Print Serial Cancellations in University Libraries Post 1990: What do the CAUL Statistics Reveal?

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ABSTRACT Recent reports on Australia's research infrastructure have highlighted the decline in serial subscriptions in academic and research libraries during the 1990s. They have used the annual CAUL statistics in order to support these claims. This article examines the CAUL statistics for serial subscriptions, indicating their numerous flaws when used for longitudinal analysis. Alternative interpretations of the statistics are provided, which provide some evidence that rates of subscriptions to print periodicals were sustained for a longer period than previous uses of the data have suggested.

Throughout the 1990s and the early part of this decade considerable attention has been given to the issue of periodical holdings in Australia's research libraries. This interest has been driven by concern regarding the diminishing journal resources available to Australian researchers. There has been a widespread belief, supported it seems by statistical evidence, that serial subscriptions declined substantially during the 1990s.

It has been accepted that the reduction in print serial collections was driven by the rapidly rising cost of scholarly publishing – in particular journals – and the declining purchasing power of the Australian dollar over the course of the 1990s. More recently these concerns have been muted slightly by the uptake of electronic journal subscriptions, particularly in the form of large-scale aggregations, which have gone some way towards restoring buying power. Nevertheless there is some unease with the service delivered by these aggregations, in terms of the quality and completeness of their content, the restrictive aspects of their licensing agreements, and issues regarding long term security of access to the digital content.

For these reasons there remain questions about the amount of 'damage' which was done to the national collection of research journals by the cancellations undertaken since 1990. This issue is much more than simply a lingering anxiety for research library managers. The declining quality of the national journal collection has been raised in recent reviews of Australia's research and information infrastructure, and it has therefore become part of the ongoing discussion around national research performance.

In some cases these reviews have produced generalised statements of concern about the decline in the purchasing power of Australian academic and research libraries. For example the Australian Library Collections Task Force's *Access to Scientific Journals in Australian Libraries* reported that the 'current pattern of progressive cancellation of journal subscriptions is a matter of great concern'.[1] The Task Force declared that 'subscriptions to print versions of journals deemed by researchers to be essential to their work have been cut at an annual rate of about 7% over the three years 1997-1999', but failed to provide a source for this statistic. Similarly, the Department of Education, Science and Training (DEST) Information Infrastructure Advisory

Committee pointed out in a 2002 report that 'Australian universities are acquiring a diminishing percentage of scholarly publications at a time when the body of knowledge is rapidly increasing',[2] and nominated 'refereed journal literature' as a priority area under its 'Access to Research Resources Programme'.[3]

In other cases, however, reviews of research infrastructure and trends have produced more detailed statistics intended to demonstrate the decline in serials subscriptions in academic libraries. The key components of these statistics are typically an indication of the rate of increase of the money spent on serial subscriptions over a given period, compared with a simultaneous decline in the number of serials acquired.

For example the report *The Chance to Change*, authored by the Chief Scientist Dr Robin Batterham and published in November 2000, declared that;

> Despite an increase in the output of the world's research information, the three years from 1996 to 1998 saw a significant decline in the purchase of print serial subscriptions… Whilst there was a 22 per cent increase in serial expenditure over the period, there was a 48 per cent decline in the number of print serial subscriptions purchased…[4]

Batterham provides a table with the relevant figures for the three-year period. These figures are sourced to the Coalition for Innovation in Scholarly Communication and derived from the annual statistics published by the Council of Australian University Librarians (CAUL).

The August 2003 report *Changing Research Practices in the Digital Information and Communication Environment* (Houghton Report) prepared for DEST included similarly alarming figures. The Report noted that the 'total number of serials titles purchased declined by almost 37% between 1986 and 1998, but total serials expenditure increased by 263%, and aggregate serial unit costs by no less than 474%'.[5] The Report represented these figures, again sourced from the CAUL statistics, in a graph that tracked them in terms of percentage change for the years 1986-2001. Critically, that graph reproduced the same serial subscription data contained in the *The Chance to Change,* indicating a massive increase in subscriptions in 1996, followed by an even more massive decline in 1997 and 1998 (see Graph 1 below). These same figures and graph have also been made available in other documents associated with the Houghton Report.[6]

Central to the issue of assessing the possible impact of serial cancellations on research performance is the quality and reliability of the statistical data that is available regarding the extent of the cancellations. Unfortunately the primary source of relevant data, the annual statistics reported by CAUL, is severely flawed. Nonetheless these statistics have been reported in influential and widely read documents as having an authority which can't be sustained. As an analysis of the CAUL statistics will demonstrate they are simply not capable of being put to this use with any degree of reliability.

It is important to note that the following analysis attempts to deal specifically with the figures for print subscriptions. This is not a simple task. As libraries began to take serials in electronic form during the 1990s they found different ways of recording these statistically. Some libraries seem to have largely ignored them, while for others they may have been included in at least some of their metrics reported to CAUL. For

the most part, however, it would appear that they were not included prior to 1999, when the CAUL statistical reports were redesigned to specifically include several categories of electronic serials. This has resulted in a discontinuity of data at that time, and is one of a number of complicating factors when analysing the CAUL serial subscription statistics.

It is also the intention to account for paid subscriptions only. Gifts and exchanges are exempt from some of the financial pressures that have driven the cancellation of serials that are acquired by paid subscriptions. Fortunately the CAUL statistics have, until quite recently, treated these categories of serials separately.

Why are the CAUL statistics unreliable?
There are a number of reasons why the CAUL statistics for serial subscriptions are flawed.

1. The annual CAUL figures for serial holdings have frequently not included all of the relevant libraries. This is certainly the most significant cause of 'error' in these figures.

   It has only been since 2000 that all university libraries have reported their current journal subscriptions. Prior to then the number of current subscriptions to serials was considered to be a 'non-core' statistic, which meant that lodging this figure was optional. The decision to make this figure non-core arose because of the innate difficulties with accuracy that resulted from issues of definition and comparability between libraries. The 1997 meeting of the CAUL Statistics Focus Group considered deleting the calculation altogether, and relying on figures reporting total serials expenditure instead. They noted the problems of accurately recording serial subscriptions due to issues of 'electronic versus non-electronic, current versus new subscriptions, duplicate subscriptions, etc'.[7] It is for these reasons that current serial subscriptions and other non-core measures have not been included in the annual statistics appearing in the September issue of *AARL*, although they have been available from the CAUL website. The figures for serial subscriptions have only been included in *AARL* since 2000 after work by the Statistics Focus Group to improve their reliability. This was achieved by clarifying problems of definition and providing for separate reporting for different forms of subscription to electronic serials.

   Crucially, in 1998, the low point for current serial subscriptions during the 1990s as recorded by the CAUL statistics, 18 of the 39 university libraries did *not* lodge a relevant figure. These included the libraries of the University of Queensland, University of New South Wales, Flinders University and the University of Tasmania. Therefore the subscription low point indicated by *The Chance to Change* and the Houghton Report records no more than the low point in reporting of this figure by the CAUL libraries. By comparison in 1996, the high point for reported subscriptions in the decade and the year chosen for comparison with 1998 in *The Chance to Change*, 36 universities lodged a return for this statistic. Neither *The Chance to Change* nor the Houghton Report provides any indication that the statistics they quote are of little or no value for a longitudinal analysis because of this flaw.

The flaw resulting from the inconsistent return of data – and from the highly aberrant years of 1996 and 1998 in particular – is apparent in a table presented by O'Connor and Pugh[8] representing the decline in periodical subscriptions for the period 1994-1998. O'Connor and Pugh give as the source of their data the CAUL statistics, with a note that 'The figures have been adjusted to reflect gaps in the data collection'. By way of comparison, the following table compares these adjusted figures to the raw CAUL data.

	O'Connor & Pugh	CAUL
1994	200,666	173,950
1995	194,639	170,461
1996	255,836	223,526
1997	143,971	138,210
1998	112,974	111,836

It is unclear as to exactly what adjustments were made by O'Connor and Pugh, but the crucial issue of the inconsistent number of libraries submitting a return has certainly not been allowed for in these 'adjusted' figures. This is clearly evidenced by the difference of just over 1000 in the figures for 1998, when nearly half of the libraries did not submit a return for this figure in that year.

An indication of how statistical evidence is perpetuated is given in that the figures reported by O'Connor and Pugh were later repeated – without acknowledgment as to their source or the fact that they were in any way adjusted - by Colin Steele, then University Librarian at the Australian National University. Steele reported that;

> In the five years to 1998 the number of journals purchased by Australia's 38 university libraries was reduced by almost half from 200, 666 to 112,974 titles ....[9]

It should be noted that the CAUL data relied upon by O'Connor and Pugh does not refer to 'titles' as claimed by Steele, but rather to the number of subscriptions.

Failure to report by some libraries may not lead to a significant distortion in determining the general trend of serial subscriptions if the same libraries always failed to report. This was, however, not the case. For example during the 1990s the University of Queensland reported a figure in three dispersed years, 1990, 1996 and 1999. It is almost certainly not a coincidence that these three years produced the highest total results recorded during the decade. Of the Group of Eight research libraries, only three, Sydney, Monash and Adelaide reported in every year between 1990 and 2002; and in all only ten libraries reported for each of those years. As a result, not only do the CAUL statistics fail to adequately record the total number of serial subscriptions in a particular year, but they also render the statistics meaningless for the compilation of time-series data.

2. Inconsistencies between universities in the methods of calculation. It is difficult to know how extensive such inconsistencies are within the CAUL statistics, but several otherwise unaccountable anomalies have become entrenched in the figures for current serial subscriptions. Perhaps the most spectacular of these is that reported by Flinders University. In 1995 Flinders had 4506 subscriptions. This number exploded – against the general trend – to 17,978 in 1996. This ranked

Flinders as the country's largest acquirer of periodicals for the year amongst the CAUL libraries, after having been ranked 14th in the previous year. Flinders subsequently reported 18,000 subscriptions in 1997, and then did not report again until 2000 when it had 6,444 subscriptions.

The likely explanation for these anomalous years is that Flinders included aggregated electronic periodicals in their return prior to other libraries. As discussed above, CAUL did not include reporting for electronic subscriptions until 1999, at which time they listed as separate from print or microform subscriptions.

3. Changes in methods of collecting or presenting statistics. A difficulty in using the statistics for time-series analysis has arisen as a result of the decision to change the reporting for print serial subscriptions from 2000 onward, as part of the ongoing attempt to obtain an accurate count of electronic subscriptions. From that year the former column 36A ('current print and non-print serial titles subscriptions') has been omitted. The information about print title subscriptions is now embedded in column 41A ('current print and non-print serial titles'). Libraries were instructed that this column should include 'Individual print and non-print serial titles, excluding electronic and CDROM titles'.[10] The difference from the former 36A is that this measure includes non-paid subscriptions ie gifts and exchanges.

   For many libraries this led to a sharp increase in the reported print subscriptions from 1999 to 2000. For example, Macquarie rose from 6294 to 9795; Sydney from 9257 to 13,596; and Deakin from 3870 to 8,374. It is an indication, however, of the confusion that followed from this and changes related to reporting of electronic serials, that other libraries recorded substantial decreases in subscriptions between the same years. University of Technology, Sydney went from 10,014 to 4742; and the University of Canberra from 8510 to 1306. Once again, volatile outcomes such as these render the statistics of little or no value for the purpose of longitudinal analysis.

   The extent of the confusion at this time was acknowledged at a meeting of the Statistics Focus Group, where it was noted that 'the collection of 1999 data on electronic resources clearly didn't work. Some couldn't count their electronic titles; others didn't include them, thus skewing the comparisons between institutions'.[11] It is apparent that this confusion in turn impacted on the collection of data concerning print serial subscriptions.

   CAUL has since gone to some effort to ensure that the notoriously difficult to keep figures for electronic subscriptions are as accurate as possible. This has been achieved through the innovation of the 'deeming list' for large-scale full text aggregations, which is used to assist libraries in calculating electronic subscriptions.

4. Inaccurate calculation by one library. There are examples in the statistics where a library produces an aberration in an otherwise fairly consistent set of numbers. This is evidenced in an example from the University of Melbourne. The library had been reporting subscriptions in a range of 10-11,000 in the early 90s. In 1995 there was no report; in 1996 the number rose sharply to 17,897; before returning

to a more 'normal' level of 11,922 in 1997. In this case scrutiny of the figures seems to provide an explanation, in that for the one aberrant year the figure would appear to include serials acquired by non-subscription methods i.e. donation. Nonetheless, the outcome is a significant inflation of the number of subscribed serials for that year.

An amending note providing the correct figure for Melbourne for 1996 (11,890) was issued as part of the CAUL report *1999 Australian and New Zealand Academic Library Statistics*.[12] That amended figure has not, however, as yet been incorporated into the CAUL statistical data. In the same report Melbourne also reported a figure for 1995 (10,425) which has also not been incorporated into the data for that year.[13]

5. Addition of new universities. Longitudinal calculations based on the sum of the figures reported to CAUL can also overlook the addition of new universities to CAUL membership.

   Prior to 1990 the CAUL statistics compiled separate reports for the universities and colleges of advanced education. The erosion of the 'binary divide' in the latter part of the 1980s meant that many of these colleges were amalgamated to form new universities or subsumed within existing universities.

   For this reason CAUL has noted that the 'percentage increase from a base year of 1986 is therefore exaggerated… and a more realistic presentation of the data might be achieved by using 1990 as the base year'.[14] Years subsequent to 1990, however, also produced new inclusions based on the erosion of the binary divide or the creation of new institutions. Edith Cowan University (an amalgamation of several existing colleges) was first included in 1991, the Australian Catholic University first reported in full in 1992, and the University of the Sunshine Coast in 1998.

6. Errors of calculation. For the years between 1991 and 1998 the CAUL statistics for periodical subscriptions do not have a total representing the combined tally of all university libraries. The total figure for 1990, however, has an error in that it includes some double counting. This is a result of some universities presenting two results; firstly for the total library collection, and then individual results for each library within a multi-campus university. The calculation of the total for the year has counted both figures, inflating the result by 5.1%. It is this incorrect total which has apparently been used in some of the available analysis of subscription trends.

   The practice of including figures from various campus libraries has since been discontinued, meaning that this particular problem will not recur.

The net result of these various 'distortions' to the CAUL statistics is that while the figures for individual universities *may* be an accurate reflection of *their* current subscriptions, simply summing the total of all reported current serial subscriptions to indicate broader collecting trends will inevitably produce substantially misleading results. Some of the error factors have had the effect of inflating the returns for particular libraries and particular years, while others have had a deflationary impact.

It should be noted that CAUL, through the activity of its Statistics Focus Group, has been attempting to overcome the problems with the annual statistics. The accurate recording of current serial subscriptions, firstly in print and more recently in electronic form, has been a particular concern of the Statistics Focus Group. It should also be stressed that serial subscription is a notoriously difficult area of calculation, and the problems relating to these statistics do not necessarily arise in other areas of the CAUL statistics.

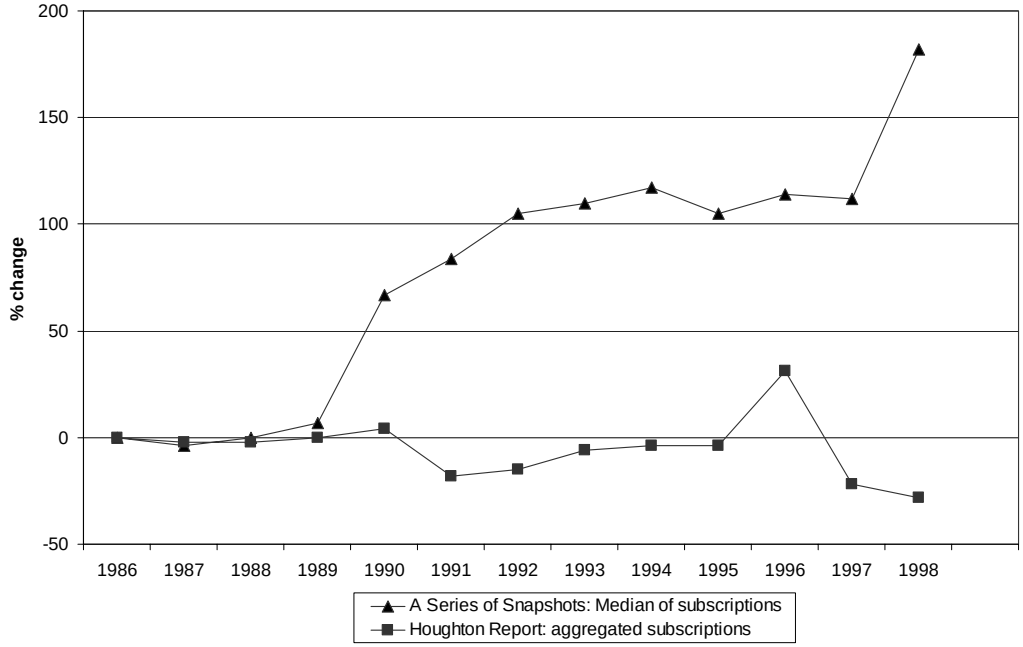
Contradictory evidence from the CAUL statistics

An outcome from the current state of the CAUL statistics for periodical subscriptions is that they should *not* be used to produce time series data. This is, however, exactly the use to which they have been put by both *The Chance to Change* and the Houghton Report.

An indication of the degree to which the statistics in their current state can be used to produce conflicting evidence is apparent when a comparison is made between the data provided by the Houghton Report, and the CAUL report, *A Series of Snapshots of the Size and Nature of Recent Economic Investment in Library and Information Infrastructure*. This latter report was prepared by CAUL for the Coalition for Innovation in Scholarly Communication in August 2000.

Both reports provide a comparison of serial subscription trends measured by mapping percentage change with 1986 as the base year. The figures in the Houghton reflect the aggregate number of subscriptions for reporting libraries in each year, while those in *A Series of Snapshots* use the median result from the same data. CAUL chose this latter figure in order to be consistent with the form of presentation used by the Association of Research Libraries (ARL). As can be seen from Graph 1, these two different methods of calculation produce conflicting evidence of the 'trend' for serial subscriptions, with the median calculation used in *A Series of Snapshots* indicating a substantial increase in subscriptions between 1986 and 1998, with most of this increase occurring after 1989.[15]

Graph 1
Changes in research library subscription after 1986



While a median and a sum derived from the same data do not necessarily support consistent conclusions – and indeed the two figures are sometimes compared for that very reason - it is unusual that they should differ so markedly. For the reasons discussed above, however, in this case both are severely compromised as a reflection of serial subscriptions by CAUL libraries for the years covered. The evidence is contradictory to the extent that the Houghton Report presentation of the data indicates a decline over the recorded period, while the median figure reported in *A Series of Snapshots* has the suggestion of a substantial increase.[16]

It is worth recalling the Houghton Report conclusion quoted previously that, 'The total number of serials titles purchased declined by almost 37% between 1986 and 1998'. Such is the erratic nature of the data reported in the CAUL figures, that the same set of data could just have correctly supported a conclusion that 'the total number of serials titles purchased increased by almost 40% between 1986 and 1996'. As discussed above, there are reasons why 1996 and 1998 represent extreme points in the 'error' rates for the CAUL statistics.

What do the CAUL statistics tell us?

In the absence of a complete or consistent set of data, the user of the CAUL statistics is forced to trawl through what is presented in order to gather information regarding the decline (or otherwise) in the subscriptions for printed serials for the post 1990 period.

If, as indicated above, a major flaw with the statistics is the inconsistency in the number of reporting libraries, then this can be corrected to some extent by using only the figures for those libraries that reported in each year. This will provide a consistent set of returns that should be at least indicative of trends for the full population of CAUL libraries.

Ten libraries reported in each year for 1990-2002. These were the libraries of the following universities; Adelaide, Curtin, Central Queensland, Deakin, James Cook,

Monash, New England, Newcastle, Southern Queensland and Sydney. Fortunately this 'self-selecting' group is reasonably representative of the full complement of CAUL libraries.

Table 1 presents the total of their serial subscriptions, and a median figure, for 1990-1999. It was decided to cease the Table at 1999 due to the different method of recording printed serial subscriptions after that date as discussed above.

Table 1
Serial subscriptions for ten selected libraries, 1990-1999

	Total	Median
1990	56,373	4566
1991	58,462	4378
1992	58,663	5180
1993	61,095	5475
1994	56,324	4266
1995	56,562	4548.5
1996	57,609	4450
1997	58,032	4397
1998	55,654	5027.5
1999	57,193	5392.5

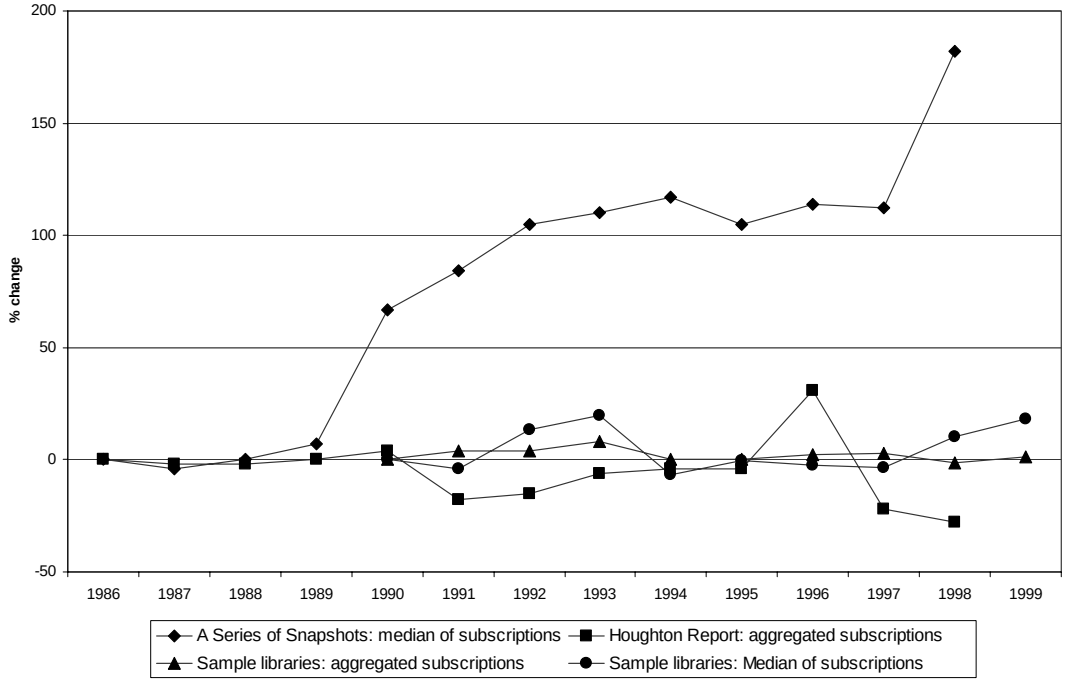
These ten libraries reported a net gain of 1.45% in print subscriptions over the course of the decade, although it should be noted that there was a loss of 8.9% between 1993 and 1999.

Two aspects of these results deserve comment. Firstly, seven of nine years reported an increase over the preceding year, with downturns in 1994 and 1998 only. From this it might be concluded that, despite the advent of electronic periodicals, the print serial collections still demonstrated a tendency for growth throughout the decade, with 'corrections' being experienced only at times of abnormal pricing pressure. Late 1993 and 1997/98 were low points in the value of the Australian dollar.

Secondly, there were apparent differences between the established, larger universities and their newer and smaller counterparts. The three Group of Eight libraries at Adelaide, Monash and Sydney universities accounted for the majority of lost subscriptions, experiencing an overall loss of 18.5%. New England and Newcastle also recorded a loss over the course of the decade, with the other five all recording increases in subscriptions. Taken together, however, the seven non-Group of Eight libraries had an increase of 24% in their serial subscriptions between 1990 and 1999. Curtin University was the only one of the ten libraries that recorded an increase in every year for this period.

When the total and median figures from these ten 'sample libraries' are calculated as percentage fluctuations and graphed against the figures presented in the Houghton Report and *A Series of Snapshots*, it is immediately noticeable that these representations of the data present a far less volatile – and almost certainly more accurate - picture of subscription activity during the decade.

Graph 2
Changes in research library subscription after 1986: additional measures



A second method of doing an 'alternative' calculation of subscription changes over this period is to compare the annual figures that are provided for new serial subscriptions against 'active cancellations' (ie not including cessations). To some extent these figures are tainted by some of the same factors detailed earlier, in particular the omission of reports by libraries in some years.

The potential advantage of these figures, however, is that if the same institutions report both figures in a given year, then the sum totals for that year should at least indicate a trend for either an increase or decrease in the number of subscriptions. Unfortunately even that much cannot be guaranteed, as in some years libraries have reported one figure (ie new subscriptions *or* cancellations) but not the other. For example in 1995 the University of South Australia reported cancellations but not new subscriptions, while Murdoch reported new subscriptions but not cancellations. There are similar occurrences in almost every year.

The new subscription and cancellation figures are also problematic in that they sometimes contradict the information given by libraries for their total periodical subscriptions. An example of this can be seen by comparing University of Tasmania figures for 1995 and 1996. In 1995 the library reported 4287 current subscriptions. In 1996 they acquired 118 new subscriptions and cancelled 135, a net loss of 17 titles and presumably giving a total of 4270 subscriptions. The number of total subscriptions reported by the library for 1996 is in fact 3962. There are many similar discrepancies in the figures reported by other libraries.

Notwithstanding these problems, the figures for new subscriptions and cancellations are still useful, however, in that they provide a different view of subscription activity to that given by the more frequently quoted total subscriptions.

Table 2
New subscriptions and cancellations, 1990-2002

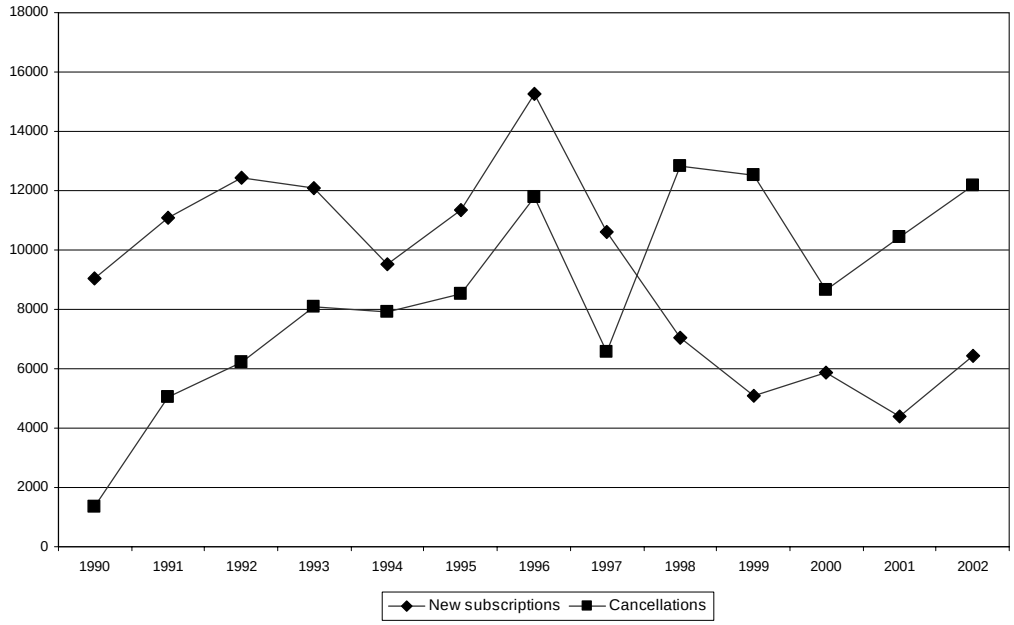
	New subscriptions	Cancellations
1990	9023	1329
1991	11107	5037
1992	12432	6225
1993	12071	8072
1994	9541	7911
1995	11357	8520
1996	15260	11772
1997	10603	6561
1998	7039	12807
1999	5095	12520
2000	5877	8660
2001	4385	10455
2002	6416	12190
	120,206	112,059

Two results that clearly contradict expectations are apparent from these figures. Firstly, that the total number of new subscriptions exceeds the total number of cancellations for the period 1990 - 2002. Indeed for the 1990s, the decade that supposedly saw the severe decline of journal subscriptions in Australian academic libraries, the figures indicate that there were 103,528 new subscriptions and 80,754 cancellations, a net *gain* of 23,774 new subscriptions.

Secondly, the CAUL statistics suggest that the number of cancellations for any one-year did not exceed the number of new subscriptions for that same year until 1998. As has been seen, it has often been claimed, and indeed generally accepted, that the reduction in subscriptions began well before this.

When graphed these figures produce the following:

Graph 3
New subscription and cancellations after 1990



The general similarity in the profiles in Graph 3 for new subscriptions and cancellations for the period 1990 to 1997 is suggestive of libraries going through a normal process of regeneration as they review their current subscriptions and replace existing titles with new ones. The indicators are still of a tendency for growth, with new subscriptions outnumbering cancellations. It is certainly not a pattern indicative of a 'crisis'. It is only with 1998 that we witness a substantial breach to this trend.

The cause of error regarding calculations of new subscriptions v. cancellations noted previously – that is, a library providing one figure but not the other - can be allowed for by including only those libraries that provided both figures in a given year. This may not completely erase problems with these figures, but it should produce a more accurate account of trends in subscriptions and cancellations in each year. The following calculations were done accordingly, with a blank return for either metric being interpreted as N/A (ie the library is eliminated from the calculation) rather than as '0'.

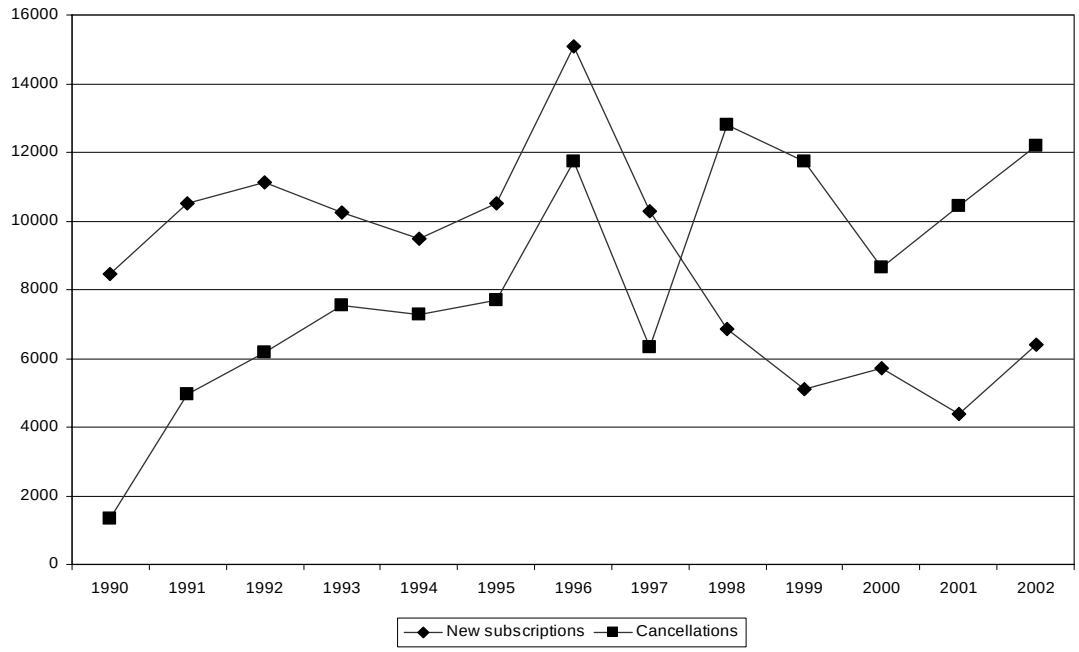
Table 3
New subscriptions and cancellations, 1990-2002, corrected

	New subscriptions	Cancellations
1990	8447	1329
1991	10528	4956
1992	11138	6169
1993	10259	7526
1994	9500	7280
1995	10511	7678
1996	15102	11750
1997	10282	6313

1998	6844	12807
1999	5095	11736
2000	5710	8660
2001	4385	10455
2002	6416	12190
	114,217	108,849

This correction makes no substantial difference to the trends indicated by the figures. The total for new subscriptions still outweighs that of cancellations for the period, and 1998 remains the first year in which cancellations surpassed new subscriptions. When graphed, the profiles are consistent with those presented in Graph 3.

Graph 4
New subscriptions and cancellations after 1990: corrected



It should be noted, of course, that these figures – and indeed all of the figures presented above – reflect shifts in the quantity rather than quality of the national collection. Fluctuations in the total number of *subscriptions* reveal little or nothing about the total number of *titles* held, and unfortunately the CAUL statistics have never attempted to assess the number of unique titles in academic libraries. The qualitative impact of both cancellations and new subscriptions will depend largely on the extent to which the relevant titles are represented elsewhere in the national collection. There is scope for substantial additional research in this regard. Some research into the cancellation aspect of this equation has been undertaken by Genoni,[17] and other relevant information is found in recent collection overlap studies.[18]

Discussion

It is difficult – perhaps impossible - to determine with any high degree of accuracy the figures or trends for subscriptions to print serials since 1990. Some of the statistical errors might be corrected or mitigated in some way, but some of the necessary missing data may never be recovered.

It is important, however, that there is at least a better understanding of the shortcomings of the current statistics, and an attempt to place a more accurate representation of 'reality' on the public record in future. It is unfortunate that the CAUL serial subscription statistics have been used in influential public forums without any acknowledgment of their obvious inaccuracy.

Once this inaccuracy is understood, and with the benefit of some additional analysis such as that provided above, a new understanding of serial subscriptions and cancellations during the 1990s begins to emerge. At least some of the available evidence indicates that the rundown of print serial collections in academic libraries was much slower in occurring than has previously been suggested and believed. Indeed, it may well be that although 1998 has been suggested on previous use of the CAUL statistics to have been a culmination of a period of decline for print serial subscriptions, the real decline – to the extent that it can be discerned in the CAUL statistics - began only at about that time. It is certainly difficult to justify the very grim accounts of the decline in subscriptions in the years prior to 1998 given by Batterham, the Houghton Report and others, which were quoted earlier in this paper.

These conclusions are, however, still only tentative at best. More evidence would need to be forthcoming to allow a more accurate analysis. Some of this evidence might potentially be made available from the CAUL libraries. In 2000 CAUL provided the Coalition for Innovation in Scholarly Communication with two recommendations for improving the accuracy of the statistics. Firstly, 'That gaps in CAUL data be completed by extrapolation and interpolation of known data for the years 1990 to 1998'; and secondly, 'That the data be recompiled to reduce the impact of the 'binary divide' of the higher education system on the presentation of the data'.[19] To date no work has been undertaken on either of these recommendations. If implemented these recommendations would, however, go some way towards completing and correcting and the data needed for a accurate longitudinal analysis of changes in print serial subscriptions.

Conclusion

It might be argued that any errors in the past CAUL statistics are of little interest. However, the value for the effort and resources that will be put into compiling the statistics in future years is derived in large part from what they reveal about the way library services and collections evolve in response to their changing environment. This can only be achieved by statistics that can be relied upon for accurate longitudinal analysis. It may be too late to correct some of the uses which have been made of the existing inaccurate statistics, but the permanent statistical record itself should be made as complete and accurate as possible.

Notes:

[1] Australian Library Collections Taskforce *Access to Scientific Journals in Australian Libraries* Available at <http://www.nla.gov.au/initiatives/alctf/fletcher.html

[2] Department of Education Science and Training Information Infrastructure Advisory Committee *Research Information Infrastructure for Australian Higher Education* Canberra DEST 2002 p14 Available at < http://www.dest.gov.au/highered/otherpub/heiiac/report.pdf>

[3] ibid pp47-48

[4] R Batterham *The Chance to Change: Final Report by the Chief Scientist* Canberra Commonwealth of Australia 2000 Available at <http://www.dest.gov.au/ChiefScientist/Reports/Chance.To.Change/Documents/ChanceFinal.pdf>

[5] J Houghton, C Steele and M Henty *Changing Research Practices in the Digital Information and Communication Environment* Canberra Department of Education, Science and Training, 2003 p128 Available at <http://www.dest.gov.au/highered/respubs/changing_res_prac/c_res_%20pract.pdf>

[6] J Houghton *Economics of Scholarly Communication: A Discussion Paper Prepared for the Coalition for Innovation in Scholarly Communication* Victoria University Center for Strategic Economic Studies 2000 Available at <http://www.anu.edu.au/caul/cisc/EconomicsScholarlyCommunication.pdf>; J Houghton 'The crisis in scholarly communication: an economic analysis' Paper presented at *VALA 2002: e-volving Information Futures: 11th Biennial Conference and Exhibition* Available at <http://www.vala.org.au/vala2002/2002pdf/16Houton.pdf>

[7] Council of Australian University Librarians Statistics Focus Group *[Minutes of a] Meeting held Friday 8 August 1997* Available at <http://www.caul.edu.au/meetings/statistics1997.doc>

[8] S O'Connor and S Pugh 'Collaborative purchasing: a model for financially straitened times' *Collection Management* vol 24 no 1 2000 p57

[9] C Steele 'Booked to die?: Australia's information future' *Journal of Librarianship and Information Science* vol 32 no 3 2000 p99

[10] Council of Australian University Librarians *CAUL Statistics: Instructions for Completing the Spreadsheet – June 2001* Available at <http://www.caul.edu.au/stats/instructions2000.doc>

[11] Council of Australian University Librarians Statistics Focus Group *[Minutes of a] Statistics Focus Group Meeting, Melbourne, 16th February 2001* Available at <http://www.caul.edu.au/meetings/statistics20011.doc>

[12] Council of Australian University Librarians *1999 Australian and New Zealand Academic Library Statistics* Available at <http://www.caul.edu.au/stats/1999commentary.htm>

[13] These figures will be updated on the CAUL website following an enquiry made in the course of writing this paper.

[14] Council of Australian University Librarians *A Series of Snapshots of the Size and Nature of Recent Economic Investment in Library and Information Infrastructure Prepared for the Coalition for Innovation in Scholarly Communication* 2000 p3 Available at <http://www.caul.edu.au/stats/cisc/proj-1.report.doc>

[15] The CAUL calculations of the median included the sum of the university library subscriptions and the college library subscriptions for 1986-1990. The CAUL statistics available on the website do not include median figures for

1997 and 1998. These were calculated for use in *A Series of Snapshots* as 3962 and 4082.

[16] The median figure used in *A Series of Snapshots* suffers a particular distortion post 1990 due to the inclusion in the data after that year of the new universities brought about by amalgamations. The graph would have presented a much flatter and presumably more 'accurate' profile if 1990 had been used as the base year.

[17] P Genoni 'An assessment of Australian research library journal cancellations, 1990-2003' *Australian Library Journal* 2004 forthcoming.

[18] R Missingham and R Walls 'Australian University Libraries: collections overlap study' *Australian Library Journal* vol 52 no 3 2003 p247; Australian Research Libraries Collection Analysis Project *Report* 2004 Available at http://www.library.uwa.edu.au/research/arlcap/ARLCAP_Final_report-mark2.pdf

[19] Council of Australian University Librarians *A Series of Snapshots* p3