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The Role of Universities in IT Service Management Education

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Abstract

IT Service management standards such as the IT Infrastructure Library (ITIL), and now ISO/IEC 20000, are of increasing importance to organisations around the globe. These standards provide guidance and tools for effective management and control of IT service delivery. Academics have not embraced these standards in either research or education related to them, but education and training of IT staff is vitally important and in demand. Universities have a unique place in this education process since demand grows for IT staff qualified to various levels, particularly basic or foundation levels, in these standards. This paper outlines the evolution of these standards, and considers the training on offer and the requirement for education related to IT service management. Benefits to universities, graduates and industry are numerous but there are challenges for traditional university structures and academics in delivery of such specific knowledge and skills.

Keywords: IT Service Management, Industry Certification, ITIL, ISO 20000, IS Curriculum.

1. Introduction

IT service managers are responsible for an increasingly diverse and crucial infrastructure. They are under pressure to reduce costs while helping the organisation generate revenue, and to provide fast, cost effective service to their customers. Over the last few years, many organisations have adopted the IT infrastructure library (ITIL) to provide effective management and control of IT service delivery and support. The ITIL best practice framework enables managers to document, audit, and improve their IT service management processes.

In recent years, a quiet revolution has occurred in IT service management. Over the last 20 years, the ITIL phenomenon has spread from the UK government data centres to the IT departments of private and public organisations around the world. With the evolution of ITIL from a 'company' standard to its ratification in December 2005 by the International Organisation for Standardization (ISO) as an international standard (ISO/IEC 20000), growth in its adoption is guaranteed to accelerate.

An important feature of ITIL which has facilitated its acceptance is the internationally recognised certification of accredited ITIL training courses. Today, many consulting firms offer ITIL training in response to the demand for ITIL certified staff. Despite this sweeping adoption by industry, most academic institutions appear to be reluctant to include ITIL in their IT curriculum. Accompanying this is a general lack of interest by information systems researchers in ITIL adoption, as noted by Venkatraman and Conger: “The best practice processes and principles that are part of ITIL: Service Management, Service Delivery, Applications Management, etc. are very much in-line with the teaching objectives of MIS departments. Despite this, however, the level of understanding and interest of ITIL in academia, both on the research and teaching dimensions, significantly lags industry activity” (2006). There are exceptions, such as Cater-Steel et al. (2006), Hochstein, Tamm and Brenner (2005), Niessink and van Vliet (1998), Potgieter, Botha and Lew (2005), and Praeg and Schnabel (2006), all of whom have undertaken empirical research into the ITIL phenomenon.

There have been recent attempts to raise general awareness of the need for education on standardization (Purcell 2006). In particular, communities engaged in vocational training and university education are urged to recognise their important role, alongside business and government, in ensuring that standardization is effective and practical. “Their specialized knowledge can form a vital contribution to standards development, while integrating the principles of standardization into the curricula allows students to carry them forward into the workplace: an investment in the future” (BSI Education 2006).

Standardization and certification are two separate issues, but are often confused (Kruithof et al. 1994). Many IT service departments adopt standards to improve service, consistency of performance, and productivity. These standards are sometimes developed in-house, or adapted from vendor, national or international standards. Standards adoption may be motivated by a corporate compliance or improvement program, or undertaken as a separate exercise within the IT department.

A recent survey of Human Resources (HR) managers and IT employees in the United States found strong evidence of the increasing acceptance, prevalence and benefits of certification of IT staff in business and industry (Wonacott 2003). The US study focussed on certificates awarded by vendor organisations such as Microsoft and Cisco, as well as professional associations such as the Project Management Institute and the American Institute of Certified Public Accountants. The HR executives and IT employees reported that certificates related to IT education were of great benefit in the recruitment and job application process; both felt that an IT certificate was a clear signal of not only specific IT knowledge and skills, but also of desirable motivation and attitude (Wonacott 2003).

The objective of this paper is to describe the evolution of ITIL from a company standard to international standard, and to consider the growing need for training and the possible role of universities in providing education to assist students gain certification related to IT service management. To meet this objective, two research questions are posed:

RQ1: is there a demand for education related to IT service management standards?

RQ2: should universities include IT service management standards in their curricula?

The paper is structured as follows. Firstly, the methodology used to gather evidence is described. Then a detailed explanation is provided of the ITIL framework, its origins, growth and certification. The evolution of ITIL to an international standard is explained. The role of universities in providing education related to IT service management, ITIL, and standardization is then discussed. In the final conclusions section, suggestions are made for further research.

2. Methodology

As well as reviewing recent literature on ITIL adoption and training, the authors have conducted two surveys and six case studies of ITIL adoption with IT service managers. The analysis is based on the data gained from these sources. The case studies used structured interviews based on an instrument developed by Hochstein et al. “to identify insights which can be logically followed and transferred to other organisations” (2005). Structured interviews were conducted with the managers of ITIL implementation projects in six large organisations between March and September 2006. The organisations were selected on the basis of their response to a survey which was conducted at the IT Service Management Forum (itSMF) Australian national conferences in 2005 and 2006. These six case studies complement the survey data and enable both a broad view of the phenomenon as a whole and a richer, more detailed picture of a few organisations. The interviews were recorded and transcribed, checked by the researchers and confirmed by the interviewees as a valid record of the interviews. The completed survey forms provided background information prior to each interview and supplemented the interview data.

3. IT Infrastructure Library (ITIL)

3.1 Origins of ITIL

In response to the serious economic downturn in the late 1980s, the Central Computer and Telecommunications Agency (CCTA) in the United Kingdom developed the Government Information Technology Infrastructure Management framework to reduce costs and better manage IT service delivery (Sallé 2004). Since 2000, the ITIL framework has been administered by the Office of Government Commerce (OGC), an independent office of the UK Treasury.

As shown in Table 1, the core of ITIL version 2 as released in 2001 comprises five service delivery processes, five service support processes and one service support function (service desk). Service support processes apply to the operational level of the organisation whereas the service delivery processes are tactical in nature.

Table 1: Description of core ITIL components (adapted from OGC 2006)

Service Delivery – Tactical Level		
Service Management (SLM)	Level	Negotiates service level agreements (SLA) and ensures that these are met. Responsible for ensuring that all IT service management processes, operational level agreements, and underpinning contracts, are appropriate for the agreed service level targets.
Financial Management		Manages an IT service provider's budgeting, accounting and charging requirements.
Capacity Management		Ensures that the capacity of IT services and the IT infrastructure is able to deliver agreed service level targets in a cost effective and timely manner.
IT Continuity	Service	Manages risks that could seriously impact IT services. ITSCM ensures that the IT service provider can always provide minimum agreed service levels, by

Management (ITSCM)	reducing the risk to an acceptable level and planning for the recovery of IT services.
Availability Management	Defines, analyses, plans, measures and improves all aspects of the availability of IT services. Ensures that all IT infrastructure, processes, tools, and roles are appropriate for the agreed service level targets for availability.
Service Support – Operational Level	
Service Desk	The single point of contact between the service provider and the users. Manages incidents and service requests, and also handles communication with the users.
Incident Management	Manages the lifecycle of all incidents. The primary objective is to return the IT service to customers as quickly as possible.
Problem Management	Manages the lifecycle of all problems. The primary objectives are to prevent incidents from happening, and to minimise the impact of incidents that cannot be prevented.
Change Management	Controls the lifecycle of all changes. The objective is to enable beneficial changes can be made with minimum disruption to IT services.
Release Management	A collection of hardware, software, documentation, processes or other components required to implement approved changes to IT services.
Configuration Management	Responsible for maintaining information about configuration items required to deliver an IT service, including their relationships.

The ITIL Refresh Programme Board expects to release ITIL version 3 in early 2007. The project will not be a radical overhaul of ITIL version 2 and is expected to produce five new core texts: IT Service Strategies; IT Service Design; IT Service Introduction; IT Service Operations; and IT Service Improvement.

3.2 Adoption of ITIL

ITIL has a strong following in Europe, especially in the government sector, and adoption is growing in North America and other countries (Barton 2004). Recent surveys and case studies have reported an upsurge in awareness and adoption of ITIL (Casson 2005; Hochstein et al. 2005; Niessink et al. 1998; Schuller et al. 2006). Although de Vries' research (2006) suggests multinational companies would be more likely to adopt standards from other countries, the surveys conducted at the itSMF conference did not support this suggestion. Strong adoption of the UK-based ITIL framework was reported by Australian-based private and public sector organisations; it did not appear that multinational companies are more likely to adopt the framework (Cater-Steel et al. 2005).

In this section, the salient points from the interviews of the six organisations are presented and illustrated with quotations from the managers interviewed. Due to the commercial sensitivity of the information and comments, the actual names of the organisations cannot be disclosed. The six cases are referred to as Case A to F with the interviewees referred to as Manager A to F and the corresponding organisations as Organisation A to F.

Table 2: Summary of key aspects of six case study organisations

Case	Organisation Type	Total # of screens	ITIL start date	Initial process implemented	Subsequent processes
A	Government Dept	600+	Mid 2002	Incident, problem, change mgmt	Service level, configuration, availability mgmt

B	University	5,000	Early 2003	Change mgmt	Problem, configuration mgmt
C	Government Dept	12,500	2001	Financial, service level, change, configuration mgmt	Incident, problem mgmt
D	Government Dept	35,000	Mid 2001	Change mgmt	Release, incident, problem mgmt
E	University	11,000	2003	Incident mgmt	Problem, change mgmt
F	International Finance Co	70,000	2003	Incident, problem, change mgmt	BS 15000 ISO/IEC 20000

The cases investigated provide evidence that ITIL enables standardization of IT service management processes and terminology across organisations, and that such standardization is vital to ensure a consistent and reliable level of service:

“We had built our practices and processes formally on the 9000 series of standards and we could see that the ITIL framework was much more aligned with an IT service management business. So when we started, it was clear to see that there would be an evolving standard around IT service management that we would be able to adopt. [We wanted] really to align ourselves with an industry reference framework or an industry reference model that made more sense to us than trying to adopt an esoteric principle within 9001” (Manager A).

“[Previously] they didn’t define processes. They had little islands of expertise and islands of practice with very little connections, or standardization across them ... ITIL is something that we could use as a framework to standardise some of their processes, and keep in mind, many of these processes did exist already, we just may have used different terms, different names, different labels, and they may be at different levels of maturity” (Manager B).

“[Previously] you had maverick and cowboy practices whereby every so often somebody would run off and do something and the whole thing would come crashing down and nobody would know who had done what” (Manager C).

“We had these feral groups doing their own thing, and we had ourselves doing our own thing, and we had IT operations. We didn’t have anything related to really best practices. There were good people and I think people were doing best practices as they knew, but in terms of process, no. There was no formal process in place” (Manager D).

“Standardization makes us more efficient and using common language, you get benefits out of using the same tools ... Our ways of dealing with issues and our ways of responding to critical and non-critical things is the same all across the university - a standard process for service” (Manager E).

“The director of service delivery ultimately made the decision ‘we’re going to use ITIL because it’s an industry standard’” (Manager F).

A future research area identified by de Vries is the role of company standards in cases of outsourcing IT activities (2006). Two managers interviewed mentioned contrasting views in relation to outsourcing, firstly that outsourcing could be facilitated by adoption of standards:

“There’s a big push for outsourcing that sort of stuff, and it was recognised that we really couldn’t outsource because we didn’t really know what everybody did. Well, you could get someone else to do it but you’d be charged an arm and a leg for it because

you'd have to go out and say well, look after our computing, and you'd get charged like a wounded bull. So what they needed to do actually in fact was streamline some services, and supply quality services before you could even think about doing that. So they needed to get quality in there" (Manager C).

and secondly that standards certification can provide a defence against outsourcing:

"In the old days where business units were told 'you will go to Group IT for your IT needs', we could see a time coming where they wouldn't have to do that. It hadn't actually happened, but we could see that time coming, so the Director of Service Delivery at the time said 'well what we need to do is get ourselves in a position where we are truly competitive so that ideally they won't even go looking because they'll know we're the best', and to him the way of doing that was that we have to improve. We have to show we're improving, but getting an industry recognised qualification would be a really good way of doing that and that's what kicked off our BS 15000 challenge ... To become the supplier of choice for internal customers. Rather than they having to come to us because that's the way it's done, we want them to choose to come to us" (Manager F).

3.3 ITIL Certification Education

As summarised in table 3, there are three levels of professional qualifications available in ITIL-based IT service management. These qualifications enable organisations to identify the competence of individuals:

- The ITIL Foundation certificate is an entry-level qualification gained by successfully completing a one-hour multiple-choice exam. The exam focuses on foundation knowledge with regard to the ITIL service support and service delivery sets, generic ITIL philosophy and background.
- The Practitioner certificate can be gained either for a single specific discipline within the ITIL service support or service delivery set, or for one of two clusters (release and control; support and restore). The focus of this qualification is on practical knowledge and skills to implement, manage, improve and execute the specific discipline.
- The Manager's Certificate in IT Service Management is for experienced IT professionals who intend to implement and/or manage service management functions. The focus of this qualification is on comprehensive knowledge and skills to implement, manage, improve and execute processes in the ITIL service support and service delivery set. Qualified Service Managers are aware of people, process and technology aspects around ITIL disciplines, have a profound understanding of ITIL processes, are able to translate the ITIL theory into the practical environment of any IT services organisation, and are able to prepare, plan and manage service improvement and process implementation programs with a program/project team. They can address all aspects of process design, process deployment, tool alignment, communication, awareness and understand the importance of obtaining senior and executive commitment, involvement and budget (itSMF Australia 2003).

Training is available from many accredited training providers such as Pink Elephant, Lucid, TOAS, Mercury, and BMC Software.

Table 3: ITIL certification courses (Source: itSMF Australia 2003)

Certificate	Course format	Assessment format	Exam duration
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ITIL Foundation Certificate	Self study or 2-3 day instructor-led	Multiple choice exam	1 hour
ITIL Practitioner Certificate - Single Process: Incident Management/Service Desk; Problem Management; Service Level Management; Availability Management; Capacity Management; Financial Management; Security Management	2 day accredited, instructor-led course	in-course assessments and a case-study based multiple-choice exam	1 hour
ITIL Practitioner Certificate - Clustered Processes: Release and Control; Support and Restore (includes service desk function, incident and problem management)	5 day accredited, instructor-led course, 20 hours private study	in-course assessments and a case-study based multiple-choice exam	1 hour
ITIL Service Manager Certificate	accredited 10-day training program	In-course assessments, written exam	2 exams each three-hours

As shown in figure 1, professional qualifications based on the philosophy and content of ITIL are currently offered by two examinations' institutes: the Information Systems Examination Board (ISEB) (a wholly owned subsidiary of the British Computer Society), and EXIN (the Netherlands Examination Institute). However, as a result of OGC's Commercial Activities Recompetition project announced 15 June 2006, EXIN and ISEB will no longer be licensed to use the ITIL trademark for exams from 1 July 2007. From that date, examinations will be licensed to APM Group, currently provider of certification of OGC's Prince 2 examinations.

Figure 1 shows the current situation: ITIL is owned by OGC, with the ITIL books sold through itsSMF chapters around the world. Candidates can choose from a variety of accredited training providers to undertake the ITIL Foundation, Practitioner or Manager courses; the examinations are conducted by EXIN and ISEB.

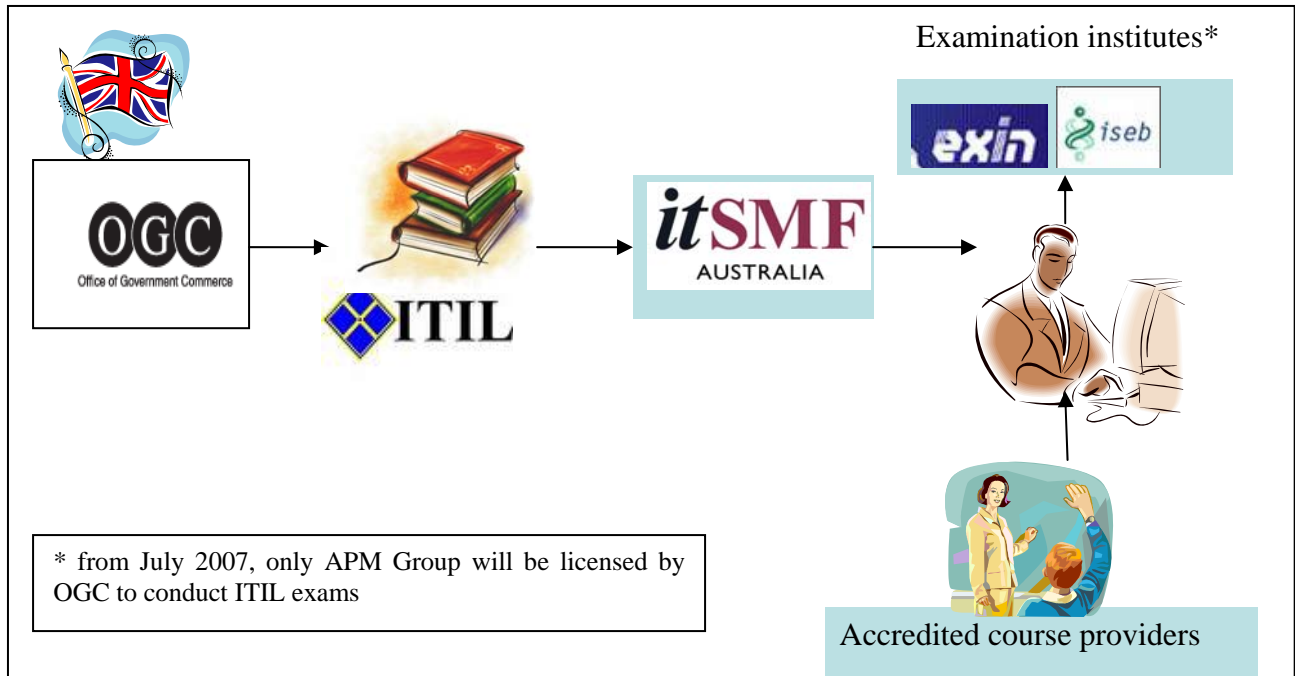


Figure 1: OGC, ITIL, itSMF, training providers, examination institutes.

3.4 Adoption of ITIL certification

The number of ITIL certification examinations administered by EXIN International has grown exponentially since 2000 to a total worldwide of 100,000 in 2005 (Cross 2006).

To examine the demand for ITIL certification from employers, in March 2007, the authors queried the 21,804 Australian jobs on it.seek.com.au - Australia's #1 Job Site and found 588 jobs requesting ITIL skills posted within the last 30 days. These positions were in the areas of Help Desk/Support, Project Management, Business Analysis, Software Engineering, Networking, and Training. This is a marked increase since May 2004 when Seek listed only 25 jobs asking for ITIL skills (Wilson 2004). These statistics confirm reports in industry press that certification has become a 'recruiting filter' in Australia as well as in Europe (Schuller et al. 2006; Wilson 2004).

One manager interviewed reported that ITIL skills have been included in the position descriptions (PDs) and are required of IT contractors:

"I guess because we were redefining the PDs on an ongoing basis back in 2002 anyway as we were bringing staff on, and we were including ITIL as part of that. Almost all the PDs, certainly in my group all PDs go out with ITIL in them. When I go out for contractors they have to understand that these are processes we use and they have to have ITIL in them as part of the requirement" (Manager D).

But the manager at Organisation F did not agree with this approach, stating he is prepared to fund ITIL Foundations training for new recruits:

"No, what we do is we put [ITIL Foundations] on as part of the induction. When you have new people come in, part of their standard training service to staff will be a one day ITIL overview. We encourage people to do the Foundation certificate but don't insist on it" (Manager F).

Therefore, based on reports in industry press and comments from the managers interviewed, it appears in answer to research question one (RQ1) that there is growing demand for education in IT service management.

4. ISO/IEC 20000 IT Service Management

In the 1990s, ITIL gained the support of the British Standards Institute and was extended and adopted as BS 15000 (Code of Practice for IT Service Management) in 1995. The 2nd edition of BS 15000, incorporating certification, was launched in June 2003. Australia followed this lead in July 2004 releasing AS 8018 ICT service management, based on BS 15000. The development of an international standard based on BS 15000 was fast tracked by the ISO/IEC joint technical committee one (JTC1) sub-committee seven (SC7).

In December 2005, ISO member countries agreed to adopt ISO/IEC 20000 based on BS 15000. The British national standard BS 15000 has been withdrawn and it is expected that AS 8018 will be withdrawn when ISO/IEC 20000 is adopted by the Australian national standards body.

The IT Service Management standard comprises two parts:

- part 1: specification. Promotes the adoption of an integrated process approach to effectively deliver managed services to meet the business and customer requirements (ISO/IEC 2005a);
- part 2: code of practice. Provides guidance and recommendations based on industry consensus to service providers planning service improvements and/or seeking to be audited against ISO/IEC 20000-1:2005, and to auditors (ISO/IEC 2005b).

ISO/IEC 20000 integrates the process-based approach of ISO's quality management system (ISO 9001:2000) by including the *plan, do, check, act* (PDCA) cycle and requirement for continual improvement. Part 1 of the standard contains ten sections: 1 scope; 2 terms and definitions; 3 requirements for a management system; 4 planning and implementing service management; 5 planning and implementing new or changed services; 6 service delivery process; 7 relationship processes; 8 resolution processes; 9 control processes, and 10 release process. Figure 2 shows the main components as described in sections 6 to 10.

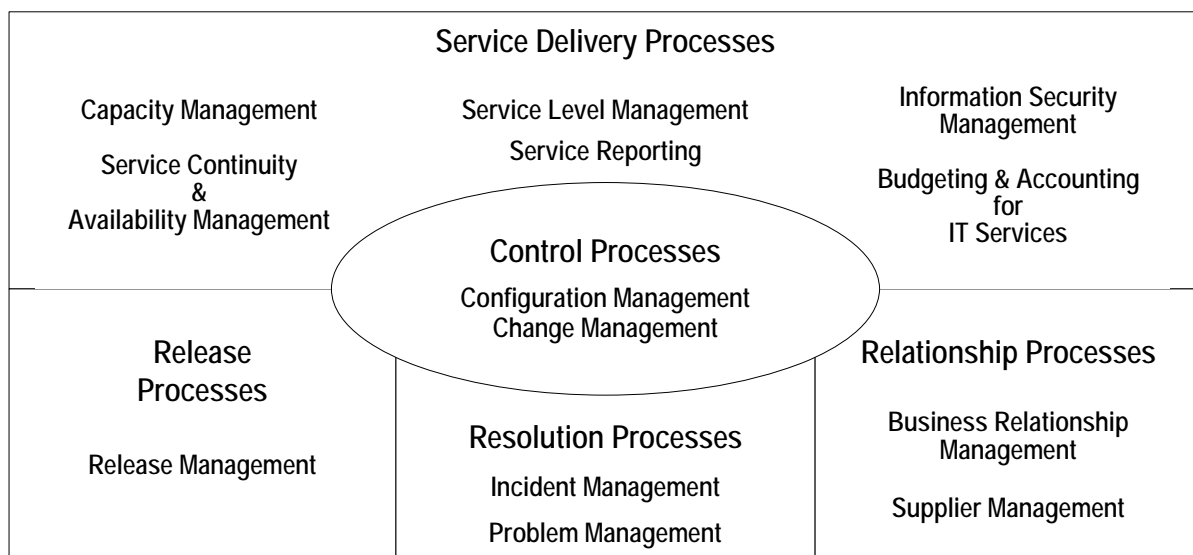


Figure 2: Components of ISO/IEC 20000 (ISO/IEC 2005a)

Part 2 of the standard provides guidance to auditors and offers assistance to organisations that are to be audited against ISO/IEC 20000 or are planning service improvements (ISO/IEC 2005b).

4.1 The Process of Achieving Certification to ISO/IEC 20000

To achieve ISO/IEC 20000 certification, companies must successfully undergo a third-party audit by an accredited conformity assessment body (CAB). The terms accreditation and certification have specific meanings in relation to international standards, and are in fact defined in EN ISO/IEC 17000 (Conformity assessment - Vocabulary and general principles). Accreditation: third-party attestation related to a conformity assessment body conveying formal demonstration of its competence to carry out specific conformity assessment tasks. Certification: third-party attestation related to products, processes, systems or persons (ISO/IEC 2004).

A successful compliance audit is the culmination of months of planning, training, documentation and review. The qualified auditor seeks objective evidence (records, documents, etc.) to confirm that the activities of the organisation are in accordance with the documentation and the requirements of the relevant standard. The process to attain ISO/IEC 20000 certification varies depending on the size of the organisation, the breadth of its operation and the prior/existing level of standardization and documentation.

As shown in figure 3, the organisation seeking certification needs to select a conformity assessment body (CAB) to perform the audits. CABs in Australia and New Zealand are registered by JAS-ANZ (Joint Accreditation Scheme - Australia and New Zealand) to perform audits and grant certificates. On its web site, JAS-ANZ provides a list of all CABs it has accredited, and also a list of organisations certified to various standards by these CABs.

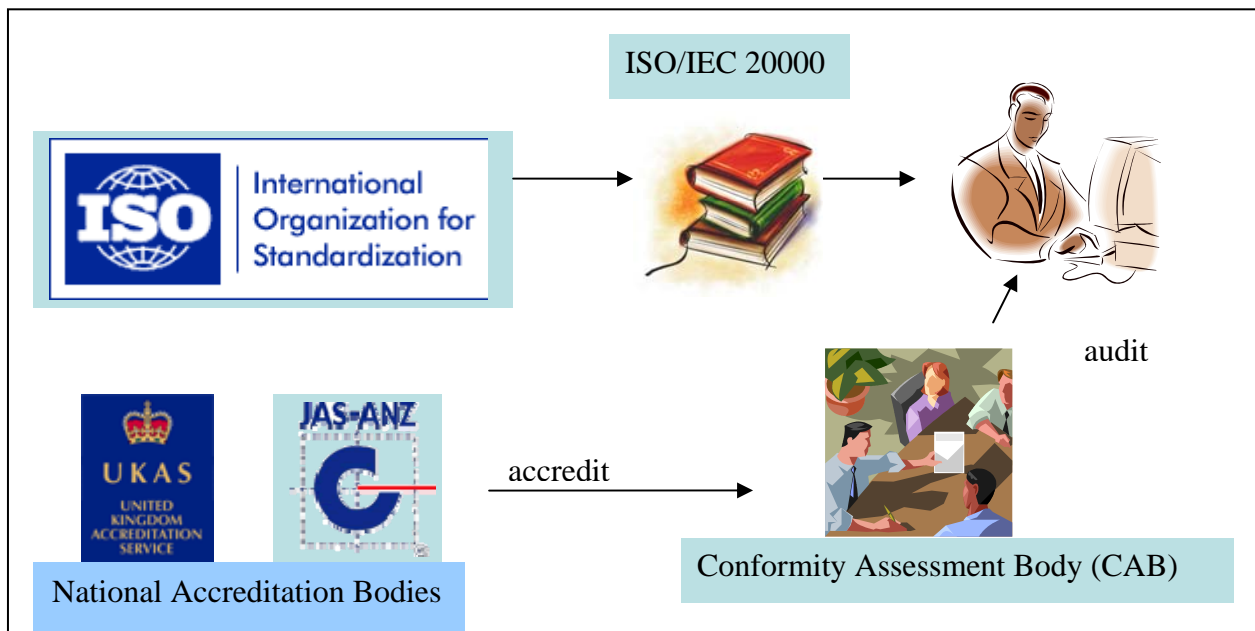


Figure 3: The role of organisations involved in ISO/IEC 20000 certification.

Other countries have similar bodies to JAS-ANZ, for example the United Kingdom Accreditation Service (UKAS). In the US, accreditation programs for management systems certification bodies are operated by the ANSI-ASQ National Accreditation Board; auditor certification and auditor training provider programs are operated by RABQSA International.

Table 4: Summary comparison of ITIL, BS 15000 and ISO/IEC 20000

ITIL	<p><i>Origin:</i> late 1980s by Central Computer and Telecommunications Agency <i>Owner:</i> OGC <i>Evolution:</i> refresh to version 3 in progress <i>Structure:</i> core library comprises 7 books: business perspective - the IS view on delivering services to the business; software asset management; service support; ICT infrastructure management; application management; planning to implement service management; service delivery. <i>Certification:</i> individual, exams by EXIN & ISEB until July 2007, then APMG</p>
BS 15000	<p><i>Origin:</i> based on ITIL, 1st edition BS 15000 published 2000, 2nd edition BS15000 published 2002 <i>Owner:</i> British Standards Institute <i>Evolution:</i> ceased, withdrawn <i>Structure:</i> part 1. specification; part 2. code of practice <i>Certification:</i> organisation - certification scheme launched June 2003</p>
ISO/IEC 20000	<p><i>Origin:</i> fast-tracked from BS 15000 2004, adopted Dec 2005 <i>Owner:</i> ISO/IEC <i>Evolution:</i> continuing by JTC1/SC7 <i>Structure:</i> part 1. specification; part 2. code of practice <i>Certification:</i> organisation - by conformity assessment body</p>

It is clear from the discussion above as summarised in table 4 that there is a critical difference between ITIL certification and certification to ISO/IEC 20000: ITIL certification is awarded to individuals after successfully completing assessment from an examination institute, whereas ISO/IEC 20000 certification results from an audit of an organisational unit.

Although ISO/IEC 20000 was released in December 2005, the two parts of the standard figure in the top ten best-selling standards list for the first two quarters in 2006 (Helberling 2006). Due to the conformance between ITIL and ISO/IEC 20000, ITIL certification will continue to be popular as an industry qualification for IT service management staff.

5. Role of Universities

5.1 IT Service Management Education

The competition between traditional education providers and the increasing number of private sector companies which provide education and training, assessment of competencies and provision of credentials, has received attention of community colleges in the US (Flynn 2001). Stein et al. (2005) raise the concern that industry certification programs are perceived as *training* and are therefore not *educative*. Kurtus (1999) discriminates between the two based on the location of the training: “*Education* concerns remembering facts and understanding concepts. It is usually taught in school, although self-study is possible. *Training* concerns gaining skills and is taught either in trade schools or business training sessions”. Further clarification from Tovey and Lawlor (2004) focus on the timing of the training: “Training is concerned with the

development of knowledge and skills to be used immediately, or in the very near future, and deals with developing people who already have, or who are just about to enter, a job” .

The distinction is further blurred by the practice of many professional bodies accrediting University programs to ensure graduates have the required skills to be admitted as members of a professional society. For example, the Australian Computer Society considers the course and curriculum content, academic leadership and staff qualifications, and resources provided for students when accrediting courses as prerequisites for membership for graduates.

Although there are myriad accredited commercial providers offering ITIL training courses, after consulting colleagues and searching the internet, the authors found few universities are teaching ITIL, the exceptions include the Masters of Information Science program in Norway’s University of Bergen, and two undergraduate IT programs in Australia (Jovanovic *et al.* 2006; Rossi 2006).

For any university prepared to provide ITIL Foundation training, there are many benefits possible. As well as the promise of an increase in the number of student enrolments and subsequent income, the reputation of the university could be enhanced as it would be seen as providing internationally recognised qualifications in response to demands from the business community. To ease the education path of students, the possibility would exist for recognition of prior learning by offering course credit to students who have achieved the ITIL Foundation certificate. Furthermore, as demonstrated by the research partnership between the University of Southern Queensland and itSMF Australia, opportunities for research would be encouraged and enhanced between the university and local business community (Rossi 2006). These benefits support a positive response to the second research question (RQ2) posed in this paper: universities should provide education in relation to IT service management.

However, there are challenges to universities that consider including education on IT service management in their academic curricula:

- the authors have not been able to identify a suitable text book and teaching materials for a IT service management course.
- currently, there are few information systems (IS) academics with expertise in IT service management. IS academics would need funding to attend training courses.
- as discussed earlier, the continual upgrading of standards such as ITIL and ISO/IEC 20000 make it difficult to keep the course materials and academic skills up to date. The “cumbersome course curriculum approval systems” mentioned by Flynn (2001) in relation to community colleges are also problematic for universities.
- the cost of the ITIL Foundation exam (currently US\$150) would probably not be borne by the university and may be prohibitive for students, however it would be a career advantage for graduates to have covered the concepts.

Although this might appear to be a daunting list of challenges, some academic IS departments have overcome similar obstacles in providing courses related to other standards such as ISO/IEC 17799 (IT Security techniques - Code of practice for information security management) and facilitate certification to SAP and Microsoft qualifications. Many universities teach the Project Management Body of Knowledge (PMBOK) in IT Project Management courses. In this case

students are given the option of taking the Project Management Institute exam for the certified Project Manager Professional (PMP) qualification.

5.2 Role of Universities in Standardization Education

With the increasing emphasis on governance and compliance since the Enron and other corporate scandals, many organisations are adopting industry-based standards. For example, in Australia, financial institutions must comply with many regulations (UCCC, FSRA, APRA); and hospitals apply for accreditation from the Australian Council on Healthcare Standards. Any company listed on the New York Stock Exchange must comply with the requirements of US Sarbanes-Oxley legislation. To improve their IT governance, many IT departments are adopting CobiT (Control objectives for information and related Technologies). However, regardless of whether the standard is focussed on the entire organisation or the IT department, all efforts to comply with standards involve IT staff, since records need to be kept and business processes changed for compliance.

The itSMF survey recently conducted by the authors found that many firms are adopting multiple standards such as ITIL, CobiT, ISO 9000 and CMMI. The complexity associated with standards adoption raises the question: where do managers learn how to implement standards? Although aspects of human resource management, organisational behaviour and project management are included in both undergraduate and postgraduate offerings, there is an obvious need for universities to provide education in standardization, as well as in specific standards.

The need for education in the standardization process is recognised in the ITIL Service Manager course which prepares managers to plan and manage the introduction of the ITIL standard by addressing vital aspects such as communication, awareness, budget, executive commitment and involvement as well as process design, deployment and tool alignment.

6. Conclusion

In summary, the ITIL phenomenon has radically changed the discipline of IT service management. There is growing demand for IT staff to understand ITIL concepts and processes. With recognition of ITIL as the basis for the international standard for IT service management, it is important for universities to include ITIL concepts in programs to ensure graduates are prepared for the workplace. Furthermore, universities are urged to provide courses generally related to the development and implementation of standards in organisations.

This research has provided a comprehensive account of the content and evolution of ITIL from company framework to international standard. The structure of ITIL certification education is described, with accounts of increasing demand for ITIL certified staff confirmed by industry research. Currently, it is impossible to determine how many organisations have adopted ITIL: the training certificates issued are the only measure of adoption at this time. On the other hand, all ISO/IEC 20000 certifications are recorded on a national basis. Future research will analyse certification records to perform an international comparison of the up-take rate of the new standard.

Another area of research currently being undertaken by the authors concerns the need to provide validated evidence of the return on investment from adoption of ITIL. The relationship between

best practice and cost reduction has been identified by de Vries as worthy of further research effort (2006).

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