

ARBITRATOR HEARS TWO GRIEVANCES AGAINST UW ADMINISTRATION

On January 10, 2001 two grievances filed last August against UW's administration reached the final arbitration stage. Stan Lipshitz, of the Department of Applied Mathematics, filed a grievance to protest the unilateral changing of final grades for an Advanced Calculus course that he taught in the Winter 2000 term. The grades that he submitted and that subsequently appeared on the students' transcripts were later changed by the Dean of Mathematics at that time, Alan George, without Prof. Lipshitz' knowledge and authori-

zation. The FAUW Board of Directors unanimously approved the filing of a separate Association Grievance on the grounds that the academic freedom clause of the Memorandum of Agreement was violated. (Association Grievances are described in Section 9 of the M of A between UW and the FAUW.) The grievances are being considered in parallel.

The initial phase of the arbitration procedure – opening remarks followed by testimony and cross-examination of

witnesses – took place over two consecutive days. On January 22, the last phase – arguments and rebuttals by respective legal counsels – was conducted. The entire hearing was open to the public. Both parties now await the arbitrator's final decision. The arbitrator's award, which will be a public document, will be posted on the FAUW's website when it becomes available. We also hope to publish it in the *Forum*.

COMMERCIALIZATION OF UNIVERSITIES: FLIRTING WITH DISASTER?

Pat Grassick, Policy Advisor to the University of Calgary Faculty Association, thinks so. As he writes in an article published in TUCFA's Newsletter, *Interviews*, "We are all exquisitely capable of excusing our own behaviour, and the fact that we can be seduced into doing things that in retrospect turn out to be very bad things is a regularly occurring theme in the human experience. With governments turning off the funding and encourag-

ing us to more and more seek 'partnerships' with private concerns, the pressure to go after the cash is enormous." Grassick's article, "Commercialization of Universities: Dangerous Liaisons" appears on Page 3 of this issue. (We thank the author and TUCFA for permission to reprint the article.)

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EDITORIAL

In the feature article, "Commercialization of Universities: Dangerous Liasons", Pat Grassick is concerned that pressures to seek more partnerships with corporate enterprises could steer the university away from its important mission in "providing a place for disinterested scholarship and learning." An undesirable consequence of this choice is Grassick's tenth point entitled, "Universities lose credibility". The reader will note the parallels between Grassick's point and the statement of E. Shils *et al.* in the *Academic Ethic* (*Forum* Editorial, Nov.-Dec. 2000) regarding the decline in status of universities when they neglect the pursuit of truth.

In his letter to the Editor, Jan Narveson asks CAUT and OCUFA what exactly all the fuss is about regarding the Government of Ontario's recent decision to allow private universities in the province. The OCUFA/CAUT arguments against private universities are summarized in the November issue of the OCUFA *Forum* for those interested. We would like to know that our UW readers think about the issue. For example, will private universities (if, indeed, they ever come) hurt public universities or could they possibly help them?

Ken Davidson of Pure Mathematics continues the discussion on "learning technology" in the classroom (*Forum*, Nov.-Dec. 2000).

Finally, you'll note a new addition to the *Forum*, "From the Professor Files". We invite you to share your experiences, whether they be from the classroom, office, laboratory or the coffee room.

Please keep those contributions coming!

ERV

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The following article first appeared in the September 2000 issue of Interviews, the newsletter of the University of Calgary Faculty Association. It is reprinted with permission of the author and of TUCFA.

COMMERCIALIZATION OF UNIVERSITIES: DANGEROUS LIAISONS

Patrick Grassick

The general concern about the increasing commercialization of the university can be expressed by saying that we are in very great danger of being seduced away from the important mission of the university in providing a place for disinterested scholarship and learning. The university is preeminently a place that nourishes and supports the life of the mind, a place that (albeit imperfectly) supports a critical examination of received wisdom, and a place that provides for the continuation of that mission from generation to generation through the education and training of students. In this last function, the university also has, from its first beginning, served the useful purpose of preparing students for citizenship and for productive roles in the larger society. These activities are essential for the preservation of a free society, and it is no surprise that controlling universities is high on the agenda of autocrats of all ideological persuasions.

Well, you don't have to march in jack-booted storm troopers to bring a university under control, if you can simply buy one. People will do things for money that they won't (or can't) do with a gun pointed at their heads. And they'll do these things willingly, even cheerfully. We are all exquisitely capable of excusing our own behaviour, and the fact that we can be seduced into doing things that in retrospect turn out to be very bad things is a regularly occurring theme in the human experience. With governments turning off the funding, and encouraging us to more and more seek "partnerships" with private concerns, the pressure to go after the cash is enormous; but the complexities of these new "partnerships" makes them Dangerous Liaisons, entering into which ought to make us very nervous.

Others have written eloquently and at length on the dangers of our new "partnerships" with industry (see, in particular, the excellent article by E. Press and J. Washburn, "The Kept University" in the March issue of *The Atlantic Monthly*), and I do not plan to repeat all of what they have already said. Instead, let me summarize, as briefly as I can, what seem to me to be the important worries.

- 1. When research is privately funded, this creates pressure to suppress or discredit findings that may be not in the interests of the research sponsors.**

The Olivieri affair at The Hospital for Sick Children/University of Toronto is perhaps the most famous of these cases, at least for Canadians. Two others that are equally disturbing are the cases of David Kern at Brown University and of Arpad Putzai at the Rowett Research Institute in Scotland. David Kern lost his job in occupational medicine at Brown after presenting a paper at a medical conference about a lung disorder he had observed in workers in an industrial concern that had hired him, in fact, to investigate the mysterious illnesses of their workers. Kern wanted to present his findings to his medical peers in order to see if any of them had observed similar cases (this was how asbestos was found to be a health hazard), but his research sponsor objected that his paper threatened trade secrets (it didn't, but that didn't seem to matter to Brown, which found a handy excuse for dropping Kern from the payroll). Putzai was dropped from the Research Institute when he let slip in an interview that he had some preliminary findings indicating

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that there might be some damaging health effects on rats fed with a genetically modified potato. In all three of these cases, preliminary scientific findings that might have reflected badly on the research sponsors provided the occasion and the apparent impetus for the scientists' dismissal. In none of these cases was there anything remotely approaching due process before their positions were threatened, and in Putzai's and Kern's cases eliminated. Serious scientific consideration of their research findings was also lacking, and in Putzai's case attempts to cobble together scientific critiques of his work after the fact have only demonstrated the transparent weakness of the case against him.

What makes cases like these more worrying, of course, is the near collapse of government regulatory bodies in all three countries involved which are supposed to ensure the safety of foods and drugs on behalf of the public. More and more in the U.S., Canada and Great Britain vetting of

new drugs and foods has slipped away from central public agencies and into the private sector. Thus, the possibility that some parties in the private sector (and their academic institutional partners) may be engaged in the suppression of troublesome data is very disquieting.

Overt suppression of research findings represents an extreme and dramatic form of control of science. Less likely to provoke public uproar but equally troublesome is the more widespread practice of passively handing control over publication to research sponsors, ostensibly in the interests of protecting their trade secrets. *The Atlantic Monthly* article, referenced above, states that 35% of the engineering schools the authors contacted admitted they would allow corporate sponsors to delete information from studies prior to publication. And while protecting trade secrets may represent a valid interest of private research sponsors, there is no question that some sponsors are just as concerned about protecting their PR images. *The Atlantic Monthly* cites the case of four researchers who quit a study on the effects of a calcium channel-blocker (agents used to treat high blood pressure) after their sponsor, Sandoz (now Novartis) deleted references in a draft manuscript that highlighted the drug's potential dangers, which include stroke and heart failure.

2. Some things are studied and some are not.

It goes without saying that the liberal and fine arts are of

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next to no interest to private sponsors – likely a good thing overall, were it not for the growing indifference of public bodies for scholarship in the arts – but just sticking to the hard sciences, there are vast areas of study that can be systematically neglected in a climate of growing commercialization and shrinking public investment in research. The practical importance of research that is unlikely to lead to enhanced profits is illustrated by the history of the studies of the effectiveness of ASA (aspirin) to prevent the recurrence of strokes. The massive clinical trials that demonstrated the life-saving properties of this cheap over-the-counter medication in preventing strokes was sponsored by a government agency, the NIH, since it was clear to everybody that substantial profits would not be made if the trials came up with positive results.

Clinical studies are very expensive indeed, and private sponsors simply aren't going to enter into the activity

unless the probability of significant earnings looks promising. As government shrinks its support for basic science, even practical work of potentially immense importance can suffer.

In agricultural research you can get buckets of money to investigate new genetic modifications of animals and plants to produce marketable (and, only perhaps, beneficial) organisms. You can get lots of money to investigate new and expensive technologies that involve heavy applications of chemicals to crops. These are hot topics, and there are fortunes to be made. There's next to no money available to investigate less costly, more labour intensive, less environmentally intrusive ways of producing and distributing food that might preserve rural communities instead of threatening their viability.

There's lots of money around to study chemicals to alter the brains of the mentally ill (particularly the brains of the middle classes), but little to fund research that might help people to improve their communities and their lives in ways that might just reduce the prevalence of these disorders.

The Atlantic Monthly points out that diseases like schistosomiasis (a liver parasite that afflicts people in the Third World), malaria, river blindness, and dengue fever have all "been dropped from the pharmaceutical industry's docket" since they primarily afflict people in developing nations who do not represent markets worth exploiting (p. 50).

Disinterested research, basic research, of the kind that has brought about the scientific revolution of the last century is increasingly shuffled aside in favour of product-development activities that often are little more than mechanistic reapplications of previous discoveries, all in the interests of increasing sponsors' market share. Tons of information is generated, and new products with the potential for high earnings flood the market. But little in the way of new understandings is generated in the process, and anything that lacks the potential for immediate marketable applications is just left unstudied.

3. The institution gets permanently shaped around the interests of private research sponsors.

When NSERC offers incentives to universities to establish chairs whose primary focus will be to conduct research that profits the private sector, universities lose their ability to establish their own research agendas around basic questions of continuing importance. In order to seize the opportunities for the funding of endowed chairs, departments sacrifice scarce positions in research areas that are not commercially sexy, while scientists "who are in harmony with the directions and values of industry based research are . . . inserted into academia at the most senior levels" (Clark, 1999). Some of our

members, of course, actively welcome this, seeing it as a kind of "partnering" that ought to be encouraged. The question is, of course, if the vacant positions are all filled with industry-friendly researchers, who investigate on behalf of the public interest?

The 21st Century chairs program carries similar risks. While direct links to industrial sponsors is not one of the features of this program, the fact that the chairs are only offered in specific fields that already are linked to the agenda of business means that universities which sign on to the program (and which administration won't?) are committing themselves to a permanent change in the staffing structure of the university – one determined by industry-friendly government agencies that have an interest in supporting the liberal arts and sciences core of the university that is somewhat weaker than might be desired. The 21st Century chairs program is a "gift" that actually robs the university of the ability to design its academic staff complement and therefore its academic program around an agenda of its own devising.

Some agreements with research sponsors give the sponsors control far beyond the right to profit first from the outcomes of research. In an agreement uncovered at the University of Toronto (and stopped at the last moment by the protests of faculty and students), the

In evaluating research publications these days, who paid for the research is just as important a question as how good the science was.

University planned to accept \$15 million from the Rotman Foundation, for the purpose of founding a series of endowed chairs in the Faculty of Management (so far, so good), but with contingency that members of the faculty would have to continue to demonstrate "unqualified support for and commitment to the principles and values underlying" the terms of the endowment. One of the provisions would allow the donor to redirect, not only his own donation, but also the university's matching endowment, however he liked if he was not satisfied with progress towards the vision incorporated in the endowment agreement. The terms of the Nortel donation, accepted by U of T in 1977, gives Nortel the right to be consulted with respect to the appointments of chairs and tenure-stream positions funded by the donation (presumably someone who might not be totally in sympathy with Nortel's particular business agenda might not be wanted on the staff of the university). Interestingly, the intellectual property rights section of the Nortel agreement is incorporated in a secret memorandum. At the University of California Berkeley, the department of Plant and Microbial Biology recently got \$25 million

from Novartis, the Swiss pharmaceutical giant, in exchange for which Novartis gets two of five seats on the department's research committee, determining not just how the Novartis donation, but all research money, including federal and state grants, is managed and directed. Novartis also gets the right to negotiate licenses on roughly a third of the departments discoveries, including the results of research completely funded by public sources.

4. Investigators become "interested parties", are co-opted or corrupted.

In evaluating research publications these days, who paid for the research is just as important a question as how good the science was. There is no getting around the fact that the source of one's research funding necessarily shapes both what questions are studied, but it also shapes findings.

H.T. Stelfox, et al., in their 1998 article in *The New England Journal of Medicine* provide perhaps the classic illustration of how research outcomes can be conditioned by the source of research funding. In their review of the literature on the safety and efficacy of calcium channel blockers (the class of blood pressure mentioned above), they found that:

- 96% of the authors who had their research sponsored by drug companies that marketed calcium channel blockers supported the use of these drugs,
- 60% of the researchers who had funding by drug companies who didn't market these products were supportive of their use,
- but only 37% of researchers who had no links to drug companies supported the use of these drugs.

Are calcium channel blockers safe and effective? It seems to depend on whom you ask and who is signing that person's pay cheque.

It is important here to state that no one is asserting that the cases discussed by Stelfox and his collaborators represent instances of wilful manipulation or falsification of data, nor is it being suggested that these researchers deliberately set about to find evidence to support the commercial objectives of their research sponsors (though, as we shall see, that does happen). Instead, what Stelfox and his colleagues assert is there simply is a significant relationship between funding source and the scientific findings that brings into question the objectivity of the researchers involved. Given what we know about attitude formation from other areas of study, it would not be surprising to find that these researchers, just like people in general, are open to sources of influence of which they

(Continued on page 11)

LETTER TO THE EDITOR

What's wrong with private universities?

Being now an involuntary contributor to the University of Waterloo Faculty Association, and hence to the CAUT and other such organizations, I am writing as an equivalent-to-member regarding an editorial that appeared in the November 2000 issue of the *CAUT Bulletin*. (I am assuming that my complaint would not be published in the *Bulletin*, since the CAUT does not seem to tolerate heresy.)

The editorial reflects an illiberal attitude that characterizes the leadership of the CAUT for as far back as I can remember. It assumes that education in general, including post-secondary education, at the expense of the public, is an absolute and sacred right of all Canadians. A corollary, it seems, is that the general terms and structure of this education should be controlled by political means rather than by the independent actions of individuals and associations with ideas of their own. It is hard to see why we should accept either of these assumptions.

Ontario is at last making it legally possible for private institutions of higher education to exist. The *Bulletin* quotes Henry Jacek, President of OCUFA, "There has been no identified need for private universities," although Jacek does not go on to make the obvious further suggestion that there is no need for universities at all.

An argument for a "need" for such universities would require (1) invoking suitable criteria for their existence and (2) establishing the case that this need ought to be fulfilled at taxpayers' expense rather than at the expense of the student, his family or whatever persons are willing to help bear that student's cost. There is, of course, no problem in denying that the "need" has been "identified" when: (1) the people who make this statement are bureaucrats interested in protecting their turfs and (2) the opinions of those who would purchase university educations (offered on nonpolitical terms) are simply not acknowledged.

Utilizing such self-serving arguments, it is easy to establish that there is no need for car manufacturing, agriculture or housing to be private either. All of these goods could, after all, be provided by first taxing citizens and then setting up centrally controlled factories or farms to produce them. Such systems would not serve society nearly as well as the free market, in terms of quality, quantity, dependability and so on, as the slightest attention to history will confirm. But never mind – they aren't "needed", you know. Look at all the different kinds of cars we have! Surely there's no "need" for all of them? It seems, however, that one isn't allowed to use that sort of

evidence when considering the shrouded mystique of "Higher Education."

One is not, for example, permitted to look at the success of some hundreds of American institutions of higher learning, despite the fact that they have to compete with state institutions providing higher education at subsidized rates. There is no point in mentioning the fact that young people of modest or even no means (such as the author of this letter) attend Harvard, Chicago, Yale, and Stanford, and without government assistance.

Why? Because the CAUT Editorial quotes Erin George, Ontario Chairperson of the Canadian Federation of Students: "While this government claims it is offering a choice for students, it is only a choice for students from affluent backgrounds." The CAUT will promptly tar any company or association providing scholarships to young people with the brush of "special interest" or some such thing. After all, the resentment of business has been a familiar academic trait since the time of Aristotle. And it is also inconceivable that bureaucrats in a democracy could ever have "special interests"!

In Canada, it appears not to be acceptable to simply allow someone to sell something that others would willingly buy. No. First the seller has to prove that the deal is "better" than what some government agency would do along that line – the criteria of being "better" being, of course, determined exclusively by – who else? – civil servants.

In a free society, however, no such "betterness" needs to be proven. If purveyors of a good or service manage to attract purchasers, and keep on doing so over the years, then no other proof of "necessity" is needed. To deny this in the case of education is to run smack up against John Stuart Mill's case for freedom of speech and thought. If government education is better, then it should at least be able to beat out the privateers in a fair fight. Or at least in an unfair fight as is the case at present. (The current government offering is supported involuntarily by all taxpayers so that privateers are forced to sell to people who are already forced to pay for the competition! Even so, you won't find a lot of people in the US who are ready to deny that Harvard, Chicago, Princeton, Yale, and Stanford are the cream of the educational crop.)

In the US, as noted above, the government does not provide better education. Would it do so here? The CAUT is dead set against even putting them to the test! Nor, of course, will it tolerate the possibility that some people would prefer an "inferior" education. Perhaps the CAUT is afraid of other possible outcomes, including "elite" institutions with first-class faculty that will attract stu-

dents with high entrance qualifications, as noted by Professors Barry Cooper and David Bercuson ("Academic excellence depends upon private universities," *Calgary Herald*, November 8, 2000).

This is sorry stuff, and the CAUT ought to be ashamed of

itself.

Jan Narveson
Department of Philosophy

The article by Cooper and Bercuson quoted above is reproduced below. We thank The Calgary Herald for permission to reprint the article.

ACADEMIC EXCELLENCE DEPENDS ON PRIVATE UNIVERSITIES

Barry Cooper¹ and David Bercuson²

The recent announcement that Ontario is about to allow the establishment of private universities is a stark reminder that for many decades there has been next to no innovation in the organizing and financing of post-secondary education in Canada. Everywhere the picture looks the same. At the top of the heap are the degree-granting universities, heavily subsidized by taxpayers. Then come the two-year vocational colleges and two-year junior colleges. The latter are also usually subsidized, but not to nearly as great an extent as the universities. Canada's universities – notwithstanding what the people at *Maclean's* may say to boost their sales – are virtually the same, particularly with respect to their undergraduate programs. They all accept students within a narrow range of high school graduation scores. They dole out much of the same undergraduate education. Their academic staff are virtually indistinguishable. Since most of their physical plant was built after 1965, even Canadian campuses look much the same.

Minor differences exist. Universities are not, after all, homogeneous organizations. Because some faculties such as education or social work are in the business of certifying clients rather than education, they have different procedures to admit, to process and to graduate their people. Likewise the professional schools (medicine, law, engineering and various graduate programs) vary widely in the quality of the education they offer. The rest of post-secondary education in this country, however, is like Eli Whitney's cotton gin, made up of interchangeable parts. Moreover, the sameness of Canada's undergraduate universities is in large measure a result of the fact that they are all so heavily subsidized. Thus do they feel constrained to offer the same basic educational products to everyone who comes knocking. In Alberta and Saskatchewan, for example, there are currently six universities. They look the same because neither provincial government will allow any of them to transform itself into a first-class institution. Such an elite university would, for example, restrict total enrollment to a relatively small number of students with high entrance qualifications. This notional university would hire fewer but better paid faculty. It would introduce requirements such as compulsory science and language courses. In short, it would be what universities once were in this country as well as abroad.

Such innovations would never be allowed because the two provincial governments, so different in nearly every other way, are agreed that the basic mission of their universities is to serve as

broad a qualified student body as possible. To be sure, Canada's universities produce a large number of reasonably well-educated graduates. But that is not good enough. For those Canadians who are able and willing to learn in an exceptional institution, there is simply nothing available.

The only way that Canada will be able to grow genuinely first-class universities is to follow the lead of Ontario and allow for the establishment of private universities, either on a for-profit basis or as cost-recovery non-profits. They would be sanctioned by provincial governments. They would be obliged to adhere to provincially established norms of scholarship, which would ensure they would not become storefront degree mills. They would also be allowed to charge whatever the traffic would bear in tuition fees. They might set their own entrance requirements, and their own optimal size. This last factor is the key to quality in an undergraduate education. Whether in a limited number of academic disciplines or across the whole range of undergraduate education, such institutions would have a genuine shot at achieving excellence. One of the most important factors that makes one university really superior to another is a low student-to-professor ratio and a high number of contact hours both in and out of class. Governments that are trying to maximize the return on their educational dollar are not interested in subsidizing smaller and better universities. They are in a mass market, period.

If Canada is to survive the educational pressures of the twenty-first century, it is going to need a lot more variety in its advanced educational facilities. It would have been difficult to offer such a variety a few decades ago when fewer than 10% of the country's high-school graduates went on to university. The number today is about the same as in the United States, with about four out of ten high school graduates attending university or college. Among the fifty or so universities in this country today there is surely room for a half dozen private, high quality, first class institutions. They will never emerge from the public sector. Only if the provincial governments allow private universities to flourish can this ever happen.

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USE AND ABUSE OF TECHNOLOGY IN TEACHING

Kenneth R. Davidson, Department of Pure Mathematics

No one can deny that computer technology has significantly changed the way we can calculate and the way we can communicate at a distance. The question raised in the latest *Forum* concerns the best ways to make use of these advances to assist teaching. I will limit myself to the teaching of mathematics where I have experience, as the outside observer might expect computers to take over here to a greater extent than in English literature.

I do not consider myself a Luddite. I use e-mail daily (hourly?). I use LaTeX to typeset papers and books. I collaborate at a distance using these tools. I rarely use computers to do calculations, but only because they can't help me much (yet). I have a website, and I post assignments and solutions there, as well as current research papers.

Let me start with calculators. I don't allow them to be used on calculus exams, and I set exercises for which they are of little use. I deplore the early introduction of calculators in elementary school. There is ample evidence that students today have poorer arithmetic skills than previous generations which concentrated on addition and multiplication tables to a greater extent. This lack of facility handicaps the students' ability to think about more difficult notions because they stumble on elementary points that should be second nature. Procedure often precedes understanding, and the ability to do long division imprints a concept on the brain that punching numbers into a calculator does not.

At the university level, I am not particularly concerned about developing the students' skill on a calculator. I am interested in developing their ability to think logically, critically and creatively about a variety of problems. Mathematics involves a number of useful qualitative as well as quantitative techniques, and "number crunching" is not the central issue.

Can we learn from a computer? Of course! We can learn in lots of ways. New technology certainly allows us to record and transmit information over great distances, including the written word, voice and visual images. However, the ability to do this is not new, only the speed is new. The speed does allow two new scenarios: firstly, the possibility of interactive sessions and, secondly, computer generated responses which simulate an interactive interface. I have no doubt that this can provide a better learning environment than the correspondence courses of twenty years ago. For some people, distance education is superior to their alternatives, and it will

undoubtedly continue to be improved in a technological sense.

The main point overlooked by North, but captured by Narveson and others, is that learning is interactive. The classroom is just one part of the equation. The instructor provides some excitement (if you're lucky), an informed perspective on the subject, an emphasis on important themes, and a critical interaction with students' ideas. There is no doubt that I myself get more out of a lecture than out of a TV script, even if the TV program is a lot glitzier (which most classroom tapes will not be). Yet if learning stopped when students leave the classroom, distance learning might not be too bad.

A significant part of the education process comes from student to student interaction. The university is a place for fresh, bright young minds to wrestle with each other, teach and learn from each other, and to exchange ideas on many fronts, not just course material. Students compete against each other as well as against the professor, and they collaborate as well. It is the whole experience, scholastic and social, which molds the education of our students. Sitting at home watching a clever computer program just doesn't compare.

How good is computer teaching today? In recent years, a lot of effort and expense has gone into providing computer support for elementary mathematics courses such as calculus. Most people would expect that such courses are well suited to computer assistance. Indeed, there are several programs available that are very good at "doing calculus" themselves. If our goal is to make our students good at using these programs, one might think that introducing them early on would facilitate that. I disagree.

The ability to make sensible use of these sophisticated programs requires a good understanding of what can be done and how one proceeds to do it. These programs are excellent at "cookbook" questions such as "integrate this function," or "factor that polynomial." However, they are not particularly good at taking a word problem and turning it into an integral question. And they are very bad at theoretical questions such as "can you factor every polynomial?" They are also poorly prepared to isolate the parts of a problem which require extra attention. As with calculators and division in elementary school, the calculus student learns more than just procedure when he/she computes a variety of integrals by hand. By using a computer, the student mainly learns how to type.

Moreover, there is a big difference between a program which can do calculus and a program which can teach calculus. The ones I have seen are very limited in the number of topics covered, the scope of the examples, and the variety of questions asked. Over time, I anticipate that these issues can be ameliorated. However, a good computer teaching program will require much more work than a collection of audio tapes which, as others here have already observed, take more time than ordinary lectures. In addition to the programming time, one has to find a new way to break down information. Somehow the program has to attempt to interact as a one-on-one tutor. This could work well for routine problems where student response is predictable, but it will be a long time before a computer can interact critically like an instructor does. In other subjects (like philosophy and theoretical mathematics for instance), this may never be possible.

There is a significant negative impact of computer technology which should be addressed more often. The ability of computers to make written material look good tends to detract from the more important issue of content. Many students spend more time setting up the physical layout of a project than they do on the intellectual contribution. Is there any of us who has not by now reprinted a page to correct a minor stylistic point which doesn't affect content?

In the same vein, the ability to calculate a multitude of things from data entered into database programs has led to a deluge of irrelevant statistics. Worse than this is the perception that such computed quantities, however erroneous or irrelevant, are superior to other qualitative information which is not amenable to such calculation.

For example, a famous American mathematician (who should know better) who led an American Mathematical Society task force on elementary education recently displayed a computation of the ratio of average test scores to the number of hours of instruction for various countries. Why should we believe that this ratio has any meaning at all? It presumes a very simple (linear) relationship between the two measurable quantities that is completely unjustified. Perhaps more significantly, it suggests that this ratio is more important than absolute performance! If we didn't teach arithmetic at all, we could significantly improve this ratio.

To sum up, teaching is about stimulation and interaction. Generally this is best accomplished in person. Technology has a place, but learning to use technology must take a back seat to learning to think. And good technology can only be used well by those who understand the principles behind it. Turning technology into useful teaching tools is a worthwhile goal if taken in proper perspective. However, it is foolish to expect a computer to provide a total teaching environment.



Membership Reminder

New FAUW membership cards for 2001 have been mailed to all members.

Your membership in the Faculty Association includes a membership in the Grad House. Just show your FAUW membership card as your identification.

If you are not a member and would like to join, please contact Pat Moore in the FAUW Office (x3787 or facassoc@uwaterloo.ca) for a membership form.

FROM THE “PROFESSOR FILES”:

In the winter of 1993, I was teaching a large first-year computer science course in which students learned to write programs using elementary methods of data storage and manipulation. On the midterm, I placed a question which asked the students to write a function called "occurrences" which counted the number of occurrences of a key value in one of these data structures.

In the course of marking the midterm, I noticed that some students were spelling the word "occurrences" incorrectly in their answers. The word appeared twice in the statement of the question, much as it does in the paragraph above. Though it made no difference as to the mark they earned, I asked the markers to keep track of the number of misspellings. Of the roughly 400 students who wrote the midterm, there were more than 50 that spelled "occurrences" incorrectly.

While discussing the midterm, I mentioned this statistic to the class, and pointed out that although the word was a difficult one to spell from memory, they only had to copy it from where it appeared on the page. I then promised to address this unexpected deficiency in their

abilities by putting a question on the final exam that asked for the correct spelling of "occurrences". This brought the expected laugh, and we went on to discuss more serious deficiencies.

On the final exam, I placed a question which asked the examinee to write a function named "occurrences" which counted the number of occurrences of a key value in another data structure. That was part (b) of the question, which was phrased in a fashion almost identical to the midterm question. Part (a) of this question read, "What is the correct spelling of the word 'occurrences'?" and was worth two marks.

I had expected this to be a small gift to all of the students, but soon after beginning to mark the final exam, I discovered otherwise.

Out of 364 papers marked, there were 142 wrong answers to part (a). There were a number of students who spelled "occurrences" differently in their answers to parts (a) and (b), but we did not keep statistics on this.

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(Continued from page 5)

are blissfully unaware and whose effects that will stoutly deny. As McGill law and medicine professor, Dr. Margaret Somerville, remarked in a recent interview in *University Affairs*, "Most ethical mistakes are not made by people who think, 'I'm going to do the wrong thing, and I don't care'." One could equally make this statement about mistakes in general; people seldom make them on purpose. Losing objectivity is seldom a conscious project.

Thus, a failure to report commercial connections between researchers and private funding sources can conceal what may be a very important (perhaps, the important) issue in the evaluation of scientific findings. Such connections are not always transparent. For instance, *The New England Journal of Medicine* in a recent editorial published the details of 19 cases where the journal breached its own policy on conflict of interest when it failed to notify readers of the fact that the research on the products discussed had been bought and paid for by the drug companies that made them. The researchers, themselves, did not make clear in their articles that they were, in effect, employed by the companies whose products they were reviewing.

For years and years the tobacco industry was able to use the cooperation of compliant academic researchers to bolster the industry's patently false claims that the dangers of tobacco addiction had not been established. It is probably truthful to say that the vast majority of these researchers actually believed their findings and would have denied that they had been corrupted by being paid by the industry. (It has been established, of course, that

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research findings that the industry did not like, whether those findings came from industry employees or from research contracted to academics, were simply filed and hidden from view by the industry.)

The Atlantic Monthly suggests that this may not be the only case of such systematic co-optation of science, citing the arguments put forward Ross Gelspan, who argues that over the last several years fossil fuel companies have systematically sponsored research that downplays the seriousness of global warming (p. 45).

Being funded, or performing contract research is one thing and the degree to which a contractual relationship

introduce the possibility of systematic bias is troubling. How much more worrisome, then, when researchers actually take an ownership position in the firm or product that is the object of their research activities. In such cases, the conflicts of interest are obvious. Occasionally, the conflict so blatant as to amount to corruption. *The Atlantic Monthly* mentions two cases that illustrate this extreme:

- a case where the U.S. Securities and Exchange Commission recently laid insider trading charges against a university researcher who bought stock in a company just before releasing his positive findings on a drug the company was promoting.
- the case of a Florida criminologist who, while he was advising the state on prison policy, had pocketed \$3 million in consulting fees from the private-prison industry, in which he also owned stock.

5. The education of students is shaped to a corporate agenda.

If undergraduate students already are impatient with the degree to which their professors are made unavailable for teaching because of their research commitments, how much more antagonistic they will become when it becomes clear that their professors are increasingly investing their research time in developing products to maximize the profits of private corporations. This, coupled with the increasing vocationalization of university education, and the commodification of the curriculum, gives the lie to university rhetoric about the importance of the life of the mind and the importance of independent thinking. We used to support a notion of liberal education in which the university sought to provide an education that was appropriate for a free citizen, the chief feature of which was an open and honest inquiry marked by vigorous debate of alternative points of view. Now, we boldly promote the notion that university education ought to be an education that fits one, not to become a free citizen, but rather to become an employee. University education thus becomes just a classy kind of technical training. Something terribly important has been lost in the process.

Graduate students already are increasingly driven into the bosom of private corporations because the underfunding of universities has sharply reduced job prospects in academia. Graduate students in many disciplines more and more find that the only funding available to them involves them in areas of proprietary research sponsored by private industry. If they are going to do research at all, increasingly they are going to be doing it for somebody outside of the university who has a keener interest in maximizing profit than in advancing knowledge. It's becoming almost routine in some areas for students' graduations to be delayed while industry sponsors take advantage of their funding agreements to secure patent protection for the students' discoveries. Some students

have even been placed in the position where publication of their research has not just been delayed, but actually prohibited by their research sponsors. This not only limits students' chances for future employment and hides their findings from scientific scrutiny, it demolishes whatever idealistic dreams they once may have had about pursuing scientific careers in the hope of improving the human condition. The only condition that counts is the condition of bottom-lines of their research sponsors. All of this is a pointed lesson in the power of money over ideas, and the power of private interests over the public good.

6. The public subsidizes private profit.

An article of faith in the neoconservative agenda that dominated the last part of the 1990s was that government ought not to be in the business of subsidizing private businesses. Well, then, it is curious, don't you think, that we are now in a position where government policy actually encourages cash-starved universities to subsidize the research (read product-development) activities of private business? Given the very favourable terms of such devices as the NSERC Industrial chairs and many individual research funding agreements, private companies can obtain, for a very small cash investment, significant control of a research establishment built up over time and still largely supported by public money. Many of these deals give private research sponsors first dibs on information generated in research, and often outright ownership of the "intellectual property" that results, regardless of the clear stake that the public ought to have in discoveries they have financed.

This isn't the way it was supposed to be. At the beginning of the decade, the push was on to encourage more Canadian companies (read, branch plants of multinationals) to spend more on R&D. Nobody said that the idea was to replace existing publicly funded research with research for private profit at the taxpayer's expense.

7. Knowledge is commodified.

It used to be the case that universities put themselves forward as being in the business of generating and sharing knowledge in the public interest. The argument was made that the public ought to fund universities because the process of scholarship and scientific discovery was of benefit to us all. Researchers would rush to publish their results, not only so they could legitimately claim to have first discovered important findings, but also in the belief that sharing one's findings was in everybody's interest. Most universities' mission statements, including our own, still trumpet the noble goals of promoting and sharing knowledge, but increasingly these statements are sounding more and more hollow. Under the current regime, knowledge is "intellectual property", and like all other property it is in someone's control, someone who can legitimately limit access to the

property in any number of ways. If something important has been discovered, the public doesn't get to know until all the patenting and licensing arrangements have been wrapped up by the lawyers so that the discovery can then be made available on the market – for a price. And if the "property" is a discovery that does not advance the private interests of research sponsors, it can be quietly hidden from view, usually with the complicity of the actual discoverer (who must know which side his or her bread is buttered on).

8. Discovery is impaired.

All of this actually inhibits discovery. Some important findings are kept off the market, because their publication is suppressed by sponsors. The study of interesting and important questions simply doesn't take place, because there are insufficient market forces to provoke interest. Under many, if not most, privately funded research arrangements, the publication of findings is routinely retarded in order to allow sponsors to secure patent and other protection for whatever marketable products might be produced as a result of the findings, delaying the useful dissemination of those findings in the scientific

And more insidious, the language of commerce comes to pervade every corner of the institution: students are seen as customers to be satisfied, courses are commodifiable units that can be replaced with cheaper units picked up off the Internet,

community. The common understanding is that delays of three to six months are the norm, but our Vice-President (Research), Dr. Len Bruton recently told the audience at a forum organized by our Graduate Students' Association that delays of one or two years are common in agreements the U of C signs with industrial sponsors, quite clearly to enable the research sponsors to use research findings to obtain a commercial advantage.

Increasingly, researchers discover that before they can conduct a piece of research, not only do they have to buy pieces of equipment, patented reagents and patented life forms, they have to conclude revenue-sharing agreements with the owners of these pieces of intellectual property guaranteeing them a stake in whatever results are found. The lawyers meet and meet and trade fine print while interesting research questions are left dangling.

9. Universities try to behave like businesses.

With all this lusting after revenue, universities are also in a grand hurry to show they mean business by acting more and more like private corporations. Research offices turn themselves into marketing enterprises, selling the expertise of the faculty to potentially interested buyers.

Departments and faculties deform the reward system by promoting those who successfully hustle research grants from the private sector, and punishing those who simply want to poke along studying interesting questions that don't require extensive overheads. The university administration denies this is happening, but those of use who have sat on Faculty Promotions Committees know this for a lie. Being a good scientist pursuing important questions becomes less important than demonstrating appropriate levels of entrepreneurial zeal. The "have" departments (chiefly in some but not all areas of science, engineering, and medicine) get more attention and get richer, and the unpopular disciplines get down-sized and have to beg for scraps. And more insidious, the language of commerce comes to pervade every corner of the institution: students are seen as customers to be satisfied, courses are commodifiable units that can be replaced with cheaper units picked up off the Internet, what we do day-to-day in our transactions with students and the materials of our studies is dehumanized and transformed into products, outputs and through-puts that become the objects of endless managerial accounting and marketing exercises. This change in language and in practices systematically shifts behaviour within the institution in the directions signalled by the values implicit in whatever "key performance indicators" are of interest to those who establish them. Universities across the continent have rushed into managing intellectual property by establishing branch operations to flog the discoveries of the faculty and students to the market – few of these enterprises actually make any money, but that seems to be beside the point – and there is the very devil to pay if a hapless professor or student doesn't want to buy into the new corporatism. At the very least, academic careers are advanced or retarded by the degree to which students or faculty members are willing to sign on to the corporatist bandwagon. At the extreme, the issue becomes one of liberty itself. *The Atlantic Monthly* reminds us of the now famous case of Petr Taborsky, a student at the University of South Florida, who served time on a prison chain gang after the University and a private research sponsor had him charged with theft, his offense being that he used information from an undergraduate research project in his Masters project (he claims with permission from his Dean) that produced results having commercial importance to the research sponsor.

10. Universities lose credibility.

When research findings are for sale, and research so easily corrupted, the entire research establishment loses credibility. When Monsanto (now folded into the Pharmacia conglomerate) becomes a "partner" with the University of Manitoba in a major research facility, what U of M plant scientists might have to say about agricultural products marketed by Monsanto is coloured by the commercial connection between the university and this

private company. In the current climate of untempered commercialization, all scientists can become suspect, as indeed can the universities which give them homes. The erosion of public support of the university itself must be the inevitable result.

11. Private money drives out public money.

Finally, there is the quite reasonable fear that as more and more funding of universities is assumed by private sources, governments will find this a handy excuse for reducing public support for universities even more. Why should the government support research, when it's clear that private funding sources are available? Why should governments try to keep tuitions down, when students and their families demonstrate a willingness to take on increasing debt, ever eager to do what is necessary to reserve students' spots in the new economic order? The commercialization of universities thus becomes a downward spiral that can easily result in universities becoming the instruments of private interests, and obtaining a uni-

So, Dangerous Liaisons.
Even, maybe Fatal Attractions.

versity education a possibility only for the children of the middle class. The 20th century's brave experiment with public universities thus can quietly be put to sleep.

So, Dangerous Liaisons. Even, maybe Fatal Attractions. When you have to count on International Megacorp to hand over the money to pay your mortgage, buy your car and pay your kids' university tuitions, you can bet that you will become suddenly more tolerant towards what International Megacorp does, and suddenly less fascinated with doing things that might make International Megacorp grumpy. This relationship will change you, down to your very socks. You cannot hope to keep your objectivity and independence at least not for long. The world simply doesn't work that way. Never has, never will.

At the recent conference hosted by CAUT, "Universities and Colleges in the Public Interest", one of the speakers remarked that the 20th century was characterized by two important developments: the rise of national democracies, and the attempt by large corporations to bring them under control. The argument about commercialization of universities is about power and liberty, it is about who controls information and how it is constructed, it is about the basic fabric of democracy. Thankfully, we don't have to worry in this country about whether jack-booted storm troopers are going to march into the Information Commons. But we really do have to worry about Novartis,

and Monsanto, and all the other new multinationals simply buying us up piecemeal and ushering in new forms of post-industrial servitude that are just as inimical to the human spirit the older forms of tyranny. Universities ought to be in the public interest, and they shouldn't be up for sale.

REFERENCES

Clark, E.A. "Academia in the service of industry: The ag-biotech model". Paper presented at "Universities and Colleges in the Public Interest", Canadian Association of University Teachers, Ottawa, October 29-30, 1999.

Graham, W. "Corporatism and the university- Part 2", in the UTFa Newsletter, February 25, 1998. Available at the home page of the University of Toronto Faculty Association: <http://www.utfa.utoronto.ca/html/newsbull/index.htm>

Lougheed, T. "Practical Ethics", *University Affairs*. Association of Universities and Colleges of Canada, April 2000, pp. 8-10.

Press, E. and Washburn, J. "The Kept University", *The Atlantic Monthly*, March 2000, pp. 39- 54.

Stelfox, H.T., et. al. 1998. "Conflict of Interest in the debate over calcium channel antagonists." *New England Journal of Medicine*, 338(2).

Zivin, J.A. "Understanding Clinical Trials", *Scientific American*, April 200, 282(4), pp. 69- 75.

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THE SYSTEMATIC B.S. GENERATOR

The systematic B.S. generator was created to serve as an aid in the writing and presentation of professional-sounding managerial material. Properly used, the systematic B.S. generator provides an economical, concise survey of terms applicable to almost every managerial situation. Commerce students will find the B.S. generator quite useful in adding bulk and professional veneer to their writing and a hearty supplement to any original ideas the writer may have.

DIRECTIONS: Select any term from column A. Combine with a randomly selected term from column B and conclude with a selection from column C. If target person seems to understand what you're saying, select another random set of three words. Continue until your managerial acumen is firmly established.

A	B	C
integrated	managerial options	
total	organizational flexibility	
systematized	monitored capability	
parallel	reciprocal mobility	
functional	digital programming	
responsive	logistical concept	
optional	transitional time-phase	
synchronized	incremental projection	
compatible	third-generation hardware	
balanced	policy contingency	
orchestrated	strategic convergence	
linear	tactical software	
phased	multi-discipline interface	
synergistic	referential gradualism	

[Editor's Note: This valuable document was found by a colleague in some old files dating back twenty years or so. Apparently it was circulated widely although we are unaware of its origin. If anyone knows its history, we would be happy to enlighten our readers in a future issue. With changing trends and "paradigm shifts," these lists obviously require updating. Suggestions for additions to these lists are most welcome.]

Do you have a valuable document that you would like to share?]

PRESIDENT'S MESSAGE

*John
Wilson*

The things which might be worth talking about – many of which will occupy us increasingly during the rest of this year – have only just begun to happen, even though we are well into 2001. So I am going to have a lot more to say next time than this.

For one, the Faculty Relations Committee has not yet met this year (and will not until the beginning of February owing to a number of unanticipated interferences) with the result that there is nothing further to report on the matters I raised at the December general meeting regarding mediation procedures and the question of revisions to the Conflict of Interest policy. To that list it may be necessary to add some discussion about possible conflicts between the provisions of the Memorandum of Agreement and University Policy on at least two fronts – it is intended that these are to be sorted out in the FRC – but it is likely too early to be certain about this.

Discussions with the Administration regarding the addition to the Memorandum of Agreement of new articles dealing with Program Redundancy, Financial Exigency, and Layoffs are continuing, and our Compensation Negotiation team has begun meeting with the University team to reach agreement on a salary settlement for at least 2001-2002. On that front members should be aware that the new procedures governing salary adjustment which were agreed on last spring as Article 13 of the Memorandum of Agreement come into force with the settlement about to be negotiated. This means that the revised methods for determining performance ratings should be part of the reviews now going on in the departments and schools. Members concerned about this should read the relevant sections of the Memorandum of Agreement and if you have any questions I would be happy to try and answer

them.

I have met once with Alan George – who, as everyone will know, has taken over Jim Kalbfleisch's job until a new person is found – simply to discuss the lay of the land for the coming year, and when the FRC gets going again there will be more of this. One of the things that has held up our usual progress is the pursuit of an Association grievance (our first ever) which members may have seen briefly reported in the *Gazette* for January 17. As of this writing the arbitration hearing has not been concluded so I should say no more for the time being.

Many members may be interested in the way in which the search for a new Academic Vice-President and Provost is being conducted and to that end the Board has had both Jim Brox – a former Association president and member of the Search Committee – and President David Johnston visit with us to talk about progress. There will be more to report on this next time but as of this writing it appears that there has not been a final decision on the character of the new job (and therefore of the possible long-run restructuring of decision-making in Needles Hall) nor is the Search Committee yet in a position to establish a short list of candidates.

So next time there will obviously be much more to talk about.

THE FAUW FORUM

The FAUW Forum is a service for the UW faculty sponsored by the Association. It seeks to promote the exchange of ideas, foster open debate on issues, publish a wide and balanced spectrum of views, and inform members about current Association matters. Opinions expressed in the Forum are those of the authors, and ought not to be perceived as representing the views of the Association, its Board of Directors, or of the Editorial Board of the Forum, unless so specified. Members are invited to submit letters, news items and brief articles. If you do not wish to receive the Forum, please contact the Faculty Association Office and your name will be removed from the mailing list.

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