The Future of Computer Science and Information Systems in South Africa

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Abstract

Everyone talks about how important our subject is, yet many academic departments are stretched to their limits: understaffed, underfunded and with more students than they can handle. How has this situation arisen? This paper proposes some causes of the problem, and the need for a general survey of industry and academic perceptions.

1. INTRODUCTION

In discussions as president of SAICSIT with members of various departments around the country, a general picture emerges: many Computer Science and Information Systems departments are under-resourced, and are treated as cash cows to support less popular departments. How widespread is this phenomenon? Does it reflect a real problem, or just perceptions amplified by the fact that those who complain do so loudly?

When this issue is raised, a common response is: "Everyone in universities complains because funds are being cut."

Another issue is the question as to how much graduates are appreciated by industry. There are very mixed views on this question: some employers claim universities in particular (technikons less so) are producing graduates without useful skills, whereas others are very happy with the students we produce. Which perception is correct? Or are both right, but essentially in different markets?

There is a wide variety of funding programmes that could apply to both of our subjects: NRF (was FRD) administers a number, including its own Competitive Industries Programme, and THRIP. Telkom funds centres of excellence, and there are some other initiatives. A few departments report success in using these programmes. On the other hand, some departments complain that their fundamental shortfall is in recurrent expenses, most notably, staffing—and they lack the basics rather than funding for research.

I argue that the time has arrived to attempt to quantify these issues more thoroughly; anecdotes do not make a case. If Computer Science and Information Systems are indeed in crisis as many people tell me, we need to be able to convince those who want a strong economy with a strong technology sector to take action.

This paper examines some of the background to the problem, and proposes a strategy in the form of a survey to determine the state of our academic departments. It then opens up a discussion on whether the surveys are a suitable strategy and if so, what they should, more specifically, cover.

2. WHY CS AND IS HAVE A PROBLEM

Computer Science in most of our academic institutions has grown out of mathematical departments, rather than out of engineering. As a result, it has been seen as a low-cost "theory" subject in terms of its funding, and not a laboratory subject. Information Systems often comes from an even worse position: commerce faculties have even less funding per student than science faculties, as commerce does not traditionally include lab subjects.

Add to these disabilities the fact that technicians to support equipment in our area happen to have a job description that closely matches one in high demand in industry, and we have a problem. Whereas a traditional lab subject like Physics can rely on lab assistants trained into the job, with little prospect of real-world employment, our technical staff can often earn triple their salaries in the real world. The only advantage we can offer them is the pleasure of being in an academic environment, a pleasure that is limited in its appeal if they are severely over-worked.

As long as a given unit (e.g., a faculty) is working on a fixed-sized pie to slice between departments, the more established departments which have a better staff-student ratio are in a strong position to play politics to defend their turf, since they have more time on their hands than the more pressurized departments.

Add to this the fact that industry is not as supportive of academia as it could be, and we have a problem: our own administrations are not motivated to encourage growth the rational way, by rewarding it with resources, and our potential supporters in industry are not rallying to our cause.

Part of the problem lies in the fact that we are not putting a coherent case with a single voice. In a meeting at NRF, for example, I ran into the problem of the perception that everything is all right because some departments are not in such a bad position. Such exceptions however are not necessarily the general case.

Given that so many people talk about our area as being so important, if we could put a coherent case, we would stand a better chance of changing attitudes.

3. PROPOSAL: SURVEYS

One approach to the problem would be to quantify attitudes and to measure resources at our departments, through a survey. It might also be useful to survey industry, provided we can persuade key role-players to take the survey seriously.

Here are some issues that could be covered in a survey of academic departments:

- as compared to established laboratory disciplines, what fraction of the funding per student does your department receive?
- what fraction of the administrative staff that you need, do you actually have?
- what fraction of an industry-competitive salary is your technical staff paid?
- what fraction of an industry-competitive salary is your academic staff paid?
- what fraction of the equipment capital budget that you need, do you actually receive?
- what fraction of the equipment maintenance budget that you need, do you actually receive?
- what fraction of the academic staff that you need to deal with current student numbers do you actually have?
- what fraction of the technical staff that you need, do you actually have?
- what fraction of research budget that you need, do you actually have?
- what fraction of students capable of higher degrees actually stay on at each level?

Clearly, the actual questions in the survey would need some thought in terms of the wording; the intent here is to discuss the general form of the questions.

The survey for industry would take the form of assessing the skill levels needed, and attitudes in industry towards issues like innovation.

Here are some possible questions:

- do you only need people with skills relating to products you use now?
- do you need people who can think on their feet?
- do you need people who can adapt to new technologies without retraining?
- do you need people who can invent new technologies?
- do you see education as an investment for the future, that you are willing to pay for?
- do you see academic research as an investment for the future, that you are willing to pay for?
- are you interested in internship programmes to build job skills in recent graduates?
- do you see a role for professional registration, as in traditional engineering disciplines?
- do you see the Employment Equity Act as a challenge you can meet by becoming more involved in education?

As with the survey of academic institutions, these questions are designed to stimulate debate.

Let us come up with questions that industry can relate to, or at least argue about.

4. INTERACTIVE DISCUSSION

Let us now look at the questions raised here in more detail. Is the idea of surveys a good one? If so, let us consider the actual form of questions for the surveys, and other questions which arise:

- what kinds of questions will people relate to, in both surveys?
- how big is the problem, anyway: do we all agree that we need to take action to turn the situation around?
- how can we draw people's attention to the surveys (assuming we decide that this is a good idea)?
- how can we make people take them seriously enough to give considered answers?
- how can we take the results of the surveys forward, to change perceptions, funding, etc.?

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