Conference Reports

Report on the AISB'99 Workshop on "Issues in Teaching Cognitive Science to Undergraduates"

13 May 1999
Edinburgh College of Arts and Division of
Informatics, Scotland, UK

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The AISB'99 Convention included a two-day workshop about the teaching of Cognitive Science. The presentations given at the workshop are collected in the proceedings (Peterson, Stevenson & Young, 1999), and further material is available on the Web (Young, 1999). In addition, invited keynote talks by Nigel Shadbolt and Mark Steedman provided grist for wide ranging discussions in several hour-long sessions. These sessions focused on recruitment, and on the problems raised by multi-disciplinarity, such as working across and within different departments. In part because several universities in the UK are in the process of cutting back or dropping their teaching of Cognitive Science, or retracting it back into a single department, discussion tended to focus on the problems we face in the UK, although several other systems were also represented.

Recruitment

Several UK sites have trouble recruiting students. There are problems with numbers and related to this, problems with quality of applicants. Cognitive Science is a less popular choice for new students than psychology, which often has 20 to 30 applicants per place. This market pressure leads to lower requirements for entry to Cognitive Science programmes. (Currently, engineering, physics, and chemistry are in the same position.) This is ironic, because a broad Cognitive Science degree is more demanding than a straight psychology degree. It should be noted that this problem of recruitment does not lead to poorer marks in the eventual degree, for when the students can be compared, they appear to perform as well as, or better than, single degree students.

Recruitment does not appear to be as big a problem in continental Europe. Recruitment is not a problem at the University of Linkoeping in a computer science based Cognitive Science programme with about 30 students/year at a ratio of 20 applicants for each place. This is because industry in Sweden is more aware of the use of cognitive ergonomics. Companies there recognise the need to pay attention to the human user, and are explicitly hiring Cognitive Science graduates. Straight psychology students do not understand engineering and programming, but Cognitive Science graduates are seen as doing so. Increases in enrolment are thus partly driven by industry and jobs. Any new programme also gets good students, for it attracts students, generally good, who want to study a new field.

At the University of Osnabrueck (Germany), they are teaching 40 students per year chosen from about 50-60 applicants. They are trying to raise the proportion of foreign students to 50% as part of a special initiative.

Interaction between departments

Co-ordination and co-operation between departments imposes a cost. Increased workload, increased competition for resources, and a lack of a strong central university pressure for collaboration has led in many cases to departments not seeing their way clear to co-operate. In the UK, currently at least, it is nearly impossible to run multi-department programmes (Hertfordshire being an exception), and in all other cases, it is at least a minor problem.

Pressures against Cognitive Science

Nigel Shadbolt's talk, in particular, included an exceptionally lucid analysis of the institutional and other pressures working against the teaching of Cognitive Science. These should be a concern for all who support interdisciplinary work on a national and international level.

* Increasing professionalisation of the core disciplines, particularly psychology and to a lesser extent computer science, leads to difficulty meeting the degree requirements while providing the breadth in at least one other component area in a Cognitive Science degree. The most commonly cited example is the British Psychology Society's (BPS) Graduate Basis for Recognition (GBR), which makes greedy and inflexible demands on curriculum time.

* The increasing use of the ratio of applications to places as a measure of quality hurts the less known areas such as Cognitive Science. The pressure to maintain a high ratio also serves to limit the growth of existing Cognitive Science courses.

* Specialist courses are inherently expensive to run, and at a time of increasing financial pressure this works against them. A critical mass is needed in terms of staff and students. The overhead costs for degree programs is increasing, for example because of the Teaching Quality Assurance review programme. This kind of overhead discourages small degree courses.

- The effects of "modularisation" at many UK universities has in practice been to reduce choice for students, rather than increasing it. This works against the interests of a multi-disciplinary subject. (However, that consequence of modularisation in not inevitable, as is shown by the U.S. experience in which it can lead to genuine flexibility.)

- University funding structures, and a progressive tightening of financial control, work against inter-disciplinary degrees. Joint Honours programmes tend to disappear. There are anyway organisational and cultural difficulties in working across departments, faculties, and schools.

- Some of the applicants see Cognitive Science as a "back door" entry route into psychology. This works to the detriment of the course, because it attracts some of the weaker students, whereas in reality it is more intellectually demanding than an ordinary psychology course.

- Cognitive Science (along with other inter- and multi-disciplinary subjects) suffers from the conservative pressures generated by the procedures of the periodic Research Assessment Exercise (RAE) for UK universities. As well as the additional hurdle of having to meet the standards and satisfy the differing expectations of different disciplines, this leads to situations where, for example, a paper in the annual conference of the Cognitive Science Society -- which is one of the primary outlets in the field -- "doesn't count" for a Psychology panel, which is preoccupied with the idea that refereed journals provide the only acceptable route to quality publication.

- There is a perception that perhaps Cognitive Science should be treated as an inherently post-graduate level topic.

- Cognitive Science suffers from a low profile among employers as well as applicants. Although Cognitive Science students are eminently employable, and their record of employment is good, employers tend not to recognise "cognitive science" as a relevant qualification as readily as other areas.

Possible solutions

A number of potential routes to alleviate the problems were discussed.

Work more closely with the BPS. The chairs of the meeting will be writing to the BPS to note the burden the current BPS regulations impose on Cognitive Science degree programs. The Cognitive Science community should consider trying to place someone on the relevant BPS and BCS committees.

Infiltrate existing disciplines. Another route would be to "infiltrate" existing disciplines, to get Cognitive Science

material taught in their programmes and modules. Some universities and people are trying this route.

Explain Cognitive Science to the public. Ways should be found of bringing Cognitive Science, cognitive psychology, and AI to the attention of A-level students. An idea that was mooted was to try to include aspects of AI in the A-level computer science syllabus, and of Cognitive Science in the psychology syllabus. AISB is working on this, at least to the extent to developing materials on a web site for later dissemination. "Cognitive Science" needs to be advertised and used as a phrase more to help recruitment on all levels. Some ideas about creating a British Cognitive Science society were considered as a way to do this (as well as to solve several other problems).

Role of mathematics

An intriguing side-issue concerns the growing role of mathematics in psychology and Cognitive Science degree programmes. The popularity of connectionist approaches in psychological theorising means that students increasingly need to be taught some post-GCSE mathematics in order to understand the models and their associated theories. This leads to the speculation that the introduction of the mathematics needed for connectionism will contribute to a "hardening" of the otherwise notoriously "soft" psychology curriculum, just as programming is meant to do (within Cognitive Science) through the symbolic modelling.

Peterson, D. M., Stevenson, R. J. & Young, R. M. (Eds.) (1999).
Proceedings of the AISB'99 Workshop on Issues in Teaching Cognitive Science to Undergraduates.
Society for the Study of Artificial Intelligence and Simulation of Behaviour
(http://www.cogs.susx.ac.uk/aisb/). ISBN 1 902956 09 5.

Young, R. M. (1999).
Workshop on issues in teaching Cognitive Science to undergraduates: Post-workshop materials and activities.
Available at
(http://phoenix.herts.ac.uk/pub/R.M.Young/aisb99/post-workshop.html).