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Visions, hype and confusion: selling computing futures in institutional marketing

Dr Samuel Mann
Department of Information Technology and Electrotechnology

ABSTRACT

Declining student numbers in the Information Technology field has prompted considerable discussion amongst academics in the past two years. Several authors (Young (2005), McGettrick, *et al.* 2004) have explored likely contributing factors and identified strategies for improvement. Key to many of those strategies is a change in student perception of the value of a career in computing.

The authors commissioned a potential student to collect marketing material from New Zealand tertiary institutions on the premise that he was interested in pursuing a career in computing. The prospectuses were examined to determine what messages the student received about his chosen career path.

A principal components analysis was conducted, which showed clear differences between two approaches – career or course focused. Institutions need to have clearly identified the value proposition that they offer to prospective students, including a clear model of computing.

1. INTRODUCTION

Declining student numbers in the Information Technology field has prompted considerable discussion amongst academics in the past two years. At least two major workshops (Young 2005, McGettrick, *et al.* 2004) have explored likely contributing factors and identified strategies for improvement. Key to many of those strategies is a change in student perception of the value of a career in computing. The declining in student numbers is occurring despite predicted and increasingly actual shortages in ICT staffing (NZ Government 2005). It is clear that students are choosing not to take computing, that they are not perceiving a career in computing. Underlying factors behind perception issues can be seen to be based in industry, education or both. These issues are similar to those identified in the Grand Challenge Education (McGettrick *et al* 2004). They describe computing as being of "an awkward age" and, much like teenagers, many of the issues relate to perception. They argue that the

> *"desirable image is one of an exciting even vibrant discipline where there are rapid and exciting developments…computing offers great opportunities for innovation, challenge and wealth creation".*

In addition to school alignment, industry relationships etc, strategies identified by McGettrick and Young include the following:

- Provide simpler models of computing as a discipline and have this simplicity reflected in a better mix of high quality computing courses that genuinely accommodates a broad spectrum of student ability and interest.
- Reinvigorate the glam
- Focus back to basics but recognise place for duality in computing
- Engage students in what they see as computing future (ie cellphones, wireless, games etc)
- Work on strategies for using flavoured degrees without confusing market with cosmetic degrees
- Make clear the direct route to high paying and exciting jobs
- Engender in potential students a sensible understanding of the range of possibilities of advanced study of computing and, where appropriate, to ensure that they possess the skills needed to undertake successful study of (some aspect of) computing in higher education.

The issues and strategies described above all suffer from the same problem: they are mostly

little more than anecdotal. The mismatch of intakes and graduate demand is a problem upon which solutions must be found and upon which we all depend. There are (at least) two major areas that need addressing: reinvigorating computing programmes (see for example Lewandowski, 2005), and perceptions of a career in computing. In this paper we focus on the latter and examine a single part of what influences perceptions: the formal marketing of computing by tertiary institutions.

From a marketing perspective, education is a service (Palmer 1994). This means that it has qualities of inseparability of production and consumption with customers as co-producers, is intangible in form yet potentially of great significance to the purchaser, the process of production is important to the customer, value is added through differentiation, and the decision making unit is often complex. A particular feature of the education market place is that there is an entirely new cohort of customers each year. This means that selling value proposition has little to build on, instead of the virtues of a brand of fridge, in selling computing education we are selling computing, education and computing education at our particular institution (both the programmes and the experience).

By exploring the prospectuses (or equivalent) of New Zealand tertiary institutions we hope to provide first some formal analysis upon which further research and action can take place. The underlying question then, is 'What are we presenting as our value proposition?' The prospectus also plays a role in the learning process itself, such early interactions forming part of the hidden curriculum, as recognized by McGettrick *et al.* (2004):

"entrants to university computing programmes usually are unaware of what they are going to study in a way that entrants to other disciplines are not. This can lead to disappointment and dissatisfaction. Surveys of dropouts reveal this as a major cause of high attrition".

It is recognised that the prospectus is not the complete marketing effort of an institution and that most institutions are increasingly relying on other forms such as profile and targeting (Tapp 2004), school alignment and so on. The prospectus, however is a constant and allows us to analyse what the sector is doing as a whole.

2. METHOD

In late January 2005, a student was asked to contact all the state tertiary institutions in New Zealand (excluding the Colleges of Education) with the line that he was "interested and computing and could he please be sent material about it". No deception was required as he was indeed a prospective computing student. If asked, he responded that he was interested in both "computing itself and things that used a lot of computing".

31 institutions (all Universities, Polytechnic/Institutes of Technology and Te Wananga) were contacted which resulted in 16 packs of information being sent to our collaborator. A further three institutions sent an email with the address of their website (a particularly ineffective strategy as he had originally contacted them via the website). After several follow up phone calls and emails, 24 packs of information were eventually received.

It is not the intention here to attempt to rank the institutions in terms of quality and style of prospectus. We do not wish to award an "Oscar for the best prospectus', rather we are attempting to look at the positioning of computing as a sector.

A focus group of current students was used to examine the prospectuses to derive features that could be used to describe them (Figure 1). A recent graduate, in discussion with a first year student, then assessed each prospectus according to 20 parameters. A six point scale (0-5) was used with 0 being 'not at all" through to 5 "used extensively". The age of computers in imagery was assessed using 0 no imagery, 1 very old, through 4 flat screens (ie 1-2 years old) and 5 new cellphones etc. The production quality and style of the material were not assessed.

3. RESULTS

A box and whisker plot of the 20 variables (n=24) shows a wide range in the use of the different features in the prospectuses (Figure 2). Some were used by every institution some such as entry criteria used with very little variance, and others, very rarely (eg employer profiles).

The material received varied hugely between

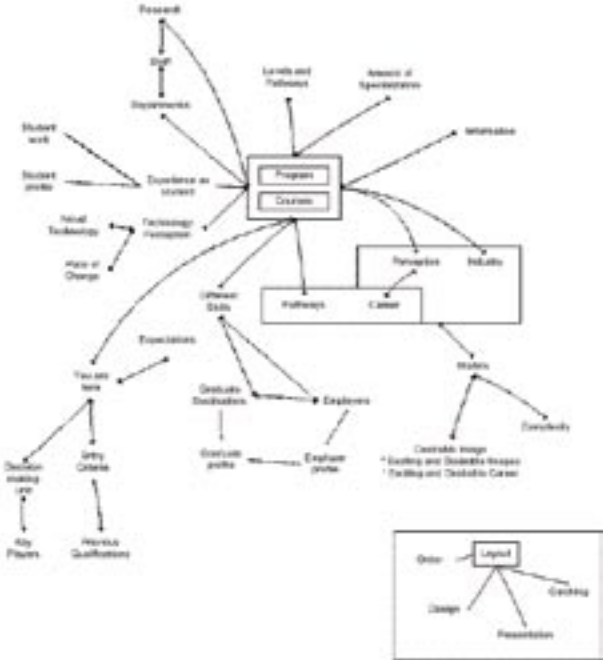


Figure 1: Model of features in structure of prospectus

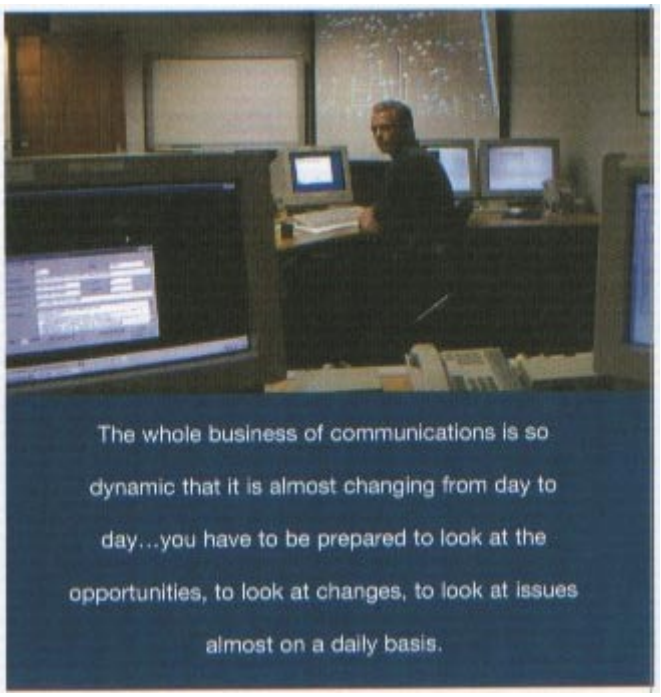


Figure 3: Future of computing.

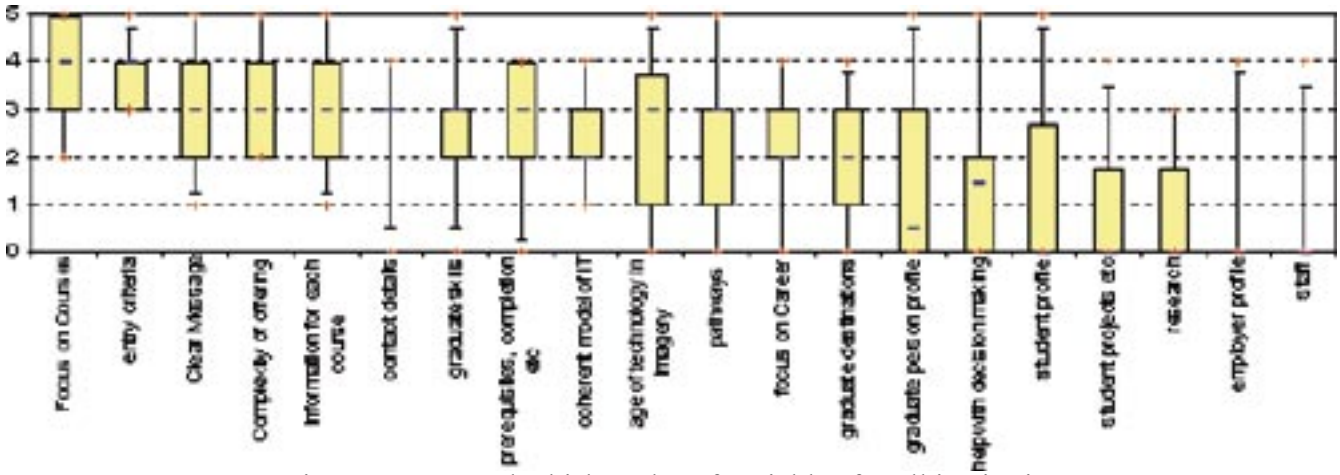


Figure 2: Box and whisker plot of variables for all institutions.

institutions and included a few photocopied pages, a glossy pamphlet for the subject area, booklets for the subject area or department, the student handbook for the department, or complete enrolment guides.

All 24 prospectuses presented contact information and entry criteria. All also provided information on each programme, although the extent of this varied greatly.

A major difference is the extent to which institutions present career information. Most, but not all, had a statement to the effect of "Computing is underpinning all areas" variously appended with "…it is a growing industry" and sometimes with the plaintive "… and here to stay" (Figure 3). While 19 included a statement about a career, only six (30%) of these were assessed as being above two on the scale, meaning most were very brief. Similarly, while graduate destinations were in 15, only six had more than a short list of potential areas in which a graduate might be placed. Only three gave employer profiles.

In some prospectuses, these statements were "programme philosophy", in others a statement about computing itself.

The skills a graduate should achieve were listed by most institutions and are surprisingly similar. Indeed, most of these could be interchanged and it is difficult to get from them a feeling of whether a particular skill is provided by studying at an institution, or if it is simply a terser listing.

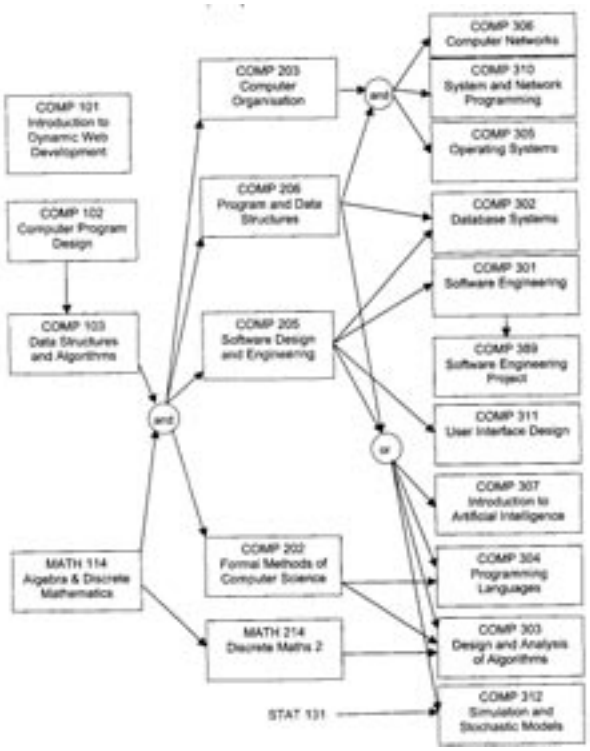


Figure 4: internal structures (including prereq-uisites etc)

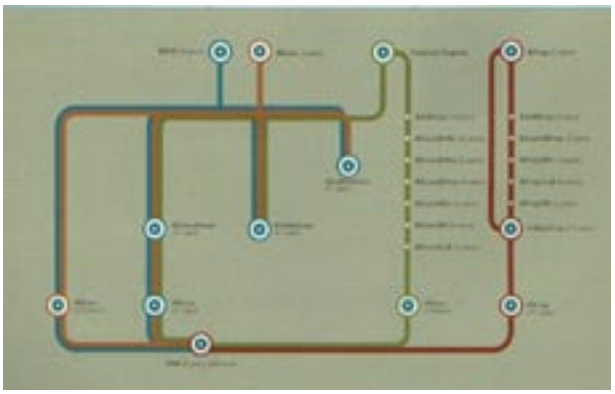


Figure 5: Progression between programmes

Figure 6: Career path

Figure 7: Decision tree

Unsurprisingly, every prospectus contained information about the programmes on offer and this was the approach of 20/24. For 11 of these the focus was on listings of programmes and the courses contained within these. 19 institutions included details of internal structures: prereq-uisite structures, completion requirements etc. Some of these were very complex. While 12 institutions included a pathway diagram of some sort, most of these are graphical representations of internal structures (Figure 4) or progression between programmes (Figure 5), few linked these to careers (Figure 6).

Two of those that do link programmes to careers did this in a decision making context (Figure 7).

The "Model of computing" parameter was used to indicate the extent to which was made clear the scope of computing and the particular institution's angle on this. For some, this was very clear such as "Applied Computing" (Figure 8) or giving an indication of the scope (Figure 9).

An area that was very poorly covered was the relationship between the IT/IS/CS fields and those of computer engineering/electronics. Indeed, several programmes (and entire depart-ments) known to the author were not included in material sent. Two conceptual diagram (Figure 10), attempt to show such relationships.

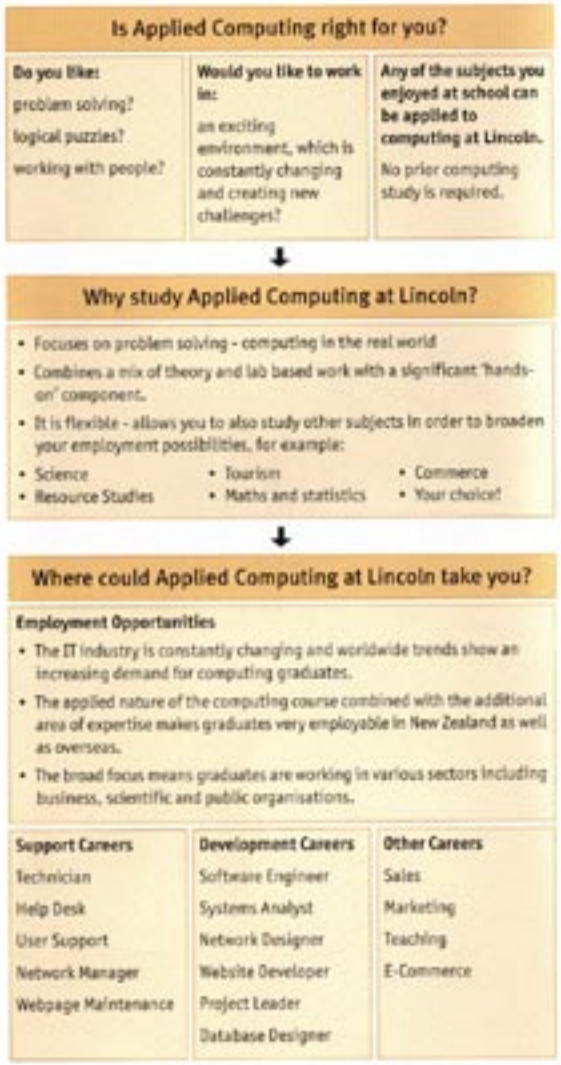


Figure 8: Scope of computing contained in decision format

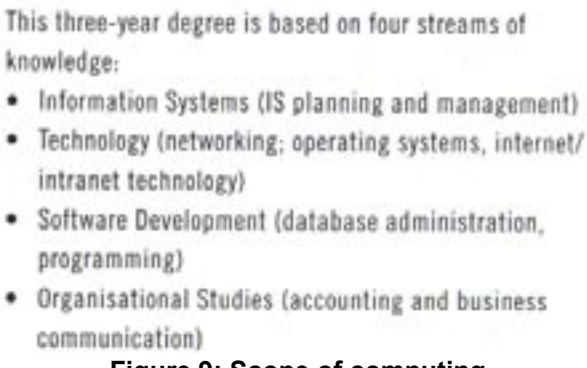


Figure 9: Scope of computing

While the glossy prospectuses contained many many images of the student experience (apparently it is always summer and party time), there were few images of computing students' experience, at least in relation to the computing programmes in the prospectuses. It seems that computers are widely used to sell the general infrastructure of the institution serving a "knowledge economy", but our tools are not used to promote our trade. The exception is the ubiquitous perspective image of a skewed keyboard, used to illustrate more than half the prospectuses. In all the prospectuses there was only one picture of a cellphone, nothing to indicate wireless and no games design/programming. The first year student assessing the prospectuses took great delight in pointing out all the old technology including a motherboard estimated to be 12 years old. There were also several cases of misused imagery (Figure 11) such as Autocad where not offered as part of the computing programmes or computer internals shown in office based community computing.

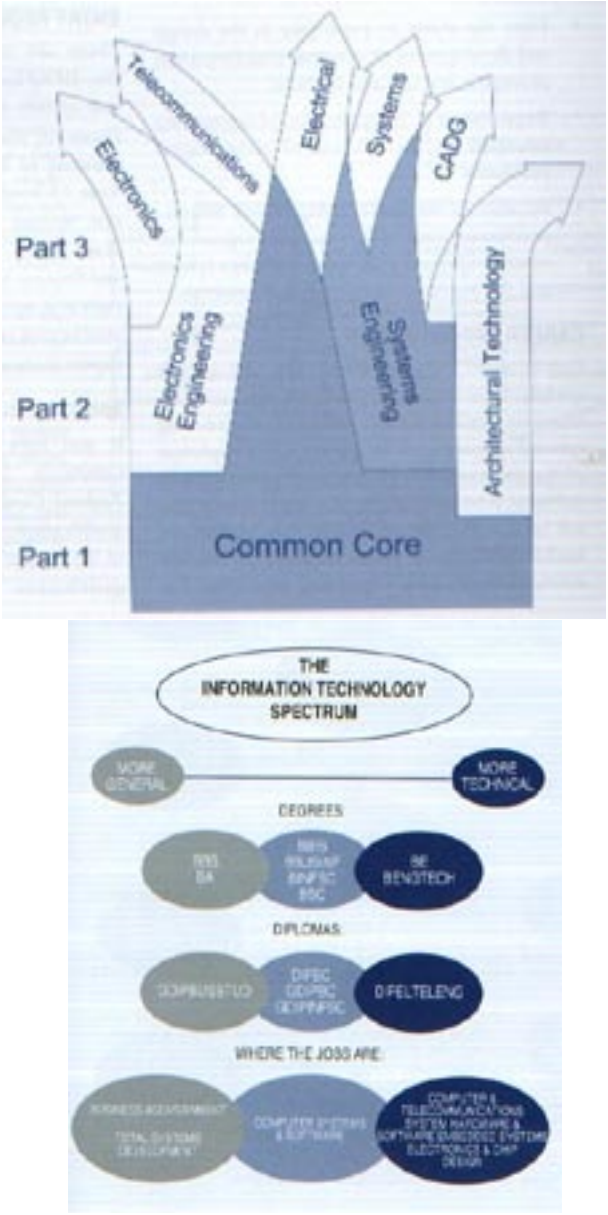


Figure 10: Models of computing

Project or research work undertaken by stu-

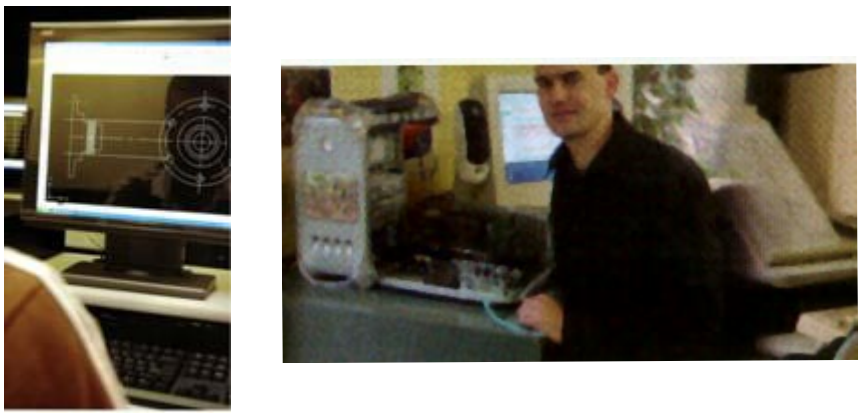


Figure 11: Misused imagery.

Figure 13: Endorsements: Industry and Student

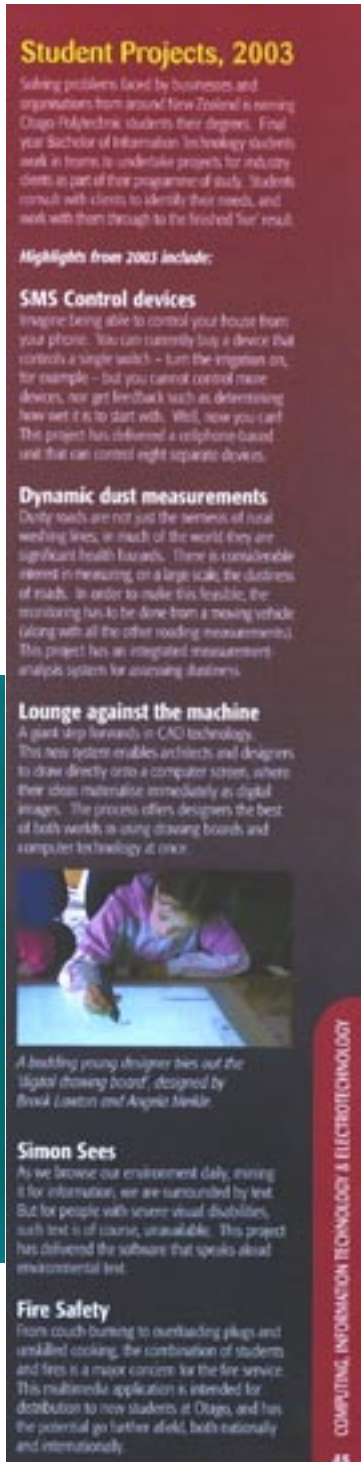


Figure 12: Student work.

dents was also sparsely represented. Only six made any reference to student work, and only one of these went into any detail (Figure 12). Few also listed areas of staff research or interests, although for one institution, such a dense telephone-book-like listing covered the first seven pages of the departmental prospectus.

A perhaps surprising finding was the low use of endorsement of courses by students, graduates or industry (3) (Figure 13), and a low use of graduate (11) or student profiles (6). For some, however, this was a central focus of their approach (profiles not shown for copyright).

It is difficult to see patterns in the raw data but a principal components analysis of the variables identifies factor (or continua) along which the influence of the variables can be plotted. By then plotting the institutions along these factors, different approaches become apparent.

Figure 14 shows the variables plotted on the first two factors. The first factor gives a continuum with course focus at one end and career at the other (Table 2; note these four factors explain 62% of the variation in the assessed variables). We can then examine the approaches of the insti-

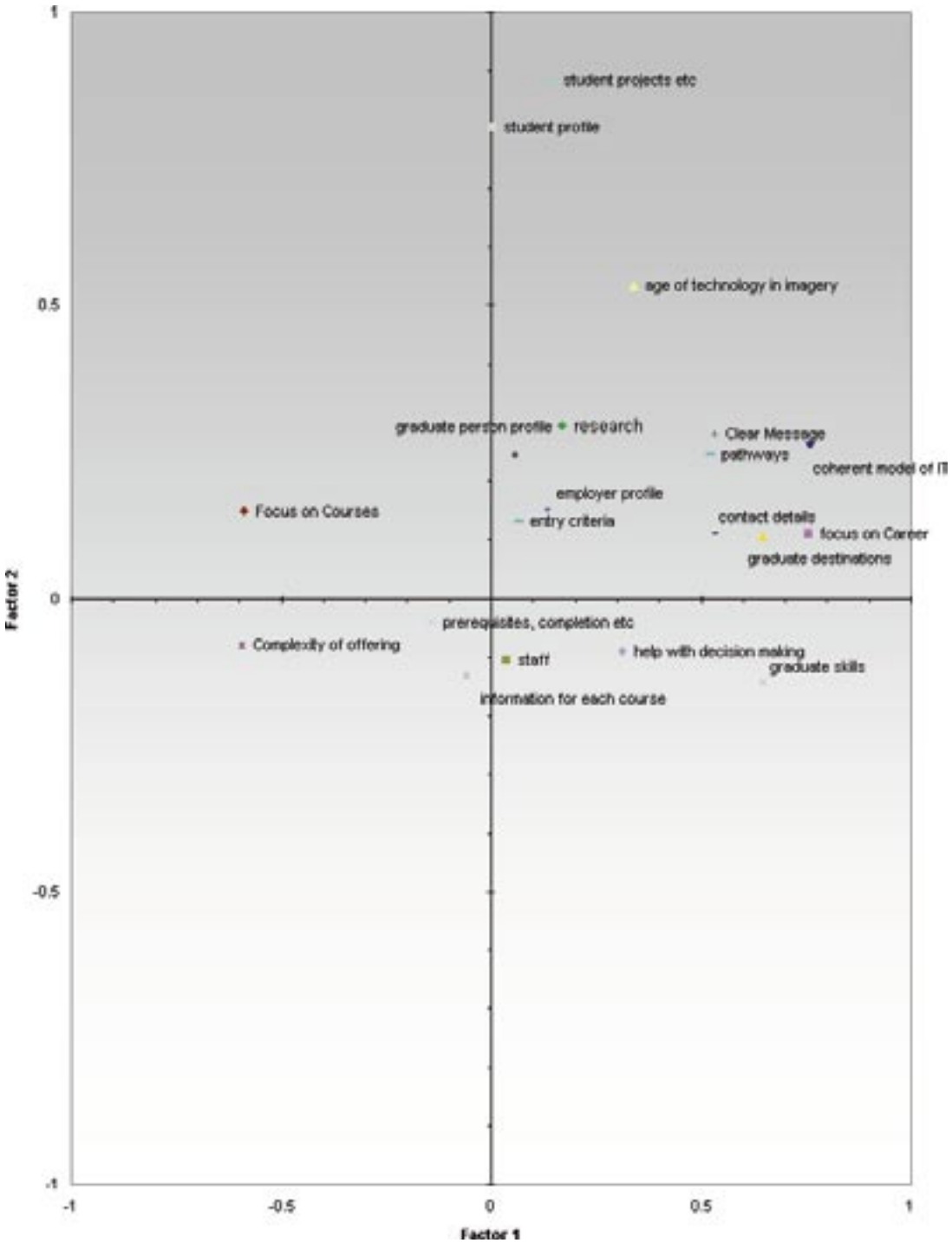
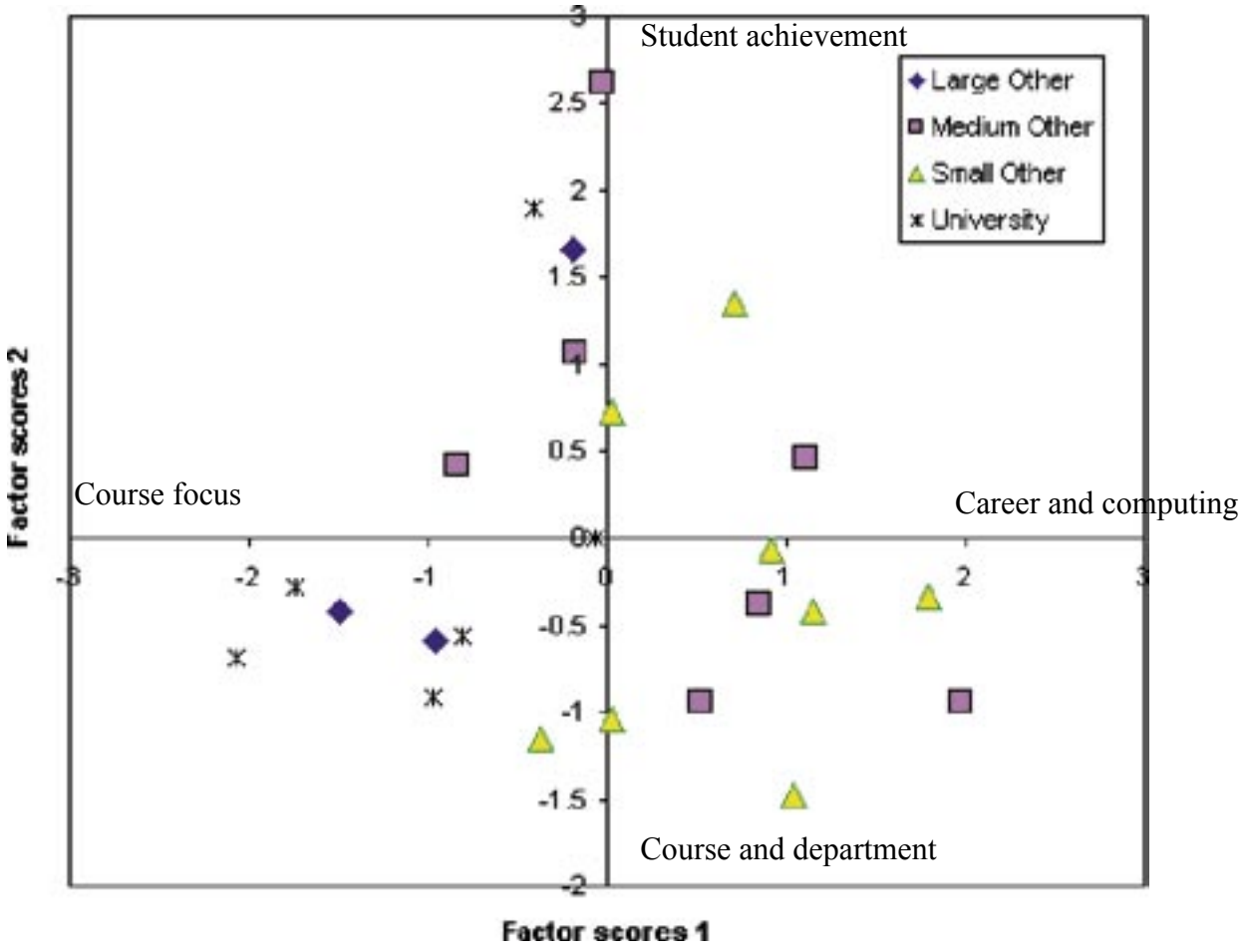
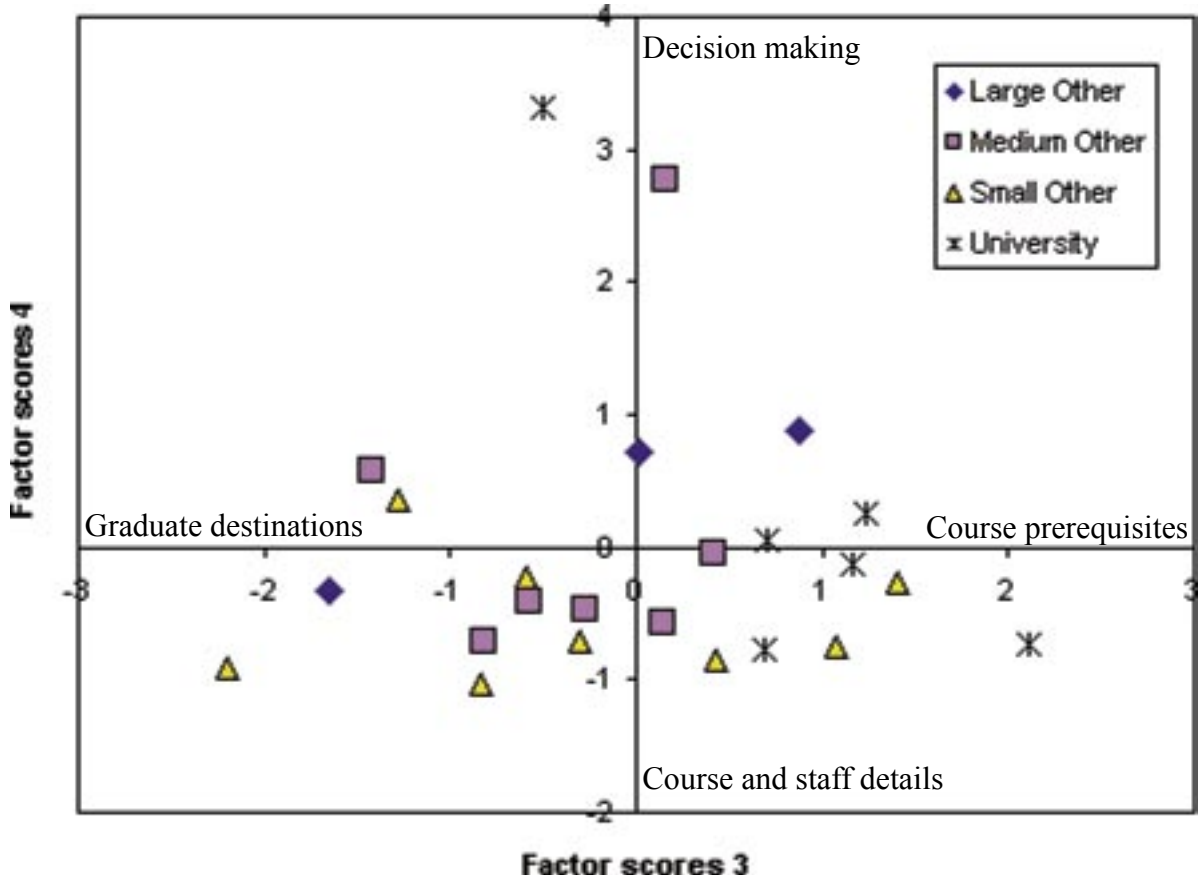


Figure 14: Variables arranged on first two factors

Table 2: Variable loadings for first four factor groupings

Factor	Varimax	Continuum 1	Continuum 2
1	19.1%	complexity of course offerings, course focus	model of computing, focus on career, graduate skills
2	11.1%	courses, departmental information, staff lists, prerequisites	student projects, student profile
3	10.5%	Graduate destinations, clear message, age of technology	Prerequisites, detailed course information
4	9.5%	Course information and staff	Decision making process





Figures 15 & 16: Institution types for first four factors (see table 2).

tutions according to these factors. Grouping the institutions by size (2003 EFTS) and type gives a basis for some comparison. Figures 15 and 16 show this analysis.

We can distinguish several different approaches in prospectus content and these largely relate to the size and type of institution.

Most of the universities take a programme and department approach, focus is on courses and prerequisites. Perhaps because of this complexity, they do tend to include a pathway/course structure diagram, although this is usually not related to careers. One of the universities shows a particular focus on student decision making.

The larger ITPs and Te Wananga also take a programme approach although they are split on whether this is department or student focused. These large "other" have more graduate destination material than the universities and less on internal prerequisite structures.

The "medium other" (all ITPs between 3000 and 8000 EFTS) place a greater focus on career than the previous groups. They are spread along the continuum in their presentation of department or student experiences.

The small other (all ITPs less than 300 EFTS) are career focused although this may be because a smaller programme offering means the material is not dominated by course information. Surprising, perhaps, they do not take a student focused approach.

The biggest variation in the prospectuses is whether they take a course or career focus. One of the universities takes a quite different approach with its presentation based on student decision making.

4. CONCLUSION

This paper has provided an initial examination of the ways in which the computing education sector is marketing itself. There is a separation of approaches between course and career. The complexity of many offerings is not helping to provide a clear understanding of computing. In this split between course and career, the underlying value proposition becomes clouded. McGettrick et al. (2004) argued for a need to provide a clear model of computing, this paper supports this argument.

A way around the course/career split may to think of the potential student as one who wants answers to "why?" (and then perhaps "how?") rather than the "what?" which could be seen to characterise our current approaches.

There are some things that individual institutions can do immediately, the age of imagery and the blandness of the computing hype suggests that we have perhaps lost steam in direction for our marketing efforts. Images of new technology and suggesting career options more inviting than systems administrator or network engineer would be a first step (however valued we might know those roles to be). As Palmer (1994) points out though, perhaps weak marketing can be a lack of direction in the products. In all the institutions surveyed, only one offered courses in wireless technology (with the exception of a few "innovative technology" courses, mostly at post graduate level).

This paper has not explored the efficacy of the marketing approaches. Future research should examine the effectiveness of the various approaches using focus group and collaborative design. Other factors such as gender would also be worthy of future effort. The marketing effort would also benefit from a clear model of computing, and efforts such Cassel *et al* (2005) as in this direction should be both applauded and encouraged as they may provide new structures to understand and communicate the breadth and depth of computing.

Note: Images with indenifiable people are shown only where permission has been sought from the institution concerned. This work approved under Otago Polytechnic Category B Ethical process.

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