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Delivering open learning through a technological network

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Open learning has the potential to offer a student access to education never before available in Australia. While the packaged product is extremely important its impact, regardless of quality, flexibility and inventiveness, will be seriously diminished if the appropriate delivery support mechanisms are not in place. Open Learning centres, as an immediate step, could offer great scope for delivery, especially where they are supported by terrestrial and satellite based technologies. This paper identifies 301 potential OLCs nationally and briefly introduces possible technologies that could be used to support education and training delivery.

Delivery of education and training programs and courses has not received the same level of attention provided to their design and development. History and comfort with what exists may account for the disparity between the two. And yet, if current Commonwealth Government initiatives are to succeed and Australia is to become "the clever country" one area where a high degree of synergy must develop is between the designers and technology applications experts. One without the other or one far more advanced than the other is a potential recipe for disaster. Fortunately history and comfort appear to be changing.

There appears to be developing within the education fraternity a shortening of the distance between design and delivery. One must assume that this signifies a growing realisation that a balance must be struck between the two.

The need for greater synergy is further heightened in an emerging environment whereby Open Learning is seen as providing the necessary requirements for a more complete client service. To fully satisfy the client, however, there must be an efficient and effective delivery network that integrates technologies in both the design and delivery phases and which allows access regardless of client location.

Growing out of the concept and practice of Open Learning design there is now emerging the concept (and practice) of Open Learning Centres (OLC).

Open Learning Centres

Jones and Dekkers (1989) and Jones (1990) described an Open Learning Centre typology whereby the delivery of distance education could be achieved on a national basis as a delivery support mechanism for the Distance Education Centres (DECs) and as an essential development prior to direct delivery into the workplace and/or home (See Figure 1).

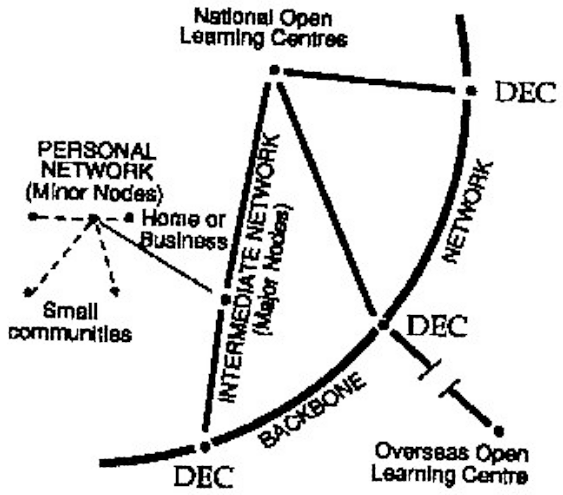


Figure 1: A Network Typology for Open Learning in Australia (Jones, 1990)

Both the Jones and Dekkers (1989) and Jones (1990) papers present the major theoretical considerations for the development of Open Learning Centres on a national basis. The next development should be the practical identification of such sites and a discussion on the likely technologies that could be used to service clients.

Selection criteria for the national OLC network

Identification of sites for a national OLC network required the following criteria be used.

1. A city or town was not used in the selection process. It was decided that an OLC would be established on the basis of it being able to provide services to a broader geographic area than a city or town vis a vis a city or town and its hinterland. Consequently two geographic spatial units were used. They were the statistical local area (SLA) and the statistical division (SD) (ABS, 1987).

   An SLA is equivalent to the old local government area and is in most instances a legal local government area. SLAs cover, in aggregate the whole of Australia without gaps or overlaps. SDs consist of one or more statistical subdivisions, which in turn, consist of one or more SLAs and cover, in aggregate, the whole Australia without gaps or overlaps, They are used as a large, general purpose regional type geographic area. SDs are designed to be relatively homogeneous regions, characterised by identifiable social and economic links between the inhabitants and the economic units within the region, under the unifying influence of one or more major towns or cities.

2. Each potential OLC site was selected on the population size of the SLA. In most cases the minimum cut-off size was 5000 people. However, some SLAs selected have less than the minimum 5000 population and were selected on the basis of student access and equity. As will be shown only 38 of the total potential sites selected cater to SLA populations of less than 5000 people.

3. Potential OLC sites were categorised into major and minor sites. Major sites have populations of greater than 10000 population, while minor OLCs contained populations of less than 10000 people.

4. Each potential OLC required access to the terrestrial and/or satellite telecommunications networks. The cut-off point based on SLAs ensured that local telephone exchanges were able to provide these services.

5. Each of the DECs would have access to each and all of the potential OLCs on an "as required" basis. While it is envisaged that local DECs may utilise the services of the OLCs in their hinterland to a greater extent, this would not pre-empt use of the OLC facilities by other institutions and organisations either on a regional, national, or international basis. The question of ownership is important and needs consideration.

6. There would be no geographically contrived barriers to the development and operation of the network. In other words, State/Territory boundaries do not exist and each of the DECs would act in concert with the other DEC members, in line with the DEC charter.

7. A final consideration for potential OLC sites concerned the actual site itself. Table 1 identifies the number of TAFE colleges, public schools and private schools in each State and Territory in Australia in 1987/1988.

Table 1: Number of TAFE Colleges, Public Schools and Private Schools by State/ Territory - 1987/1988

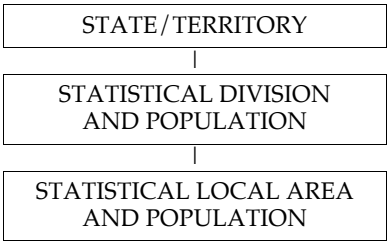
State/Territory	QLD	NSW	ACT	VIC	TAS	SA/NT	WA	Australia
TAFE Colleges	26	102	3	36	6	21/6 (27)	17	217
Public Schools	1322	2210	98	2091	261	717/143 (860)	733	7575
Non Govt Schools	386	852	35	729	66	177/22 (199)	237	2504
Grand Total								10296

There are ten thousand two hundred and ninety-six sites that could be considered. However, in fairness, forty to fifty percent of the sites could be discarded because of size, duplication or inappropriateness. However, sites located in government buildings and private businesses should not be discounted.

Potential OLCs in Australia

Using the criteria, an analysis was conducted based on the ABS Census of 1986. As a result of this analysis the following SLAs located in SDs were identified as potential OLCs. They are presented here by State/Territory which should not be interpreted as any more than a convenience.

The format used was as follows:



The analysis indicates that there is a total of three hundred and one potential OLC sites that meet the stated criteria. Table 2a and b presents a State/Territory breakdown.

Table 2a: Potential number of Open Learning Centres in each state/territory

State/Territory	QLD	NSW	ACT	VIC	TAS	SA/NT	WA	Australia
Number of OLCs	64	78	7	55	21	27/11 (38)	38	301

The main feature to note is that their selection does represent a total national coverage, thus enhancing the access and equity concerns of government and institutions and allows for participation of almost all Australians who want to participate.

Table 2b: Population by Population Centre

QUEENSLAND					
BRISBANE (2 sites)	1149401	Hervey Bay	20660	CENTRALWEST	13750
Kallangur	11145	Maryborough	22430	Winton	1986
Strathpine	10108	Kingaroy	9902	Longreach	3871
Alexander Hills	10313			Blackall	2070
Mt Gravatt	11780	DARLING DOWNS	173237		
Ipswich	71861	Toowoomba	73390	MACKAY	104388
Redcliffe	44933	Chinchilla	5534	Mackay	22199
		Dalby	9316	Pioneer	36084
MORETON	411300	Stanthorpe	9143	Prosperpine	11581
Gatton	11734	Warwick	9435	Broadslound	8419
Palm Beach	12552				
Southport	18930	SOUTH WEST	28490	NORTHERN	170550
Surfers Paradise	19069	Murweh	5287	Bowen	14361
Landsborough	36186	Roma	6162	Burdekin	18337
Maroochy	61669	Quilpie	1490	Hinchinbrook	13476
Moreton	25163	Pavoo	2733	Kirwan	11143
Noosa	20328	Balonne	5056	Thuringowa	14277
Esk	9109			Townsville	22506
		FITZROY	158471	Charters Towers	7208
WIDEBAY-	168953	Duaringa	10499		
BURNETT	31421	Gladstone	22792	FAR NORTH	167711
Bundaberg	10772	Livingstone	15886	Cairns	42227
Gympie		Rockhampton	56742	Johnstone	17457
		Emerald	9462	Mareeba	15563

Mulgrave	41711
Cardwell	8666
Douglas	7750
Eacham	5135
Torres	6821
Weipa	2406
NORTH WEST	38235
Mt Isa	23927
Hinders	2804
Cloncurry	3194
Burke	1433
NEW SOUTH WALES	
SYDNEY (3 sites)	3364858
Wyong	82368
Gosford	109278
Hawkesbury	43629
Blue Mountains	63866
Camden	18870
Wollondilly	24928
Cambelltown	121297
Liverpool	93215
Penrith	135342
Manly	35730
Waverley	59847
Sutherland	175191
HUNTER	482775
Cessnock	41733
Great Lakes	20440
Lake Macquarie	153540
Maitland	44315
Muswellbrook	14892
Newcastle	129490
Port Stephens	36011
Singleton	17277
ILLAWARRA	309345
Kiama	13443
Shellharbour	43872
Shoalhaven	55980
Wollongong	167863
Wingecarribee	28187
SOUTH-EASTERN	156110
Bega Valley	23758
Eurobodalla	21519
Goulburn	21552
Queanbean	22698
Young	10652
Snowy River	8876
Cooma-Monaro	9589
MURRUMBIDGEE	140520
Griffith	20888
Leeton	10989
Tumut	11507
Wagga Wagga	49401
Hay	3896
MURRAY	103110
Albury	38704
Corowa	7240
Balranald	2956
Deniliquin	7566
FARWEST	29162
Broken Hill	24460
Central Darling	3304
Tibooburra	
(Unincorp.Far West)	1398
RICHMOND TWEED	153009
Ballina	24416
Byron	18342
Casino	10618
Lismore	37053
Tweed	45690
MID-NORTHCOAST	208654
Bellingen	10118
Coffs Harbour	43010
Grafton	16647
Greater Taree	35921
Hastings	41804
Kempsey	22900
McLean	12023
Nambucca	14588
NORTHERN	177309
Armidale	19525
Gunnedah	13436
Inverell	15586
Moree Plains	17018
Narrabri	15532
Tamworth	33321
NORTH-WESTERN	110581
Dubbo	30918
Mudgee	14845
Cobar	5635
Bourke	4255
Walgett	7621
Coonamble	5701
CENTRAL WEST	161597
Bland	7638
Bathurst	24460
Forbes	10736
Greater Lithgow	19785
Orange	31710
Parkes	14057
AUSTRALIAN CAPITAL TERRITORY	
CANBERRA (1 site)	248441
Kambah	17312
Curtin	5706
Evatt	6328
Kaleen	8198
Narrabundah	5414
Wanniassa	9667
VICTORIA	
MELBOURNE (2 sites)	2832893
Lillydale	71564
Berwick	48677
Frankston	83819
Broadmeadows	101144
Werribee	52458
Diamond Valley	55122
BARWON	202905
Bellarine	35302
Colac	15961
Geelong(city)	27243
SOUTH WESTERN	
Portland	18145
Warrnamboo	29277
Hamilton	9969
Hampden	7072
Heytesbury	7487
Wannon	2856
CENTRAL HIGHLANDS	124610
Ballarat	19110
Ararat	12245
Baccus Marsh	9342
Buninyong	9959
WIMMERA	51606
Horsham	12174
Stawell	8804
Kakarooc	2822
NORTHERN MALLEE	73813
Mildura	3775
Swan Hill	20893
Kerang	8347
Walpeup	3496
LODDON-CAMPASPE	57827
Gisbourne	8474
Bendigo	30704
Maryborough	7705
Morong	11744
Rochester	6988
Strathfieldsaye	15011
Castlemaine	6603

Eaglehawk	8184
Echuca	8409
GOULBURN	139272
Benalla	13492
Seymour	11412
Shepparton	32659
Mansfield	6430
NORTH EASTERN	85106
Wangaratta	19637
Wodonga	22693
Bright	8505
EAST GIPPSLAND	60491
Bairnsdale	16809
Sale	13559
Orbost	6131
CENTRAL GIPPSLAND	139450
Alberton	55972
Moe	16999
Morwell	26743
Traralgon	23461
Warragul	11748
Woorayl	10644
EAST CENTRAL	49014
Upper Yarra	13637
Wonthaggi	5931
TASMANIA	
GREATER HOBART	175082
Sorell	6782
City	47356
Glenorchy	40883
Kingsborough	20367
SOUTHERN	32107
Esperance	3125
New Norfolk	10832
Hamilton	2508
Spring Bay	1992
Oatlands	1836
Glamorgan	1723
NORTHERN	120490
Beaconsfield	1171
Launceston	61102
Deloraine	5278
Georgetown	6938
Scottsdale	4398
Portland	2832
MERSEY-LYELL	108115
Burnie	20585
Devonport	24417
King Island	1989
Circular Head	7863
Queenstown	3596
SOUTH AUSTRALIA/ NORTHERN TERRITORY	
ADELAIDE (2 sites)	977721
Onkaparinga	6694
Elizabeth	30687
Port Adelaide	37319
Stirling	15255
Noarlunga	69809
Willunga	9581
OUTER ADELAIDE	78205
Angaston	6546
Gumeracha	5125
Port Elliott/Goolwa	5491
Strathalbyn	5203
Victor Harbor	6538
YORK & LOWER NORTH	42142
Mount Barker	15021
Northern Yorke Peninsula	6869
MURRAYLANDS	63370
Murray Bridge	14634
Berri	6351
Loxton	6830
Renmark	7213
SOUTHEAST	60251
Mount Gambier	25858
Millicent	7984
Tatiara	7046
Naracoorte	6621
EYRE	33644
Port Lincoln	11943
NORTHERN	88328
Port Augusta	15621
Port Pirie	14597
Whyalla	27102
DARWIN	72937
Larrakeyah	1999
Jingile	2299
Tiwi	2950
Outer Darwin	1100
NORTHERN TERRITORY	81035
Alice Springs	22759
Katherine	5691
Tennant Creek	5239
East Arnhem/ Groote Eylandt	6870
Jabiru	1410
Tanami	4704
WESTERN AUSTRALIA	
PERTH(3 sites)	994472
Perth	79409
Armadale	41248
Swan	37383
Kwinana	14025
Fremantle	22709
East Fremantle	5678
Wanneroo	126053
SOUTH-WEST	114163
Bunbury	23031
Busselton	12411
Mandurah	18872
Augusta/Margaret River	5333
Collie	9077
Harvey	9609
Manjimup	9073
Murray	6634
LOWER GREAT SOUTHERN	43102
Albany	22004
Katanning	4325
UPPER GREAT SOUTHERN	21121
Narrogin	4973
Pingelly	1247
MIDLANDS	47895
Northam	8863
Wongan-Ballidu	1823
Merredin	3797
SOUTH EASTERN	45871
Kalgoorlie	10087
Boulder	13317
Esperance	9556
CENTRAL	63636
Carnarvon	10259
Geraldton	18801
Greenough	5853
Northampton	5357
PILBARA	48429
Port Hedland	13241
Roebourne	16704
East Pilbara	9187
West Pilbara	9297

Table 3: Potential Major and Minor Open Learning Centres sites by state/territory

State/Territory	Major OLC	Minor OLC
Queensland	39	25
New South Wales	65	13
ACT	2	5
Victoria	34	21
Tasmania	7	14
South Australia/	13	14
Northern Territory	2	9
Western Australia	18	20
TOTALS	180	121

Table 3 identifies the potential Major and Minor OLC sites. The importance of this tables lies in its ability to provide guidance for a timetabled development of the OLCs. It also illustrates the balance that was brought both within and across States and Territories.

Technology and open learning

The selection of three hundred and one OLC sites around Australia led to the identification of major and minor sites in Table 3. It is important to remember the criteria upon which these sites were selected. One of the important criteria was the status of the nearest exchange. This becomes important because it will determine the equality and type of network accesses and services that could be available this is critical particularly in rural areas.

1. Major OLCs

There should be a basic network of video, audio and data facilities linking centres to the nearest DEC institution. These technologies should provide interactive communications between learners and instructors and need to be bundled together to maximise both the opportunities offered by the technologies and the quality of teaching and learning.

- Video Facilities. There are a number of options available with video conferencing.
  -- one way video, two way audio
  -- two way interactive video, full bandwidth
  -- two way interactive video compressed (2 Mbit/s or 384 kbit/s) using a megalink
  -- two way interactive video compressed using Integrated Services Digital Network (ISDN)

-- one way or two way video conferencing using the satellite.
All need to be evaluated thoroughly within the education environment although it does appear that two way interactive video conferencing has attracted considerable attention (even in TAFE) especially at 384 kbit/s compression.

- Audio Facilities. There is a need for at least three telephone lines. One line is needed for voice communication and to support an answering machine to record messages when no one is in attendance. A second line would be needed to support a facsimile machine while a third could be required for audio conferencing.

- Data Facilities. At least two microcomputers with modem (if ISDN is not available) would be required. The first would support video conference facilities by providing an Optel or Create environment to process text and data information in conjunction with lectures and tutorials while a second could provide education and training services, for example sending registrations, obtaining course and careers information etc.

2. Minor OLCs

These centres would be supported by a basic network of audio and data facilities linking them to the nearest DEC institution or perhaps a major OLC They would require at least the following basic terminal configuration.

- Audio Facilities. At least two telephone lines would be required they would support services such as 008, STD and audio conferencing as well as an answering machine and facsimile. As ISDN becomes more pervasive into these smaller communities, in the distant future, slow scan video conferencing may also be possible over these lines.

- Data Facilities. A micro-computer with modem would be required to support a variety of student and staff service on-line and to support offline delivery of text and data information for lectures and tutorials, for example through a Create package.

All of these facilities have the capacity to be networked together and when coupled with an electronic messaging system, support services through the Australian Academic and Research Network (AARNET) and supported by print materials, videodiscs, CD ROM discs, video cassettes and players, and TV offer the learner a choice never before seen in Australia.

Conclusion

The delivery of education (and training) is a vital cog in the wheel of all award and non-award programs around Australia. With a well thought-out and implemented strategic plan involving the key players there is great potential to revolutionise distance education in this country. The objectives of this paper were to identify sites suitable as OLCs that could be melded into an effective and efficient national OLC network, and to identify possible technologies that could support their operations.

The analysis of available information, in accordance with the stated criteria, determined that there are three hundred and one potential OLC sites within Australia. Major and minor sites were differentiated and each would appear to access the terrestrial telecommunications network where an upgraded exchange is available to provide the standard of services required to enhance the geographic dispersion of OLCs. Where terrestrial access is not possible satellite offers an acceptable alternative.

A variety of video, audio and data facilities that are available immediately were identified. Within a "bundled" environment they provide an efficient and effective delivery mechanism on a national basis. With this type of delivery environment and with concomitant developments in instructional design Australia might well become "the clever country", with education leading the way.

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