

# **Assessing the impact of electronic course texts on print sales and library hard copy circulation**

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## Definitions

- The JISC national e-books observatory project is referred to in this report as the '**Observatory project**'.
- The '**JISC disciplines**' are business and management studies, engineering, medicine and media studies.
- Where the term '**e-book**' is used, it refers to generic e-books available via the library, retail channels or on the web.
- Where the term '**course text e-book**' is used, it refers to electronic versions of course texts that support taught course students (e.g. undergraduates).
- Where the term '**JISC e-book**' is used, it is specific to the 36 titles licensed for the Observatory project.
- Where the term '**JISC course text(s)**' is used, it is specific to the equivalent print editions of the JISC e-books.

## Headline findings

### 1. Any differences in hard copy UK sales of the JISC course text editions in 2008 and 2007 are statistically insignificant

Using standard (non-parametric) statistical tests, we find no difference in sales of the JISC course texts between 2007 and 2008. Any observed differences at the collection level are much more likely to be the outcome of random variation than any 'real' difference in the external environment.

### 2. Bearing that qualification in mind, there are some faint signals that 2008 sales held up better than 2007 sales

Although actual year-on-year sales fell by 13.7 per cent (2008 on 2007), this was in fact less than the corresponding fall of 18.7 per cent for the previous period (2007 on 2006). Engineering bucked this trend, reversing the general direction of sales: up 8.0 per cent (2007 on 2006) then down 7.7 percent (2008 on 2007). However, this only had the effect of returning engineering sales to their original 2006 value.

### 3. Again, bearing (1) in mind, there are some faint signals that sales of the JISC course texts outperformed the market

By applying sales attrition factors supplied by Nielsen BookScan, CIBER was able to benchmark sales of the JISC course texts with comparable textbooks and study guides: similar editions published in the same year and in the same broad subject area. On the basis of this analysis, the package of JISC course texts overall sold rather better than expected in our theoretical model: 53 per cent better, in fact.

### 4. The balance of the evidence suggests that free-at-the-point-of-use electronic provision has had little, if any, impact on print sales

It is early days, though, and awareness by staff and students of the JISC e-books is patchy across the sector. The sample of books included in this experiment is a small one: in the order of one per cent of total UK textbook and study guide sales in the four subject areas, so it is impossible to generalise – either forward in time or across titles and publishers.

### 5. Any differences in library print circulation in 2008 and 2007 are statistically insignificant

A sampling of circulation data from 37 universities finds no impact of the Observatory project *at the collection level*. The data are extremely volatile and it is difficult to see any consistent pattern. Demand for business loan copies fell but grew for engineering titles (both significantly).

## Background and context

JISC Collections made 36 course text e-books available free-at-the-point-of-use to students, researchers and teachers at 127 UK universities from Autumn 2007<sup>1</sup>. The titles and editions are detailed as Annex 1.

This report considers UK sales figures, library circulation data, and COUNTER usage statistics against the background of the Observatory project in forming a view on what claims can be made for the wider impact of this experiment.

## Research design

Comprehensive UK sales data (recorded over 13 four-week periods for each year) were supplied by Richard Knight (Nielsen BookScan) and we are grateful for his expert help and guidance. A detailed description of the collection methodology used is appended as Annex 2. Richard also provided a model for benchmarking changes in print sales against industry norms, and this has been very useful in shaping an interpretation of the data.

Circulation figures for the academic years 2006/07 and 2007/08 were provided by a sample of 37 universities together with numbers of loan copies and any changes in book stock (withdrawals or acquisitions) during the period of the experiment. Circulation was recorded as the aggregate number of days that all copies were out on loan: thus, a library with two copies, each of which was on permanent loan, would record 730 days (twice 365). This approach overcomes the problem that definitions of loan status (e.g. overnight, three-weekly, termly) vary considerably between institutions.

For the usage data, we use COUNTER-compliant statistics for MyiLibrary and Wolters Kluwer Health, simply to put the circulation and sales data into a more meaningful context.

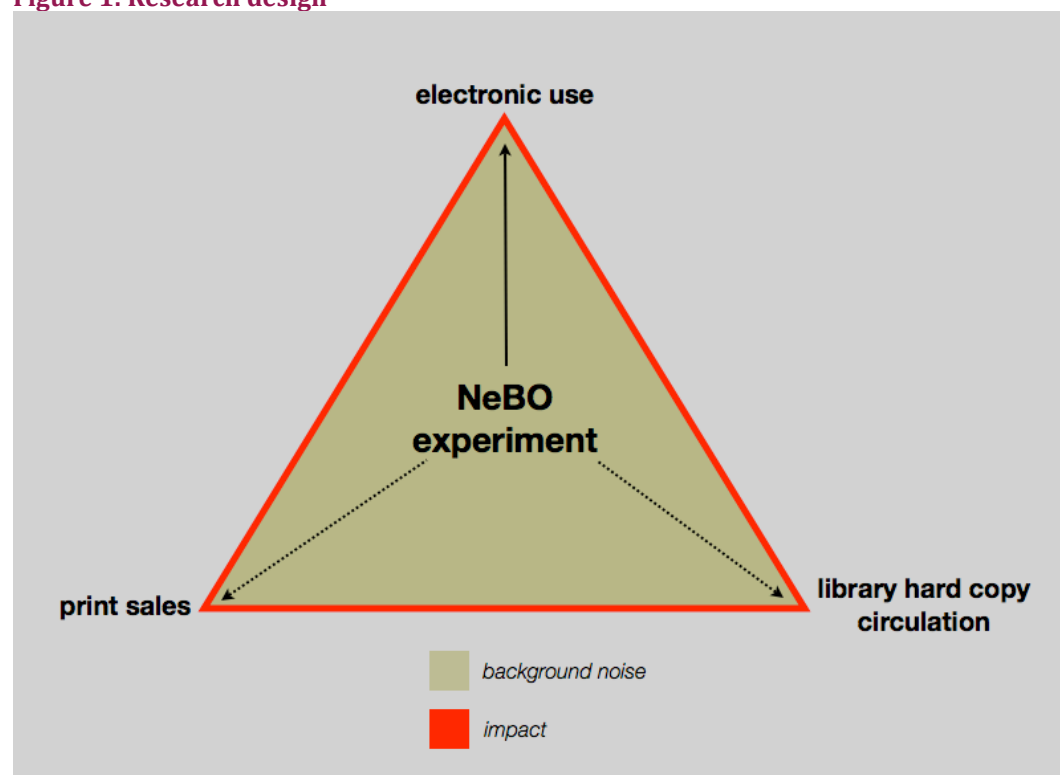
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<sup>1</sup> JISC Collections licensed the JISC e-books from the 1<sup>st</sup> September 2007 until the 31<sup>st</sup> August 2009. Due to delays in receiving the MARC records and integrating them into catalogues, there was relatively little actual electronic use of the resources until January 2008 onwards. For this reason, we feel it is appropriate to make calendar year comparisons between book sales.

## Interpreting the data

This report explores the relationship between electronic use, library hard copy circulation, and UK print sales (Fig.1.). Although we can clearly attribute all electronic use to the Observatory project and measure it directly (see Scholarly e-books usage and information seeking behaviour: a deep log analysis of MyiLibrary, Final Report, CIBER ), any impacts on print sales and on hard copy circulation are more indirect and difficult to isolate, since there is much background noise.

**Figure 1: Research design**



Some of the factors specifically relevant to the interpretation of print sales are discussed later in this report, but it is worth setting out the main limitations of this experiment.

First, the time frame of this investigation is short, little more than a year, and deeper (and possibly different) effects might become evident were a longer experiment possible.

Second, a related point, marketing and promotion of the JISC e-books has been patchy, low profile in some places, excellent in others, so we cannot assume perfect or consistent knowledge of these resources (print or electronic) across the user community.

Third, the sample of titles is small, relative to total UK sales of similar course texts (of the order of one per cent), and so we should not extrapolate from these particulars to make more general claims about electronic course texts and their impacts on sales.

## **Impact on print sales**

### **UK sales overview**

Figures 2-5 show UK sales data (supplied by Nielsen BookScan) for each JISC course text, by subject area.

Two points need to be made. First, sales patterns for each title are highly seasonal within the academic year and the same general pattern is repeated year on year. Second, it is very difficult, indeed practically impossible, to judge by eye whether underlying sales are on an upward or a downward trajectory, since the eye tends to be drawn to the peaks rather than to the area under each curve. For this reason, careful statistical analysis and hypothesis testing is essential.

Figure 2: JISC business and management titles: actual sales, January 2006-August 2008

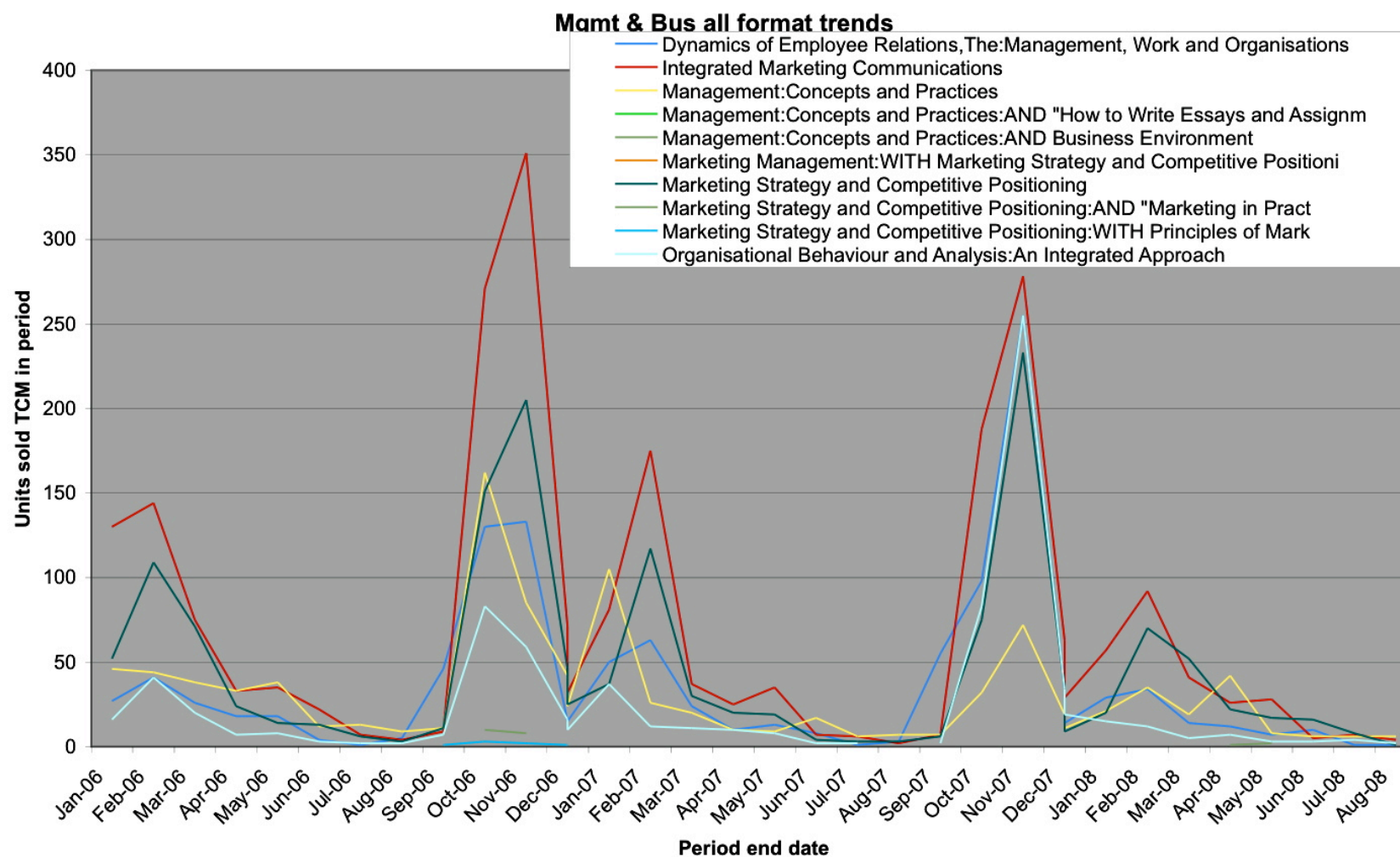


Figure 3: JISC engineering titles: actual sales, January 2006-August 2008

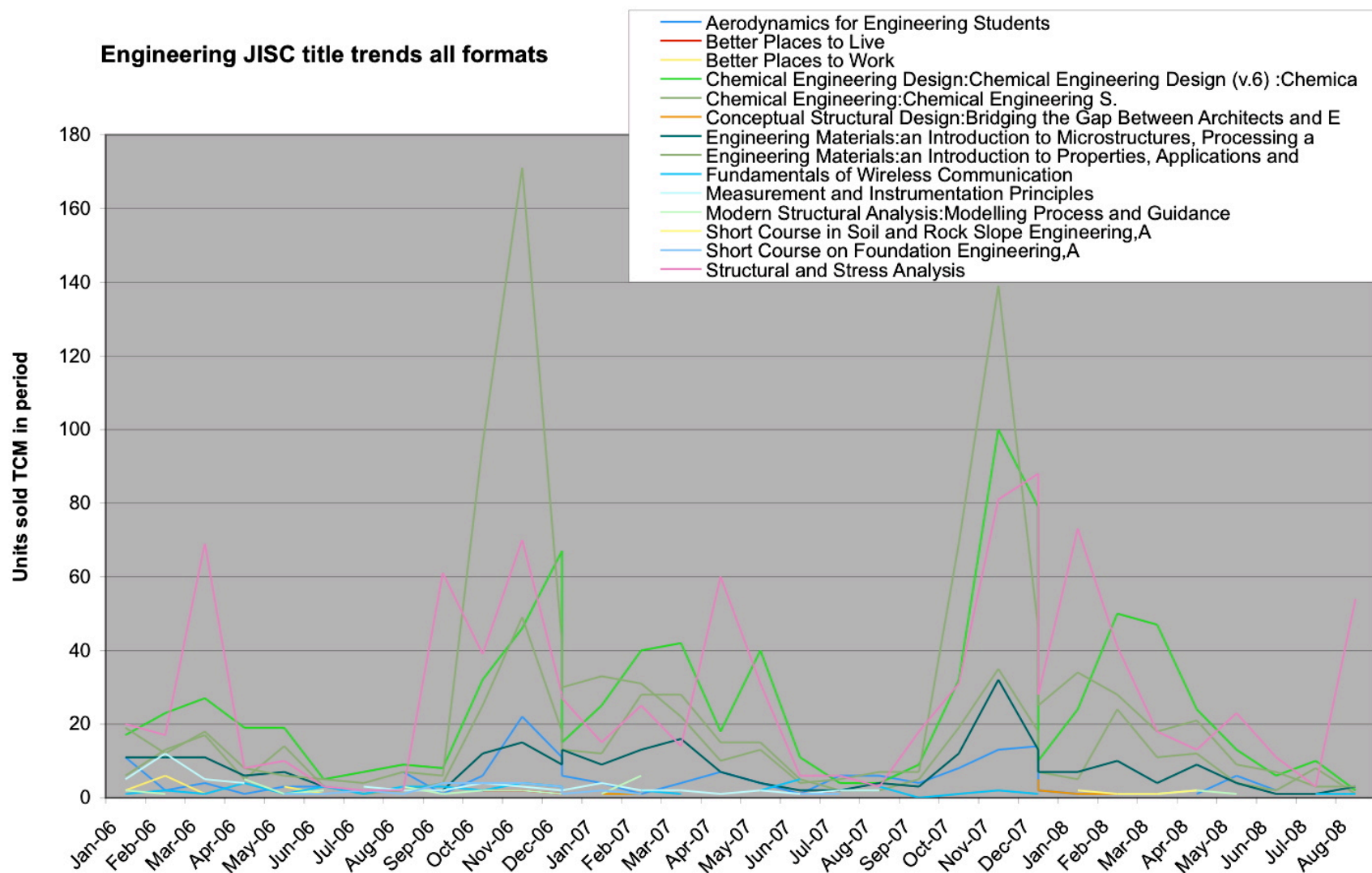




Figure 4: JISC media studies titles: actual sales, January 2006-August 2008.

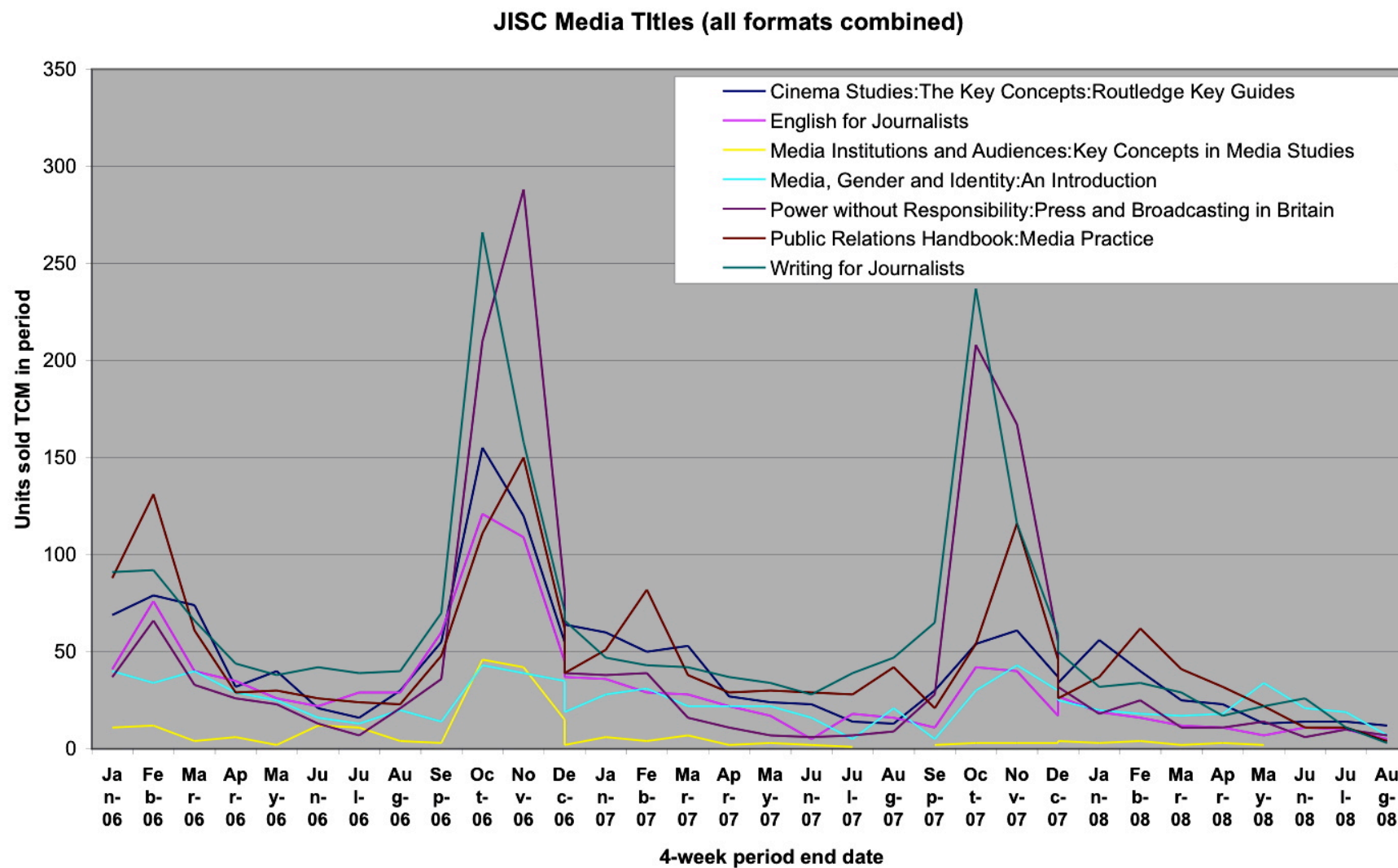
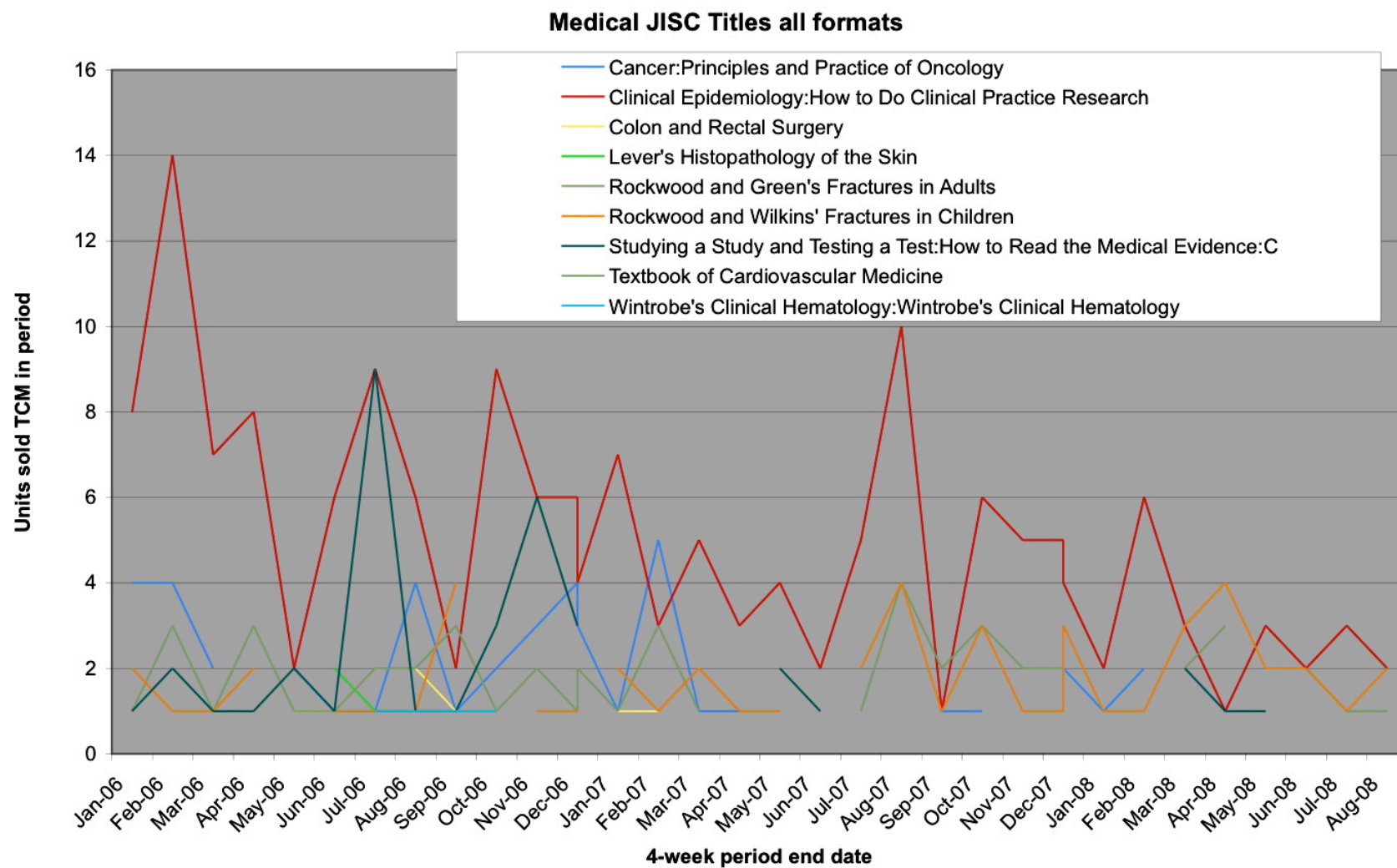


Figure 5: JISC medical titles: actual sales, January 2006-August 2008.



## Modelling sales attrition

The textbook market is constantly being refreshed with new titles and it is not realistic to assume that a given edition's sales will remain static year-on-year. The phenomenon of 'sales attrition' is well known, if imperfectly understood, in textbook publishing. Typically, an edition's sales peak is in the second year of publication and then begins a slow process of annual decline. John Thompson points out that "Before the used book market really took off in the 1980s, textbook publishers generally assumed an attrition rate of 10-20 percent – that is if a textbook sold, say 200,000 copies in a given year, they would generally assume that it would sell about 160,000 in the next year" (Thompson 2005, p.214). Informal discussions with a number of textbook sales managers confirms this figure as a reasonable rule of thumb.

The factors behind this attrition, apart from a burgeoning second-hand market, may include any or all of the following:

- textbooks may have become less affordable over time to students
- students are forming book clubs (as evidenced by the Observatory project user survey)
- publishers are out of touch with student and course tutor needs
- information gradually becomes substitutable on the open web / lecture notes
- books date and lose their appeal
- new titles and editions eat into existing market share
- booksellers lose interest in older editions and prefer to stock the latest editions
- lecturers lose interest in renewing bookshop orders
- the library may buy more copies, relative per head of student population
- marketing effort shifts rapidly from current to new and forthcoming titles
- older books become less visible, they are no longer reviewed nor as actively promoted

In the context of this report, there is also of course a possibility that JISC-enabled e-book access has also influenced the landscape, but this cannot be quantified separately from the factors above since few are easily measurable or even captured.

The 'Thompson' hypothesis that textbook sales typically exhibit annual attrition roughly of the order of 20 per cent is lent support by a CIBER analysis of the long-running UK sales trends for a popular JISC course text, *Writing for Journalists*, over the period January 2001 to August 2007. As can be seen in Figure 6<sup>2</sup>, sales (the blue line) are highly seasonal through the academic year but by using time series analysis, we can uncover the underlying trend (the green line). The vertical line indicates the start of the Observatory project.

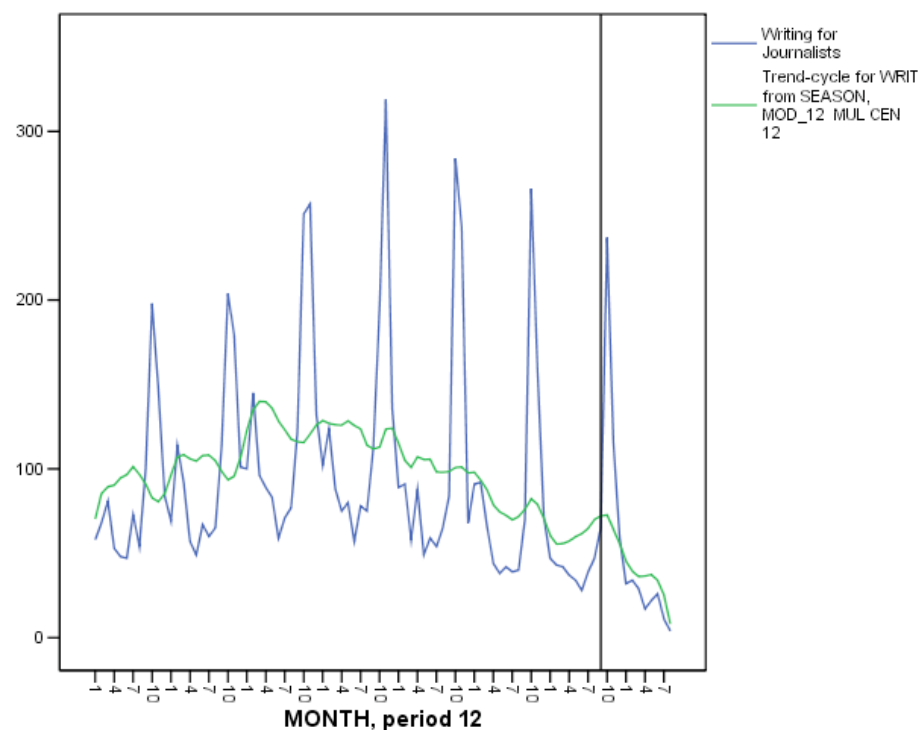
In this analysis, sales for the 80 months before the Observatory project began operation were used to forecast predicted sales during the

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<sup>2</sup> This analysis was carried out using SPSS time series analysis: sales data were fitted using a multiplicative seasonal decomposition model.

Observatory's first year. In other words, what sales might we reasonably have expected in 2007/08 on the previous year, given the long-running trends in sales up to that point? In this case, *Writing for Journalists* (Figure 6), the answer is around -33.6%. It will be noted, however, that the green line is quite bumpy and that this is not an exact science!

**Figure 6: *Writing for Journalists*: predicted Observatory sales based on past performance**



Another way of quantifying sales attrition is to use a basket of similar textbooks as an industry benchmark. The attrition data in Table 1 are based on a large-scale analysis of Nielsen BookScan data (courtesy of Richard Knight) and this is easiest to explain by example: take Blyton & Turnball, *The Dynamics of Employee Relations*, Palgrave Macmillan, 3<sup>rd</sup> edition, 2004, for instance.

This *edition* was first published in 2004, so we go to the 2004 column to the row for Business, Accounting and Vocational in BookScan speak. This tells us that in 2008, we would expect UK sales of all textbooks and study guides in that subject category still in a 2004 edition to have fallen, on

average, by 44% from the previous year (2007).

This is an evidence-based approach to a pin down a difficult problem of moving targets, and we can at least be confident that we are comparing Blyton & Turnbull with similar business textbooks published at the same time.

**Table 1: Nielsen BookScan attrition factors by subject area**

	Anticipated drop in sales between 2008 and 2007 for editions first published in						
	2000	2001	2002	2003	2004	2005	2006
<i>BookScan textbooks and study guides:</i>							
<b>Business, Accounting &amp; Vocational</b> (S4.0T)	-37%	-39%	-29%	-43%	-44%	-29%	-36%
<b>Medicine</b> (S6.1T)	-34%	-47%	-46%	-43%	-20%	-25%	-11%
<b>Engineering &amp; Technology</b> (S9.9T)	-28%	-20%	-66%	-34%	-16%	-47%	-7%
<b>Literary Studies</b> (T3.9T)	-24%	-26%	-29%	-10%	-14%	-20%	-30%
<b>All the above</b>	<b>-31%</b>	<b>-33%</b>	<b>-43%</b>	<b>-33%</b>	<b>-24%</b>	<b>-30%</b>	<b>-21%</b>

These attrition factors are applied to 2007 actual sales in the next section to generate some predictions for the level of sales we might reasonably have expected for each title in 2008, given these norms.

## Findings: analysis by title and subject group

Table 2 offers an analysis of UK sales at the title level. Notes for each column (a – i) are provided underneath the table.

Table 2: UK print sales (Nielsen BookScan): analysis by title and subject group

	2006 sales (actuals)	2007 sales (actuals)	2008 sales (actuals)	2008 sales (expected)	BookScan attrition factor	% change 07 on 06 (actuals)	% change 08 on 07 (actuals)	Index change	New ed.	Totals
	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	
<b>Business &amp; management</b>	<b>3,350</b>	<b>3,057</b>	<b>2,907</b>	<b>1,723</b>	.	<b>-8.7</b>	<b>-4.9</b>	<b>168.8</b>		<b>9,314</b>
<i>Dynamics of Employee Relations</i>	479	628	283	352	-44%	31.1	-54.9	80.5		1,390
<i>Integrated Marketing Comms</i>	1,259	1,022	741	572	-44%	-18.8	-27.5	129.5		3,022
<i>Management Concepts &amp; Practices</i>	575	341	360	191	-44%	-40.7	5.6	188.5	Y	1,276
<i>Marketing Strategy &amp; Comp. Pos.</i>	763	591	640	337	-43%	-22.5	8.3	190.0	Y	1,994
<i>Organisational Behav. &amp; Analysis</i>	274	475	883	271	-43%	73.4	85.9	326.1		1,632
<b>Engineering</b>	<b>1,573</b>	<b>1,699</b>	<b>1,569</b>	<b>869</b>	.	<b>8.0</b>	<b>-7.7</b>	<b>180.5</b>		<b>4,841</b>
<i>Aerodynamics for Eng. Students</i>	77	74	38	49	-34%	-3.9	-48.6	77.8		189
<i>Better Places to Live</i>	10	5	3	4	-20%	-50.0	-40.0	75.0		18
<i>Better Places to Work</i>	14	0	1	0	-47%	-100.0	.	.		15
<i>Chemical Engineering, Volume 2</i>	170	191	133	65	-66%	12.4	-30.4	204.8		494
<i>Chemical Engineering, Volume 6</i>	294	414	317	219	-47%	40.8	-23.4	144.5		1,025
<i>Conceptual Structural Design</i>	6	12	14	8	-34%	100.0	16.7	176.8		32
<i>Engineering Materials 1</i>	424	411	417	206	-50%	-3.1	1.5	202.9		1,252
<i>Engineering Materials 2</i>	100	124	97	62	-50%	24.0	-21.8	156.5		321
<i>Fundamentals of Wireless Comm.</i>	30	17	9	9	-47%	-43.3	-47.1	99.9		56
<i>Measurement &amp; Instrumentation</i>	44	18	4	14	-20%	-59.1	-77.8	27.8		66
<i>Modern Structural Analysis</i>	20	10	7	5	-47%	-50.0	-30.0	132.1		37
<i>Short Course in Foundation Eng.</i>	22	10	3	7	-28%	-54.5	-70.0	41.7		35
<i>Short Course in Soil &amp; Rock Slope</i>	6	7	21	6	-20%	16.7	200.0	375.0		34
<i>Structural &amp; Stress Analysis</i>	356	406	505	215	-47%	14.0	24.4	234.7		1,267

	2006 sales (actuals)	2007 sales (actuals)	2008 sales (actuals)	2008 sales (expected)	BookScan attrition factor	% change 07 on 06 (actuals)	% change 08 on 07 (actuals)	Index change	New ed.	Totals
	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	
<b>Media studies</b>	<b>4,802</b>	<b>3,187</b>	<b>2,406</b>	<b>1,863</b>		<b>-33.6</b>	<b>-24.5</b>	<b>129.2</b>		<b>10,395</b>
<i>Cinema Studies: The Key Concepts</i>	810	480	508	336	-30%	-40.7	5.8	151.2		1,798
<i>English for Journalists</i>	670	308	376	216	-30%	-54.0	22.1	174.4		1,354
<i>Media Institutions &amp; Audiences</i>	170	40	18	28	-29%	-76.5	-55.0	63.4		228
<i>Media, Gender &amp; Identity</i>	367	300	291	213	-29%	-18.3	-3.0	136.6	Y	958
<i>Power Without Responsibility</i>	880	623	528	561	-10%	-29.2	-15.2	94.2		2,031
<i>Public Relations Handbook</i>	822	592	425	509	-14%	-28.0	-28.2	83.5	Y	1,839
<i>Writing for Journalists</i>	1,083	844	260	n/a	n/a	-22.1	-69.2	.	Y	2,187
<b>Medicine</b>	<b>204</b>	<b>133</b>	<b>87</b>	<b>101</b>	.	<b>-34.8</b>	<b>-34.6</b>	<b>86.0</b>		<b>424</b>
<i>Cancer</i>	31	15	4	12	-20%	-51.6	-73.3	33.3	Y	50
<i>Clinical Epidemiology</i>	87	60	35	45	-25%	-31.0	-41.7	77.8		182
<i>Colon &amp; Rectal Surgery</i>	7	3	1	2	-20%	-57.1	-66.7	41.7		11
<i>Fracture in Adults</i>	23	20	12	15	-25%	-13.0	-40.0	80.0		55
<i>Fractures in Children</i>	15	22	21	17	-25%	46.7	-4.5	127.3		58
<i>Lever's Histopathology of the Skin</i>	6	3	2	2	-20%	-50.0	-33.3	83.3	Y	11
<i>Merritt's Neurology</i>	.	.	.	.	.	.	.	.		.
<i>Studying a Study &amp; Testing a Test</i>	31	8	12	6	-20%	-74.2	50.0	187.5		51
<i>Text of Cardiovascular Medicine</i>	0	1	0	1	-9%	.	-100.0	0.0		1
<i>Wintrobe's Clinical Hematology</i>	4	1	0	1	0.57	-75.0	-100.0	0.0	Y	5
<b>TOTAL</b>	<b>9,929</b>	<b>8,076</b>	<b>6,969</b>	<b>4,556</b>		<b>-18.7</b>	<b>-13.7</b>	<b>-153.0</b>		<b>24,974</b>
<b>Standard Deviation</b>	<b>356.8</b>	<b>281.9</b>	<b>250.4</b>	<b>250.4</b>		<b>44.8</b>	<b>56.3</b>	<b>84.7</b>		

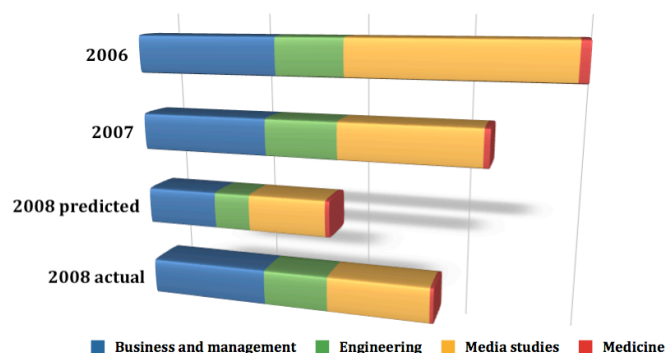
## Notes

- a* UK sales volumes (actuals) for calendar 2006 (before Observatory project)
- b* UK sales volumes (actuals) for calendar 2007 (before significant JISC Observatory use)
- c* UK sales volumes (actuals) for calendar 2008 (parallel with JISC Observatory)
- d* Anticipated 2008 UK sales volumes, as projected from 2007 actuals using the sales attrition factor below (*e*)
- e* Nielsen BookScan sales attrition factor (see Table 1, p. X)
- f* The difference between 2007 and 2006 actual sales, expressed in percentage terms.
- g* The difference between 2008 and 2007 actual sales, expressed in percentage terms.
- h* The difference between 2008 *actual* and 2008 *projected* sales (see *d* above), expressed as an index of 2007 actual sales.
- i* Whether a new edition appeared during the course of the Observatory project.

The key point to emerge from this analysis is that there is no evidence of a larger than expected fall off in sales during 2008 co-incidental with the introduction of free-at-the-point-of-use electronic provision. This is supported by a non-parametric test<sup>3</sup> that finds **no significant difference between 2007 actual and 2008 predicted sales**. In fact, actual volumes in 2008 declined *less* in both absolute and percentage terms than they did in 2007 for three of the subject areas. Engineering is the exception, although it is worth noting almost no difference between 2008 and 2006 sales volumes.

The analysis is summarised in Figure 7. This further suggests that, sales probably held their own rather well against the 2008 predictions based on the Nielsen BookScan attrition factors.

**Figure 7: UK sales trends: all JISC course texts, 2006-2008.**



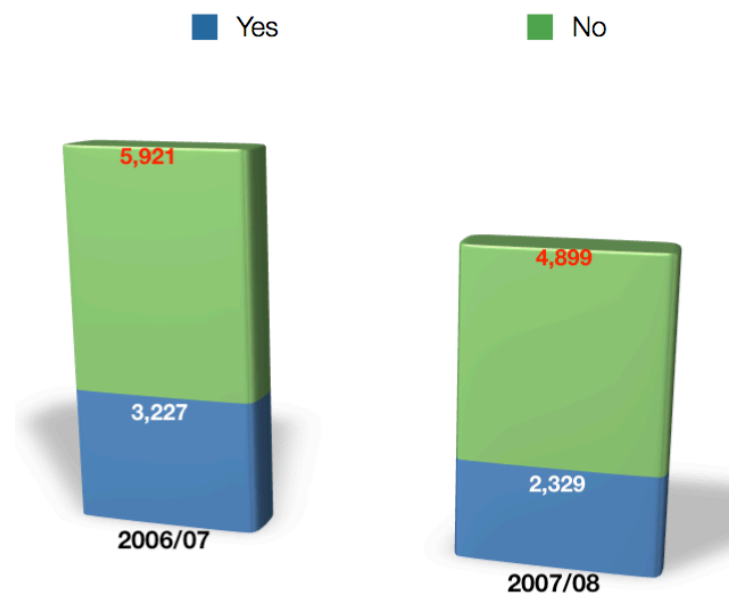
During the course of the Observatory project, eight titles were re-published in a newer edition (as detailed in Annex 2). This factor does not seem to

<sup>3</sup> Wilcoxon Signed Rank Test:  $z=-1.114$ ,  $p=0.265$ .



have influenced the experiment to date, since, statistically, there is no difference<sup>4</sup> in the sales volume fall for titles with a new edition and those without. This is a very small sample and several new editions came in late in the cycle. For the purposes of this report, however, we can discount the impact of new editions on sales of earlier editions within the study timeframe.

**Figure 8: Comparison of UK sales (actuals): titles with and without new editions, 2008.**



<sup>4</sup> Wilcoxon Signed Rank Test:  $z=-1.114$ ,  $p=0.265$ .

For the sake of completeness, we repeat the analysis here, removing the eight titles that went into new editions:

**Restricted set (*excluding titles with new editions*)** ( $n=28$  titles)

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2006 actual sales	-
2007 actual sales	<b>14.2% down</b> actual 2007 on actual 2006
2008 actual sales	<b>7.5% down</b> actual 2008 on actual 2007
2008 predicted sales	<b>51.5% up</b> actual 2008 on predicted 2008

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## Findings: analysis by publisher

This table contains the same data as Table 1, but this time re-aggregated by publisher rather than by subject.

**Table 2: UK print sales (Nielsen BookScan): analysis by publisher**

	<b>Titles and new eds.</b>	<b>2006 sales (actuals)</b>	<b>2007 sales (actuals)</b>	<b>2008 sales (actuals)</b>	<b>2008 sales (predicted)</b>	<b>% change 07 on 06 (actuals)</b>	<b>% change 08 on 07 (actuals)</b>	<b>Index change 08 on 07 (adjusted)</b>
	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>
<i>Cambridge University Press</i>	1(0)	30	17	9	9	-43.3	-47.1	100.0
<i>Elsevier</i>	8(0)	1,471	1,650	1,525	854	12.2	-7.6	178.6
<i>Lippincott, Williams and Wilkins</i>	10(3)	204	133	87	101	-34.8	-34.6	86.1
<i>Palgrave Macmillan</i>	2(0)	649	668	301	380	2.9	-54.9	79.2
<i>Pearson Education</i>	4(2)	2,871	2,429	2,624	1,371	-15.4	8.0	191.4
<i>Taylor &amp; Francis</i>	6(3)	4,632	3,147	2,388	1,834	-32.1	-24.1	130.2
<i>Thomas Telford</i>	5(0)	72	32	35	22	-55.6	9.4	159.1
<b>All publishers</b>	<b>36(8)</b>	<b>9,929</b>	<b>8,076</b>	<b>6,969</b>	<b>4,556</b>	<b>-18.7</b>	<b>-13.7</b>	<b>153</b>

## Notes

*a*

*b* UK sales volumes (actuals) for calendar 2006 (before JISC Observatory)

*c* UK sales volumes (actuals) for calendar 2007 (before significant JISC Observatory use)

*d* UK sales volumes (actuals) for calendar 2008 (parallel with JISC Observatory)

*e* Anticipated 2008 UK sales volumes, as projected from 2007 actuals using the sales attrition factor

*f* The difference between 2007 and 2006 actual sales, expressed in percentage terms.

*g* The difference between 2008 and 2007 actual sales, expressed in percentage terms.

*h* The difference between 2008 *actual* and 2008 *projected* sales, expressed as an index of 2007 actual sales.

The picture is one of mixed fortunes, with sales for five publishers holding up rather well against expectations (Column h) and two doing not so well. However we are dealing here with very small samples relative to the whole market size and at only two calendar years. The bigger picture is no significant drop in UK sales at the collection level.

## Impact on library hard copy circulation

The information in Table 3 was supplied by the 37 institutions that returned full sets of circulation data to CIBER via an online survey. Again, definitions are provided in the notes under the Table.

**Table 3: Circulation statistics by title (n = 37 universities)**

	Circulation 2006/2007	Loan copies	Loan pressure	Circulation 2007/2008	Loan copies	Loan pressure	% Volume change
	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>
<i>Aerodynamics for Engineering Students</i>	2,965	82	36.2	5,041	75	67.2	70.0
<i>Better Places to Live</i>	1,328	38	34.9	381	38	10.0	-71.3
<i>Better Places to Work</i>	104	4	26.0	112	4	28.0	7.7
<i>Chemical Engineering Design, Volume 6.</i>	3,776	107	35.3	12,399	94	131.9	228.4
<i>Chemical Engineering, Volume 2</i>	4,663	73	63.9	5,516	73	75.6	18.3
<i>Cinema Studies: The Key Concepts</i>	3,990	150	26.6	2,252	150	15.0	-43.6
<i>Conceptual Structural Design</i>	700	23	30.4	359	23	15.6	-48.7
<i>Dynamics of Employee Relations</i>	12,361	211	58.6	8,596	206	41.7	-30.5
<i>Engineering Materials 1</i>	4,942	150	32.9	6,651	139	47.8	34.6
<i>Engineering Materials 2</i>	3,943	177	22.3	6,338	177	35.8	60.7
<i>English for Journalists</i>	669	159	4.2	2,341	159	14.7	249.9
<i>Fundamentals of Wireless Communication</i>	1,677	31	54.1	3,532	30	117.7	110.6
<i>Integrated Marketing Communications</i>	20,952	206	101.7	14,958	182	82.2	-28.6
<i>Management Concepts and Practices</i>	16,926	263	64.4	5,143	286	18.0	-69.6
<i>Marketing Strategy and Competitive Positioning</i>	24,150	270	89.4	21,763	344	63.3	-9.9
<i>Measurement and Instrumentation</i>	1,118	22	50.8	596	22	27.1	-46.7
<i>Media Institutions and Audiences</i>	2,262	72	31.4	2,956	72	41.1	30.7
<i>Media, Gender and Identity</i>	16,023	157	102.1	14,700	167	88.0	-8.3
<i>Modern Structural Analysis</i>	136	8	17.0	357	8	44.6	162.5
<i>Organisational Behaviour and Analysis</i>	12,407	197	63.0	11,906	215	55.4	-4.0
<i>Power Without Responsibility</i>	14,286	446	32.0	10,398	443	23.5	-27.2
<i>Public Relations Handbook</i>	7,034	56	125.6	6,252	63	99.2	-11.1
<i>Short Course in Foundation Engineering</i>	1,828	44	41.5	2,062	44	46.9	12.8
<i>Short Course in Soil and Rock Slope Engineering</i>	998	25	39.9	1,030	25	41.2	3.2
<i>Structural and Stress Analysis</i>	3,532	55	64.2	6,158	52	118.4	74.3
<i>Writing for Journalists</i>	6,911	145	47.7	6,163	154	40.0	-10.8
<i>Fractures in Children</i>	145	6	24.2	376	6	62.7	159.3

<i>Fracture in Adults</i>	130	21	6.2	332	21	15.8	155.4
<i>Colon and Rectal Surgery</i>	0	1	0.0	0	1	0.0	
<i>Cancer</i>	430	32	13.4	552	27	20.4	28.4
<i>Lever's Histopathology of the Skin</i>	291	12	24.3	172	13	13.2	-40.9
<i>Wintrobe's Clinical Hematology</i>	306	10	30.6	160	12	13.3	-47.7
<i>Clinical Epidemiology</i>	839	39	21.5	910	39	23.3	8.5
<i>Studying a Study &amp; Testing a Test: How to Read the Medical Evidence</i>	1,015	49	20.7	1,958	49	40.0	92.9
<i>Merritt's Neurology</i>	121	15	8.1	162	15	10.8	33.9
<i>Textbook of Cardiovascular Medicine</i>	242	10	24.2	358	10	35.8	47.9
<b>Total</b>	<b>173,200</b>	<b>3,366</b>		<b>162,940</b>	<b>3,438</b>		
<b>Mean</b>			<b>51.5</b>			<b>47.4</b>	<b>+6.0</b>

## Notes

- a* Total circulation for the academic year 2006/07. This is the aggregate number of days that all copies of the edition were out on loan, irrespective of loan status.
- b* The number of loan copies reported for the academic year 2006/07, irrespective of loan status.
- c* Circulation (*a*) per loan copy (*b*) for 2006/07. A measure of the pressure on book stock (maximum value = 365).
- d* Total circulation for the academic year 2007/08. This is the aggregate number of days that all copies of the edition were out on loan, irrespective of loan status.
- e* The number of loan copies reported for the academic year 2007/08, irrespective of loan status.
- f* Circulation (*d*) per loan copy (*e*) for 2007/08. A measure of the pressure on book stock (maximum value = 365).
- g* The difference between circulation (as in *a*) between 2008/07 and 2007/06, expressed as a percentage.

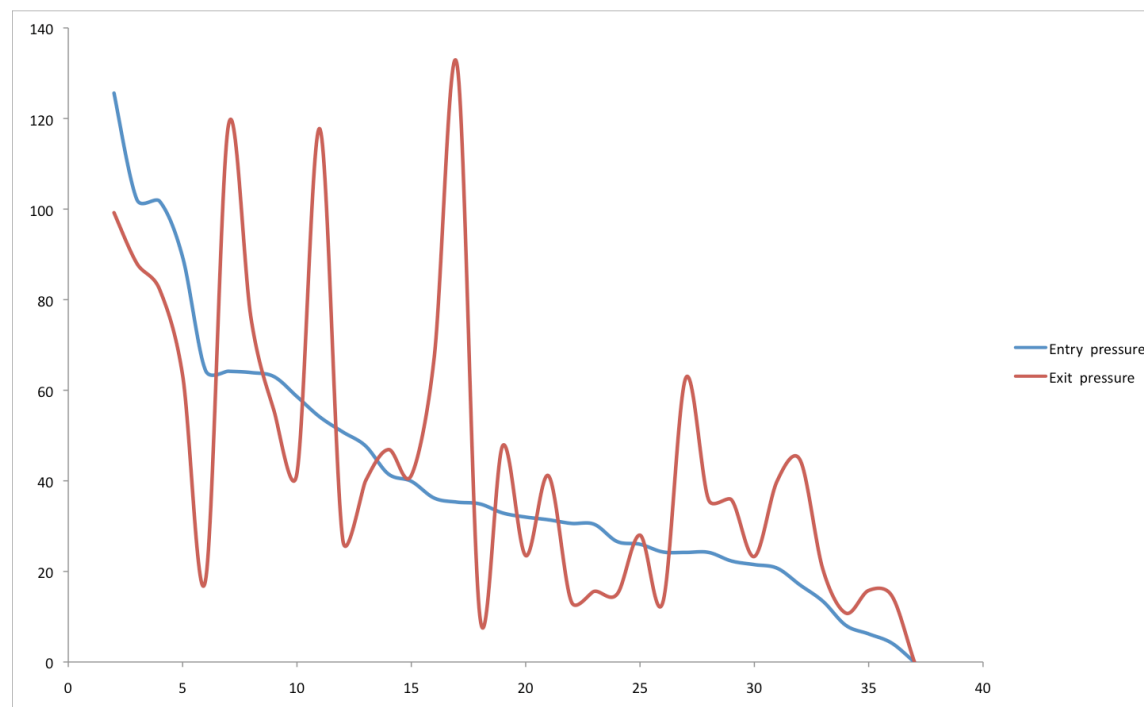
The key finding is that the provision of course text e-books made no difference to hard copy circulation<sup>5</sup> at the collection level. In fact, looking at the data in Column *g*, we can see no consistent pattern: circulation patterns seem volatile.

In Columns *c* and *e*, we present a 'loan pressure' metric. This represents the average number of days a year that a loan copy is actually out on loan. The maximum value is 365 days, so it looks as though loan copies are being used at about 12 per cent of their capacity. This varies a great deal between different universities (the standard deviations are large) and should be interpreted in the light that we know that demand is very seasonal. Loan pressure seems to have eased very slightly during the first academic year of the Observatory project (down to 47.4 from 51.5 days) but this is probably due to a net increase (acquisitions – withdrawals) of the loan stock.

<sup>5</sup> Wilcoxon Signed Rank Test:  $z=-0.49$ ,  $p=0.96$

The lack of any obvious relationship between 'entry' and 'exit' circulation figures are very graphically expressed as Figure 8. This shows loan pressure before (blue) and during (red) the experiment. To make the graphic more accessible, the titles are sorted in descending order by entry pressure.

Figure 8: Pressure on loan stock before and during the Observatory project



It is difficult to conclude anything other than the provision of electronic alternatives has any systematic impact *at the collection level* on print circulation, at least in an experiment on this scale and duration.

When we look at the data by subject, however, we find that circulation decreased significantly in business, increased significantly in engineering and in the other two subject areas there was no real change (Table 4). This is puzzling and needs further investigation.

**Table 4: Circulation statistics by subject area (n = 37 universities)**

	Circulation 2006/2007	Circulation 2007/2008	% Volume change	Statistical verdict
Business and management	86,796	62,366	-39.2	A significant drop <sup>6</sup>
Engineering	31,710	45,062	29.6	A significant increase <sup>7</sup>
Media studies	51,175	50,532	-1.3	No difference <sup>8</sup>
Medicine	3,519	4,980	29.3	No difference <sup>9</sup>

Finally, we look at an interesting set of relationships between circulation and use, by publisher (Table 5) and conduct a small thought experiment.

**Table 5: Circulation and use statistics by publisher (n = 37 universities)**

	ACTUAL DATA		CIBER THOUGHT EXPERIMENT	
	2007/08 circulation (total loan days)	2008 electronic use (Successful session requests)	Total number of loans (assuming 14 days)	Ratio of use to '14-day' loans
Cambridge University Press	1,677	6,617	120	55.1
Elsevier	25,608	110,725	1,829	60.5
Lippincott, Williams & Wilkins	3,519	14,497	251	57.8
Palgrave Macmillan	14,623	40,882	1,045	39.1
Pearson Education	74,435	251,284	5,317	47.3
Taylor & Francis	48,244	171,068	3,446	49.6
Thomas Telford	5,094	23,288	364	64.0
Total	173,200	618,361	12,371	50.0

Table 5 juxtaposes use of the hard copy and electronic versions of the Observatory project titles. Hard copy circulation, as measured here, is the aggregate number of days that all hard copies were off the shelves and out on loan during 2007/08, irrespective of their loan status.

In a simple thought experiment, if we were to make the assumption that an average loan lasts two weeks, then we might express the data in Column 2 as being equivalent to a total of 12,371 14-day loan events (Column 3). If we divide total electronic use (618,361) by this figure, we arrive at a ratio of around 50:1. This seems like a reasonably constant underlying 'digital rhythm' or rule of thumb for the seven publishers. The point really is that circulation and electronic use appear, somehow, to behave like gears on a bike and to move in synchrony.

<sup>6</sup> Wilcoxon Signed Rank Test:  $z=-2.023$ ,  $p=0.043$

<sup>7</sup> Wilcoxon Signed Rank Test:  $z=-2.103$ ,  $p=0.035$

<sup>8</sup> Wilcoxon Signed Rank Test:  $z=-1.352$ ,  $p=0.176$

<sup>9</sup> Wilcoxon Signed Rank Test:  $z=-1.481$ ,  $p=0.139$

Given that our earlier conclusions were that electronic use – at the levels exhibited during the course of the Observatory so far – cannot be shown to have decisively impacted upon either print sales or circulation, the 50:1 ratio might be an interesting idea to research further. The key question being, at what point does this ratio tip over into a decisive impact on sales and circulation? We do not know the answer to that question from this experiment, but there are some interesting leads here for future work.

### **In conclusion**

Given the limitations of this experiment, any conclusions must remain provisional. In the context of what we have seen so far, two points stand out. The first is that free-at-the-point of use electronic access has not led to excessive or over-consumption. We can see this both from the 'gearing ratio' described and from the deep log analysis studies and user surveys that show that much electronic use comprises relatively short sessions, with readers dipping in and out of content rather than reading or downloading the whole book. It seems likely to us, that e-books may be meeting different needs than hard copy.

The second point is that free electronic access has not impacted at all on library circulation: this chimes with many librarians' comments throughout the project, that they see e-books as offering a back-up to the print collection (many made the point that vandalism is a serious issue for course texts) and a safety valve at periods of high intensity demand. They clearly see the two media as being complementary rather than substituting for one another. The lack of a decisive impact on print sales would seem to be very consistent with this point.



## Annex 1: Editions used

### Business and management

Blyton & Turnbull, *The Dynamics of Employee Relations*, Palgrave Macmillan, 3<sup>rd</sup> ed., 2004.  
Hannagan, *Management Concepts & Practices*, Pearson Education, 4<sup>th</sup> ed., 2004 **[5<sup>th</sup> ed. published December 2007]**.  
Hooley, Saunders & Piercy, *Marketing Strategy & Competitive Positioning*, Pearson Education, 3<sup>rd</sup> ed., 2003 **[4<sup>th</sup> ed. published December 2007]**.  
Pickton & Broderick, *Integrated Marketing Communication*, Pearson Education, 2<sup>nd</sup> ed., 2004.  
Rollinson, *Organisational Behaviour and Analysis: An Integrated Approach*, Pearson Education, 3<sup>rd</sup> ed., 2004.

### ENGINEERING

Ashby & Jones, *Engineering Materials 1*, Elsevier, 3<sup>rd</sup> ed., 2005.  
Ashby & Jones, *Engineering Materials 2*, Elsevier, 3<sup>rd</sup> ed., 2005.  
CABE, *Better Places to Work*, Thomas Telford, 1<sup>st</sup> ed., 2005.  
Houghton & Carpenter, *Aerodynamics for Engineering Students*, Elsevier, 5<sup>th</sup> ed., 2003.  
Larsen & Tyas, *Conceptual Structural Design*, Thomas Telford, 1<sup>st</sup> ed., 2003.  
MacLeod, *Modern Structural Analysis*, Thomas Telford, 1<sup>st</sup> ed., 2005.  
Megson, *Structural and Stress Analysis*, Elsevier, 2<sup>nd</sup> ed., 2005.  
Morris, *Measurement and Instrumentation Principles*, Elsevier, 3<sup>rd</sup> ed., 2001.  
ODPM & CABE, *Better Places to Live*, Thomas Telford, 1<sup>st</sup> ed., 2001.  
Richardson & Harker, *Chemical Engineering, Volume 2*, Elsevier, 5<sup>th</sup> ed., 2002.  
Simons & Menzies, *A Short Course in Foundation Engineering*, Thomas Telford, 2<sup>nd</sup> ed., 2000.  
Simons, Menzies & Matthews, *A Short Course in Soil and Rock Slope Engineering*, Thomas Telford, 1<sup>st</sup> ed., 2001.  
Sinnott, *Chemical Engineering, Volume 6*, Elsevier, 4<sup>th</sup> ed., 2005.  
Tse & Viswanath, *Fundamentals of Wireless Communication*, Cambridge University Press, 1<sup>st</sup> ed., 2005.

### MEDIA STUDIES

Curran & Seaton, *Power without Responsibility*, Taylor & Francis, 6<sup>th</sup> ed., 2003.  
Gauntlett, *Media, Gender and Identity*, Taylor & Francis, 1<sup>st</sup> ed., 2002 **[2<sup>nd</sup> ed. published March 2008]**.  
Hayward, *Cinema Studies: The Key Concepts*, Taylor & Francis, 3<sup>rd</sup> ed., 2006.  
Hicks, Adams & Gilbert, *Writing for Journalists*, Taylor & Francis, 1<sup>st</sup> ed., 1999 **[2<sup>nd</sup> ed. published May 2008]**.  
Hicks, *English for Journalists*, Taylor & Francis, 3<sup>rd</sup> ed., 2006.  
Lacey, *Media, Institutions and Audiences*, Palgrave, 1<sup>st</sup> ed., 2002.  
Theaker, *Public Relations Handbook*, Taylor & Francis, 2<sup>nd</sup> ed., 2004 **[3<sup>rd</sup> ed. published December 2007]**.

### MEDICINE

Beaty, *Rockwood & Wilkins' Fractures in Children*, Lippincott Williams & Wilkins, 6<sup>th</sup> ed., 2005.  
Bucholz, *Rockwood and Green's Fracture in Adults*, Lippincott Williams & Wilkins, 6<sup>th</sup> ed., 2005.  
Corman, *Colon and Rectal Surgery*, Lippincott Williams & Wilkins, 5<sup>th</sup> ed., 2004.

DeVita, *Cancer: Principles and Practice of Oncology*, Lippincott Williams & Wilkins, 7<sup>th</sup> ed., 2004 [**8<sup>th</sup> ed. published 2008**].  
Elder, *Lever's Histopathology of the Skin*, Lippincott Williams & Wilkins, 9<sup>th</sup> ed., 2004 [**10<sup>th</sup> ed. published September 2008**].  
Greer, *Wintrobe's Clinical Hematology*, Lippincott Williams & Wilkins, 11<sup>th</sup> ed., 2003 [**12<sup>th</sup> ed. published December 2008**].  
Haynes, *Clinical Epidemiology*, Lippincott Williams & Wilkins, 3<sup>rd</sup> ed., 2005.  
Riegelman, *Studying a Study & Testing a Test: How to Read the Medical Evidence*, Lippincott Williams & Wilkins, 5<sup>th</sup> ed., 2004.  
Rowland, *Merritt's Neurology*, Lippincott Williams & Wilkins, 11<sup>th</sup> ed., 2005.  
Topol, *Textbook of Cardiovascular Medicine*, Lippincott Williams & Wilkins, 3<sup>rd</sup> ed., 2006.

## Annex 2: Methodological notes

This is the text of an email sent by Richard Knight of Nielsen BookScan to Ian Rowlands.

1. Electronically copied all e-book 13 digit ISBN's into an Excel list and ran a TCM total sales for these identifiers from 2006 to Aug 2<sup>nd</sup> 2008. Non of the e-book ISBN's returned sales (not surprisingly since the TCM monitors terrestrial consumer bookshops) but 33 of the 36 physical products did return sales data from this pass.
2. A title search was then conducted on the 3 “non-sales” titles and 2 of them then did show sales, the difference being put down to errors in ISBN's (transposed digits). However, one of the Medical titles “Merritt's Neurology” had no sales from either check 1 or 2 and the conclusion here is that this book has not had any terrestrial sales through the Nielsen BookScan TCM shop panel.
3. Check 2 above showed that sales of “Multiple editions / formats” existed for the 2 titles being searched which were not covered by the original ISBN list in stage 1. This looked significant and so I embarked on title searches for all 36 titles again in order to assess the full extent of terrestrial sales. My logic was that a “Purchaser” would not necessarily confine themselves to the single ISBN edition named in the JISC list and so if a true comparison between e-book use and terrestrial sales were to be produced then it had to encompass all selling formats of the nominated text. However, as far as possible, I would try and retain the sales data at each ISBN level before aggregating up to “Title totals” so that further detailed analysis on formats could be conducted if required. This stage also identified another incorrect ISBN for “Textbook of Cardiovascular Medicine - 9780781732253” (shown as 9780781770125 which is the ISBN for “The Topol Solution :Plus Integrated Content Website”
4. Stage 3 above returned a list of...
  - ◆ 18 ISBN's for the 7 Media titles
  - ◆ 20 ISBN's for the 5 Management & Business titles
  - ◆ 19 ISBN's for the 14 Engineering titles
  - ◆ 10 ISBN's for the 9 Medical Titles where sales data was available (1 title eliminated)

And a sales trend report was run against these sets of ISBN's using Jan 2006 as the start date for the trend for all ISBN's.

5. The trend data was then “cleaned” and pivoted; titles that had been included but on further checks were found to not be the same (but almost identical words in title) were excluded; and graphs drawn to graphically illustrate the key trends. Results for the 4 category groups will be found in spreadsheet “All JISC Trend.xls”. (3 tabs per category for raw data; aggregated data and graph)
6. The visual indication of the graphs was that no significant drop in sales was experienced at Sept 2007 when the JISC e-books were launched. (Deeper analysis required here). However, there was clearly some decay on some titles but the fact that these titles were often several years into their life cycle might lead to the conclusion that the decay was the natural lifecycle of these titles. To try and shed more light on this, I drew a small sample of the leading titles from Media; Management and Engineering categories (generally the TCM sales of the medical titles was too low to consider drawing any further conclusions) and trended these titles sales from 2001 or their publication date whichever was the shortest time span.