Stakeholder-Led Curriculum Redesign

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Abstract
The University of Tasmania is undertaking a 'green-fields' replacement of its existing undergraduate ICT offerings. As part of the process over thirty industry members and educators were interviewed to gain their advice on what should be included in the only bachelors level ICT degree offered in Tasmania from 2014. This paper reports on lessons learned in ICT curriculum review and in the identification of desired graduate skills and knowledge for future employment. With a strong trend towards utilising outsourcing and off-shoring for software and system development, industry members indicated that there is no room in the ICT industry of the future for personnel who cannot relate to customers and who lack the business acumen to be able to undertake analysis at the commencement of a project or integration at its conclusion. The review identified strong demand for graduates to be ICT professionals with generic professional skills (such as communication and teamwork) along with other non-technical skills (such as business analysis, sourcing and integration) in addition to the traditional domain skills (including programming and databases). Employers desired graduates with a broad range of ICT knowledge but with a depth of competency in at least one ICT technical area. A summary of the outcomes, including likely degree content, is provided.

Keywords: ICT Curriculum, ICT Graduates, ICT Industry

1 Rationale
As has been the case in ICT schools nationally, the staff profile of the School of Computing and Information Systems at the University of Tasmania (UTAS) has contracted, by almost a third, in the last decade and this contraction is expected to continue. Further, like many Australian universities, UTAS is re-positioning itself. The University is seeking to increase its research-led reputation and to rationalize the number of units (subjects) delivered. To this end, the School of Computing and Information Systems was recently administratively reviewed and it was recommended that the current undergraduate degrees, a Bachelor of Computing and a Bachelor of Information Systems, be discontinued and a single degree be created in their place.

In addition, the Review Panel also recommended that the School reduce the number of undergraduate units from the current fifty to only thirty. In comparison to other universities, the number of units offered is already small[1].

Unlike all other Australian universities — with the notable exception of Charles Darwin University — UTAS is the only university in its state/territory, and consequently the School has to primarily meet the ICT higher education needs of Tasmania. Every one of the intended thirty units must maximize its contribution by working towards providing graduates with the essential technical and non-technical ICT skills and professional skills to enhance the Tasmanian ICT industry and/or attracting students into an ICT research career to increase the research potential of the School and/or generating as much EFTSL income for the School as possible by being attractive to non-ICT degree students.

The aim of this paper is to present the findings of our current curriculum review process, the process followed, and the lessons learned for ICT schools of other Australian universities.

2 Previous approaches
An early investigation into Australia's ICT needs occurred in 1999 (Ignite, 1999). This identified areas of technical shortage. Domain-specific knowledge and skills, however, are not the only requirements of job-ready graduates. Nagarajan and Edwards (2008) highlighted the fast changing nature of ICT and the impact such fast-paced change has on the demands and expectations of employers. They suggested that to manage this change there needs to be close and continuous communication between universities and industry.

Despite the high rate of change, employer demands appear to have been relatively constant over time:

- The Australian Newspaper (2006) found that employers valued communication skills and people skills above academic qualifications and

[1] Monash has 120 undergraduate units listed (code FIT) in its 2012 handbook for the Faculty of IT (Monash 2012), Swinburne has 163 (code HET, HIT) in its 2012 handbook for the Faculty of ICT (Swinburne 2012), and QUT has 64 undergraduate units listed (code INB) in its 2012 handbook for the Bachelor of Information Technology (QUT 2012).

that applicants for positions would not be hired without well-developed communication skills.

- Teamwork, communication skills, integrity, reliability, and self-motivation were reported by Wong, von Hellens, and Orr (2006) to be more important to employers than purely technical skills.
- A survey on Employer Satisfaction with Graduate Skills (DETYA, 2000) for all discipline areas rates enthusiasm, motivation, independence and critical thinking abilities as of paramount importance in graduates. Academic achievement was used as an indicator of such things as motivation, problem-solving ability, and learning capacity.
- Hagan (2004) found that ICT employers were most often dissatisfied with the graduates' project management abilities, lack of understanding of business processes, poor written communication skills, and the standard to which they were able to interact with clients.
- Koppi, Sheard, Naghdy, Chicharo, Edwards, Brookes, and Wilson (2009) examined the graduate perspective and found that graduates felt technically competent but lacked interpersonal and business skills.

The main stakeholders in tertiary education are: the students, the employers, and the educators themselves. Noting that students must believe in the relevance of their courses to their future employment (Nagarajan & Edwards, 2008) an approach to curriculum review is needed which yields the best outcomes for all.

The questions of what is required and how best to provide it remain. Gruba, Moffat, Sondergaard, and Zobel (2004) tentatively conclude that curriculum change in universities is rarely best influenced by the educators. They present a picture of curriculum review being driven by dominant individuals with change motivated by financial concerns, academic fashion, and student interest. Pedagogical concerns only influence change at the micro (unit) level.

An objective framework is thus needed to guide the curriculum review. The Australian Computer Society (ACS) in its accreditation manuals (ACS, 2011) provides the following:

1. Identify potential ICT roles that could be undertaken by graduates of a given program of study.
2. Identify the skills required by professionals in a given ICT career role.
3. Identify the level of autonomy and responsibility developed.
4. Identify the ICT Role-Specific Knowledge required to practise the skills.
5. Identify Complementary Knowledge that supports the skill set or that broadens student employability.
6. Design a course structure that incorporates ICT Role Specific Knowledge with the Core Body of Knowledge and other Complementary Knowledge as part of a holistic program of study.
7. Collect artefacts to demonstrate that skills have been developed by students to an appropriate level.

The new degree at UTAS is essentially a completely original degree and its design is being undertaken with a 'green-fields' approach. It is UTAS' intention that the degree receive ACS accreditation (as previous offerings have) and hence adopting the ACS framework seems a reasonable and beneficial approach. More information on the adoption of the framework is available in (Herbert, de Salas, Lewis, Cameron-Jones, Chinthammit, Dermoudy, Ellis, and Springer 2013).

3 Gaining feedback

3.1 Approach

The approach has been decomposed to well-defined stages. The first stage has been to gather information so that tentative degree design down to the unit level can occur. This degree design is the second phase; at the time of writing it is nearing completion. The third phase is to re-engage the industry members to gain feedback and endorsement of the tentative design, before finally presenting the degree design to UTAS' senior committees and Academic Senate for approval prior to delivery.

In order to obtain as much information as possible and to allow particular avenues of enquiry to be pursued, face-to-face communication was undertaken through forums and interviews. At each forum the attendees were divided into small groups of approximately three or four attendees. Where there were multiple such groups, each group moved around a set of interviewers, so each interviewer was asking the same set of questions to each group; each group spent approximately twenty minutes with each interviewer.

3.2 Participants

The forums and interviews comprising the first stage of curriculum design were promoted as an opportunity to influence the future ICT direction of the State. Stakeholders included ICT industry representatives together with pre-tertiary and TAFE educators from institutions across Tasmania.

3.2.1 Industry participants

The number of people seeking to participate was overwhelming; for logistical purposes the number of participants was limited to twenty-odd industry representatives. Approximately ten members of Tasmania's ICT industry could not be included in the first round of information gathering due to their work commitments at the time; these people will be included in the next stage — stakeholder feedback on the new degree proposal.

Representatives of local and national ICT industry and government participated in the interviews. More specifically, the types of organisations represented included those involved in:

- IT Recruitment
- IT Service/Consulting
- IT Information Management
- IT Security
- Research and Development

- Software development
- Hospitality/Tourism/Gaming/Transport/Retail
- Fishing Aquaculture/Food Processing
- Engineering
- Education
- Government (Federal and Local)

ICT businesses of all sizes were represented. There were a number of medium sized software development companies where the number of ICT employees ranged from 20–30, there were some businesses (including government departments) that had a number of ICT employees ranging from 1–40, and there were four large national organisations with in excess of 150 ICT employees, some with thousands.

All the interviewees (except one who was a recent graduate) had employed graduates into various positions throughout their career; most had employed fewer than ten, but some had employed as many as fifty or more.

3.2.2 Education participants

Most UTAS students are matriculants who have completed the Tasmanian Certificate of Education (TCE). A significant number of students also enter UTAS from the Polytechnic[2] and Skills Institute with completed cognate Advanced Diploma, Diploma, Certificate IV and Certificate III awards. In an attempt to ensure articulation with pre-University educational awards and institutions, and to avoid duplication of content delivery and skill development a number of stakeholder educational institution representatives were also involved.

Representatives from the government and non-government college sector (Academies and Polytechnics) participated together with representatives from the Skills Institute.

3.3 Question themes

For each industry interview or forum the same set of questions was used. These questions sought information about:

- The desired skill set — including both the 'soft-skills' and domain-specific technical skills — a graduate should have.
- The participant's perception of the "added value" of a university graduate compared to a TAFE/Polytechnic/Skills Institute graduate.
- Desired career outcomes for graduates of bachelors degrees and coursework postgraduate degrees.
- Topics which should be included in the degree.
- The nature of likely graduate-entry positions in the next five years.

Similar questions were asked of the educators. In particular:

- The participant's perception of the distinction between a university graduate and a TAFE/Polytechnic/Skills Institute graduate.
- Topics which should be included in the degree.
- Information on their course offerings and for pathways and collaborations.

4 Messages

The information collected from the interviews and forums was analysed at a thematic level in order to identify key messages. The broad themes are presented below along with specific advice from both industry and educators.

The analysis of the interviews and the forums from industry resulted in information relating to technical skills, soft skills, core knowledge, work integrated learning, and degree /diploma perspectives. The analysis of the interviews and forums from the educators resulted in information relating to offerings based on interest, TCE, vocational versus university perspectives, entry and articulation, gender appeal and retention, and working together. A summary of each will now be presented.

4.1 Advice from industry

4.1.1 Technical skills

Interviewees indicated that the technical skills of graduates should include both the ability to develop ('build') and the ability to operate ('use'/'do'). Graduates should have basic programming skills but this competence wasn't requested in any specific programming language. The general opinion was that as long as the chosen programming language was taught in depth, the ICT graduates would be able to adapt quickly and effectively to another language. The interviewees expressed a desire that an ICT graduate should have at least one in-depth technical competency area, such as (but not limited to) software development, which was supported by a broad range of context and application knowledge of ICT. The identification of the specific technical skill was unimportant, but the capacity to develop one was said to be essential.

Other skills/knowledge mentioned by industry participants as being necessary in graduates included:

- Those from fundamental computing and traditional computer science such as formal methods, basic mathematics, logic, and the history of ICT.
- An understanding of data structures and databases.
- Greater capability in the use of Microsoft Office applications. Excel skills in particular were mentioned and an expectation was voiced that ICT graduates should have such skills possibly to an advanced level.
- Those related to application development for mobile devices which was considered to be increasingly main-stream.
- Ensuring graduates could function in varying operating system environments. This may be in response to the fact that UTAS is a strong partner in the Apple University Consortium and many industry members expressed their feelings that the School is too Apple focused.

[2] In Tasmania, high schools teach years 7–10 and colleges teach years 11–12. Government colleges comprise schools with a focus on academic achievement ("Academies"), academic and vocational achievement ("Polytechnics"), and vocational achievement ("Skills Institutes"). TAFE colleges were recently re-integrated with colleges to yield the Polytechnic and the Skills Institute.

In general, employers of past graduates who were interviewed were happy with the ICT technical skills currently being demonstrated by graduates. They were content to teach specific ICT skills on the job. This is a change from a few years ago when we last consulted with industry at which time they were insisting on specific tools and technology to be taught at the University.

4.1.2 Soft skills

Generic abilities such as communication skills were acknowledged as being of equal importance for UTAS to teach as technical skills. The interviewees were insistent that the University should produce professionals with the ability to communicate; it was suggested that this is the current added value that a university graduate has over non-university graduates. The interviewees recommended taking the students out of their comfort zones by making them do presentations and debates to develop improved communication skills.

Additionally, interviewees expressed the need for graduates to appreciate the drivers of business, and to be able to undertake the related activities of analysis, modelling, business process management, and project and change management.

Interviewees identified that there was no longer room in the industry for graduates who could not relate well to business and clients. Employers want graduates to have a broad ICT knowledge so they have the ability to understand the needs of clients or users. It was felt that graduates can mature into a particular area later. Those who are too specialised are unlikely to be chosen over a graduate with a broad range of ICT skills for the Tasmanian industry.

4.1.3 A core body of knowledge

Interviewees preferred that students were taught principles and context, rather than specific development languages and current tools (although Microsoft Office products were an exception). Employers believed that they could teach new tools and languages to those who understood what features tools and languages provided, but graduates needed to understand principles to allow them to continue to learn and adapt as technology emerged and evolved.

Industry indicated for graduates to be useful, they need to understand how all the ICT content links together. This sort of understanding helps with analysis and understanding the needs of clients.

4.1.4 Real work experience

Most of the employers interviewed only employed university graduates and almost exclusively ICT graduates. Local businesses predominantly hire UTAS graduates. The ICT subjects completed as part of the degree were not of major interest to employers, however, employers wanted evidence that graduates had completed enough ICT technical subjects in their degree. They compared the overall results of graduate candidates for a position and then decided who to employ at the interview based on communication skills, personality and ability to fit in with existing employees.

Industry desired graduates that have had real job experience, "even if it is just at a fast-food restaurant" was a comment often made. Many interviewees had participated as clients in the existing capstone project units, and they thought that this was good for developing team work and client interaction skills but work-integrated learning through workplace placements would provide a better understanding of what to expect on entry into the workforce and would allow the development of additional skills, such as customer awareness. They also recommended that industry participate more in the teaching program to bring in real world examples and industry perspectives to the material being taught.

4.1.5 Vocational versus university qualification

Interviewees see a distinct difference between TAFE (certificate IV, V) and University graduates. TAFE graduates are seen as more practical and employed for specific limited tasks. University graduates are considered to have a broader spectrum of skills and knowledge. University graduates have the ability to think critically and approach tasks with a broader view, they are believed to be generally more mature and by completing a degree they have demonstrated the ability to "stick at something". Although most interviewees initially employed graduates as software developers or in help desk type support roles, the university graduates are then promoted to software analysts, designers, or system administrators.

It is clear from these views that a mixture of theory and practical capability needs to be retained in the new degree and that students need to continue to be taught the generic graduate attributes of, in particular, problem solving, critical thinking, and life-long learning.

4.1.6 Other useful insights

The issue of an increased use of outsourcing and off-shoring was identified as a possible impact on graduate software developer positions. *"No matter how good our programmers are they are too expensive to compete with India's outsourcing"* was the advice of one interviewee. Graduates need business analysis, sourcing and integration, and project management skills as this is their future.

Many interviewees said that they did not employ, or even interview, Bachelor of Information Systems graduates as it was perceived that these graduates did not have enough technical skills necessary for the types of initial roles that ICT graduates undertake. Interestingly, many interviewees said business analysis skills combined with technical skills were important and in general they were not happy with the business acumen of Bachelor of Computing graduates. Graduates need an understanding of business structure and practices.

Many interviewees were concerned about the standard of the weaker graduates, with a suggestion to raise the entry bar to the degree. Industry representatives were equally concerned by the decreasing number of students graduating from the ICT degrees and the fact that demand for graduates is exceeding supply. Discussion also took place on the quality of the international graduates and in particular how to improve their communication skills and hence make them more employable in the local industry.

When asked, the interviewees liked the idea of having a single degree with reduced options and a few clear

majors as this would remove confusion and ensure all ICT graduates had a balance of technical and non-technical skills.

During the interviews there was discussion about the future of ICT both in the State and nationally. Industry identified that the future direction of ICT is not easy to predict but future ICT jobs will still require fundamental ICT skills.

In summary, there was a very strong emphasis on producing professionals with generic skills such as verbal and written communication, team work, ability and desire to learn, and problem solving along with non-technical skills in areas such as requirements analysis, business analysis, project management, and sourcing and integration. In addition a broad base of technical ICT fundamental skills are required including programming, data structures and databases, mobile and web programming, and low level tool skills — in particular Microsoft Office products. The interviewees from industry were in favour of an "all-rounder" rather than aiming for a specific targeted career outcome.

4.2 Advice from educators

The purpose of the educator forums was to identify what ICT background students have before coming to UTAS, what UTAS should value-add to graduates, and what pathways/incentives/content could be established to encourage more students to enrol.

4.2.1 Offerings based on interest

Non-government college-level ICT training is now focusing on developing the specific interests of students, rather than preparing them for job-readiness in ICT. As a result, traditional ICT training in Computer Science and Information Systems was less likely to be taught in the future; newer attractive topics like Computer Graphics, Games, AI, and Robotics are being introduced. Similar changes are occurring in Government schools with Computer Graphics enrolments far exceeding those in the pre-tertiary subjects of Computer Science or Information Systems.

Interviewees suggested that the students tend to want to learn more in the areas they are already aware of. There was a general feeling that University should offer a broad range of topics to meet student interest and to give them a rounded introduction to many topics.

4.2.2 Tasmanian Certificate of Education

The college curricula for Computer Science and Information Systems in Tasmania are being redeveloped for 2013 and the introduction of the national curriculum in high school and college makes it harder to prepare a university curriculum that builds on existing lower levels of ICT education.

At college, a technology subject is mandatory but this does not necessarily need to be a university pathway (TCE) subject. College interviewees recommended that entrants receive reward or credit if they have completed Computer Science or Information Systems TCE subjects, as an incentive to enrol at university. This was also seen as a possible way to increase enrolments at college in these subjects that currently have low student interest and enrolments compared to the more popular, but less rigorous non-TCE topics like Computer Graphics.

To increase enrolments at university it was identified that there was a need to tap into the growing Computer Graphics numbers at college. Many students choose this as their college elective to complement their main interest area. It is seen as something interesting and relevant to many fields.

4.2.3 TAFE versus university

Polytechnic ICT teaching is focused on developing graduates to specific operational ICT jobs. Non-TCE offerings that support programming, web technologies, system administration, databases, and networking, have been recently revised in the light of industry demands. It is therefore important that the new degree retains flexible entry and not rely on TCE subjects.

When asked "why do students want to do ICT at university?" the interviewees indicated students come to university to do more ICT (not maths or business). They urged us to ensure that they get enough of what they want. They come expecting it to be more interesting material than what they get at college or Polytechnic. They come because they think on graduation they will get better jobs than they would with just a college or Polytechnic qualification. After a tour of our facilities it was mentioned repeatedly that the "hack space" (a room where students can do their own thing and explore ideas with software and hardware) was something that students would enjoy.

Polytechnic representatives saw the difference to University being that University should teach similar skill sets, but in much greater depth, surrounded by much broader context.

4.2.4 Entry and articulation

Educators feel the degree entry requirement should be sufficiently low that it attracts a broad range of students coming from the Polytechnic and college. However, this view is contradicted by industry members who want a higher entry requirement in order to get a higher quality graduate.

Clear articulation with the Polytechnic was recommended so these students can build on their prior learning rather than just repeat their college experience with more theoretical material added — which is not of great interest to them.

Interviewees indicated they had received feedback from their students who had gone onto university that some of the first year content was identified as being too low-level for some of the top students coming from the colleges and Polytechnic. The perception is that they have done it before. Interviewees recommended investigating offering credit (or different options) for top students to encourage transition. Catering for the top students was identified as something that should be a priority because at the moment they are leaving university as they are bored and feel they are simply doing the same material again.

4.2.5 Girls versus boys

Interviewees indicated their male students wanted hands-on activities in their learning. More practical

components, especially early on will attract and retain new entrants much better. Advice from the Polytechnic was to keep the students interested and engaged, so that they did not focus upon the two or three years that they had ahead of them. The view was that they do Polytechnic courses as they are practical and shorter.

The lack of interest from female students, who anecdotally tend to be less interested in the hands-on approach, is a concern for all levels of ICT education.

4.2.6 Working together

There was recognition from all interview participants that educators wants all levels of the education system working together to produce the best ICT personnel possible to meet the ICT needs of Tasmania. It was clear that the college and Polytechnic educators needed the university degree to be attractive as it would attract students to ICT at their levels. They strongly encouraged more collaboration to ensure understanding of each other's' offerings and directions and to create attractive pathways. ICT college teachers would like the University to host professional development days as there are no longer moderation days, so teachers do not have the opportunity to get together any more.

5 Outcomes for curriculum design

The first degree design has been completed and has been guided by the input received from industry and educators.

The result is a three-year (24 unit) degree with three different majors comprising much of the ACM curricula: "ICT Professional" (which will be compulsory), "Software Development", and "Games and Creative Technology" (which continues the teaching in UTAS' successful Games Technology and Human Interface Technology sub-disciplines). Students will complete eleven technical units with four units at different levels focused on professional and non-technical skill development. The structure ensures that all students have the technical, non-technical, and generic professional skills needed, while — with the inclusion of at least four units that are electives from any discipline — still affording enough choice to further their individual interests.

The following points outline the key components for the proposed degree:

- Professional skills units are to be introduced from first year to develop communication and teamwork skills early. Further development of teamwork and communication skills have been included at all levels to provide depth in professional skills for the students.
- Breadth in ICT topics will be introduced through the range of units provided. Depth has been created with units to be offered at all year-levels in a hierarchy requiring pre-requisites and with integrated content. In previous offerings, units were perceived as being disjointed (silos) and consequently there was little opportunity to develop a depth of knowledge. Broad ICT topics will now be more practically oriented (while maintaining the theoretical content and professionalism necessary to differentiate this topic from what is offered at the Polytechnic).
- There is depth in software development with compulsory units at all three levels. There is one compulsory programming unit at first-year and three programming units at second year when the bulk of the students are more developed and able to cope with the material. The compulsory first-year programming unit will have a prerequisite, ensuring all students have some programming experience on entry. The requirement for pre-requisite knowledge will facilitate a more interesting and challenging unit — which should have a positive impact on retention. Flexible options at degree and pre-degree level will be available to qualify students that do not have prior programming experience.
- In response to the demands for business acumen in our graduates all students will be required to complete units in entrepreneurship, project management, requirements and business modelling, business analysis; and system sourcing and integration to develop non-technical ICT skills.
- ICT career outcomes and the relevance of the content of the degree to those outcomes will be mapped out in a first year unit to give students a context for what they can achieve as an ICT professional. Consideration is being given to introducing elective industry-based experience units at all levels to enable students to gain genuine work experience throughout their degree in addition to the capstone experience they receive in the final year project units. There is an intention to embed talks by industry speakers throughout all units to relate the content of each unit to what the students will experience in employment.
- Artificial Intelligence, a key research direction of the School, has been proposed as a first year unit in an attempt to inspire students to consider a research career. This unit will be accessible to a broad range of university students and will be developed to appeal to non-ICT students who are just as likely to be intrigued by the topic matter.
- Units that relate to research focuses in the School will also be offered but will have pre-requisites that restrict enrolment to the top students. Small classes and special experiences for these elite students will hopefully inspire in them a desire to stay to complete higher degrees and pursue a career in research or innovation in the field of ICT.
- There is an intention to embed 'research hotspots' throughout all units and relate the content of each unit to research that is happening in the field. Consideration is being given to introducing specialised R&D units at all levels for the elite students, so that research experience can be obtained from an early stage.
- A compulsory bridging unit will be introduced for all international students given a year or more credit. Many international students are given advanced standing on the basis of prior

learning in their own country. This results in them being 'slotted' into second or third year at UTAS and by-passing units that have provided incidental induction to UTAS and which have developed communication and team work skills. As a result many are technically competent but are not best able to participate in group work and compete for employment on graduation. The bridging unit will redress these deficiencies and ensure all students are at a high standard on graduation with well developed communication and teamwork skills.

- Two units with a focus on visualisation are being considered for first year to attract the students who were interested in Computer Graphics. One will focus on the visualisation of information and the other on visualisation as it relates to computation and simulation.
- Two pervasive themes are to be developed throughout the degree: security and user-centeredness including HCI. The pervasive themes alongside the three depth areas (software development, professionalism, broad ICT knowledge) and the need to present the content from both a technical and non-technical perspective will discourage teaching in silos. The approach will focus on relating the content of each unit to other units in the degree. This will generate graduates who have a much better understanding of the relationship between the ICT content.

6 Conclusion

A role of universities is to educate and produce 'well rounded' graduates who meet industry demands for job readiness. Having been provided with the rare opportunity to design a 'green-fields' degree, the School looked to engage with key stakeholders such as industry and other educators for advice. Curriculum review guidance was sought from the ACS and this paper has explored the second stage of the review process.

The key messages that have been incorporated into the design and structure of the new degree are:

- ICT graduates need generic professional skills and non-technical skills in addition to technical ICT skills and tool skills.
- An ICT graduate should have at least one in-depth technical competency area.
- An ICT graduate needs a broad range of ICT knowledge. Employers believe it will give graduates the ability to understand the needs of clients/users. Educators believe a broad range will attract more students into the degree.
- There is no longer room in the industry for ICT graduates who are unable to relate well to business and clients. Graduates need business analysis, sourcing and integration, and project management skills as this is their future as a result of the growth in outsourcing and off-shoring.
- UTAS should produce the best ICT personnel possible to meet the ICT needs of Tasmania.

The School is currently refining and documenting information relating to the structure and design of the new degree. The documentation will provide information on the proposed content of the units in the degree. Once completed, the School can move to stage three of the process — to re-engage with key stakeholders for feedback and hopefully endorsement.

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