Chapter 7

POD TRIALS IN THE AUSTRALIAN TERTIARY EDUCATION SECTOR

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This chapter's brief was to research the history of internal production and publishing at a number of Australian Tertiary Education Sector Institutions, with emphasis on the evolving use of digital print-on-demand (POD), online publishing and issues of digitisation. However, it was quickly evident that there are a number of issues to resolve in the sector before any full consideration of POD usage can take place.

For the purposes of this Chapter, I describe POD as a way of producing conventional-looking printed product in small volumes at short notice using laser-print technology. Assuming the sector has significant internal generation of material and high levels of technical competency in computer and software use, one might infer that the majority of such print material would be digitally-sourced.¹ This would provide opportunity for very efficient digital-to-print output, maximising the use of available digital-print technology, and a common-source for other publication genre such as the Internet. It would also provide opportunity for integrated rights management security if digitally created and archived files were the 'choke point' for all publishing genres.

However, digital files and their management bring a whole new complex set of issues. Whilst outside the scope of this chapter, these complexities are evident in two different research projects. One is a comprehensive working paper of the IMS Digital Repositories Working Group² (Neil McLean of Macquarie University is one of the Contributors to this paper), and the other is the Collaborative

¹ Produced as a digital file, then output to print.
Online Learning and Information Services (COLIS) Consortium\textsuperscript{3} (again McLean is involved). Whilst these are important projects with some relevance to use of digital POD as outcomes, they don’t place much importance to print as a consequential outcome of the publishing process.

However, reliance on digital files and digital file storage mechanisms, in isolation to printed hard copy, as a way of long-term archiving may increasingly be a hazardous process. Software evolves and links between versions may become increasingly tenuous, and version control increasingly a complex and growing issue. Software programs and storage hardware that once inspired awe are quickly superseded.\textsuperscript{4} Printed hard copy has long-term archival survivability.

Before detailing the outcomes of this chapter’s research in the tertiary sector, it is important that the difficulties and limitations of the analysis be highlighted. This study has been based on a limited sample size where those with the knowledge and ability to comment upon the subject matter showed great reluctance to be acknowledged and quoted. It appears that this reluctance stems from the belief that there is a general lack of cohesive direction in the planning and resourcing of print facilities and technology. Those who were willing to be acknowledged appeared to come from stronger positions of innovation and cohesion and therefore were keen to make this publicly known. While evidence that can be acknowledged is limited, there is sufficient information to give general impressions and perceptions that further research should illuminate.

Generally speaking, this sector is not utilising the available hardware and software technology to the most efficient extent in order to seamlessly create printed product from files originated by academic creators. It appears that five to ten years ago, parts of the tertiary sector were innovative leaders in the use of digital print technology. Use of digital copier engines was common, but many of those same leaders have not substantially upgraded equipment in recent years. It could be inferred that upgrade of digital print engine technology, or a move to digital from conventional offset print, may

\textsuperscript{3} COLIS: an alliance of five Australian Universities, to share knowledge and engage in research aimed at developing systems interoperability specific to online learning. http://www.colis.mq.edu.au/goals/synopsis.htm downloaded March 2002.

\textsuperscript{4} E.g.: the evolution of MS Word and the abrupt extinction of 5.25inch floppies are simple examples.
not be the most important decision facing the sector vis-a-vis print, but that digital object management, and its consequences, may be more important issues. Print and the appropriateness of a range of print technologies then becomes a consequence of wider issues.

However, the COLIS Consortium’s project indicates, at least in relation to online learning and information services, that universities have been ‘relatively poor at identifying and stating their business requirements in terms of infrastructure support and again a lack of clear methodologies to express business functions and technical requirements’. I suggest a similar situation also exists regarding tertiary sector print units.

If the rationale of the tertiary sector is to encourage the creation and subsequent dissemination of information then the print facilities need to be more strategically positioned to promote their role in the application of new technologies. Further, print facility departments are not playing significant roles in ‘Rights Management Security’. Their positions in universities are often marginalised. There is a general lack of dedication to using digitally-sourced (and controlled) material as soft-copy for print rather than the very significant volume of hard-copy supply as is generally the case. This marginalisation can perhaps account for the frustration of many print unit managers and their reluctance to speak ‘on record’.

Perhaps the marginalisation of the print units within the tertiary sector is but a reflection of the scenario operating for the entire print industry in the wider economy. Where business organisations throughout the wider economy once used the print industry as their prime supplier of printed hard copy, they are now themselves volume creators of print, via their management information and information technology systems using internally managed photocopying and laser output from their computer systems. Thus the tertiary sector seeks alternative publishing genres, marginalising their print units.

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7 The COLIS project suggests a ‘high degree of “silo” mentality between key stakeholders in the institution.’
8 A typical example would be the replacement of the multi-part Employee Group Certificate business-form set with a single A4 laser-printed statement of earnings.
INDUSTRY OBSERVATIONS—TECHNOLOGY PROVIDERS

Undoubtedly, the main digital-print technology providers, actual or potential, to the Sector are:

- Fuji Xerox with its copiers and Docutech series sheet-fed print engines.
- Océ with its copiers and Demandstream series web-fed print engines.
- IBM with its Infoprint series web-fed print engines.
- Heidelberg with its Danka series sheet-fed print engines.

I contend that the technology providers are conducting, unwittingly perhaps, regular research into the technology needs of the sector, through their marketing efforts to install technology into potentially new sector customers, or to upgrade older technology at existing sector customers. Therefore they are well placed to interact with a number of relevant players within the sector and gain insight to opportunities, difficulties and at times frustrations.

John Murphy⁹ of Fuji Xerox observes that university printing business units are usually not a comfortable fit within many university structures.¹⁰ They are often part of building services or similar divisions which have agendas quite alien to the strategy needed for modern printing processes within a tertiary education institution. Although Murphy estimates that approximately 75% of the sector uses some form of digital print equipment, he is aware that, generally speaking, the technology is outdated.¹¹

Murphy says that significant print output in many universities is still traditional offset technology—which is costly and requires large print-runs to be economical. In such cases output can often be two to three years worth of printed course supplies. But many University print units are not held accountable for base costs such as space, long-term storage, power and the like. Murphy estimates that long-term storage of large (supposedly economic) print-runs results in eventual waste factors of 40% or higher, as course material is updated. Thus he contends wastage is a high, but hidden cost of conventional printing processes.

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⁹ Industry Marketing Manager—Education Industry.
¹⁰ This is a commonly held viewpoint, including being made by university print unit managers.
¹¹ See comments later in this chapter supporting this view.
This is not just an Australian phenomenon. Recent USA statistics\(^{12}\) suggest the tertiary sector print breakdown as:

- 58% traditional offset.
- 26% digital (digital print and copier systems).
- 14% variable data printed digitally.\(^{13}\)

Principal POD technology providers, all large multi-national firms, can calculate the total cost of production using their POD solutions, making it seem obvious that POD should be a significant total-cost effective process that makes economic sense. However, such cost models, unless substantially modified, are useless in the tertiary sector as they fail to take into account that many university print units do not use traditional cost-structure models. So, for example, the cost of utilised floor-space for production and warehousing cannot be a potential savings consideration if a print unit does have to carry such costs within the university structure.

Recognising it may be a simplistic statement; Murphy contends any sector drive to use digital processes usually comes from:

- Lecturers or faculties deciding to create soft-copy products for other publishing genres independent of a similar or same product produced hard copy by the printing business unit. An indication of the print unit being seen as a peripheral rather than a core function.
- Faculties having their own scanning devices as a legitimate part of hard-copy creation—then being tempted to use this technology to bypass the print unit.
- The very genuine concern regarding the issue of ‘Rights Management Security’ providing impetus for institution-wide forms of control. In this regard Murphy contends that in many Sector environments files used for print purposes are seldom named adequately to record content or content origin and the audit-trail for adequate rights management security is usually lacking adequacy.\(^{14}\)

It would be tempting to place little emphasis on the comments of a technology provider with a vested interest in selling technology solutions. Yet Xerox’s perceptions are similar to those of Océ and to

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\(^{12}\) David Staines, University of Central Lancashire, reporting the 37\(^{th}\) Annual Conference (March 2001) of the Association of College and University Printers

\(^{13}\) Staines: Many USA Tertiary Print units are taking on the mail operations role, with digital variable data content.

\(^{14}\) See comments later in this chapter supporting this view.
a lesser extent IBM. All three major international companies successfully provide total solutions to the tertiary education sector overseas.

Kit Andrews, Marketing Manager of Océ Australia, advises Océ is currently undertaking a major investigation on behalf of a significant Australian university to review all aspects of workflow, digital output, multiple publishing genres, digital-print, rights management, archiving and the like. He states Océ, and its client, view the need for a comprehensive solution to all these issues as strategic. This may include central or distributed output, but with centralised work-flow control. Andrews considers this review as similar to other successful projects Océ has conducted and installed in Universities internationally.

But generally speaking, again, Andrews sees university print units as alienated from core strategy and direction. He contends university print units, rather than being central to core strategy in the provision of what I earlier called the ‘encouragement of creation and subsequent dissemination of information’, are driven more by the imperative to be commercial print operations competing with the wider business community.

Andrews sees faculties having control over their output environment and being strategy drivers. However, he also believes they are not usually aware of what can be achieved by modern digital technology, and are thus not drivers for change within university print units. Conversely, the print units who may well have that technology knowledge are often marginalised in environments peripheral to core strategy and thus unable to pass their knowledge on effectively. Like Murphy of Xerox, Andrews is concerned at the lack of the sector’s ability to adequately control rights management and archiving in strategic and cohesive ways.

IBM is a successful provider of digital technology solutions to overseas tertiary sectors. But in Australia, Mark Vandevasere (IBM Printing Systems Division) suggests it is too difficult for IBM to provide resources to market into this sector.

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15 See comments from Murphy of Xerox supporting this view. It is also a view held by University Print units, though usually only ‘off-the-record’.
16 Many university print units view themselves as required to be profit-centres, self-funded etc with that being the driving imperative.
From the comments of these providers of digital print technology, I can infer that much of the university education sector has some or many of the following characteristics:

- Sector print units and managers are frequently marginalised and not part of integrated strategy.
- Sector print technology is generally outdated.
- Sector print units are sometimes a poor fit to other segments of departments they belong to.
- Sector print units are generally not drivers of innovative change.
- Use of digital file applications in the sector, and resultant management and services benefits, is limited.
- Sector print units are more profit focused than service oriented.

TERTIARY EDUCATION SECTOR OBSERVATIONS

The following observations are limited to those sector officers willing to be interviewed and quoted, although others were prepared to assist off-the-record. It would appear the above-mentioned characteristics indicated by the technology providers are supported by commentary made by those from the University sector, as follows.

Paul Lees is Deputy Head of Direct Electronic Print, RMIT University. An equivalent Deputy Head is in charge of a separate traditional offset print unit. Lees states he and his department report to the Deputy Vice-Chancellor, Resources in conjunction with buildings and security.

Lees states that RMIT have been in some form of digital print for around 20 years going back to times of photocopy technology. Currently they have Xerox digital print technology with output of some 30 million copies per year. However, this is based on Docutech 135's that are 8–10 years old. This suggests to me that a decade ago RMIT were in the forefront of digital technology usage, but that advantage has dissipated.

Most input copy to the department is hard-copy, regardless of its source, and approximately 80% is scanned. Lees is keen to propose
upgrades to equipment that will allow him to ‘back-store’\textsuperscript{17} the Docutech digital files he creates from hard copy so that such files can then be used for publishing genres other than the Docutech print path. This seems to place emphasis on digital file creation too far down the supply chain and too late for comprehensive rights management security.

Michael Sanderson, General Manager of the RMIT Bookshop discusses general trends and directions in the Tertiary Education sector. He is concerned that University bookshops will need to find new directions and services during the next five years or become increasingly out of step with students’ needs. Over time he believes the processes will shift from textbooks to composite products tailored to student needs. He sees this as ideal for a mixture of web-sourcing and hard copy production using digital POD. Thus digital POD will lessen need for textbooks, but it will also create demand for innovative digital print solutions as part of a strategic and comprehensive range of university publishing genres. Sanderson believes students will happily use web structures as a learning resource but will still want hard copy and will want their University to produce that hard copy on-demand.

Faculties could be a driving force for innovative use of digital POD as one of many forms of publishing genre within a University, but Sanderson suggests short-term tenure for many lecturers constrains their ability to influence change. Indeed, it is possible this situation may be a driver for faculties ‘doing their own thing’.

Sanderson therefore believes it vital that university print units, libraries and bookshops should all be part of integrated strategy to develop shared resources and outcomes.

Warren Jones, Print Unit Manager at the University of Melbourne, advises the print department is a part of Property and Building Services. Jones has been with this University for nearly two years and is a long-term member of NIPPA,\textsuperscript{18} and as such is in contact with many Print managers in the sector. The University of Melbourne is another example of a University that was in the forefront of digital technology ten years ago and, like RMIT still relies on Xerox equipment sourced back in those times. Jones

\textsuperscript{17} The Docutech 135 is an earlier model that creates its own proprietary digital file from scanned hard-copy and such files can only be accessed by the Docutech equipment. Later Xerox software can resolve this issue.

\textsuperscript{18} National InPlant Print and Publishing Association.
estimates that 2%-5% only of the copy material received is in digital form, though much of the source material may have been digitally create. Also, faculties have their own scanning devices and thus hard-copy output may not be limited to the print room.

Jones has been involved in developing new strategies for digital print and the University has investigated new print technology that will allow for better control over digital files and provide a total control environment using sophisticated file management software integrated with modern print-engines. No decisions on this proposal are yet finalised, however Jones believes the proposal will not only provide better rights management security but also reduce total print costs.

Helen Hayes, University of Melbourne Librarian and office bearer at CAUL (Council of Australian University Librarians) does not believe their print department to have been a good model but is well aware of leading-edge work done in other universities, ‘doing superb work delivering digital and print on demand using the latest software’. At the ALIA2000 conference Hayes presented a paper on ‘the impact of change at the Melbourne University Library’ reporting important changes made to University structure in response to:

- Growth of the adult student market and overseas students.
- The rise of Internet-based learning and substantial new competition.
- Economic and political pressures that will force educational providers to deliver more than 75% of educational content electronically by 2005.
- Comments on the recognition by the University of Melbourne’s vice-chancellor, Professor Alan Gilbert, that a key role is to provide a campus learning environment matching, or better than, any online learning environment.

Given the above commentary it is not surprising to see the development of new strategies for digital print and potential use of sophisticated file management software. But I contend that consideration of the implications of the first three points made by Hayes above, would make it difficult to determine whether print

19 In particular Hayes refers to the Northern Territory University.
volume will grow (thus needing new and high capacity print engines) or whether they will ultimately fall.

Ray Hayes is the Charles Sturt University Manager of the Reprographics Unit. CSU is another University that has been involved in digital print for many years, but in the last 2 years has been able to upgrade to Xerox Docutech 6180 equipment. CSU still has a traditional offset print unit at Bathurst campus, but the Wagga campus is totally digital print output. Partly because of CSU’s off-campus student base, the print unit produces 75 million printed pages per year, which is a considerable volume of output worthy of good equipment and processes. The department is a part of the Learning Materials Centre, which places it within a sphere of influence for a sense of belonging to strategic direction, and thus the print department has no sense of marginalisation. After a 1999 restructure, the CSU Print unit became a full cost recovery unit.

Colleen Shaw is CSU’s Director of the Learning Material Centre and advises that the print department is also a sub-set of I.T. because of the introduction of complex computer resources within the print department requiring a development of skills.\textsuperscript{22} Rights management security appears foremost and given a lot of attention with uniquely skilled education designers placed in every university building to give advice to faculty members as to how best present material.\textsuperscript{23} CSU’s objective is to provide online access for all students and the most appropriate print capability.

CSU does not have a close fit with the characteristics suggested by the technology providers. It is possible this is so because of the long-term development of needs specific to the large number of distance-learning students CSU has to contend with.

University of Adelaide’s Supervisor, Image and Copy Centre, Maria Fedczyszyn, manages a self-funded unit and the Centre is a part of the University Library now. Previously, it was part of I.T. Services and before that a part of Central Services. Profit generation has apparently been a factor in determining where the Centre is attached. Like many other universities, Adelaide has aging Xerox

\textsuperscript{22} This arrangement indicates to me that Print is not currently marginalised at CSU but considered a core activity.

\textsuperscript{23} These designers are independent of each faculty. They not only give design advice, but provide skills development to faculty members and in my opinion are a likely conduit to increasing use of digital-print facilities, as they would encourage creation of digital files.
135 print equipment and approximately 50% of content is provided as a digital file. Rights management policy is not a factor in product creation within the Centre and there is little software sophistication in use for converting files created for print to be used for other publishing genres.

Elsewhere in this paper are comments indicating that many universities are either using outdated digital technology, or are using (by inference) obsolete and uncompetitive traditional offset equipment. Deakin University, however, uses offset as a major part of its print output.24

Deakin Print Services is a profit centre and part of Learning Services, producing in excess of a hundred million print pages per year, using a combination of analogue photocopiers and offset printing machines—ranging from computer-to-plate two-colour offset to the more traditional small Ryobi offset machines. Whilst many might consider that offset cannot compete with digital print for short print runs, the print manager25 argues that for longer print runs offset technology is more cost-effective. In most cases these longer runs represent requirements for one semester only. Customer satisfaction is monitored and at 98% satisfaction ratings, the University believes quality and service has not suffered. For shorter runs, analogue photocopiers are used, representing 50% of the throughput.

The print unit is integral to Deakin’s strategy for providing superior service to students, a result of its genesis in the 1970s as a distance education provider—the large off-campus student base meant print was an ideal technology to disseminate learning materials. Currently, a thorough investigation of Deakin’s requirements for a digital object management system is taking place, which includes investigating hard and soft technology. One consideration is the requirement for version control to allow publishing in hard copy and web soft copy. Control over the creation, archiving, retrieval and use of ‘native’ digital files will provide the University with a mechanism to manage the publication of its intellectual property and its use of third-party copyright material.

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24 The following information was provided by Gill Gartlan, Manager, Resource Planning and Project Control Learning Services.
25 David Freeman, Manager Deakin Printeries.
Deakin is also investigating the appropriate digital print technology to suit its requirements. There are concerns about digital print technology providers that create both high fixed costs and flat running costs regardless of volume. A further consideration is the effect on students, who prefer to receive printed and bound copies of their course materials rather than having to download files and print them.

Like CSU, Deakin also does not have a close fit with the characteristics suggested by the technology providers, and a shared characteristic for both universities is their large number of distance-learning students.

The situation at Monash University is unusual. The print unit is a profit centre part of Facilities and Services and does not appear to be an integral part of strategy integrated to needs of other sections such as Learning Services, Library and similar. Thus the print unit might be considered a candidate for marginalisation as appears to happen in some other parts of the tertiary sector. Yet this may not be so and what is happening at Monash is very encouraging.

Keith Allen, Manager Monash Print Services,26 is aware that the structure he works within is not dissimilar to the structure that many university print managers also operate within, and he is well aware of the frequent sense of frustration and marginalisation within the sector.27 But he shows little sympathy and in his words ‘it’s up to print managers to just get on with it!’ For Allen and Monash that has meant a number of initiatives:

- A review of the policy statements of the vice-chancellor and strategies and sense of direction of faculties and departments such as I.T.
- An understanding that future emphasis will be web directed but that hard-copy print will be an integral part.
- Unusually for a print manager, a realisation that print engine and print technology are not the prime decisions to be made but are just consequences of other decisions further back in the supply chain regarding software and objects management and archiving.

26 Monash Print Services is likely to be re-named MPS-online which is indicative of initiatives described later in this chapter.
27 Allen was a founder member of the organisation that became known as NIPPA.
A decision to be a driving force for development of services to faculties by providing software and systems that are user-friendly enough that faculties want to make use of them. This is Allen's 'just get on with it' advice to all print managers.28

Thus, like many other Universities, Monash had typical print technology seven or eight years ago,29 and have since upgraded to relatively modern print engines such as the Xerox 6180. Single colour digital output is about 43 million copies per year and growing. But the emphasis is on suites of programs that will push digital file creation back in the supply-chain, empowering faculties to create, archive, control, and send to print digitally. Not only is document management pushed back in the supply chain, but rights management also, and ultimately digital document creation forms a common supply point to all publishing genres, of which hard-copy print is but one.

Committed conversion of faculties to new software emphasised processes 'at their own pace' is the key according to Allen and he sees a part of his role to train faculties of how to use the introduced software and the benefits it brings.30 Hard copy print technology decisions will thus be consequences, not drivers.

The situation at Monash is unusual as I would contend that some of the technology provider characteristics do apply for this University, and significant progress is being made to overcome perceived shortcomings in system and process.

SUMMATION

It is clear that there are a number of issues to resolve in the Australian tertiary education sector before any consideration of POD applications can be seriously evaluated. Research highlights a confused sense of direction, with POD technology an uncertain fit in this environment.

It has been suggested by many in the tertiary sector that students dislike downloading material for themselves to print hard-copy and would much prefer their university provide a printed copy for them. If that is so, and if that situation is to exist in the foreseeable future,
then university print units remain indispensable and integral to encourage the creation and subsequent dissemination of information. Given this contention then the whole question of tertiary print technology and management mechanisms as part of integrated university strategy needs close investigation and attention.