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THE ROLE OF THE THIRD SECTOR IN FURTHER EDUCATION - ESTABLISHING A TRAINING PROGRAM FOR THE ACOUSTICAL SOCIETY OF FINLAND

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ABSTRACT

Many acoustical societies in Europe and elsewhere offer further training in acoustics to their members and others in need. In Finland, the role of the third sector in further training after secondary and tertiary education has strong traditions. In this paper, the need for further education in acoustics in Finland was studied with the help of an online survey, and the possibilities of catering for those needs as training provided by the third sector. It was found that there is a need to cover general topics especially related to acoustic consultancy that are not offered by tertiary education.

Keywords: *further education, acoustics, third sector, training*

1. INTRODUCTION

Tertiary education refers to any type of education pursued after high school. This compasses, among others, certificates, diplomas, bachelor's and master's and doctoral degrees. Tertiary education is provided by vocational schools, community colleges, technical schools, professional schools, colleges and universities. These educational facilities are typically run by the public and private sectors. The third sector, comprising not-for-profit voluntary and community organisations, co-operatives and the like, provides much of the life-long and life-wide learning in society, with a widely known example being the scouts. Many third-sector organisations have well-established educational programs that can sometimes be counted towards a formal degree.

University programs tend to respond to changes in working life very slowly and may suffer from a lack of personnel with industrial work experience or suitable connections. To bridge the gap, the third sector may be much more flexible and alert to tailor training suitable for working life. It should complement formal education, at least when it is about training professionals, for example in Australia when transitioning to acoustic consultancy [1]. Furthermore, community-driven third-sector representatives, like the national acoustical societies, have the potential for a larger vision and dynamic response to the industry's needs because of the variety of people involved in their activities than public or private institutions.

Acoustics is a multidisciplinary subject, which means that the skills and knowledge of acoustics are often coupled with those of other fields. On the other hand, basic knowledge and skills in acoustics should be propagated to the experts in many other areas. The myriad of applications makes the acoustic field very scattered with in-depth knowledge that generally cannot be covered in the tertiary curricula, and thus further training and sharing of expertise are vital. Indeed, there are many examples of the training in acoustics offered by the third sector. For example, Deutsche Gesellschaft fur Akustik organises training courses under DEGA-Akatemie, and in the UK the Institute of Acoustics and in Australia, the consultants have started a short distance-learning program together with the university [1]. Recently, initiatives for online training courses, such as acouacou [2] funded by the European Union, have surfaced. National acoustic conferences

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can also be considered important training and networking events.

In Finland, the Acoustical Society of Finland (ASF) organises a biannual national conference, but no other training events with a long-term outlook. This paper studies the feasibility of establishing a training program within ASF aligned with its aims to support people working in the field of acoustics and to improve the operational conditions of the field in Finland. To this end, the needs of people working in acoustics are mapped with the help of a targeted online survey. In addition, the acoustics-related courses offered in the tertiary institutes in Finland are summarised in order to identify any gaps in the domain knowledge.

2. ACOUSTICS AS PUBLIC TERTIARY EDUCATION IN FINLAND

The professional acoustics community was brought about by the need for the acoustic design of buildings during the 1930s along with the rest of Europe [3]. Today, it is estimated that there are about 1400 person-years of work related to acoustics in Finland and the number is growing [4]. Acoustics is currently being taught at the master's level as a major (40-60 ECTS) at Aalto University with a wide range of topics and as a minor at Tampere University (25 ECTS), where the focus is on building acoustics, with the possibility of some audio signal processing courses. In addition, the University of Eastern Finland offers environmental acoustics and noise courses for 15 ECTS. Individual courses on audio signal processing, room acoustics, building acoustics and environmental acoustics are offered at several tertiary education institutes in different fields, as expected by the multidisciplinary nature of the subject. These frameworks include environmental science, music technology, sound design, musicology, luthiery, and interior planning, and in some study programs, acoustics are integrated into the teaching.

A clear need for post-degree training is identified in acoustic consultancy. First, to work as a designer in construction certain qualifications are needed based on the complexity of the project. A certain amount of studies in acoustics (20-35 ECTS) is required to obtain this certificate and continuous professional development is also required at its renewal. This creates also the need for providing some basic courses in acoustics at the tertiary level outside the formal study programs. In practice, many courses in the study programs are open to the public for a fee. Some consulting companies also request private courses from tertiary institutes or professors. Second, several national and international standards oblige certified noise measurements, and training is provided for the proficiency test by some public and private institutions. A few private companies offer short training courses on a specific topic, mostly regarding measurements.

3. QUESTIONNAIRE

3.1 Design

The needs of the people working in acoustics were mapped with an online survey. The actual questions are presented in Appendix A. The key topics in acoustics were predefined in the questionnaire, and for each of them, detailed subtopics were listed. The questionnaire was designed to answer the following questions:

- What kind of job descriptions do people work within acoustics?
- Which topics people would like to get trained on?
- Would people attend training organised by ASF?
- How should this training be organised?
- How much people would be willing to pay for training?
- Are there any very specific training needs?
- Does the training have to provide a certificate?

The target audience was the members of ASF and non-members who might benefit from the training. Consulting companies, technology companies, governmental and municipal authorities, and other organisations were among the identified target groups and they were approached by email with a request to spread the questionnaire.

3.2 Results

The online questionnaire was open for about a month and in total 79 responses were collected, which is about 26 % of the number of people contacted. Most respondents work in consulting (64%), research and development (39%), or education and training (12%). The acoustic consultants are heavily presented among the respondents, but at the same time, these companies are also the major employers in acoustics. The respondents were fairly evenly distributed between working less than 10 years, 20 years, 30 years, and over 30 years.

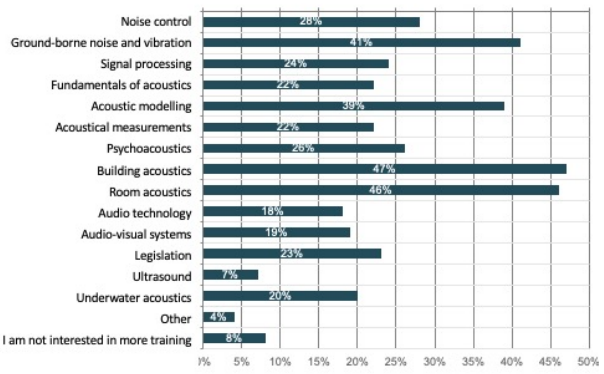

Figure 1. The most popular topics for possible post-degree training by the respondents

Acoustics is a major part of the work for 76% of the respondents. Interestingly, only 55% had done a major in acoustics, and 17% had not had any prior training in acoustics. However, 80% of the respondents had acquired post-degree training in acoustics, mostly organised internally in a company (54%) or organised by an external company (39%), or by an institute (24%). Other methods for post-degree learning were self-study, learning by doing and attending conferences. For most people, the main reason for further training was self-interest, not external motivation.

The results for the desired training topics are shown in Fig. 1. The most popular topics are ground-borne noise and vibration, acoustic modelling, and building and room acoustics. For ground-borne noise, the most interesting topic would be the practical solutions and example cases, while for room and building acoustics modelling methods such as ODEON and CATT, sound insulation, acoustics of wooden buildings and building physics were among the most demanded topics.

The preferred types of training were expert lectures of 2-4 h (72%), and 8-16-hour training courses (68%). In particular, lectures by experts outside Finland were requested. The preferred method of delivery was live online, also combined with live teaching. The preferred teaching methods include lecturing (86%), modelling examples (62%), and modelling exercises (49%). The majority of the respondents (90%) would be willing to pay for the training and assumed that the company would pay (84%). A little more than half (57%) of the respondents would need either a certificate or credits for the training.

In the free comments, concerns were raised about the possible training provided by the ASF competing with the existing courses offered openly by the universities. Generally, international collaboration was endorsed. Some comments also called for more sharing of good practices in modelling and measurement, and literature on specific topics. The topics for training mentioned in the free comments include machine learning, spatial sound, acoustics and noise control of ships, the annoyance of noise, modelling of materials, sensor technologies, signal processing for acoustical measurements, machinery acoustics, and multimodal perception.

4. DISCUSSION

The survey response rate was lower than expected, but it is believed to give an adequate picture of the training needs of those people who have identified such needs. In particular, the attention is drawn to the fact that most respondents who work in consulting would like to be further trained on topics that concern them, such as noise and building acoustics. On the one hand, this reflects the lack of topics such as ground-borne noise in formal education. On the other hand, in the case of building acoustics, this may reflect a geographical imbalance: while graduates from all tertiary institutions work in acoustic consulting, most building acoustics courses are offered at Tampere University. In this case, the task of ASF might be to endorse the collaboration between universities and to encourage students to take courses in other universities to ensure a pool of graduates with the necessary skills, rather than start filling this gap with additional training programs on fundamental topics. However, for people whose job description barely intersects with acoustics, but who might benefit from some domain knowledge, such courses might be considered. Unfortunately, it seems that this questionnaire did not reach this pool of people, and many needs might still be hidden.

Another outcome of the survey is that academics are expected to lecture in the training. This can potentially be a conflict of interest, as the same experts are also teaching in the private and public sectors. However, as pointed out by some of the respondents, the national societies have good opportunities and networks to invite international lecturers within the possible training framework.

Running a training program means also hiring dedi-

cated staff, such as a training coordinator. The majority of respondents were willing to pay for the training and assumed that the employer would cover the costs. Currently, the only employed staff by the ASF is a part-time secretary. Financial feasibility was also studied. A rough estimate suggests that with about 160 training day participations annually, a 50% part-time coordinator could be hired. Given the estimate of 1400 person-years in acoustics, a little over 10% of those should be attending the ASF training annually. Also, this is slightly more than the attendance at the biannual acoustical conference. With the right outreach and high-quality program, it may be feasible but requires an initial investment. For comparison, the DEGA Akatemie is estimated to have about 140 annual participations [1].

5. SUMMARY

In sum, the role of the third sector in post-degree training is not clear-cut and not without conflicts of interest. In Finland, the tertiary or post-degree education in acoustics is divided both geographically and topics-wise. The majority of the respondents of an online survey of people working in acoustics had taken part in such training provided by a private or public institution, and about 70% of the respondents would participate in training organised by the ASF. The most popular topics reflect also the demographics of the respondents: building and room acoustics, and ground-borne noise were at the top of the list. On the other hand, courses on such topics are already provided by some universities, and there appear to be concerns with possible overlapping. International experts are expected to provide the possible training.

6. REFERENCES

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7. APPENDIX A

The questions for the online questionnaire

1. Which sector are you working in: Public, Private, Third

2. Which field do you on (you may choose several): Forestry, Mining, Metal, Construction, Real Estate, Health and environment, Environmental protection, Education, Architecture, Engineering, Other

3. What is your main job description: Planning and consulting, Sales and marketing, Research and development, Production, Management and finance, Education and training, Logistics and procurement, Other

4. What is your job title:

5. What part of your job is related to acoustics: 0%, 1-10%,11-50%, over 50%

6. How long have you been in working life: less than 1 y, less than 3 yrs, less than 5 yrs, less than 10 yrs, less than 20 yrs, less than 30 yrs, more than 30 yrs

7. What is your highest degree: (specific options for the past and present Finnish system)

8. How many credits (1 ECTS =27 hours) of acoustics did your degree include: 40 ECTS or more (major), 15-25 ECTS (minor), 10-15 ETCS, less than 10 ETCS, not at all

9. Have you obtained any post-degree training in acoustics: Organised internally, Organised by an external company, Organised by an institute, Other, No

10. What are the reasons for obtaining post-degree training: Obtain a certificate, Change of job responsibilities, Ordered by employer, Update my skills, My own interest, Other

11. Are you a member of the Acoustical Society of Finland:

12. Which topics you would like to get training on: Noise control, Ground-borne noise and vibration, Signal processing, Fundamentals of acoustics, Acoustic modelling, Acoustical measurements, Psychoacoustics, Building acoustics, Room acoustics, Audio technology, Audiovisual systems, Legislation, Ultrasound, Underwater acoustics, Other

13. Please specify subtopics.

Noise control: Machine acoustics and noise control, Environmental noise, Noise modelling, Noise and hearing, Other, Doesn't concern me

Ground-borne noise and vibration: Measurement, Modelling, Practical solutions for mitigation, Other, Doesn't concern me

Signal processing: Digital signal processing fundamentals, Audio effects, Speech signal processing, Other, Doesn't concern me

Acoustic modelling: Element methods (BEM, FEM), Room acoustic modelling (CATT, ODEON, Cadna), Noise modelling, Other, Doesn't concern me

If you answered Element methods, specify some applications of interest to you.

Psychoacoustics: Hearing, Hearing aids, Conducting listening tests, Sound quality evaluation, Other, Doesn't concern me

Building acoustics: Sound insulation, Multipurpose buildings, Hospitals, Schools, Wooden buildings, Building physics and acoustics, Other, Doesn't concern me

14. Are there any specific topics that you would like to get training on:

15. Are there any specific experts in Finland or elsewhere that you would like to hear:

16. Would you participate in the following paid training organised by ASF: 1-2 hour expert lecture, 8-16 h training course, A longer course, Other, No I wouldn't

17. How would you like to study: Live online, Live classroom, Online course at own pace, Combination of online and classroom live

18. What kind of teaching methods would you prefer: Lectures, Excercises, Examples, Measurements, Modelling, Writing and reading reports, Other

19. The training provided by ASF should provide: Official Certificate, Credits that can be verified towards a formal degree, Nothing

20. Which would be your preferred language for the training: Finnish, Swedish, English

21. How much would you be willing to pay for an 8-hour (1-day) training: 0€, 100-200€, 500€, 1000€

22. I think my employer would pay for the training: Yes, No

23. Any other comments: