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TEACHING OLD AND NEW DOGS NEW TRICKS – CHALLENGES IN ADJUSTING TO THE DIGITAL AUDIO PARADIGM SHIFT IN LIVE EVENT AUDIO

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This paper examines the impact of digital technology on the live sound sector and the educational and developmental challenges posed to sound systems technicians and engineers.

The responses of a group of leading industry Audio operatives (n30) via an online questionnaire, outline the importance of understanding developing digital technologies.

Findings also suggest that a more streamlined approach to the integration of industry and traditional providers of education could be a way to progress contemporary, innovative provision.

BACKGROUND

The live sound industry is relatively new, having ~~only~~ existed as an entity since the mid 1960's with a well documented progression from the initial, inadequate 'Beatles' 600W Shea stadium reinforcement system of 1965¹ with the resultant negative impact, to modern large scale complex systems, such as that deployed at the Royal Albert Hall for the 'Teenage Cancer Trust 2015' concerts².

Over the last 50 years technologies have advanced significantly. Methods utilised to capture, process and ultimately deliver audio to an audience have evolved in terms of efficiency and complexity.

In turn, the skills required for technicians assembling, testing, operating and maintaining this equipment have

changed dramatically. Developing and maintaining skills that allow the continuation of this career has become somewhat of a challenge – as the rate of change of equipment complexity has become increasingly high, so has the learning curve necessary to 'stay with the game.'

Until the 1980s available technologies were entirely analogue in nature, and thus demanded a particular technical skill-set to implement, deploy and maintain a system of scale. Early digital technologies were exemplified by the Yamaha R1000 reverb unit, providing a repeatable representation of a 12 bit mono approximation of reverb³ - but this technology was by no means transparent in terms of audio quality and had a very limited range of reverb values available to it.

Reliability, quality and cost of early digital equipment led to its development only into areas in which it outperformed analogue equipment, such as effects, many of which were not achievable by analogue systems.

Since then, digital devices have gradually increased in prevalence and audio devices have displayed a marked

1 : Mitchell K, 'Parnelli Innovator Honoree, Father of Festival Sound' FOHOnline http://fohonline.com/index.php?option=com_content&task=view&id=579&Itemid=1 September 2006. Viewed on 13th May 2015

2 : Author unknown, 'Sound to behold – d+b ArrayCalc simulation software V8 featuring ArrayProcessing' http://www.dbaudio.com/fileadmin/docbase/ArrayProcessing_EN.PDF, D+B Audiotechnik 2015. Viewed on 12th May 2015

3 : Author unknown, 'Yamaha R1000 digital reverberation operating manual' Yamaha <http://www2.yamaha.co.jp/manual/pdf/pa/english/signal/R1000E.pdf>, Yamaha. Viewed on 12th May 2015

improvement in reliability and quality – replacing their analogue predecessors. In addition to this, digital systems components have also developed the ability to ‘communicate’ via networking protocols allowing prediction of and control of an increasingly complex set of electro-acoustic parameters not feasible in the purely analogue model. Work-flow of the modern engineer has also been affected by these developments.

SCOPE OF STUDY

The researchers wished to ascertain the impact of technological change on the working practices of front-line operatives in the live music industry with a small-scale initial study.

Job roles in 'the industry.'

One constant in the live audio market is the need for personnel to deploy audio equipment to satisfy the requirements of venues, bands and target audiences. The balance of job roles do vary depending upon the scale of the event, but the scope of this research is intended to reflect roles found in a generic, moderately to large sized festival event. The roles examined are the front of house (FOH) mix engineer, the FOH systems technician, the monitor (MON) mix engineer and the MON systems technician. In larger systems, there may be more specific subdivisions of job role or even multiple operatives responsible for one area. However, for the purposes of this paper it is assumed that there will be one person per role.

Areas of interest

This study focussed upon initial responses in the following areas:

- a: Identify skills development necessary by operatives to stay ‘current’
- b: Identify areas in which significant development has been necessary
- c: Identify challenges faced by operatives as a result of developments
- d: Consider challenges faced by education providers in meeting the demand for development

RESEARCH METHOD

The target personnel for the research study consisted of a small group of audio professionals with first hand experience of the challenges presented in transitioning from analogue to digital systems and work-flows.

This was achieved by being granted administrative access to a closed Facebook group – ‘*Sound Engineers*

Beyond the Pub’⁴ - (SEBTP) utilising online Survey software.

‘SEBTP’ is a self-selecting and moderating closed Facebook group created on June 11th 2014 by Freelance Audio and System Engineer Liam Halpin⁵. Administrative access was granted and is held by one of the authors of this paper.

The group comprises in excess of 650 members ranging from freelance mix engineers, systems technicians, PA company employees, Manufacturer employees to in-house engineers. Membership of the group is reserved to experienced and reputable operatives at industry level, or who work for a known company. It is a forum where professionals can engage in debate, discussion, ask advice and network. As a result, validity of opinions expressed is to an extent assured.

A group of volunteers responded to the call for survey responses.

The questionnaire employed both closed and extended questions which enabled trends and themes to be explored in greater detail. It was constructed and deployed on 2nd August 2014. It was intended that the survey should not require an excessive amount of time for the operative to complete (**Appendix 1**).

RESULTS AND FINDINGS

Number of Respondants

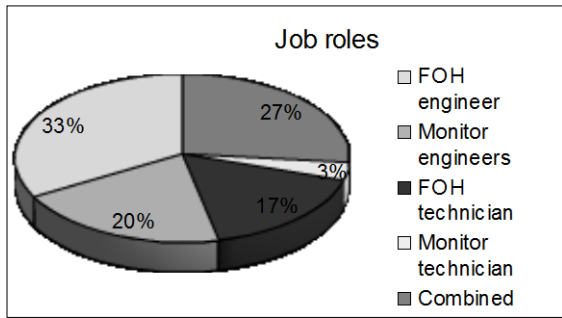
The number of operatives completing the survey was 30.

Responses

Q1: Which role do you mostly fulfil at Music Festivals / Live Events?

4 : Halpin L, Sound Engineers beyond the pub <https://www.facebook.com/groups/Probersoundengineers/>, 2014 viewed on 14th May 2014

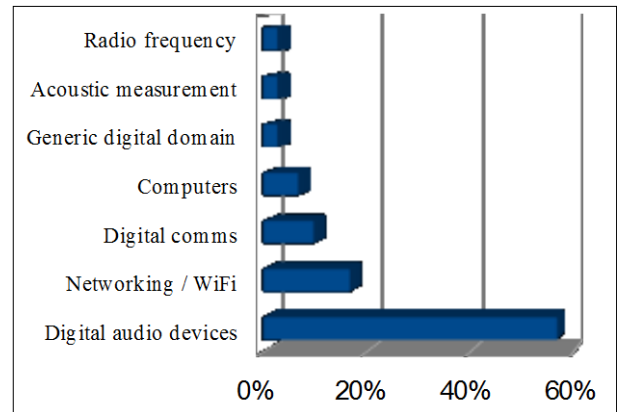
5 : Halpin L, Personal website <http://135db.com>, viewed on 14th May 2014



0-5 years	2 (7%)
5-10 years	4 (13%)
10-15 years	6 (20%)
15-20 years	7 (23%)
20-25 years	5 (17%)
25-30 years	4 (13%)
30+	2 (7%)

Length of experience is also spread, with a slight peak between 10 – 20 years.

Q3: What is the single most important advancement that has most impacted your professional day in the past 10 years?



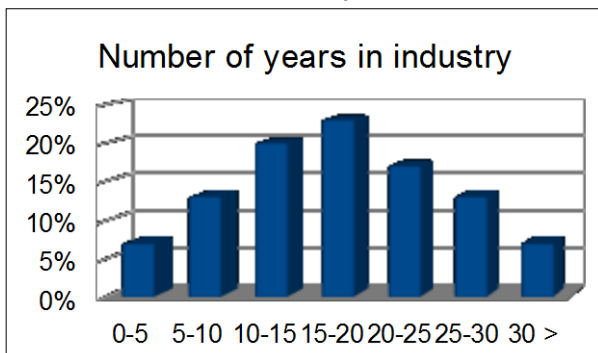
Exclusively front of house engineer :	10 (33%)
Combined, non exclusive:	8 (27%)
Exclusively monitor engineer:	6 (20%)
Exclusively front of house technician:	5 (17%)
Exclusively monitor technician:	1 (3%)

This data displays a good spread of job roles – some have exclusive roles, some are multitaskers.

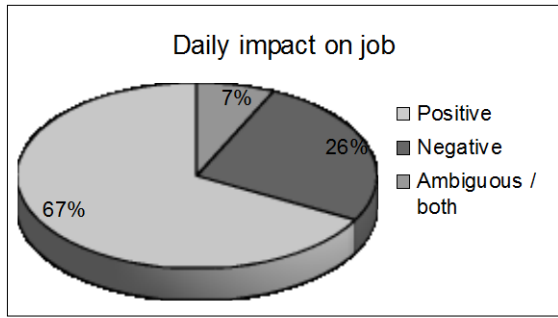
Digital Audio devices (consoles, etc.):	17 (57%)
Networking / wifi :	5 (17%)
Digital Communications / e-mail / mobile:	3 (10%)
Computers / Pads:	2 (7%)
The digital domain in generic:	1 (3%)
Acoustic Measurement:	1 (3%)
RF (Radio Frequency) regulation changes:	1 (3%)

This displays a combined majority of 74% involving Digital audio devices and network communications.

Q2: How long have you been an active professional in the Live Production industry?



Q4: In what way has this advancement impacted your working day?



Positive – 20 (67%)

Negative – 8 (26%)

Ambiguous / both – 2 (7%)

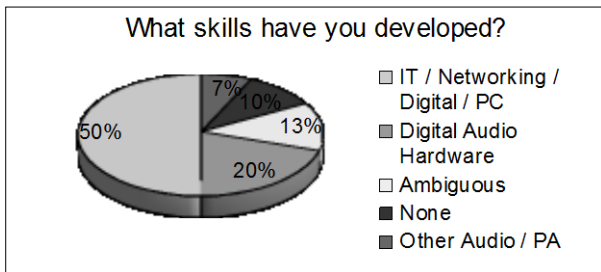
These results indicate that 2/3 of respondents view the developments to be positive.

Q5: Have you found yourself needing to acquire new skills to continue with your career?

Yes – 27 (90%)

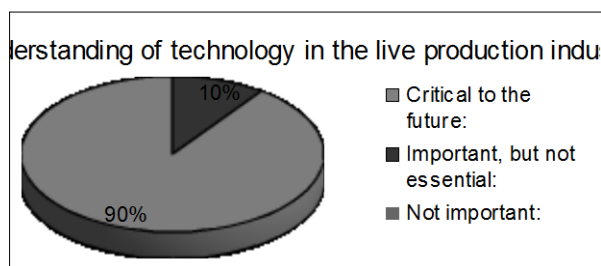
No – 3 (10%)

Q6: If you answered 'Yes' to the previous question, what additional skills have you acquired?



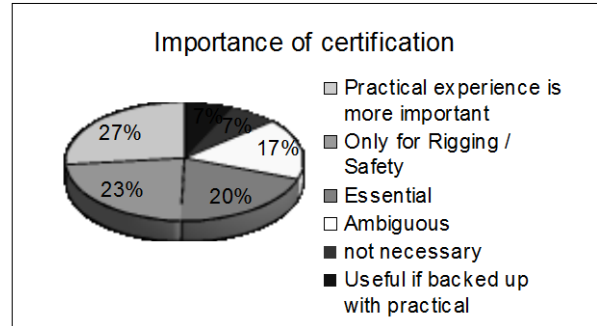
This data indicates that 70% of respondents have developed either digital audio or networking knowledge.

Q7: Do you see the understanding of Technology being: (to the live production industry)



This data indicates that understanding of technology is critical to the future of the industry.

Q8: What is your view on professional Accreditation / Certification for the operation of equipment?



This data displays more variability than in previous responses. It indicates that there is a far more varied opinion regarding certification and the learning process.

DISCUSSION

Q1: The respondents represented a range of roles within the business providing an even spread of experience and insight; 10 class themselves exclusively as FOH engineers, 6 exclusively as MON engineers, 5 exclusively as FOH systems technicians and 1 exclusively as MON technicians.

8 engineers serve multiple roles of varying scopes and complexities; 6 have identified two roles, and the remaining two engineers have at least 4 roles that they could occupy.

This is important to the study as it displays a good representation of the varied roles within the business. It also highlights the multitasking nature of some engineers.

Q2: This is important as it captures the experiences of operatives that have been in industry for varying lengths of time. Operatives (in the 0-5 year range and the 5-10 year range) would not have the same historical perspective of the digital advancement as those in the 10-15, 15-20, 20 – 25, 25-30 or 30+ ranges.

Only one operative in the 0-5 year range – has identified that they have not needed to develop new skills. Likely reasons for this are if the person in question came into the industry with an existing digital oriented skillset.

Q3: From this data, it can be seen that 28 responses directly involve digital technologies. Whilst the importance of digital audio device advancement is prevalent, there is also a strong trend towards networking and WIFI communications being critical to

the modern industry. Computers are mentioned as important developmentally, as is 'the digital domain' in generic terms.

The remaining two 'non digital specific' also involve or have been impacted by digital technologies.

To achieve Acoustic Measurements it is likely to involve operation of computer system with digital processing, and the Radio Frequency regulation changes have been made in response to 4G mobile phone / digital TV crowding in specific UHF bands previously used by radio microphones and in-ear monitor systems. (Innovation driven by mass digital communications details can be found at the OFCOM⁶ website.) Protecting bandwidth is crucial to the operation of radio equipment at events, the importance of which is outlined by the existence of BEIRG⁷, an industry led group trying to protect the redeployment of radio bandwidth.

Q4: 67% of operatives indicated that their experience of digital technologies is positive, and responses include quality of service phrases such as 'consistency'; 'Streamlining' (of work flow); 'quality and complexity'; 'speed, scene storing, recall ability and wireless mixing'; '...more creative and able to deliver more for an artist'; 'faster changeovers, more accurate preproduction'.

In comparison, the 26% negative comments, are revealing: 'made everything slower and more complicated'; 'lots of last minute changes'; 'it's more of a f***about now'; 'it's made it less enjoyable'; 'it's made it harder' and 'spoiled it' - indicating that the benefits of working digitally do not have universal appeal.

Clearly, 2/3 of the respondents view digitisation as positive, and have developed ability to utilise the new equipment to their working benefit.

Q5: The need for new skills development is highlighted in the responses to this question. 90% of operatives have indicated that they required new skills to continue developing their career. It is unclear how they achieved their current levels of development, but anecdotal evidence suggests that training is largely completed on an 'ad-hoc' basis, or is run by manufacturers on specific products without certification (other than a certificate of attendance).

Q6: This further reinforces the responses to question 3 – in that 70% of respondents have required to learn aspects of digital audio equipment and IT / networking. Increasingly, with the prevalence of audio over IP, it can be inferred that these two discrete areas are becoming strongly aligned. The market success, for instance of Audinate's DANTE⁸ in providing audio connections utilising IP may support this view.

The capacity of digital audio equipment to be controlled by wirelessly connected devices is another area of digital audio where the understanding of connectivity over IP is essential for the modern engineer.

Q7: The importance of understanding technology is reinforced, with 90% of respondents indicating that they believe it to be critical to the future of the live production industry.

Q8: In the last question, the importance of certification is questioned, and responses are less clear cut in outcome than for the previous section. What is evident is that just over a quarter (27%) of respondents believe that practical experience is more important than certification, whilst a further 23% only see the value of certification if it underpins rigging or safety.

Overall, it is clear that the importance of understanding technology in the live production industry is universally accepted within the target group. Digital audio and networking technologies are recognised as being the two main areas of knowledge development over the last 10 years. Despite this, operatives seem reluctant to undertake structured learning unless it directly relates to safety; one response described certification as a 'necessary evil'. A further response indicated that training is acceptable, unless it is a barrier to earning - as training effectively removes the operative from their employment.

Industry has not been slow in addressing the need for information to be passed to operatives, but ~~these~~ courses tend to be very manufacturer-centric, unassessed (a certificate of attendance only) and tend to be delivered for fixed times in fixed locations.

Barriers to learning-may include

Timing: Busy engineers cannot guarantee that they will be available for a lengthy course delivered by 'face to face' methods

6 : Website www.ofcom.org.uk/ Viewed on May 11th 2015

7 : Website <http://www.beirg.co.uk/> Viewed on May 11th 2015

8 : Website <https://www.audinate.com/> Viewed 11th May 2015

Materials: Any materials, tests, etc. for learning tend to be restricted- availability 24/7, 365 days of the year in any global location may alleviate this barrier.

Certificate: Currency – is 'certificate of attendance' valid prove of skills development or knowledge?

Cost: Whilst freelancers do get tax relief to cover the cost, time out impacts earning and availability

Credibility and validity: The operative may be sceptical about CPD unless the industry accepts the need for proven certification in non-critical or safety driven disciplines. A certificate of competence directly linked to a structured CPD route in specific digital skills may be the answer.

Educational establishments, University and College level, can play a critical role in provision.

The traditional educational establishments have developed courses onto involving enrolment for long periods of time. Whether such courses are designed to meet the needs of the contemporary live audio sector is debatable,

The Music Industry can also provide support in relation to student and current staff development - in 'subject' 'currency, equipment ownership cost implications, variety of equipment, size and availability of venues, and perhaps most importantly provision of 'on the job' experience that, in longer terms will benefit the industry itself.

SUMMARY / CONCLUSION

Rapid innovation in any sector can be both positive and disruptive - initiating improvement and response to new demands and forcing adaptation and renewal of working practices - and acquisition of new knowledge, understating of operational impact and resultant skill set transformation. Innovation in digital audio technology hardware and software raises serious questions about technical ability, skills development and continued employment in this rapidly evolving sector of the music business. High quality, expensive music performance demands the highest quality soundscape to ensure effective presentation for performers and experiences for audiences. To stay in the field and to stay abreast of change and innovation professional operatives require access to high quality training and practical experience in new technologies - either in the workplace or in simulated laboratory conditions.

This rapidly evolving landscape also asks serious questions around training, education and knowledge exchange between education providers and the business. How do colleges, universities and industry bodies

respond to this challenge? The education sector is habitually restricted in funding to provide the equipment and resources to prove up to date courses and facilities to support new entrants to the business.

This challenge highlights the need for new strategies to meet these demands and suggests a 'blend' of approaches and inter-industry planning to create effective provision - for both operatives in the business seeking CPD and lifelong learning opportunities for renewal of skills and knowledge base, and vocational courses curriculum for new students in education wishing to enter this professional world. Such a blended approach may involve colleges and universities collaborating much more closely and effectively with industry and technology providers to ensure that the music business keeps delivering the highest quality product for the market place. Collaboration and shared strategies between education sectors and the industry may be the key to future quality proviosn for this highly lucrative market.

Appendix 1: Questionnaire questions

Q1: Which role do you mostly fulfil at Music Festivals / Live Events?

- FOH Engineer
- Monitor Engineer
- FOH Systems Technician
- Monitor Systems Technician
- Electrician
- Rigger
- LD
- Lighting Technician
- Noise Monitoring operative
- Audio Visual technician
- Communications / Internet

Q2: How long have you been an active professional in the Live Production industry?

- 0-5 years
- 5-10 years
- 10-15 years
- 15-20 years
- 20 - 25 years
- 25 - 30 years
- 30 years +

Q3: What is the single most important advancement that has most impacted your professional day in the past 10 years?

Q4: In what way has this advancement impacted your working day?

Q5: Have you found yourself needing to acquire new skills to continue with your career?

- Yes
- No

Q6: If you answered 'Yes' to the previous question, what additional skills have you acquired?

Q7: Do you see the understanding of Technology being:

- Critical to the future development of the Live Production industry
- Important, but an operative can survive without it
- Not at all important

Q8: What is your view on professional Accreditation / Certification for the operation of equipment?