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The Queensland Tertiary Admissions Centre: An Example of a Cooperative System Using State Of The Art Technologies

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Abstract

The Queensland Tertiary Admissions Centre Ltd (QTAC) faced a daunting challenge over the past two years in accommodating the new profile approach to the assessment, selection and admission of students to tertiary courses in Queensland. The solution involved the use of state-of-the-art technologies; three of these technologies are discussed.

1. INTRODUCTION

The Company used as the case study for this presentation is Queensland Tertiary Admissions Centre Ltd (QTAC), which is a company limited by guarantee and was established by the six State universities of Queensland. Its Directors comprise the Chief Executive Officers of universities (the Vice-Chancellors), the Director-General of Education and the Chief Executive Officer of the Company (the Managing Director). To understand the context in which QTAC has embraced State of the Art Technologies in a cooperative venture, some background to its history and culture may be helpful.

The Company has been in existence, pre and post incorporation, for 18 years now and during this period it has implemented 3 very major systems developments plus a host of sub and auxiliary systems developments. Starting in the mid 1970's as an operation that was as much clerical as computerised, by 1985 it was able to introduce the first (and very major) interrelational data based systems available in its industry. It provided on-line interactive access to its data base by all its member institutions, firstly via AUSTPAC and later AARNet. Up to 1992, QTAC systems have run on The University of Queensland IBM 3083 or its predecessors, with technical and computing expertise provided through contract by The University.

These days, QTAC handles applications for entry to the 7 State funded universities and 32 technical colleges in Queensland. It operates the most highly sophisticated computer system based around 75 SUN desk top workstations and X-Terminals running INGRES Windows4GL applications in client-server mode against a central INGRES database on a SUN SPARC Centre 2000. The systems run over both local private networks and the Australian universities national network (AARNet). A 96-line Periphonics Interactive Voice Response System provides clients (which includes tertiary institutions and student counsellors as well as students) with telephone access to information services and to QTAC's central applicant database.

There are many major features of QTAC's system worth exploring; in the time constraints, however, I will briefly outline just three of these.

2. PAPERLESS APPLICATIONS FOR UNIVERSITIES AND TAFE ADMISSIONS (OR THE "ELECTRONIC APPLICATION FORM").

The first significant development in QTAC's State of the Art Technologies was the provision of a sophisticated PC-based method by which Queensland Year 12 students apply to QTAC for places in tertiary courses.

There are many benefits of this innovation, some major ones being:-

to Year 12 students

.   more timely and appropriate information is provided as part of the application process which should assist students in making better course choices. Parts of the system replicate QTAC's publication, the *Queensland Tertiary Courses* with any changes to courses since publication incorporated. Students can, while entering their choices, select from institutions and courses and are automatically presented with the prerequisites, interview requirements etc.
.   on-line help is available to the student for each field and action required.
.   all required codes and code descriptions are provided on-line and only valid codes are accepted. In the past, 15% or more of students had course duplication and course coding inaccuracies on their initial application.
.   students are presented with questions that only pertain to their circumstances, for example, those that answer 'no' to the question 'Have you completed Year 12 studies previously?' are not then asked questions about previous study.
.   students are prompted where additional action is required, for example, to supply documentary evidence.
.   up until the time that the school administration uploads their data, students can change or reorder their preferences as many times as they wish.
.   experience has shown that students enjoy using the new technology.

to Schools

.   less postage and paper handling and avoidance of "lost" forms.
.   faster response time from QTAC for acknowledgment of receipt of the applications.
.   time savings for school guidance and counselling staff.

for QTAC

.   reduced printing, mailing and file storage costs.
.   replacement of keyboard data entry of Queensland school-leaver applications by fast uploading from diskette.
.   greatly reduced time in entering applications means that earlier information is available to educational planners regarding the patterns of course applications.
.   only 'good' data is collected, for example

   -   students can only select valid course codes and because they are presented with the prerequisites for that course automatically, are more likely to select courses for which they do meet prerequisites
   -   preferences cannot be repeated in the list of six available preferences and gaps are not allowed

- information is checked to ensure that it is either one of a number of valid entries or is within an allowable range, and if not, immediate action is required by the student
- data entry keyboard errors are avoided
- errors caused by poor handwriting are eliminated.

In view of the many efficiencies and savings that the electronic application form has achieved over the past 3 years, further development is planned to enable extension of the facility to other categories of applicants, such as those already studying in member institutions and Year 12 students from non Queensland schools.

3. GRAPHICS BASED INFORMATION SYSTEM

Soon after a report reviewing tertiary entrance procedures was made in June 1990, the Queensland Government had accepted all of its principal recommendations. The consequences for QTAC promised to be and subsequently became the most challenging of all the changes it has had to embrace.

The Company chose to embrace graphics based information systems in its new systems design for the following reasons:-

- the new profile approach to tertiary entrance heralded by the reforms presented what appeared and may well be the most complex and advanced system of tertiary applicant assessment and selection in this world - in regard to both humans and computers
- an early assessment indicated that at least twice the size of applicant data overall would need to be collected by QTAC (in fact it proved to be 10 to 12 fold)
- it meant the application of up to 620 course specific complex rules to derive the one or more (up to 8 in experience) rankings for each of 70,000 applicants for each of their, up to 6, course preferences (with changes of preferences this means up to 1/2 million preferences in any annual admissions period)
- the new system as outlined claimed to be but the beginning; it assumed a further evolution of (mostly unknown) changes that would occur soon after the new system was implemented (e.g. use of school principals' reports)
- on second assessment, it became clear to QTAC that what was needed was an 'expert' system
- it was clear also to QTAC that the systems we were accustomed to, whilst recognised as large and hard for a novice to readily understand, would be changed to something so complex that none, not even the inventor would find simple or easy to understand.

In other words, it was understood that to achieve a fairer tertiary entrance system, a far greater complexity had to be introduced. Thus some major questions QTAC asked of its technical expert consultants were -

- How do we acceptably present new systems that are even more complex than the current systems?
- How can we ensure that users in institutions including for example Deans of Faculties with little time and no opportunity nor desire to familiarise themselves with QTAC's operations before the busy admissions/enrolments system hits in December/January, tolerate these changes?
- To present a system that would be so complex and difficult to understand and be able to interpret correctly the vast new data elements and corresponding terminology inherent to the new profile approach surely would be too tall an order to place on staff in institutions (i.e. the users)

who had cooperated so fully in the past and were exemplary in the use of the existing systems. Surely they would resent the change.

QTAC's technical advisers proposed, in response to our queries or concerns, the use of Graphics Based Information Systems. In non-technical terms, to the user the benefits of Graphics Based Information Systems (or GUI) included quite simply:

- an easier way to understand complex computerised information with data explained on-line in plain language
- friendlier presentation of this complex data, allowing essential data to be highlighted
- use of scanned images of documents etc. (i.e. a picture paints a thousand words)
- a fool proof way of not ignoring important information - it hits you in the face or warns you
- a vastly improved correspondence system that permits graphic headings, scanned personal signatures and bar coding to enable fast receipting of responses.

It was clearly evident that QTAC should aim for a GUI system. Experience has subsequently vindicated the decision.

QTAC believes that it would not have been possible to manage the volume of data generated by the profile-based admissions systems without employing the techniques available with graphics-based systems. It also believes that a graphics-based information system gives it the capacity to cope with whatever may in the future comprise assessable elements within the admissions process. The success of QTAC's new systems is testimony to the validity of those beliefs.

Many of the general benefits to any users of a GUI based system are multiplied for an admissions systems (as one would expect for any student enrolment system or indeed for any other "seasonal" activity). The process of admissions occurs over relatively short but intense periods, normally only once or twice each year. When admissions are not being processed, the core functions supported in the admissions computer system are not used. For most staff, a period of six to seven months passes without the need to venture down the admissions menus. As a result, users' knowledge of the admissions system is lost or at best severely diminished. Re-training is required every year.

To compound this problem, a number of temporary staff is recruited every year to help with admissions processing. The problem of training them in what is a very complex process is quite significant. However, compared to character based systems, users find GUI systems easier to learn, they accept the environment more willingly, they are more willing to explore within the system. A GUI system allows the system developers to provide an environment which encourages these traits, which provides guidance as to the state of processing and what has to be done next and which provides what we call active help for users.

Lastly on GUI, and most importantly, because the system is visually attractive there is and in our experience it has been proven, a much higher probability of maintaining interest and therefore increasing productivity.

4. AUTOMATIC RETRIEVAL OF TERTIARY RESULTS SYSTEMS (ARTS)

The third major feature I have selected to talk briefly upon, was implemented by QTAC in the most recent admissions period. This is the Automatic Retrieval of Tertiary Results System, known in Queensland as ARTS. ARTS has been a truly cooperative project between QTAC, the universities and the Headquarters of the TAFE colleges, involving complex specifications and programming at both the QTAC end and at the institutions.

Many thousands of applicants to QTAC each year have already undertaken tertiary study and are seeking to transfer to a more preferred course or to undertake a second degree. An important part of QTAC's work is the collection of the official academic records for these applicants as their tertiary results form an important part of their criteria for assessment for selection. Typically about 25,000 academic records must be obtained from member universities and from TAFE and the large bulk of these cannot be collected until mid to late December when end-of-year examination results have been recorded on the student databases.

This has therefore been a mammoth task each year, both for QTAC and for the universities and colleges. As the thousands of academic records came into QTAC they had to be matched with the applications.Staff then assessed the results, calculated grade point averages, checked on exclusion matters and so on and updated the computer files. All this work had to be undertaken in about 14 working days.

With ARTS, all the clerical work and mountains of paper involved in the task has been eliminated. Through the AARNet communication network QTAC now

- automatically generates and sends electronic requests for academic records to the universities and to the technical colleges
- an electronic scan of the institutions student databases creates electronic copies of the records and automatically returns them to QTAC
- the records are electronically attached to the applicant record
- GPAs and ranks are automatically calculated according the expert rules for each course listed by the applicant.

The efficiencies achieved by ARTS have exceeded all our expectations. In the first year, up to $200,000 were saved in clerical work at the QTAC end and similar savings would have been made at institutions. More importantly it shifted the peak of the computing work, some 1.2 million calculations on one day alone, from mid-January back to December, thus providing staff at QTAC and at institutions valuable extra time to perform checks and balances before the major offer round in mid-January.

ARTS has been one of the best examples of the benefits of cooperative systems and of State of the Art technologies.

5. CONCLUSION

The new information technologies such as those discussed here have enabled a tertiary admissions system to be introduced that can handle massive volumes of diverse data and highly complex rules in a sophisticated, efficient and user-friendly way. The new systems benefit all users within QTAC and within tertiary institutions. Most importantly, it benefits applicants by providing, for example, a "paperless application" that ensures that only accurate data is collected and the means for automatic retrieval of examination results as soon as they become available. QTAC is a fine example of how co-operative use of the latest technologies can achieve excellence.