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Apprenticeship Skills in Audio Education: A Comparison of Classroom and Instructional Focus as Reported by Educators

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ABSTRACT

Recent research of audio industry employers indicated that their new hires lacked communication skills, which the employers deemed valuable for their new hire's success. In this research, audio engineering technology (AET) educators were surveyed about the communication skills focused on in their classrooms, focus of their departments/ institutions, and their internship programs. The quantitative data suggested that both educators and their institutions lacked a focus on apprenticeship skills. Also, fewer than half of the institutions required an internship. Further research must be conducted to understand what these educators reported and how it affects AET education as a whole.

1. INTRODUCTION

The ultimate goal of most students who have matriculated at a formal AET program is to enter the audio industry upon graduating. Whether this means working in a recording studio, on tour as a live-sound engineer, or as part of a video game development team, they often enter as interns or assistant engineers [1]. Most likely, these millennials work under the authority of a head engineer, who often has years of experience, possible accolades or awards, and are from the baby boom or X generations [1,2,4]. The intern or assistant engineer's interaction with a mentor is important for success on the job and future advancement [1,2,5,15,21]. Little research exists on how formal AET training programs prepare students for these apprenticeships. However, research has shown that, since 1990, industry employers have witnessed a deficit in social and communication skills from recent graduates [2]. Audio industry leaders have requested that AET programs focus on teaching professional attitudes and increase awareness of day-to-day studio activities [3]. Some argued that AET programs have failed to teach social skills and ways to deal with clients to fully prepare students for work in the industry [10,13, 15]. Additional research indicated that the ability to work well under stress, be an astute observer, be easy to work with, and have a sense of humor was paramount for aspiring engineers [18, 21,8,9]. These abilities and traits are the components of a good apprentice. Some contemporary research has addressed what skills aspiring engineers have, still need, and are required to have by employers.

1.1. Current Research

Contemporary research asked recording engineering experts to identify required skills for students graduating from a four-year AET program in 2019 [20]. The top ranked skills were (1) effective listening towards co-workers and clients, (2) communicate clearly and tactfully with clients/co-

workers, (3) the ability to complete projects, and (4) responsibility.

A 2011 survey of 300 employers from across the US, indicated that their new hires lacked communication skills, had poor attitudes and misguided expectations, and lacked responsibility [2]. Also, the employers stressed the importance of the internship process and the mentor-apprentice relationship developed in this process. One of the employers surveyed reported that, "During the internship he started to learn what it means to take responsibility for completing tasks" [2,p7]. In addition, employers commented on the ineffectiveness of AET programs to prepare students for the social dynamics of the studio and even the application of basic technical tasks. Another employer reported, "Most have had no real-world experience and still require much training on the job, especially in the area of problem solving and client interaction" [2, p7]. Where and how these skills are best acquired is uncertain and is reflected in the multiple approaches and formats of formal AET training programs [6].

1.2. Purpose and Significance

Knowing what educators and their formal AET programs are focusing on could help to understand the comments made by frustrated employers. Moreover, it is important to understand how educators and formal AET programs are helping their students form apprentice and real-world skills that the employers identified as invaluable and important for their new hire's success [2]. The educators of this study indicated a lack of focus on the ability to work under the authority of a mentor in their classroom and at their formal AET institutions. Additionally, requirements for internships varied greatly from program to program resulting in many students not having an opportunity to develop these apprentice skills during a formal and guided mentorship.

2. METHODOLOGY

2.1. Sample

Over one hundred current educators voluntarily completed an online mixed-methods survey. These international AET educators taught at one of the following formal AET programs: Tonmeister; four-year music college; four-year engineering/technical /communications college; three-year professional or special focus school; two-year associates program; or a certification program.

2.2. Collection Process

The online survey asked these educators a series of quantitative questions that focused on communication, technical skills, and personal skills. Participants indicated their responses on a modified Likert scale. First, participants indicated the skills that were focused on in their classrooms and then the skills focused on by the AET program at which they taught. A follow-up, opened-ended question inquired about the internship programs or processes at their AET institutions.

2.3. Skills

The queried communication skills included (a) communicate clearly and tactfully with clients and co-workers, (b) effective listener towards co-workers and clients, and (c) work well under the authority of a mentor. The queried technical skills were (a) the ability to record audio on current computer platforms using current audio programs, (b) audio signal flow in the recording studio, (c) basic knowledge of and basic skill in manipulating entry-level professional recording equipment, and (d) competency in the use of studio microphone techniques. Finally, the queried personal skills were (a) the ability to be a life-long learner, (b) the ability to work hard and complete projects, and (c) show a strong passion for what they do.

2.4. Analysis

The quantitative questions were analyzed by means of descriptive statistics to indicate which skills were most focused on in the educators' classrooms. These classroom statistics were compared with the skills focused on by the AET programs (as reported by the educators). The open-ended internship question was purposefully coded.

2.5. Validity

The skills used in this survey were from my 2013 doctoral research in which employers indicated the top 10 skills they required for their new hires [1], and from Tough's 2009 research of the top 50 skills required by employers [16]. The criterion-related validity as well as the reliability of the instrument was established by the use of a pilot test administered to the faculty at Middle Tennessee State University (MTSU) prior to the administration of the final survey. Based on MTSU

Skill	Classroom %	Institution %	% Difference
Competency in the use of studio microphone techniques	64.7	28.9	35.8
Life-long learning and continuing personal development	64.4	47.8	16.6
Work hard and complete projects	63	45.9	17.1
Audio signal flow in the recording studio	60	48.2	11.8
Record using current platforms/audio programs	54.4	58.9	4.5
Communicate clearly/tactfully with clients/co-workers	45.6	52.9	7.3
Strong passion for what they do	43.5	25.9	17.6
Be an effective listener towards co-workers and clients	41.1	23.3	17.8
Using entry-level professional recording equipment	40	37.7	2.3
Work well under the authority of a mentor	23.5	11.8	11.7

Table 1: Top ten skills focused on in the classroom and by institution

feedback, it was concluded that an additional category be included as many formal AET programs operate out of a technical or communications college. There was mention that the survey was focused solely on recording and studio work, and therefore, did not include the live-sound, post, gaming, and internet segments of the audio industry. However, the prior research from which these skills were defined had a studio recording focus and therefore, this research does not include those areas of the industry.

3. RESULTS

3.1. The Employers

Most educators of the on-line survey taught at four-year music colleges or four-year engineering/ technical /communication colleges in the middle and eastern United States, and 83.2% had worked in the industry for more than five years. While 36.6% received their formal AET training at a four-year music college, 25.7% indicated that they had no formal AET training.

3.2. Skills Focused On in Classroom and AET Programs

As seen in Table 1, more than half of the educators strongly agreed that they focus on the top ten ranked skills in their classrooms. The educators reported that their institutions focused mainly on recording using current computer platforms and current audio programs, communicating clearly and tactfully with clients and co-workers, and understanding audio signal flow in the recording studio.

3.3. A Lack of Focus on Mentorship

The response to the question, 'In my classroom, I focus on the ability to work well under the authority of a mentor' is shown in Table 2. Very few of the educators strongly agreed that their institutions focused on working well under the authority of a mentor.

Response	n = 85	Percent, %
I Strongly Agree	20	23.5
I Agree	20	23.5
Neutral	25	29.4
I Disagree	14	16.5
I Strongly Disagree	1	1.2
N/A	5	5.9

Table 2: Mentorship in classroom survey question

Table 3 shows the responses for the questions, 'The AET training program I teach at focuses on the ability to work well under the authority of a mentor.' Few educators strongly agreed the ability to work well under the authority of a mentor was a skill they focused on in their classroom or a skill their formal AET training programs focused on. This was much different from the responses for the other nine skills. Therefore, the educators or AET programs of this study did not focus on these apprentice skills.

Response	N = 90	Percent, %
I Strongly Agree	10	11.8
I Agree	21	24.7
Neutral	33	38.8
I Disagree	16	18.8
I Strongly Disagree	1	1.2
N/A	4	4.7

Table 3: Mentorship at institution survey question

3.4. Educators' Particular AET Institution's Internship Program

An open-ended, follow-up question asked educators to report their AET training program's internship requirement. As shown in Figure 1, the responses indicated that only 38% of the formal AET programs required an internship.

The educators' responses regarding internships were purposefully coded into four major areas. The educators' actual responses are shown in Tables 4, 5 and 6. Some educators responded that internships were built into the program (QR11). Many indicated that there were opportunities available and that students were encouraged to pursue them, but they were only offered as electives. Of those educators who responded that internships were not required, many gave a variety of reasons for their institution's policy including too few studios, too many graduates, or the availability of good audio jobs upon completing their program (QR12). At some institutions only junior or senior students with high GPAs could apply for an internship. Fewer than half of the educators responded that internships were required at their AET programs. The length and location of these required internships varied greatly. The range was from 3 months to 120 hours, or as much as 2 years. No consensus of length or location was displayed.

Figure 1: Internship programs educators reported at their formal AET institution

QR	Code	Response
1	None	None
2	None	4 year degree in music with tech specialty. Kent univ.
3	None	4 years University degree
4	None	None
5	None	None
6	None	None required. 2year school. Connections are there for worthy students.
7	None	None.
8	None	Not required but strongly recommended
9	None	none
10	None	Minimal requirements. Low numbers of eg. commercial recording studios and high number of students/graduates (including other AETs) means market saturation. Commercial studios often only take on one intern per year. 10hrs minimum "work experience", can be anything audio related.
11	None	Our "internship" is really a practicum class where students support broadcast audio for TV and Film Sound projects with the film and broadcasting students. Additional projects may also come up from time to time from the community. Students may, alternately, do a traditional internship with a business.
12	None	None. Our graduates can get paying audio jobs directly out of the program. We only encourage and support internships when they match an individual's employment goals.
59	N/A	Ask Dan [redacted]!
60	N/A	It is a 3hour registration that is just now being implemented.
61	N/A	NA
62	N/A	Not sure.
63	N/A	Unsure
64	N/A	one semester for graduate students
65	N/A	production studios, mastering studios, live sound crews, amusement parks, radio and television production facilities. Training and simulation labs, forensic audio facilities.
66	N/A	at the master's level, it's one semester, the only location requirements are that they are off campus

Table 4: Open-ended responses for AET internship requirements that were coded for none or not applicable (n=66)

QR	Code	Response
13	Not Req.	Internship is optional and runs for 1 semester.
14	Not Req.	Internship is optional. Most are local, but sometimes they go abroad. 1 semester.
15	Not Req.	Internship not required for graduation
16	Not Req.	Internships are an optional elective.
17	Not Req.	Internships are electives and usually last 10 weeks.
18	Not Req.	It is not a requirement, but we offer a senior internship off campus.

19	Not Req.	It is not feasible to require an internship, but it is highly recommended.
20	Not Req.	No requirement, but there are a wide range of internship opportunities available to students.
21	Not Req.	No requirement. We offer connections for those who are interested and capable.
22	Not Req.	Optional 2 semesters
23	Not Req.	Optional onesemester or summer internship, can be anywhere appropriate.
24	Not Req.	Optional; per semester; up to 3 semesters for credit; more recommended
25	Not Req.	not required but strongly encouraged. rigorous application/selection process to qualify
26	Not Req.	There is an option to take an internship course for credit. It can be used to fulfill one of six major electives requirements, Internships generally account for 120180 hours of service and it includes a journaling requirement and a final paper.
27	Not Req.	None required, but Internship satisfies one of six required guided major electives requirements, so many students take this.
28	Not Req.	must be junior level; must be enrolled for credit; must have certain GPA. Formal programs in LA, NYC, Nashville, Chicago and Washington DC.
29	Not Req.	For the AS, the prerequisites for internships include a strong ability to manipulate signal flow. Internships are 1credit/60 hours or 2credit/120 hours, supervised. Our students are interning at every recording studio, postrpoduction, and mastering house , as well as at the theme parks, television stations, and audiobook studios in the Orlando area. For the BS, students intern at all audio engineering firms in the area, mostly in the traininsimulation indusrty, and the theme parks.
30	Not Req.	Internships are elective. Undergraduates can take up to 6 credit hours towards their major electives. Each credit hour requires a minimum of 75 hours on the job. Students must be seniors and have completed core competency courses. They intern with providers in all areas of professional audio.
31	Not Req.	We do not require. It is standard in the industry to be an intern. We only recommend to intern as much as possible before they graduate
32	Not Req.	Internships are elective and open to only seniors who work a minimum of 75 hours on the job for every credit earned. A max of 6 credits can count toward major electives. Any aspect of pro audio is acceptable as long as there is an audio profession who will mentor the student. Students cannot work in a professional's private living space.
33	Not Req.	This is not required, but recommended for students over 75 credits. Students can receive three internship credits for 120-180 hours of work over a semester. This includes a journalling requirement and a significant written reflective paper.

Table 4: Open-ended responses for AET internship requirements that were coded for not required (n=66)

QR	Code	Response
34	Required	120 hours of contact time in a professional environment related to the student's career goals.
35	Required	120 hours, any location, junior year or later, no department grade below c
36	Required	180 hours at a working facility in music recording, postproduction, or live sound
37	Required	2 three month internships required. Any location. After sophomore and junior years.
38	Required	2 11week internships requiring 9 hours of work per week specific to the audio field.
39	Required	2 internships over 4 years (60 hours and 120 hours)
40	Required	2 three month internships required.
41	Required	6week internship. 210 hours. Students' choice.
42	Required	At least one semester, 120 Hrs at an approved audio Tech facility.
43	Required	One Quarter internship
44	Required	One semester
45	Required	Two different internships. 1 month each.
46	Required	6credit internship requirement. 210 hours. Approximately 67 weeks. Can be achieved at any geographic location but must be in the broad realm of Music Technology.
47	Required	undergraduate level: 6 months internship in recording studio or similar facility, graduate level: no requirements
48	Required	120 hours. Mandatory to graduate. Students must have a C or better in all major courses to qualify for an internship. Any location.
49	Required	One semester with anyone we can place the student with. This often translates as the need to place the student in multiple studios for short stretches. The overall requirement is 100 hours.
50	Required	2 threemonth internships required and for credit. If paid, up to 40 hours a week. If unpaid, up to 20 hours per week.
51	Required	One quarter internship that must require at least 60 hours of work from the student. Location is flexible, but student is typically enrolled in other courses at the school simultaneously, keeping student local/regional.
52	Required	We require an internship for the degree. Internship must be a minimum of 8 weeks at 20 hours a week.
53	Required	3 upperlevel courses are required which, generally, can be completed over 2 semesters. However, given admission to program requirements, this puts the student at a late junior or senior level. Internships are, generally, 1 semester long (3 hours) and can count up to 6 hours of credit towards the degree (typically, 2 semesters).
54	Required	10 weeks at a recording facility, label or other music industry business. Not sure of what else it entails.
55	Required	I feel all internship programs are way too short. Ours is a 120 hours, I feel a good 6 months internship at one or two different sites would be more beneficial.
56	Required	Our internship is a required in house yearlong course that supports the broadcasting and film in terms of audio production as well as learning test and measurement, basic troubleshooting and routine maintenance.
57	Required	120 hours internship required. Part of a music degree, studio classes and studio skills required. various proficiencies

58	Required	2 semesters of internship internal one semester in the dept and one semester external at a professional facility. There is a class to take with this that includes resume writing and students sharing their experiences in the field.

Table 5 Open-ended responses for AET internship requirements that were coded for required (n=66)

4. DISCUSSION

The educators and AET programs of this study did not focus on the ability to work well under the authority of a mentor. This lack of focus of apprentice skills is an issue for employers who commented their new hires were not interested in feedback and have an inability to take criticism [2]. For a successful mentor/mentee relationship it is important to develop the ability to receive feedback and constructive criticism and learn from the guidance [16]. Prior to AET programs, an engineer learned via apprenticeship or on-the-job training [17]. Due to the miniaturization of the recording studio by digital audio workstations and computer advancements, the apprenticeship system became very rare [17, 20]. Other factors including cost on studios to train engineers and the streamlined recording process lead to the demise of the apprenticeship system [5, 7]. While Kenny argued in the 1990s that the apprenticeship system would not be lost but rather transformed via internship, only 38% of the educators of this study reported that their AET programs required internships [11]. Not requiring internships may be a factor in the critical comments made by employers that argued new hires are unprepared socially and often are poorly suited to work in the studio environment [1, 2].

5. RECOMMENDATIONS

A supporting qualitative study should be conducted to understand why apprentice skills are not a focus of the institutions and educators of this study. Questions should focus on how they are preparing students for internships or assistant engineer positions.

In the classroom, one-on-one or mentor/mentee opportunities can be cultivated. There have been advancements in this model at MTSU in the mixing courses taught by professor John Merchant and me. We have infused one-on-one mixing lessons in addition to class meetings and coursework [3]. These mix lessons aim to help students learn how to receive feedback from a mentor/client/professor and learn to make adjustments based on this feedback. Also, the Blackbird Academy, a nine-month formal AET training program, is experimenting with a more active model of classroom and studio instruction under the aegis of veteran recording engineers [12]. These students are working with real clients at a business located on Nashville's historic Music Row [12].

How to create these opportunities and culture to improve apprentice skills can be achieved in many ways. First, current AET curriculums could infuse apprenticeship skills into current courses as additional objectives and even graded outcomes. Second, the establishment of a course could help to develop social skills, foster mentorship, and prepare students for the working environment. Developing these skills is important for all aspiring engineers whether their goal is to work in a multi-million dollar recording studio or on a laptop in their apartment.

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7. REFERENCES

[1] Bielmeier, D. C. (2013). What Skills New Recording Engineers Have and Where They Learn Them: A Survey of New Recording Engineers' Perceived Skill Sets and Those Observed By their Employers. (Unpublished doctoral dissertation). Argosy University, Washington, D.C.

[2] Bielmeier, D. (2013, July 25). Why didn't you learn this at recording school: critical comments by employers. AES 50th International Conference. Paper Presentation from AES, Murfreesboro, TN, USA.

[3] Bielmeier, D.C. (2014, February, 28). *The Apprentice: Using the Apprenticeship Model to Increase Student Engagement.* Poster presented at Student Success, Inclusion and Retention Summit: MTSU, Murfreesboro. TN.

[4] Bielmeier, D.C. (2014, March, 21). *What Employers Want.* Paper presented at the 8th Annual Central Region AES Student Summit held at Webster University. St. Louis, MO.

[5] Douds, T (1985, spring). The importance of audio education. SPARS papers (2), 1.

[6] Cash-Jones, L. (2002, October). *Finding a recording audio education program that suits your career choice.* (Convention Paper No. 5697). Paper presented at the 113th Audio Engineering Society Convention, Los Angeles, CA.

[7] Grundy, A (1984, Fall). Institute of audio research. SPARS papers (2), 1, n. page.

[8] Hirsch, H. (1985, Spring). Education for the audio renaissance. SPARS papers (2), 1, n. page.

[9] Jackson, L. (1988, July). Studios speak to the schools. MIX, 72-88.

[10] Jacobson, L. (1988, July). Studios Speak to the Schools. Mix, 12, 70-71.

[11] Kenny, T. (1990, July). Digital diplomas. *MIX,* 64.

[12] Kenny, T. (2013, November 1). The Blackbird Academy: A New Type of School With an Old-School Mission. Mix,1. Retrieved May 17, 2014, from http://mixonline.com/recording/facility_profiles/the_blackbird_academy_a_new_type_of_school_with_an_old-school_mission/

[13] Lambert, M. (1989, July). Education in the school of hard knocks. MIX, 14, 23.

[14] Lave, J., & Wenger, E. (1991). Situated learning: Legitimate peripheral participation. Cambridge, England: Cambridge University Press.

[15] Lightner, J. W. (1993). A survey of the professional audio industry in an eight-state region to assess Employers' perceived value of formal audio education and their perceived training needs for entry-level employees. Unpublished doctoral dissertation, Ferris State University, Big Rapids, MI.

[16] Merchant, J. (2011, October 20th). A Revised Approach To Teaching Audio Mixing Techniques: Applying The Deliberate Practice Model. AES 131st Convention Paper Presentation from AES, Murfreesboro, TN, USA,.

[17] Pritts, R. (1998). Education and the AES. *Journal of the Audio Engineering Society, 46*, 88-92.

[18] Sanders, D. H. (1994). The professional preparation of the audio engineers: A survey of studio personnel and recommendations for school curricula design. Dissertation Abstracts International, 55(04), 797. (UMI No. 9423006)

[19] Tough, D. (2009). Developing a Consensus-Driven, Core Competency Model to Shape Future Audio Engineering Technology Curriculum: A Web-Based Modified Delphi Study. (Unpublished doctoral dissertation). Tennessee State University, Nashville, TN.

[20] Tough, D. (2010, November). *Shaping audio engineering curriculum: An expert panel's view of the future*. Paper presented at the 129th Audio Engineering Society Convention, San Francisco, CA, USA.

[21] Walsh, E. J., Jr. (1996). Important occupational skills and knowledge needed in the preparation of the recording engineer: A survey of faculty perceptions. Dissertation Abstracts International, 57(09), 3850. (UMI No. 97057)