THE LANDSCAPE OF FUTURE EDUCATION IN SPEECH COMMUNICATION SCIENCES

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ABSTRACT

After many years of successful cooperation in Europe on education in Phonetics and Speech Communication, in 1996 a new thematic network was created with the aim to reflect on future developments in education in Speech Communication Sciences. The network constitutes of 80 European academic institutions and has the support of major international organisations. The activities of the thematic network will be presented followed by a short overview of the results obtained in the first year. Forthcoming actions are proposed.

1. INTRODUCTION

Since 1991 there is growing cooperation in Europe in the field of education and training in Phonetics and Speech Communication. This development has been stimulated considerably by the European Union through the ERASMUS programme which created conditions through which students and staff could easily travel abroad, summer schools could get financial support, while the development of new curricula was encouraged.

With respect to mobility, over the last six years more than hundred students spend on average six months of their studies abroad. We estimate that this amounts to about 25% of all students in Phonetics and Speech Communication in the partner's institutions. To encourage these visits and to support the students as much as possible, we have paid a lot of attention to provide the students with up to date information. A comprehensive overview of their possibilities in Europe has been published in 1995 in the book "European Studies in Phonetics and Speech Communication" [1]. In addition, the book contains stimulating papers on various areas of studies, written by pre-eminent researchers. The general contents of studies in Phonetics and Speech Communication has been described in an overview of elements of studies (in keywords).

Lecturers and students can also be brought together in intensive summer courses. This year, the fifth European Summer School on Language and Speech Processing has been organised in Leuven. This series of summer schools attracts between 60-90 participants a year, half of them students, 25% staff and 25% from industry. Every year a specific topic is addressed: prosody, corpus-based methods, multiliguality, dialogue systems, lexicons with forthcoming topics as robustness and multimodal systems.

All these activities are intended to provide our students with optimal and flexible conditions to maximize their qualifications. However, it has also been recognised that European cooperation could extend to the contents of studies as well. Considering the rapid developments in a field that tends to cross disciplinary boundaries, reflections on future directions of education would be timely. Again supported by the European Union, now under the SOCRATES programme, in 1996 a new thematic network "Speech Communication Sciences" has been created with the aim to reflect on the current status of education and on future directions. The fact that this network was chosen among 25 other networks out of over 400 applications shows that the achievements in the last years have been appreciated. The network consists of 80 partner institutions (mainly European but not limited to Europe) and has got the support of the international organisations ESCA [European Speech

Communication Association], ELSNET [European Network for Language and Speech], EURASIP [European Association for Signal Processing], IALP [International Association for Logopedics and Phoniatrics] and CLPLOL [European Association for Logopedics]. All information on the thematic network can be found at URL: tn-speech.essex.ac.uk/tn-speech/

This paper will summarise results of the network obtained so far and will provide an outlook on forthcoming activities.

2. THE THEMATIC NETWORK "SPEECH COMMUNICATION SCIENCES"

The thematic network "Speech Communication Sciences" covers a broad range of disciplines with Phonetics and Speech Technology at the center with links to Speech and Language Pathology and Therapy, Computational Linguistics and Natural Language Processing. Although these various disciplines have many common interests and cooperate in research in several overlapping sub areas, this is not yet reflected in academic education. For several years it has been recognised that links between pure science and technology, between speech and language sciences, between research into normal and pathological speech and language, should be utilised optimally to create the best conditions for further scientific and technological developments.

Through working groups, the thematic network will (1) establish the present status of education in Europe in the various disciplines that constitute Speech Communication Sciences as a basis for discussion and exchange of views, followed by (2) recommendations on existing curricula, the cooperation between curricula, and the need of new curricula. This process is supported by a working group addressing possibilities notably created by the Internet to promote common use of course materials, speech material and demonstrations and to explore possibilities for the joint development of courses through the Internet. Later on the relationship between academic education and industrial needs, and the need to develop specialised training for

teachers, and clinical and industrial staff will be discussed. Over 1996-97, four working groups have been active. The first three working groups address in succession the areas of Phonetics, Spoken Language Engineering, and Speech and Language Therapy. Areas linked to spoken language engineering such as Computational Linguistics and Natural Language Processing have not been given emphasis since they are among topics addressed by another thematic network "Advanced Computing in the Humanities" [URL: www.hd.uib.no/AcoHum/]. The fourth working group is concerned with techniques and materials for computer-aided instruction and the use of Internet for education.

It is difficult to reflect on future directions in education without knowing its current status. Although the "European Studies" book gives an excellent overview of institutions in Europe devoted to the teaching of phonetics and speech communication, the information does not provide details of contents and philosophies behind current education. The working groups on Phonetics and on Spoken Language Engineering have each tried to fill this gap using questionnaires. Reports will be presented at this conference by each working group, while a full account of results will be given in the year 1 report [2], available at this conference and also accessible through the network's URL.

The diversity of implementation of studies in phonetics and spoken language engineering in Europe is enormous. This relates to external factors such as the environment of the study [Humanities (linguistics or philology), Computer Sciences, Electrical Engineering], and the staffing [typically small, but departments up to 15 staff members exist]. Both have a great impact on the duration of the studies with a reported variation between 0.2 student-year (a few courses) up to a full four-year curriculum. Depth and width of the studies immediately depend on these factors.

No doubt that multidisciplinarity is essential to speech sciences. The phonetics group reports an emerging distinction between departments that keep phonetics as a discipline in its own right and departments that become more closely integrated with related disciplines. Notably, the role of speech technology courses grounded in phonetics education is growing steadily. In engineering education,

specific courses towards speech sciences form a very limited part of a full curriculum in electrical engineering or computer science. This illustrates that general engineering skills that allow for solving all kinds of problems dominate over specific domain knowledge in speech. Reports from industry [3] confirm this attitude. Industry needs smart employees with (programming) skills who can work in a team. This may certainly apply for application-oriented work but may fail to find solutions to basic problems.

For Speech and Language Therapy the situation is different. The field suffers under great geographical variation in status and focus. Actors are far less organised than is the case for the other speech sciences and communication between them is hampered by lack of access to electronic communication channels. Cooperation and networking at the educational level are in an emerging state, however. Education may take place at universities or in institutions for higher professional education. The broad contents of curricula are usually described because national law details the profession of speech and language therapist. Professional organisations such as IALP and CLPOL have made contributions towards unification (and the recognition of the education and profession over various countries) by developing a professional profile and by providing guidelines for education. The working group has started a survey that will be completed in 1998. The group has also compiled existing resources, especially concerning the implementation of education in phonetics and spoken language engineering in curricula.

The fourth working group of the thematic network addresses how techniques of computer-aided instruction applied to the education of phonetics and speech communication could be made generally available through the Internet. It discusses the technology, gives a taxonomy of the available components, it outlines the requirements of the field, and it gives advice on how potential authors of computer-based materials can learn from existing good practice.

It is likely that the Internet will play a key role in future education. It has been mentioned already that speech sciences is on the one hand a broad multidisciplinary area while on the other hand the

departments responsible for its education are small and can not provide optimal support for all aspects of studies and interests of students. This implies that departments should seek cooperation at a European or even global scale. Obviously, the Internet could provide the means to share important elements of education: teaching materials, speech material (various languages!) and tools. Of course, the position of a lecturer will not become superfluous in such a development, but the lecturers' task may gradually change a bit. The lecturer will have to guide students along opportunities for which teaching basics have been prepared elsewhere.

3. FORTHCOMING ACTIVITIES

The future work of the thematic network will be devoted to the discussion of whole curricula. Given the great variety in education across Europe, and the many different angles along which speech sciences can be studied, a series of proposals should be developed that could fit most of the conditions found in Europe. The agreement found in the questionnaires on the importance of major topics that should constitute a curriculum is an encouraging starting point. In no way the discussions on curricula are meant to interfere with the principle of academic freedom. The network will simply propose. The outcomes may bring new ideas to existing curricula, and may be used to develop new curricula. In all cases it is hoped that the results can be used in defense and in promotion of high-quality education in speech sciences.

In a curriculum the constituting topics are generally sketched in general terms, leaving room for all kinds of interpretation and implementation although the quality of education will be critically dependent on the latter. Of course it is very difficult to discuss quality of education. Still, it may be tried to optimize conditions. One of the possibilities that may be pursued is to optimize available teaching materials through the development of tutorials that are accessible through the Internet. These tutorials can cover a full course but can be topic-oriented as well. In the latter case, a lecturer could pick a set of topic-oriented modules of his/her own choice to support a course. The tutorials can be developed on the basis of best practice and should be reviewed before installing them. Tutorials could be developed under

various conditions of prerequisites and at various levels. Although actual development of tutorials is not within the present possibilities of the thematic network, the working groups on phonetics, spoken language engineering, and speech and language therapy will try to outline contents and requirements. The Internet working group will work on guidelines for implementation.

Although the thematic network has its basis and its funding in the European Union, we would be grateful for any input from outside the network. Institutions that want to be informed about the network's activities and/or want to join them are kindly invited to contact the network coordinator at the above address.

4. REFERENCES

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