

The origins and survival of Ergonomics at UCL

A personal view

Rachel Benedyk talks to Dominic Furness

This informal interview with Rachel Benedyk, Ergonomist at University College London (UCL) for 30 years and the current Course Director, offers a unique perspective into the early history of one of the oldest ergonomics departments in the UK. This illustrates how the University College London Interaction Centre (UCLIC) got to where it is today, by giving access to departmental concerns that have remained invisible to past, present and future students and other people outside of its academic administration. Spanning a 42-year period, we learn of the roles people have played, changing research interests and course direction, and the political struggles concerning academic presence, funding, space and support. For the Festschrift, specifically, it provides a record of the unique contribution John Long has played in the development of this group, which continues to play a leading international role in HCI and Cognitive Ergonomics.

What are the origins of the Ergonomics interest at the University of London?

As I remember, the creation of an ergonomics group at the University of London started around 1966, arising directly from a discussion of interested parties at a meeting of the Industrial Section of the Ergonomics Research Society which considered Ergonomics Education. Some of the big ergonomics names of the time were involved in that meeting: Shackel, Davis, Whitfield, Murrell, Edholm, Venables and Rodger, for example.

The Ergonomics Unit itself was set up in 1967. And around then, there were a number of people in various departments in the University of London who realised that they had some commonality, which was a human-centred focus to their Science, and an interest in Ergonomics. One prime mover was in Applied Human Physiology at University College London, Joe Weiner. Then, there was Harry Maule, who was an Occupational Psychologist, and there was Otto Edholm who studied heat and cold at the MRC Extreme Environments Lab, and Heinz Wolff in Instrumentation at the National Institute for Medical Research. There were Harry Billett and Tom Lambert in Systems Engineering at UCL, Ralph Hopkinson in the Bartlett School of Architecture, Don Grieve, a Biomechanist at the Royal Free School of Medicine, and Rainer Goldsmith in Human Physiology at Chelsea College. And I believe there were people in Experimental and Occupational Psychology – Alec Rodger and Arthur Summerfield at Birkbeck were two of them, and there was Sayers in Electrical Engineering at Imperial and people in Experimental Design at the London School of Tropical Medicine, whose names I can't recall just now. They came together to plan to teach a course that combined all their interests into Ergonomics.

In those days, there were almost no University inter-departmental or interdisciplinary subjects, so it was really breaking new ground. They managed to set up an MSc in Ergonomics by combining interests from no fewer than ten Boards of Studies! Teaching came from University College London, Birkbeck College, Chelsea College, Imperial College and the Royal Free Hospital School of Medicine, along with two of the MRC Clinical Research

Labs, at Hampstead and at Harrow. However, in order to set it up between departments and between five different University of London colleges, they had to make it a university-based degree instead of a college-based degree. So this was the MSc in Ergonomics, University of London. And it opened its doors in 1969 with four students to start with. It grew to about 18 students, and ran in that form, I would say, until about the mid-1980s.

What was different about the set up of the Ergonomics degree?

In those days, all the Colleges of the University of London were separate, so they all awarded University of London degrees, but they normally administered their own courses. The Ergonomics degree was different; it was administered by the University as a whole because it was inter-collegiate. And so it was run by a big committee over at Senate House, the HQ of the University. The Ergonomics Unit was set up to do the day-to-day admin, but there was a large committee of people who were actually the board of governors, so to speak, for the degree. Careful thought went into the composition of this committee, which was called the Special Advisory Committee (SAC) for Ergonomics, because they wanted to represent a range of applications of Ergonomics. So, along with university people, there were people from industry, from commerce and from the military. They wanted the degree to prepare people for jobs as well as being research based. And this broke new ground. It was not the first Ergonomics degree in Britain, that was at Loughborough, but it was unique in its applied focus.

Right from the very beginning, the link with outside organisations was very much emphasized by the committee, and so it featured in the timetable of the course, as field visits to industry and as invited speakers from organisations. So it included, in those days, between 15 and 20 visits a year to different organisations, in which the students would either understand about work systems and interfaces and equipment and severe environments and so on, or they would actually learn from other ergonomists about applications in those different domains. There would be a whole range of different visits particularly to cover a range of industries, so anything from food processing to coal mining, or whatever. And because it was Ergonomics, it involved all different kinds of technology.

What was the role of the Ergonomics Unit?

As a result of the inter-collegiate set-up, the administration of the course was particularly complex, and was managed by the Ergonomics Unit. The first Ergonomics Unit consisted of Harry Maule, who was appointed Director of Studies, and a secretary – who was his wife, Gunvor Maule. There were just the two of them and that was the Ergonomics Unit from 1967 for many years.

Another aspect concerned the ‘housing’ of the activities. The Ergonomics Unit just consisted of an average-sized office, in the Dept of Mechanical Engineering at first, chosen because the teaching Degree was in the Faculty of Engineering, and the Faculty Dean, Prof. Billett, was supportive. There was no base for the students, so they were peripatetic, moving around between teaching facilities in the different colleges. The Biomechanics was given

by Don Grieve and Steve Pheasant, who were based at the Royal Free Hospital School of Medicine. The Applied Physiology was given by Rainer Goldsmith at Chelsea College, with the added use of specialist equipment such as climatic chambers at the MRC Labs. The Applied Psychology was given by Paul Barber and Vernon Gregg, who were at Birkbeck College, and the Occupational Psychology was given by Alec Rodger and Pat Shipley, also at Birkbeck. David Broome at UCL taught Systems Engineering, and Research Methods teaching was given by staff at the School of Hygiene and Tropical Medicine.

Then after about ten years, the SAC decided Ergonomics needed to be more than just a teaching course, and introduced a lectureship with potential for research activities. As a consequence the Ergonomics Unit was given extra space by the Bartlett School of Architecture in Wates House. The first lecturer was Chris Peace. Unfortunately, he became very unwell, and after less than two years he had to retire on medical grounds. My appointment followed his. I was recruited in 1978 to a lectureship; but actually to cover what would nowadays be called course administration. In those days in universities, all course administration was done by academics.

Although there were only two people sitting at the Ergonomics Unit, they had a huge number of reins to hold to keep the whole thing going. In addition, there was a lot of building to do every year, because the course was so reliant on other people for whom our teaching was not their main remit in life, although they were always interested. So teachers would move on, or they would have to withdraw their services in favour of other activities, and we would have to find a replacement. It became quite an unstable setup

and it needed a lot of holding together, a lot of handholding every year, just to be able to run the course. And registration of the students used to be distributed between several different colleges, so that all would share the fees, and thus continue their commitment to the course.

At the point when I joined, Harry Maule, who was in charge, was less than two years off retirement. In fact, he was beyond retirement age, but he was less than two years off his intended retirement. There were moves by the University of London Senate at that point, 1977, to close the Ergonomics Unit and the Ergonomics course; these were successfully parried by the Special Advisory Committee under Joe Weiner. Instead, I was recruited to take over the complex academic administration of the course, and permission was given to recruit a new Director of Studies. This time, it was important to recruit somebody who was strong at research, because they could see that a Director who was leading in research would benefit the Unit’s place in the university. They recruited John Long, who was at the time a senior researcher at the MRC Applied Psychology Unit (APU) Laboratory at Cambridge, and who had completed his PhD under Donald Broadbent. He had a very strong track record in research and proved so, because within a few years, he’d brought in research funding and expanded the Ergonomics Unit from three to 20 people with a whole group doing Ergonomics research.

How did the Ergonomics Unit develop under John Long?

As part of John’s taking on the job, in 1979 the Ergonomics Unit moved to the department of

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Psychology, under the auspices of Bob Audley. It was felt that the teaching could be based anywhere because it was interdisciplinary, but the research needed a home. John was a Cognitive Ergonomist with a degree in Psychology and a PhD in Applied Research, and he knew he had to be in Psychology so that he could nurture the cognitive lines of research that he was doing through fruitful interaction with other psychologists. It was also important to make his publications count in the right domain, in the right department. The move to Psychology was initiated by Bob Audley who was the Head of Psychology at UCL in those days; he was an interesting man. He had no Ergonomics in his department, but he listened really well and he saw the potential. He was very keen to see the Unit survive and prosper. In fact, he went against the grain among some of his colleagues to admit the Ergonomics Unit to the Psychology Department. And in line with this, after some years the MSc Ergonomics Degree also changed from the Faculty of Engineering to the Faculty of Life Sciences, which also reflected the general move in Ergonomics focus from heavy physical work to cognitive work.

So, thanks to John Long being recruited, the whole Ergonomics Unit moved to Psychology. Psychology had just moved into the newly built Bedford Way Building. They had been in a much smaller building in Gordon Square. Although already a big department, they didn't fill the Bedford Way space at that time, so they had the space to offer. And of course, later on that became a difficulty, when Psychology grew much bigger and needed that space back.

Not long after that, Human-Computer Interaction (HCI) started to ramp up. So if you think about it historically, the culture, this was

in 1979 ... John came in the same year and the first PC landed on people's desks in 1983. So that was when HCI was invented. In fact, the first meeting of the British HCI Group, as it was to be known, happened in the Ergonomics Unit. It was convened by Tom Stewart, but it was a group of Ergonomics people, who thought HCI may be the way to go. And in 1984, we sat around in our meeting room and said we wanted to form a new group. I was there! But it was no accident that the meeting was hosted in the Ergonomics Unit; John Long and many of his research group were already exploring the HCI area; as he had been, with IBM, since his time at the MRC APU in Cambridge, from around 1974.

How did the teaching develop over this time?

The MSc Ergonomics course, under John and me, stayed as it was for a while, and then he decided that we needed not just to build the research, but to enrich and broaden the teaching. The first thing we did – I hope I'm getting this in the right order – the first thing we did from 1991 was offer a Diploma as well as an MSc, a Graduate Diploma, which was quite unusual. We were getting interesting applicants, who did not qualify to come in on the MSc, professional people, without a degree, that kind of thing. There were rules in those days that were quite strict about getting you in. The Graduate Diploma, which was a level between the first degree and the masters, the requirements for entry for that were less, so we could admit these people. Essentially, it was the same teaching as the MSc without the project, but with a lower pass level. Instead of 50%, it was 40%. So they could do exactly the same teaching and the same exams but

they could pass at a lower level and get the Graduate Diploma. And that was really good, because there were plenty of applicants who didn't need the research project because they were practitioners, or they wanted to be; they just wanted to get a qualification. We managed to get recognition from the Ergonomics Society for both degrees, which was really helpful. I was really pleased we did that.

The next major development, under John's influence and under the influence of his research group, and under his far-sighted recognition of the way the world was going, was to start to introduce Cognitive Ergonomics and HCI into the syllabus. John's own contribution to the course, called Foundations of Ergonomics, was really quite perceptive and he would move it in the direction that technology was moving, updating it every year. He gained professorial status, choosing the unique title Professor of Cognitive Ergonomics, and in his Inaugural Lecture in 1989 he integrated HCI into a unified framework, at a memorable event that attracted the biggest Inaugural Lecture audience UCL had seen for some time. It put John and HCI at UCL firmly on the University map. John got quite a name really for HCI research and teaching, and he started to be active in the British HCI Group and in CHI, Interact, and other places, and recognised that there was now a world movement in this area. In line with this, the focus of the research group then became Cognitive Ergonomics and HCI.

We decided, around 1992, that we should try and split our degree and offer HCI very specifically, as well as Ergonomics. But we didn't want to run two degrees, the overheads of that were too difficult. So, what we did was to run optional streams within the degree.

Unfortunately, though explicit, the option title was not exactly snappy. Students would do an MSc in Ergonomics, with an Option in the Human Factors of Human–Computer Interaction. Or they would do an MSc in Ergonomics, Generalist Option. Now, calling a specification a ‘general option’ is a contradiction in terms. It had to be called something, because it had to contrast with the HCI option. But it was in fact the original degree and the other one was a more specialised one. And what the HCI Option did was to omit the Applied Physiology and most Biomechanics from the timetable, and replace it with HCI and cognitive material. It was quite popular. It took off straight away, attracting an extra 20 or so students to the class. At the same time the generalist course was still strong.

Now, that went on for a few years, probably through to the late 1990s. It helped give us a firmer footing, because the numbers of students went up, from about 18 to about 40. And then a number of things started to have an effect. First of all, Health and Safety Legislation became much stronger in Britain, as a result of which a lot of companies wouldn’t let visitors in anymore. We stopped being allowed to go down a coal mine. We stopped being allowed to go to British Steel. It was becoming too difficult even to go to a food factory, partly also because our student group was now so large. And for companies, whereas they saw this originally as a way of building relationships with universities, which was approved by the government and so on, it turned out in the end, that those relationships were not the type the government had in mind. They would much rather it was collaborative research going on, or collaborative development, or that they provided placements for students. So running the course, in the form in which it

previously appeared, was becoming very, very challenging. And every year, we were tearing our hair out saying, this visit has dropped out; what can we replace it with?

In addition, calling something a Generalist Option did it no favours. People didn’t really see it for being a strong course. They saw it for being a dumping ground for everything. What we recognised was, when we looked around the country, all the Ergonomic courses had become specialised. John recognised this as a sign of a maturation of the discipline. In the end, it becomes diversified and it becomes specialised. Then, you don’t have any general courses anymore; or, if you do, they are foundation courses and you move on from there to specialise. Psychology was going in that direction, for example. Nobody actually got a job as a psychologist: they became a specialist psychologist. So, at that time, Nottingham had set up a specialised course in Manufacturing Ergonomics, Birmingham had gone to Engineering Ergonomics, Loughborough had specialised in part-time students, Surrey had become Medical Ergonomics. So John said, right, we’re going to be the HCI Ergonomics. As a result we changed the name of the Unit from the Ergonomics Unit to the Ergonomics and HCI Unit, which was a start to develop that identity. We wound down the Generalist course and focused on the very successful HCI with Ergonomics (HCI-E) course that we have today.

A second lecturer was recruited to teach HCI and also to carry out research in that area. That lecturer was deliberately a Cognitive Ergonomist or an HCI person, in order to teach the HCI option. The first HCI Lecturer was Andrew Life and then it was Peter Timmer, and finally, in John Long’s era, the post was shared between Becky Hill and Steve Cummaford. We were also

successful in being awarded student grants from the government which helped support students.

What challenges did the course and the group face?

The course and the group were successful and productive in the 1990s, but behind the scenes there were a number of complicated things going on; different movements that presented several challenges. Firstly, the Government withdrew the student grants for established MSc courses like ours, meaning that all students had to support themselves. Then, the College was setting new targets of numbers for the course. We were under threat if we didn’t meet the targets, because we had to be financially viable. Next, we lost the support of two of the outside colleges because the people who were interested had moved on or the colleges themselves didn’t have the wherewithal anymore, so the students were no longer registered there. In addition, the University of London, the overarching organisation, was being basically re-scoped and responsibilities were being devolved to the other colleges. Big colleges like Imperial and UCL were fighting for independence. The University ended up devolving the management of our course and it had to be devolved to one place. So (thanks to Bob Audley) it ended up at UCL, and we no longer registered students at any other colleges. The big board of governors, the SAC, that we’d had over at Senate House disappeared. And with it, so did any independence that we had had, any autonomy, because now we simply were hidden within the machinations of a huge UCL department. One of the main fallouts from that was we didn’t have direct control of

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our own money. And indeed, we didn't have any rights to any money other than through the Psychology Department, which gave us much less independence. It was very difficult to handle that.

Thus, in the mid 1990s movements began in Psychology to edge the Ergonomics and HCI Unit out – Bob Audley had retired and there were other issues, such as QAA starting to come in – the Quality Assurance – and the RAE, which is the government assessment of departments for research money. The criteria of that, at the beginning certainly, are research publications and research contract money. There was pressure on our group because each department had to choose a theme for research publications, and the theme that was chosen by the UCL Psychology Department was Experimental Psychology at that time. There wasn't any way you could easily shoehorn HCI and Ergonomics publications into Experimental Psychology because we used to publish in *Behaviour and Information Technology* or *Ergonomics Journal* or *International Journal of Man–Machine Systems*. And none of these are the *Journal of Experimental Psychology*! Indeed, we didn't even have an experimental lab. So the message seemed to be: 'you don't fit; you're not going to get us any brownie points; we could do with your space; we're expanding'. There was big pressure to edge us out and possibly to close us down.

Now, for a few years, John Long, who was a skilled negotiator (learned, no doubt, from his experiences as a line manager with Shell Oil International), defended our back successfully. I don't know how he did it, but he was spending half his time trying to fight the politics. It was really difficult, but he did it

really well. And so for a while, we survived. And then came the fact that he was nearing retirement age and he wouldn't be in the job anymore, after a while. The Department then said, right, at that point we're closing you, because they reckoned – and in this they were correct – about 80% of the people who worked at the Ergonomics and HCI Unit were there because of John, because they were his research group. There was a very big research group full of PhD students, and RAs and they had four or five contracts going on, etc. But if he went, they would go too, because they were all on soft money. So Psychology said, oh well, in that case, you're going to go down to only these few people and your research is not of much note, and the degree that you're teaching is only partly Psychology; we're not bothered about it, and you only have this small number of students compared to the very popular Psychology degrees.

Psychology colleagues accused us of being isolationist, because in a sense, we were self-sufficient. Apart from the occasional small collaboration or joint teaching venture, essentially we were doing other things. For example, our main professional conference every year was HCI or Ergonomics. It wasn't a Psychology conference. So you could see why they thought that.

We tried to shore up our presence in the department. We started teaching an Ergonomics and HCI undergraduate course unit and we started doing undergraduate seminars, tried to be a more active presence. At the same time, we began developing collaborative links in the Computer Science Department, with Angela Sasse, Anne Adams, John Dowell among others. Various joint research activities began, and we contributed some teaching to CS courses.

Anyway, John's retirement was due for 2001, and so our survival was threatened yet again. However, John managed to get Ol Braddick, the HOD at that time, to agree to a major independent review of us, rather than just shut the door. This review happened in 1999. We contacted all the people, from many organisations, who had helped us with the teaching or the research over the years, and we got approbationary statements from all sorts of different places, from other institutions, and from the International Ergonomics Association. Many external colleagues in the world of HCI and Ergonomics thought very highly of our teaching and research, and even that we were a centre of international repute. Essentially, they opened up awareness at UCL of our value, and they gave reasons why we shouldn't be closed down. And it worked somehow. I don't know how it worked, but it worked. The Review made some strong, positive recommendations and conditions for our survival, which were implemented, much to his credit, by Ol Braddick.

What changes followed the success of the review?

The fallout from this was a number of things which have shaped the UCL Interaction Centre today, really. The number one was that Psychology agreed to the Unit continuing, but only as a joint inter-departmental venture with the department of Computer Science, splitting the responsibilities, housing and finance between them. We had to become a two-department group, with neither of the departments able to take us in our entirety. It was not only a resources thing, to do

with how much it cost to provide space and salaries, but also a recognition that the mix of disciplines was important for HCI activities.

So, now we belonged to two departments and neither department at first provided the best kind of support at all. For example, technical support was hard to set up. So when you belong to two departments, you can actually end up falling through the cracks. It was hard to know where we belonged.

All the students continued to be registered with Psychology, and stay in the Faculty of Life Sciences, but the numbers would have to go up to keep the course viable. This put considerable pressure on the recruitment and teaching side of our activities.

And then John had to be replaced. A new Director had to agree to build up research that was going to have the same international impact as John's had, in order to maintain the repute of the group. The person they recruited was Harold Thimbleby. Harold had grand ideas about what he was going to build. He also managed to engineer a swap of space. There were several satellite groups of the Psychology Department by then, because it was now the biggest Psychology group in Britain, and didn't have enough space in Bedford Way, so other groups were based out in outlying buildings. The Ergonomics and HCI Unit was very short of space in Bedford Way but they couldn't give us any more. Harold managed to broker a deal by which we swapped space with the Hypnosis Group, who wanted to come into Bedford Way, and we were able to move into their bigger space in Remax House.

Of course, there were two consequences of that. One was that Remax House was geographically very isolated from either department. Now some of us were OK with this. It

brought UCLIC people together with UCLIC people and we managed fine on our own. But others were frustrated, because they wanted to have cross-fertilisation with other academics and so on. And the other thing was that there was only a four-year lease left on Remax House and it was going to close. This was known right from the beginning. What would happen then? This was about 2003.

Harold left in 2005, to go to Swansea, where he has founded the FIT Lab (with whom we have collaborated since), and Ann Blandford, who had been his deputy here, stepped into Harold's shoes. When she took over, she made her own conditions, because she had seen what had gone wrong previously in the two-department set-up. She brought UCLIC gradually to a more secure situation. She also looked ahead to when Remax House was closing, and worked out a way to resolve it, so that we have ended up in our current improved premises in the Malet Place Engineering Building, close to both Computer Science and Psychology. We contribute to teaching in both our parent departments. The research group has expanded, the academic staff has grown to six, and HCI and Ergonomics are firmly part of UCL now. The postgraduate course in HCI-E has modularised, and the number of modules on offer has grown. It has its largest student numbers ever this year, and our alumni are well established in all sectors of the profession.

What do you conclude, at the end of these personal reflections?

The fact that UCLIC still exists is really rather miraculous. What had started off as

something extremely innovative, which was to be an interdisciplinary group, became really a sort of Achilles heel in terms of our identity within the university and our ability to persuade people to support us. The history of this group, and of Ergonomics at the University of London, is a history of attempting to survive in the face of people who had other priorities. That has been tricky. Other Ergonomics courses have gone under in the face of such pressures within universities; Birmingham is an obvious case.

Why is it that Ergonomics and HCI have always had to fight their battles, to persuade people, because somehow we're not owned by anybody in particular? Our value is actually that we work between disciplines. But you reflect that into an administrative structure that doesn't quite fit a university, and you find it's a weakness. It gives you less foundation and less support. Historically, the reason why we have ended up surviving has been entirely due to strong people fighting the fight, John Long being a major one.

Nowadays, things are a lot more positive, and interdisciplinarity ticks the boxes for universities; at UCL it is quite the flavour of the month for research funding and for UCL's mission! The UCL Interaction Centre has recently been held up as a role model for other research groups. And our Ergonomics and HCI teaching – well, it's not the course that it was 30 years ago, but nor should it be – it's a successful and respected course for the 21st century.