Curriculum Development in the area of Computational Linguistics in a European framework

Andy Way,
School of Computer Applications,
Dublin City University,
Dublin 9, Ireland.*

June 25, 1997

1 Introduction

Since its inception in 1993, the *Erasmus* ICP in the area of NLP has always had two main strands of interest:

- Student Mobility
- Curriculum Development

During that period, the level of funding allocated to these activities, as well as the amount of student mobility can be summarized as follows:

Year	Grant	Students	Agreements
93-94	12400 Ecu	48	31
94-95	12600 Ecu	64	43
95-96	12100 Ecu	73	52
96-97	18200 Ecu	73	52

This paper seeks to summarize the work done on Curriculum Development by the *Erasmus* ICP in the area of NLP, over the last four years.

*This paper rehashes some of Walter Daelemans' prose and some of Brigitte Krenn's tables, so thanks to them.

2 Curriculum Development

The joint curriculum development effort aims at developing a modular curriculum in NLP consisting of a basic module of courses in CL to be implemented in each participating university, and several specialisation modules, different for each university in the ICP, depending on their expertise, taking the entrance condition as nothing more than the basic module. Students travelling in the network would then be able to begin their NLP studies locally and, depending on their area of interest, take any specialisation module at any site.

Given this, our ultimate desideratum was *harmonisation* of curricula. This was seen as a four-stage process, namely:

1. Individual recognition of courses on a case by case basis.
2. Mutual agreement on lists of periodically offered courses to be recognised.
3. Mutual recognition of complete components, divisions or stages in the curriculum $\longrightarrow$joint development and coordination of different administrative requirements.
4. Mutual recognition of complete curricula, including all courses, exams and degrees $\longrightarrow$treaties between universities for mutual recognition.

2.1 Structure of the Programme

In the first phase, the undergraduate curricula of Dublin, Saarbrücken and Tilburg were standardized. Then in 1994-95, the contents of the basic module were defined and agreed upon by a subset of the partners in the ICP. The proposal was discussed, adapted, and agreed upon later by a larger subset of the ICP, with the following results:

Core Course/Topic	Contents
Introduction to Linguistics	Basics in: Phonetics/Phonology, Morphology, Syntax, Semantics, Pragmatics
Introduction to Computational Linguistics	Grammars, Parsing, Lexical Knowledge, Formal Semantics, Pragmatics, Applications
Symbolic Computation	Lisp and/or Prolog, a procedural language, Program Design, Data Structures and Algorithms
Mathematics/Logic	FOPC, Set Theory, Formal Languages and Automata, Probability Theory
Grammar Formalisms	Constraint Grammars, GB, other state of the art grammars
AI	Search Reasoning and Theorem Proving Knowledge Representation Learning

It is envisaged that these courses could be taken by students from any site at any other site. As these courses could be embedded in different types of curricula (e.g. languages, linguistics, computer science, psychology etc), the exact number of courses and the place in the curriculum where they are taught differs from site to site.

Of course, as well as these core components, there are a number of specialization modules, the whole being summarized as follows:

Course	Sheff	DCU	SB	ITK	UMIST
Intro to Ling	x	x	x	x	x
Prolog	x	x	x	x	x
Math/Logic	x	x	x	Logic/Sem	x
Proc. Prog.	x	x	optional	x	optional
S/W Engineering	x	x	-	project	-
Algorithms/Data Structs	x	x	Info 1-2	-	-
Grammar	x	-	x	x	x
Intro CL	x	x	x	x	x
LISP	x	-	optional	x	x
AI	x	x	optional	x	x
Parsing	x	x	optional	x	x
Gram. Formalisms	x	x	x	?	x
Pragmatics	x	?	x	?	x
Formal Sem.	x	x	x	x	-
Vision/Robotics	x	x	-	-	-
Complexity	x	x	Info 1-2	-	-
Philosophy	x	x	-	?	-
Corpus Analysis/ Empirical Methods	x	x	x	optional	x
Psycholinguistics	x	x	optional	x	x
Sociolinguistics	x	-	-	x	x
Acoustics/Phonetics	x	x	x	-	x
Speech	x	x	x	-	x
MT	-	x	x	-	x
Info. Retrieval	-	-	-	x	-
HCI	x	-	-	x	-

These specialization modules obviously reflect the different expertise of different sites, and will ultimately make possible a wider choice of specialization to all students in the ICP. Other modules which could be included are language-dependent NLP (French, Irish, Dutch, German, English NLP etc) and other application-specific NLP (Dialogue systems, Software localization etc).

2.2 Properties of the Programme

These can be summarized as follows:

1. Full ECTS compatibility in the credit system.
2. European dimension in Language-specific Modules.
3. Introduce long-distance teaching techniques.
4. Develop guidelines for sites starting with NLP curricula.

Of these, all have been attempted, and some have been achieved in full.

2.3 ECTS Compatibility

In 1995-96, the contents of the basic module was adapted to run on the lines of ECTS. Some of the additional material has also graduated to this level of detail. The compatibility with ECTS for those participants in the network having an undergraduate NLP programme (or if no such programme, then a sizeable number of components thereof) was estimated (under very general headings) as:

Topic	Goth	DCU	SB	Sheff	UMIST	Trond
Ling/Grammar	40	45	45	15	45	55
Maths/Logic	15	10	20	15	10	5
Computing	45	40	30	45	35	15
CL	20	15	25	15	15	45
AI	0	10	0	30	15	0

The final phase of this integration under the aegis of the ICP is currently taking place (already completed by (at least) Sheffield, UMIST, DCU).

Progress was hampered as before by the many bureaucratic and administrative problems when trying to adapt the different curricula at the different institutions to incorporate the basic module. While we remain committed to developing a joint curriculum in NLP, getting each university to adopt our model will be a much greater obstacle to progress, particularly when it comes to point (4) in Section 2.

2.4 European dimension in Language-specific Modules

This can be taken almost as a given. Obviously parsing or speech processing is taught in (say) UMIST or DCU with English in mind, whilst in Saarbrücken the focus is on German. Likewise, when MT is taught in those countries, the focus would be on translation *into* the native tongue.

2.5 Long-distance Teaching

One of our partners, UNED (the Spanish Open University), was to have implemented a long-distance introductory course on NLP based on the results of the joint curriculum development. I am uncertain as to the progress made.

2.6 Guidelines

Obviously we hoped that our work on Curriculum Development would be used by other universities setting up proposed NLP programmes, and indeed members of the ICP have been contacted by other parties interested in bringing in new courses in NLP, following publicity given to this via the WWW and papers at conferences. In addition, with the work under the ICP coming to a close, we look forward to the continuation of this groundwork under such headings as ACO*HUM, or in further joint efforts with other interested groups.

3 Migration Under *Socrates*?

The curriculum development effort started in 1993. Its implementation is an incremental effort, so no fixed end date has been projected. However, seeing as the ICP comes to an end formally in October 1997, we are working towards this as the end date. As stated previously, however, this work will be continued in conjunction with other interested parties. Here, the focus will be on things such as:

- Curriculum Development at Postgraduate level
- Further investigation of innovative teaching methodologies
- Broadening the user base (Eastern Europe?!)
- Testing our guidelines

More members of the ICP continue to succeed in implementing, at least partially, the basic module in their curriculum. However, as stated above, while the aims of the ICP in this area may be obtained in theory, its practical implementation may not forthcoming.

4 Other sites

Rather than include details of the individual programmes here, particularly with repect to ECTS conformity, the reader is encouraged to access the following WWW sites:

- *UMIST*: http://www.ccl.umist.ac.uk/teaching/modules
- *Gothenburg*: http://www.cling.gu.se
- *DCU*: http://roxy.dcu.ie/CA/comp-ling
- *Trondheim*: http://www.hf.ntno.no
- *Saarbrücken*: http://coli.uni-sb.de/cl/degree_programme.html
- *Sheffield*: http://www.shef.ac.uk/genref/modules/com.html
- *Tilburg*: http://tkiwww.kub.nl

For details of the ACO*HUM collaboration, consult:

- http://www.uib.no/acohum
- http://www.hduib.no/AcoHum/compling.html