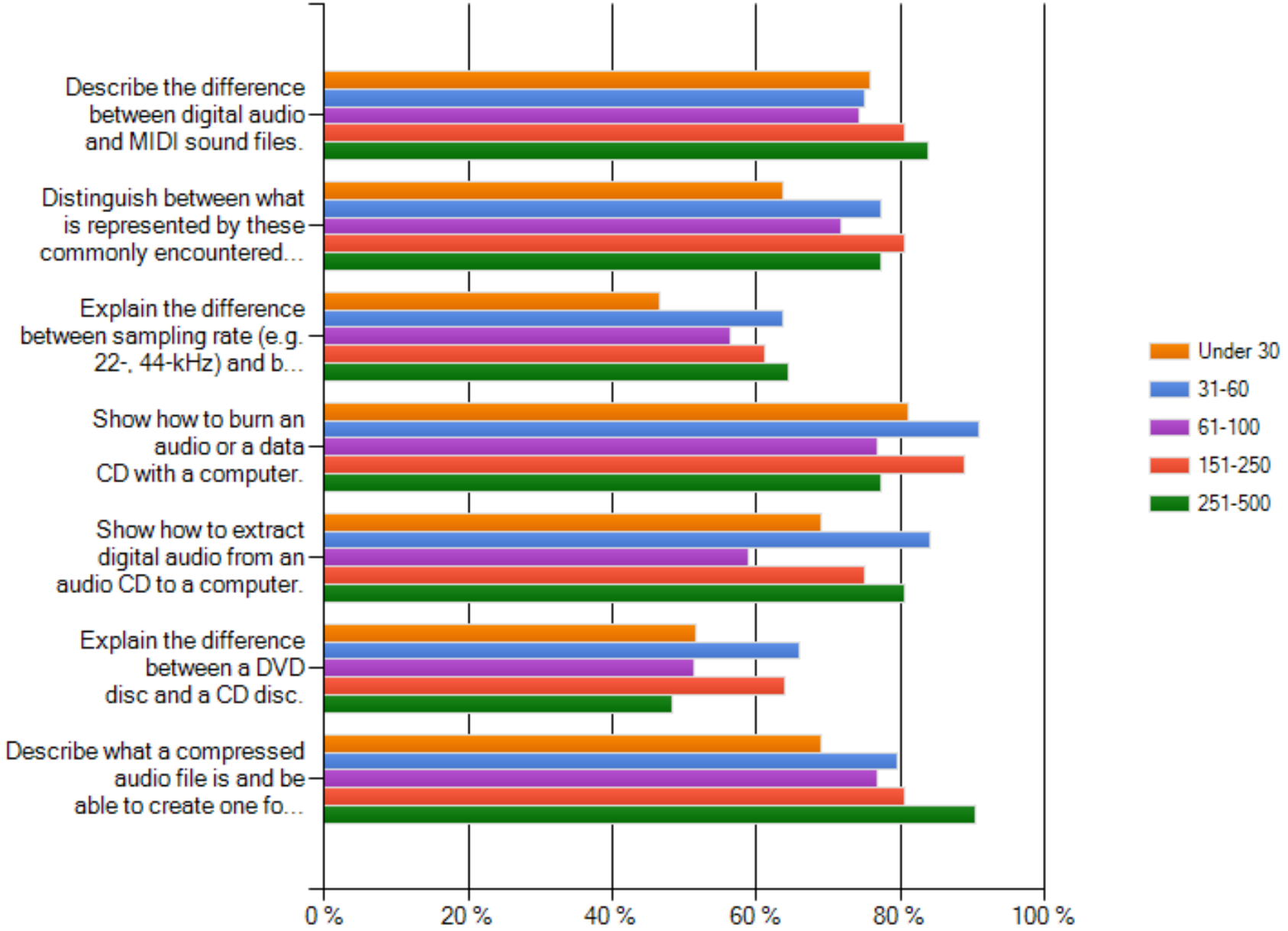
Create Chart | Download

	Response Percent	Response Count
Under 30	24.6%	66
31-60	19.4%	52
61-100	16.0%	43
101-150	9.3%	25
151-250	14.6%	39
251-500	11.9%	32
Over 500	4.1%	11
	answered question	268
	skipped question	9

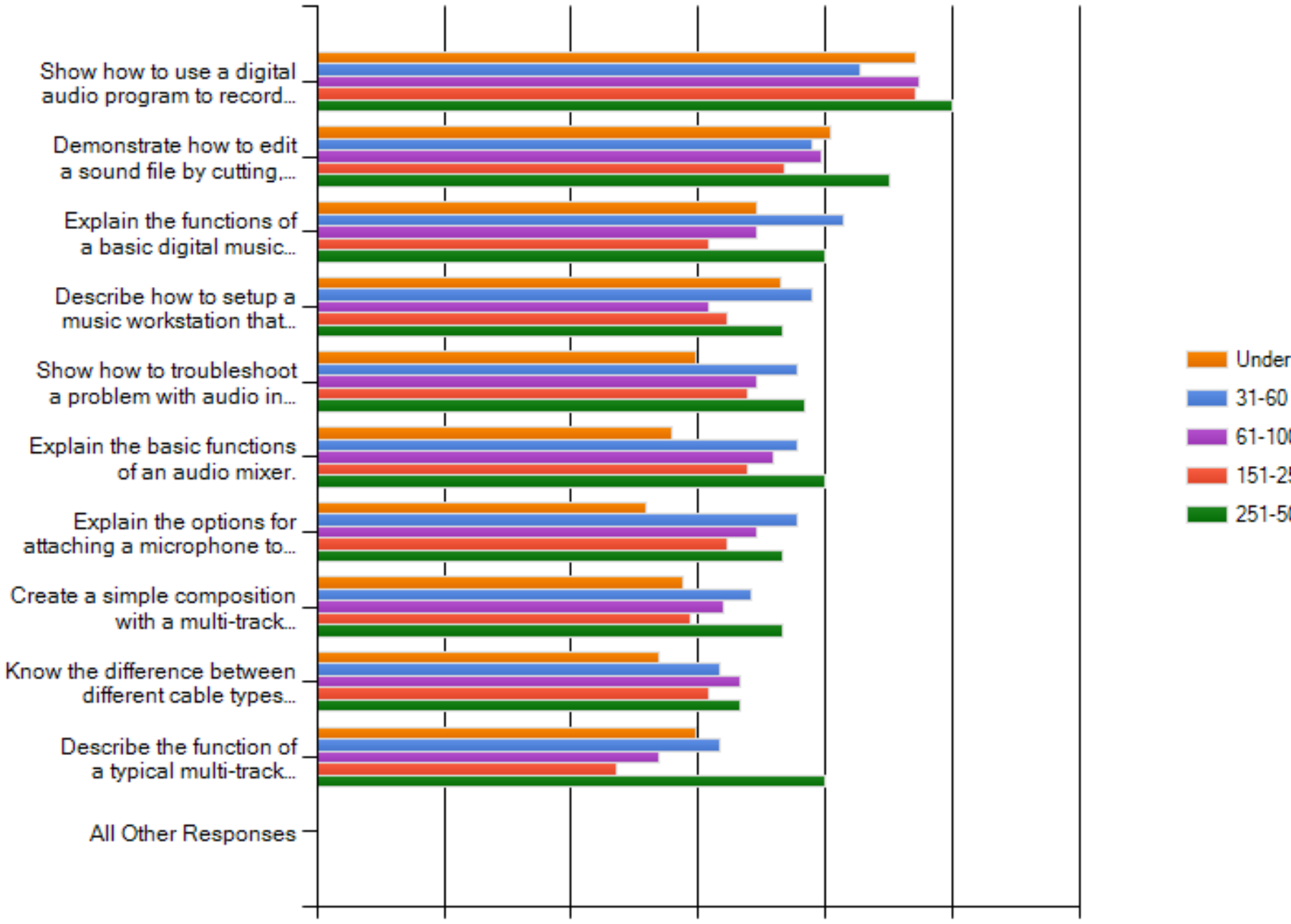
Physics of Sound (click on all that apply)

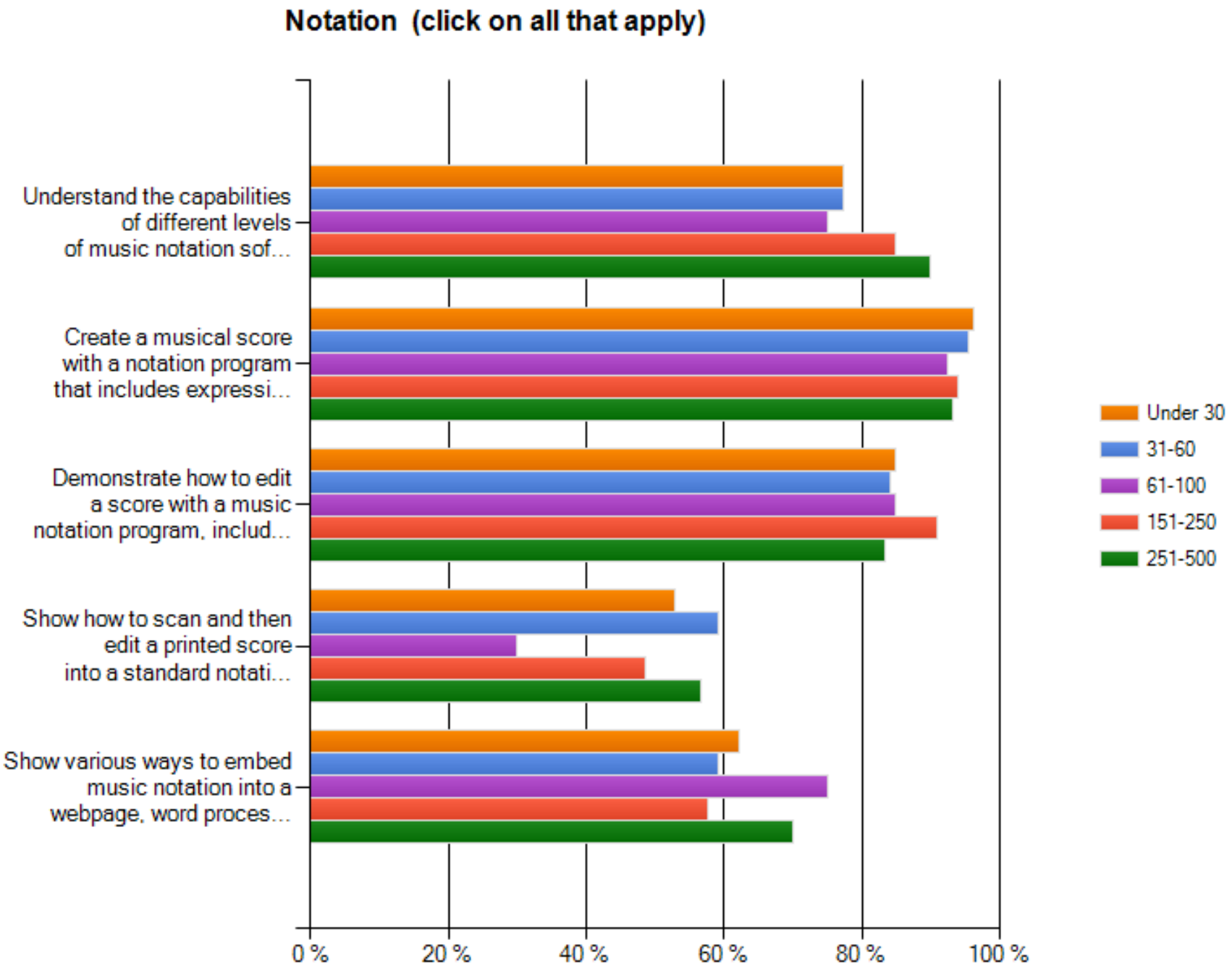


File and Disk Formats (click on all that apply)

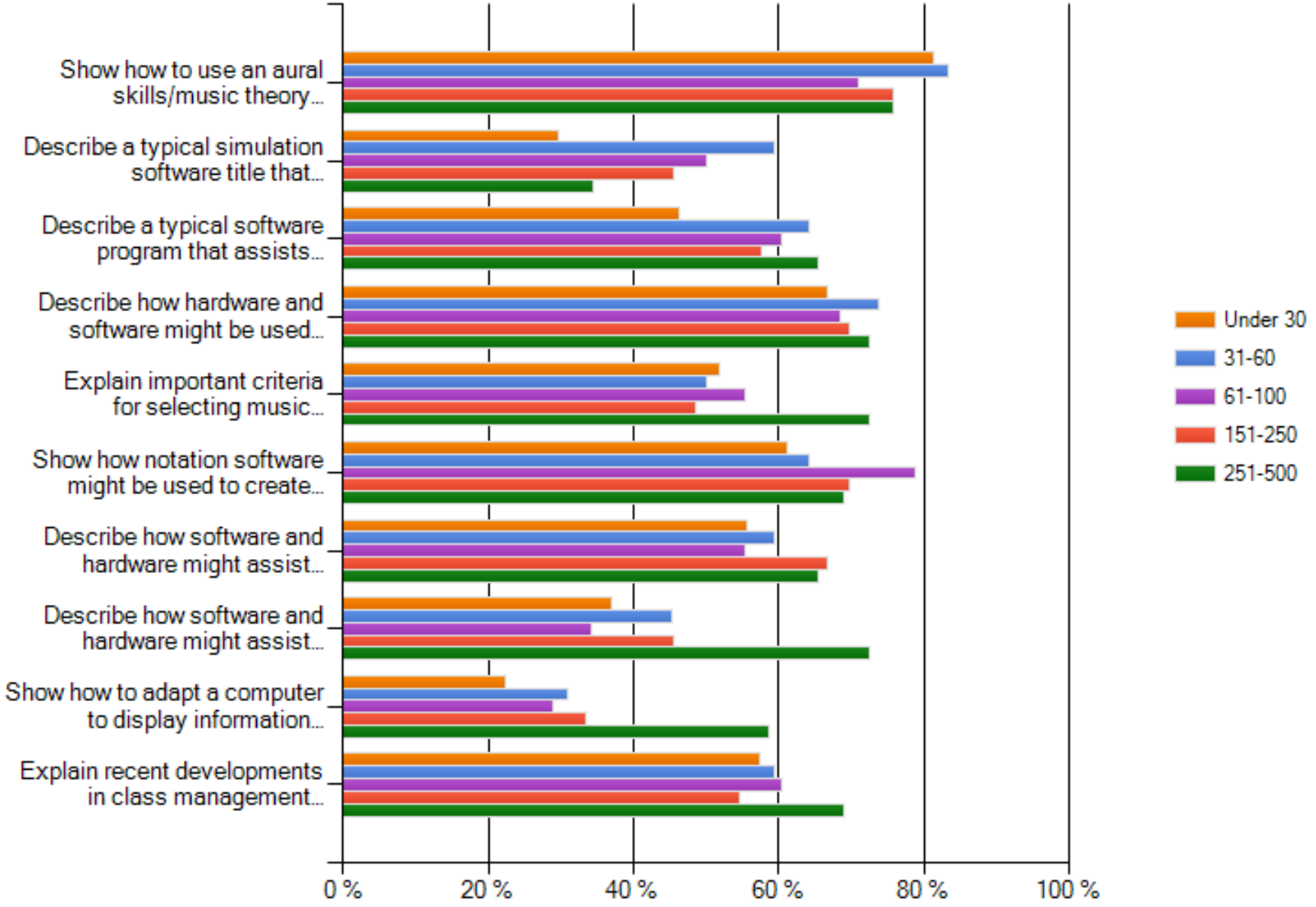


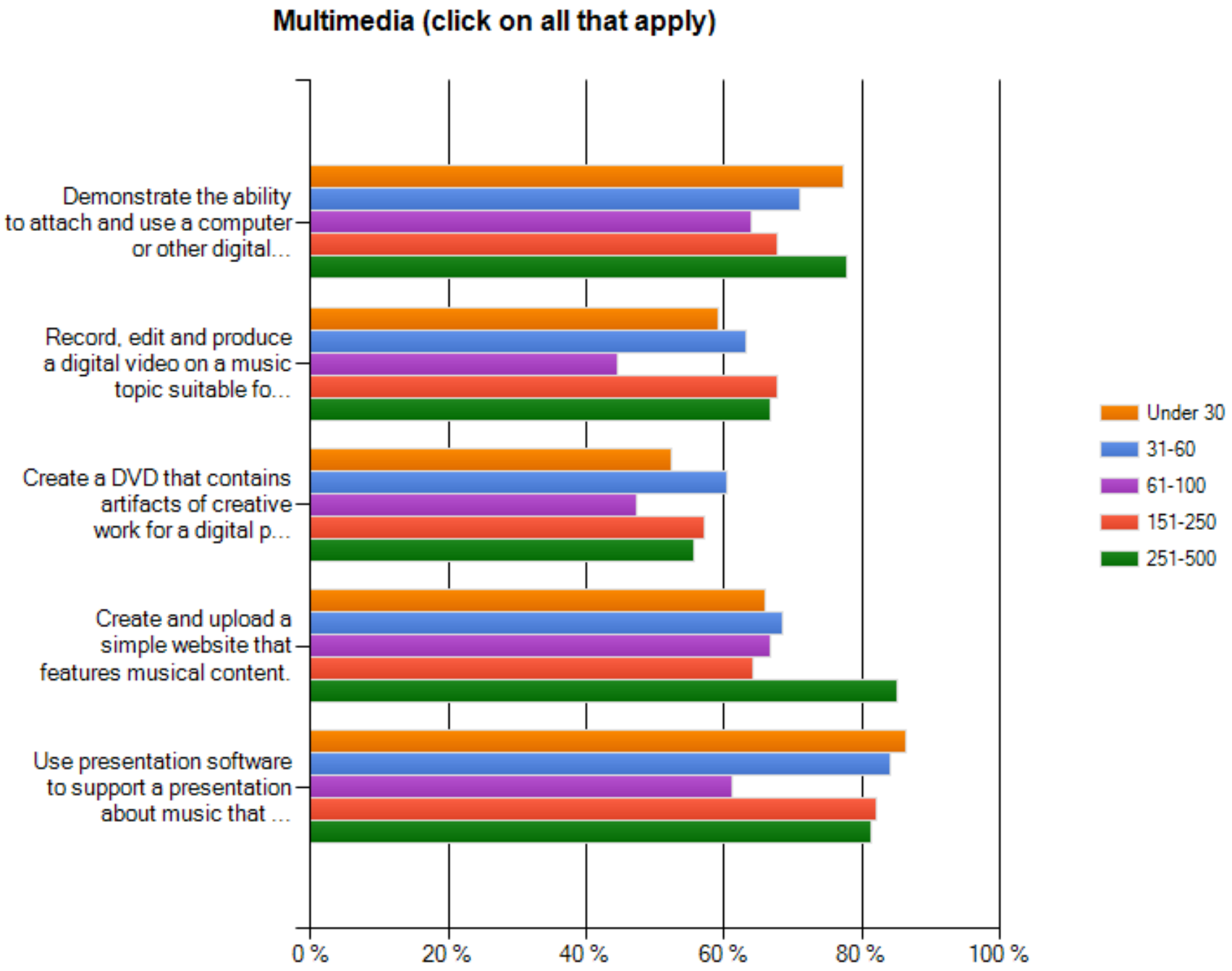
Digital Audio/Recording and Editing (click on all that apply)



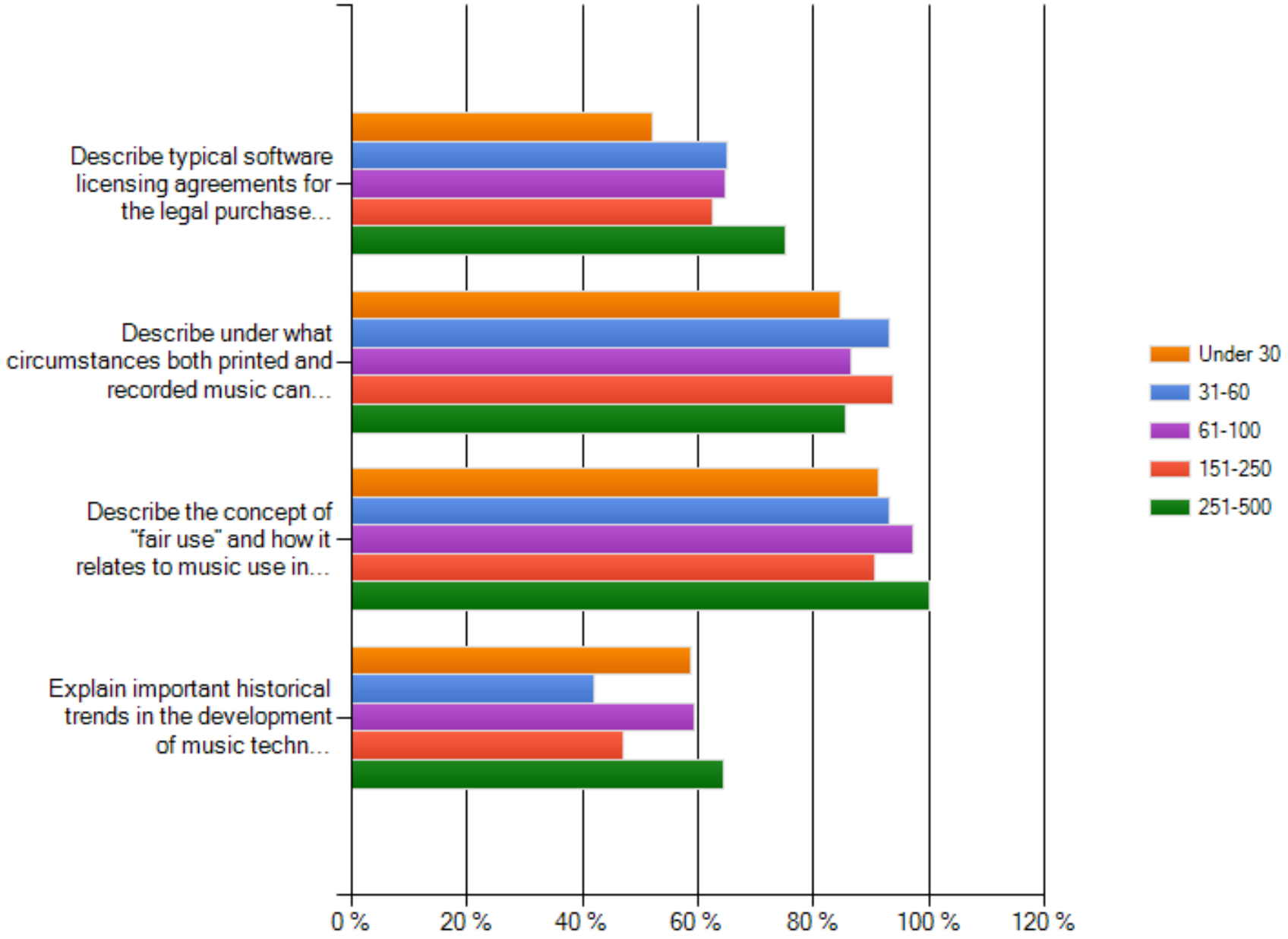

Notation (click on all that apply)
Understand the capabilities of different levels of music notation sof...
Create a musical score with a notation program that includes expressi...
Demonstrate how to edit a score with a music notation program, includ...
Show how to scan and then edit a printed score into a standard notati...
Show various ways to embed music notation into a webpage, word proces...
0 %
20 %
40 %
60 %
80 %
100 %
Under 30
31-60
61-100
151-250
251-500

Teaching, Collaboration, Distance Learning, and Creative Work (click on all that apply)




Multimedia (click on all that apply)
Demonstrate the ability to attach and use a computer or other digital...
Record, edit and produce a digital video on a music topic suitable fo...
Create a DVD that contains artifacts of creative work for a digital p...
Create and upload a simple website that features musical content.
Use presentation software to support a presentation about music that ...
0 %
20 %
40 %
60 %
80 %
100 %
Under 30
31-60
61-100
151-250
251-500

Digital Citizenship and Historical Trends (click on all that apply)



Overarching Competencies

(priority order)

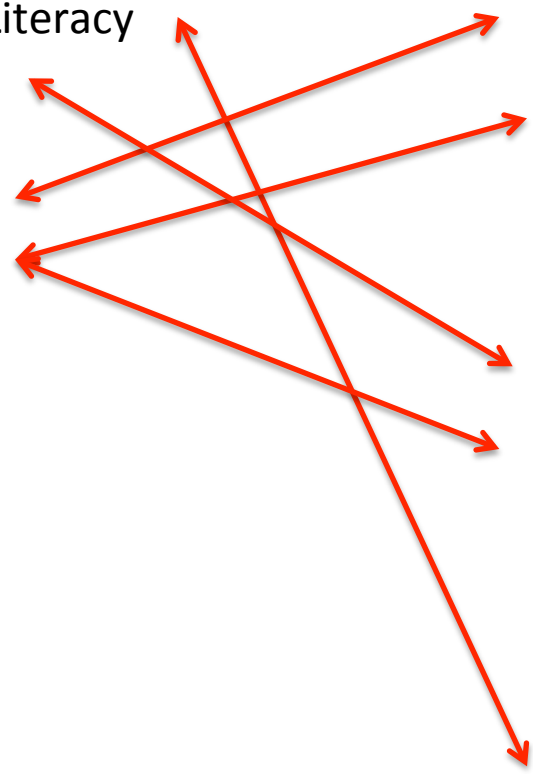
1. Use a notation program
2. Record and mix a performance with digital audio program
3. Understand copyright and fair use
4. Burn a CD or DVD
5. Edit digital audio
6. Basic understanding of acoustics and audiology
7. Use presentation software and connect to projector or smartboard
8. Set up a computer music workstation and troubleshoot problems

USC Study. The following technology skills are important to you and your specific field.

Q2. Responses by Area							
Student		**Faculty**		**Administration**		**Alumni**	
Record	4.43	Comp Lit	4.55	Prod	4.88	Comp Lit	4.67
Comp Lit	4.39	Prod	4.41	Comp Lit	4.82	Prod	4.51
Notation	4.29	Research	4.24	Research	4.24	Record	4.38
MIDI	4.14	Notation	4.21	Web	3.71	Research	4.35
Prod	4.13	Record	4.1	Multimedia	3.5	Notation	4.24
Research	4.04	MIDI	3.79	Notation	3.12	MIDI	4.02
Multimedia	3.69	Multimedia	3.59	Record	2.94	Web	3.55
Web	3.58	Web	3.56	MIDI	2.76	Multimedia	3.53

Skills comparing USC study to Pete & Dave Overarching Competencies

1. Computer Literacy
2. Production
3. Research
4. Notation
5. Recording
6. MIDI
7. Multimedia
8. Web



1. (Notation) Use a notation program
2. (Recording) Record and mix a performance with digital audio program
3. (--) Understand copyright and fair use
4. (Production) Burn a CD or DVD
5. (Recording) Edit digital audio
6. (--) Basic understanding of acoustics and audiology
7. (--) Use presentation software and connect to projector or smartboard
8. (Computer literacy) Set a computer music workstation and troubleshoot problems

Strategies

- Stand-Alone Class
- Integration Throughout the Curriculum
- Mini-courses
- Certification
- Music technology as a general studies or core competencies class on campus
- Let Students Fend For Themselves!