

## PEAK AND ELSEVIER SCIENCE

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Presentation made at the PEAK Conference, Ann Arbor, March 23, 2000

### Abstract:

This paper reviews Elsevier Science's participation in the PEAK experiment. Elsevier and Michigan had been partners in the TULIP experiment (1991-95), the first large-scale delivery of journals to university desktops. PEAK was designed by Michigan to address some of the economic questions unresolved by TULIP. Once the design of the experiment was agreed, Elsevier's day-to-day role was limited, but its interest in the outcome of the experiment was high (sufficient to risk participating).

PEAK operated in parallel with Elsevier's own development of local and Web-based commercial journal database services. The issues associated with parallel experimentation and commercialization were significant. Pricing policies and product attributes for the commercial offering were developed and implemented at the same time as the PEAK experiment was ongoing. This created points of comparison and potential tension.

This paper reviews Elsevier Science's relation to PEAK and the application at Elsevier of what has been learned from PEAK.

### Pre-PEAK experimentation with the University of Michigan

Starting in the late 1980s, Elsevier Science had been approached by several universities to do experiments with them that would test the delivery of full text to the desktop over campus local area networks. We had discussions at the Stanford University Medical School, the University of Pennsylvania, Cornell University and Carnegie Mellon University, among others. In each case, the project would be unique to that university and, while perhaps helpful to the university, would do little to give us a test that would be scaleable or that would provide us with sufficient market data to aid in practical product development. We progressed the farthest with Carnegie Mellon and carried those discussions over into a broader forum – the newly-formed Coalition for Networked Information. At the Spring, 1991 CNI meeting, it was agreed that if ten or fifteen universities would commit to the same basic experiment, then a publisher could justify investing in the creation of a major testbed. Fifteen universities organized a project on the spot and the challenge was on.<sup>1</sup>

Out of this challenge came TULIP – The University Licensing Program. Ultimately, nine of the initial fifteen became a part of TULIP (with the other six remaining as observers). The participants were Carnegie Mellon, Cornell, Georgia Tech, MIT, the University of California (all campuses), the University of Michigan, the University of Tennessee, the University of Washington, and Virginia Tech. The experiment went live in January, 1993, and continued through 1995. Elsevier scanned print copies of initially 40 and ultimately 83 materials science journals (starting with the 1992 issues), creating TIFF files with edited, structured ASCII headers and raw OCR-generated ASCII full text files. By the end of the project, more than 500,000 pages were in the system.

These files were shipped to each university, where they were made available to users via software systems developed at each site. Although there was a technical working group and some of the development was shared among more than one site, essentially each implementation was unique. This was the intent of the project, as the thinking at the time was that each university would want to integrate these journals with other information held on their campus and present it in their own context (e.g., within Melville at California, where there was a central hosting that served all campuses).

There were three basic goals of the TULIP project: (1) to determine the technical feasibility of networked distribution, (2) to study reader usage patterns under different distribution situations; and (3) to understand -- through the implementation of prototypes -- alternative costing, pricing, subscription and market models that might be viable in electronic journal systems. The project was enormously successful in many, many ways and an incredible amount was particularly learned about the technical issues. For example, this was in the very early days of the Internet, and Elsevier Science had no Internet server expertise and had to go outside (to Engineering Information, now a part of Elsevier) to be our technical host. Initially all shipments of files were over the Internet, but this proved unsatisfactory. Not only did we at times account for 5% of Internet traffic (the 4,000 TIFF pages sent every two weeks to nine sites was a slow and heavy load), but the logistics on the receiving end did not work well either. In 1994 there was a switch from *push* to *pull* shipments from our central server to the campus machines and, finally, in 1995 to delivery on CD-ROM. In a similar learning mode, TULIP made clear the need for high-speed networks in the links among the California universities.

Mosaic made its appearance in the middle of the project, immediately changing the perspective from unique university installations to a generic model. Indeed, one of the participants – having developed a Unix-based system, only to find the Materials Science Dept. all used Macs – gave up when Mosaic appeared, as it seemed pointless to convert their Unix system for the Mac when something else was going to move in.

In the end, of the nine implementations, it was fair to say that three were very good, three more limited but satisfactory and three never really got underway. The outstanding player was clearly the University of Michigan. They organized their effort with a highly-motivated interdepartmental team, were the first to go live and put up not one but three implementations. There was a general, relatively low-functionality

implementation through the campus MIRLYN system; a much higher-level functionality approach on the College of Engineering's CAEN (Computer-Aided Engineering Network) system; and finally, a Web-based approach when the advantages of a Web-system were clear. Michigan became the TULIP lead site and they graciously showed many visitors their implementation. To some degree Michigan's involvement with JSTOR came out of its TULIP participation, or at least the expertise gained during TULIP.

### From TULIP to PEAK

One of the Elsevier dilemmas during TULIP was what to do when the project ended at the end of 1995. Was there a marketable product here? Had we learned enough about networked delivery of journals to go beyond the limited scope of TULIP? The decision was made in 1994 to scan all 1,100+ Elsevier journals and to launch a commercial version of TULIP called Elsevier Electronic Subscriptions (EES). Michigan became one of the first subscribers when TULIP ended.

In designing the transition, Michigan made it clear that there was one thing they were particularly disappointed in with respect to TULIP: namely, that so little was learned about economics of networked journals. There were many reasons for that – preoccupation with technical and user behavior issues, reluctance on both sides to take risks – but the reality was that Michigan was correct: we had not gathered the hoped-for economic data. Therefore, in deciding to proceed with the EES program, Michigan stressed the importance of continuing our experimental relationship. Out of that discussion came the PEAK (Pricing Electronic Access to Knowledge) experiment.<sup>2</sup>

### PEAK design

Unlike TULIP, where Elsevier took a leading role in the design and oversight of the experiment, PEAK is a University of Michigan experiment in which Elsevier is a participant. Wendy Lougee, from the University Library, was PEAK Project Director and Jeffrey K. Mackie-Mason, a Professor in the School of Information, was PEAK Research Director. It fell to Jeff to do much of the experimental design and, later, the analysis of the results. Wendy took on the thankless task of recruiting other institutional participants and managing all of the day-to-day processes. They were ably assisted by others within the library and the graduate school.

PEAK was similar to TULIP in having a central data provider and a number of participating libraries. The University of Michigan was the host, offering Web access to all Elsevier titles from its site. The participating institutions totaled twelve in all, ranging from a small, highly specialized academic institution to corporations and large research universities. The goal of the experiment was to understand more about how electronic information is valued and to investigate new pricing options.

The participating libraries were assigned by Michigan to one of three groups (Red, Green and Blue). There were also three pricing schemes for content access being

tested and each library group had some (but not full) choice among these three pricing schemes.

In addition to the content fees (which came to Elsevier), Michigan charged a “participation fee,” to offset some of their costs, ranging from \$1000 to \$17,000 per year.

What were the pricing choices?

1. Per article purchase – Charge was \$7 per article. After this type of purchase, the article was available without additional charge to the requesting individual for the duration of the experiment.
2. Generalized subscription -- \$548 for a bundle of 120 articles (\$4.57 per article). Articles accessed under this option were available to the entire user community at no additional charge for the duration of the experiment. Bundles had to be purchased at the beginning of the year and the cost was not refundable if fewer articles were actually used.
3. Traditional subscription -- \$4 per issue (based on the annual number of issues) if the title was subscribed to in paper; \$4 per issue plus 10% of the print price if the title was not subscribed to in paper; full price of the print if the print were to be cancelled during the experiment. Those purchasing a traditional subscription had unlimited use of the title for that year.

In addition to the paid years (1998 and 1999), there were back years (1996-1997) available for free.

Elsevier participated in the pricing in the sense that we had discussions with our Michigan counterparts on pricing levels and in the end agreed to the final prices. There was some give and take on what the prices should be and how they should be measured (*e.g.*, using issues as a measurement for the traditional subscriptions was a compromise introduced to permit some reflection of the varying sizes of the journals). We had hesitation about the low levels of the prices, feeling these to be unrealistic given real costs and the usage levels likely to develop. But in the end we were persuaded by the economic and experimental design arguments of Jeff Mackie-Mason.

Once the prices were set, the Red group had all three choices, Green had choices 1 and 2 and Blue had choices 1 and 3. In making choices, some decided to take all three, some to take only transactions or only generalized. As the experiment ran more than one year, there was an opportunity to recalibrate at the end of 1998 based on what had been learned to date and to make new decisions for 1999.

The process of agreeing to and setting up the experiment and then actually getting underway took much longer than any of the participants expected. We had all hoped for an experiment of at least two years (1997-1998). We started our discussions no later than late 1995, early 1996. The experiment was actually live in 1998 and ended in August, 1999. It is hard now to reconstruct what happened that it took such a long time. Part –

perhaps most – of the initial (long) delay was likely a result of Elsevier hesitation on pricing issues (more on this below), although the experimental design also took time at Michigan. The difficulties later were more in the implementation process. Signing up institutions was difficult – many institutions that were approached were unsure about the price in general and wanted, for example, a lower participation fee (hence the ultimate range of fees negotiated). They were also concerned about participating in an experiment and felt there could be some confusion or difficulty in explaining this to their users. Once signed, start-up also took time at each location. In addition, there was a need (not always immediately recognized) for marketing and promotion of PEAK availability on campus.

### Elsevier's ScienceDirect activities during PEAK

During the PEAK experiment, the management of the experiment and day-to-day contact with participants, including all billing, was handled by Michigan. There were times when we wanted to be more involved in the daily activities, including sending in our sales support staff to assist in training or promotion of the service. We were concerned about the slow start-up at many sites, fearing this would be interpreted as low demand for the journals instead of the effect of needing to promote and acquaint users with the service, something we had learned from TULIP and ScienceDirect. Michigan discouraged this for valid reasons: (1) it was not our system, so we were not familiar with its features and (2) this could interfere with the experimental design.

Instead, we focused on production of the electronic files – and there was plenty to be concerned about there. Elsevier was the supplier of the testbed journals and, in that context, was most active in trying to improve delivery performance. The product delivered to Michigan under the EES program at that time was the same as TULIP – images scanned from the paper copy. That meant they were, by definition, not timely. It also happened that there were issues missing and problems within the files. There were format changes, not all of which were handled with appropriate forewarning on our part. And there were occasional problems on the Michigan end, as when it was discovered that there were about 50 CDs that had been inadvertently misplaced at Michigan and, therefore, never loaded on the server. (This type of problem was not unique to Michigan but is symptomatic of the problems encountered with local hosting.)

Stepping back, it is important to understand Elsevier's product and pricing development during this same time period. The EES product line (the commercialization of TULIP) was available at the time TULIP was ending. It was being sold on a "percentage of print" pricing model, where subscribing institutions paid an additional percentage to receive the electronic files and supplied their own hardware and software. When first introduced, the price had been announced at 35%, as this was the amount that would be required to compensate if all duplicate paper subscriptions were cancelled. It was quickly clear that this was too high – both in terms of what libraries were prepared to pay and what the product was worth. The price quickly dropped, and in the case of Michigan, for example, was less than a 5% premium over the paper price – a very low price set because we very much wanted them to continue with the electronic package.

While Elsevier actively sold the EES product, it had also started in 1995 with the design of what would become ScienceDirect, our Web-based electronic journal system. This system would be driven by the direct output of the journal production system and would offer journal articles both in HTML (from SGML files) and in PDF. (EES later was renamed ScienceDirect On Site and currently delivers PDF files from the production process, avoiding the time delays for most journals.) ScienceDirect would also incorporate some of the lessons learned in TULIP, including the integration of a broader abstracting and index layer with the full text.

ScienceDirect was in beta testing in late 1997, just as the implementation of PEAK was underway. It was available for full commercial use (without charge) in 1998 and sold starting in 1999. That means that the pricing decisions for this product – as well as EES, later SDOS – were going on simultaneously with PEAK. That, in itself, was a source of frustration to the PEAK participants, as there appeared to be a hope that PEAK would lead to a new pricing scheme and Elsevier would not make pricing decisions until PEAK was completed. That was an unrealistic hope from the beginning and one that Elsevier should have done more to temper.

ScienceDirect pricing had as its fundamental initial objective a desire to smooth the transition from paper to electronic. That meant from our side there was a strong incentive to try to maintain the present library spending level with Elsevier Science. We were hoping to reduce the attrition (cancellation) of subscriptions. This translated into the following pricing formula, offered for the 1999 subscription year and continued into 2000:

1. The fees paid by a “normal” ScienceDirect customer have three components: platform fee, content fee and transactional fee.
2. The platform fee is essentially a utility fee – it helps compensate for the basic costs of developing and maintaining the service. The platform fee reflects the type of institution (academic or corporate) and the number of people within the class of people authorized as users of the system.
3. If you were a standard account and wanted to either select only a subset of your paper journals to receive electronically or to cancel duplicates or unique titles from your paper collection, then the content fee is 15% of the paper list price for the titles involved. There is a 10% discount for electronic-only subscriptions. Finally, you can purchase single copies of articles in journals outside of your subscription on a per-transaction basis; the standard price per transaction: \$30.
4. If you are prepared, however, to make a “full commitment,” which means to continue at the spending level currently in paper, then the content fee is reduced to 7.5%, there is a significant transactional allowance that permits you to get articles outside of your subscribed titles at no cost (and then at \$15 per copy if the allowance is used up). You can also substitute within the total spending commitment – that is, cancel a

duplicate or unique title (particularly as you got more usage data) and substitute titles of equal value. This permits an institution to recalibrate its collection as it gathers more usage data.

5. In addition to these basic pricing systems, there are sometimes areas for negotiation, such as the actual amount of the platform fee, the possibility of price caps on print increases from year to year (in multiple year contracts) and, in some cases the content fee percentage as well. Negotiation is a reflection of the individual needs, goals and readiness levels of specific institutions, making the comparison of any two licenses difficult.
6. Finally, in situations involving a consortium, it is possible to construct situations where either all members of the consortium had access to all of the Elsevier titles or where, for a “cross-access fee,” each member could access anything subscribed to by another member of the consortium.

### ScienceDirect versus PEAK pricing

Comparing PEAK with ScienceDirect:

<b>Pricing Feature</b>	<b>ScienceDirect</b>	<b>PEAK</b>	<b>Comments</b>
host charge	platform fee	participation fee	often subject to negotiation; SD fees generally higher than PEAK, but not always
content charge (SD) or traditional subscription access (PEAK)	% of print charge	flat \$4 per issue	PEAK cheaper – e.g., for 2000, <i>Physica A</i> has 56 issues and costs \$4374. \$4/issue = \$224 vs. 7.5% = \$328.
transactions	free transactional allowance; \$15 or \$30 otherwise	\$7 per article	in SD, window of 24 hours of access for each transaction; in PEAK, individual has continuing online access to the article
generalized subscription	nothing comparable	bundles at \$548 for 120 articles	continuing online community access to purchased articles

The two parallel tracks came together during 1999 when it was necessary to plan for the end of PEAK and a transition to ScienceDirect for those libraries wishing to continue to have access to Elsevier journals. We were not willing to continue the experiment beyond August, 1999. As it developed, there was not an option for PEAK participants to continue accessing the journals from Michigan on a commercial rather than experimental basis, as Michigan decided it was ready to stop serving as a host and,

indeed, did not want to continue to receive and mount journals locally for their own use either. While Michigan can better speak to its reasons for deciding to move from being both a local host and a host to others, it appears that the latter was essentially outside the mission or scope (given the work involved) that Michigan saw for itself. Similarly, it appears that continued local hosting for its own users was felt to be less than cost-effective when there was a Web alternative. (Elsevier does have arrangements with other sites – University of Toronto, Los Alamos, and OhioLINK among others – where one institution serves as a host for other libraries.) It was necessary to make a transition plan early in 1999, before PEAK had ended and before the data could be evaluated. What could we take from PEAK (and from non-PEAK ScienceDirect experience) to inform the transition process?

### Access to the whole database

There were two messages we heard from PEAK: the desire for flexibility in pricing (an ability to make choices) and the value of providing access to the entire database. Of these, perhaps not surprisingly, the second message was one we also heard from other customer environments, such as OhioLINK and Toronto, where the user has access to the entire database – namely, there is significant use of articles from non-subscribed titles. Therefore, anything we can do to increase access to the whole database will be a win-win solution for ScienceDirect subscribers.

In PEAK, it follows therefore that the “happiest” participants were those using the generalized subscription model. They liked the notion of having access to the entire database and of not having to pre-select on a journal title basis. Even though almost everyone overbought bundles in 1998, that was generally a reflection of the slower start-up (i.e., if one annualized the monthly use near the end of 1998, the total purchase for the year would generally have been correct). The purchases for 1999 were much more accurate. This also reflects, in our judgment, the need for marketing and promotion (only recognized late in the process) and the need to build a knowledgeable user base.

It is worth briefly considering the experiences of one PEAK customer, Vanderbilt University, in a bit more detail.<sup>3</sup> Going into PEAK, Vanderbilt subscribed to 403 of the 1,175 Elsevier journals in PEAK at a cost of approximately \$700,000 per year. They chose to use only the generalized model, paying \$24,600 for 5,400 tokens in 1999. For many reasons (including the Michigan requirement for a registration process, normal ramping up and the critical introduction part way through the year of a link from their OPAC), tokens were not used at the rate anticipated, ending 1998 with slightly more than 2,800 tokens used. More interesting, however, is what was purchased with these tokens. First, there was heavy use of the engineering titles, attributed to the generally poor quality of the engineering paper collection. “Thus information-starved engineering quickly recognized PEAK as a dream come true...” Second, looking more broadly, Vanderbilt users accessed articles from 637 journals. Of those, 45% (289) were also subscribed to in paper. The remaining 55% (348 titles) were not subscribed to in paper. And, of the 403 titles Vanderbilt subscribed to in paper, 114 (28%) were not used online.

In his paper, John Haar ascribes some of this behavior to the engineering situation and some to the fact that there was little promotion of PEAK availability within the medical community. I think it is also worth considering (as Haar does) whether some of the lower use of titles subscribed to in paper was attributable to the problems Elsevier had in providing current issues. If a journal is important to you and you can read it more quickly in paper than online, then it may not be surprising that the online use is modest. That is, admittedly, a more optimistic spin on the data, but one that we believe has to be considered in evaluations.

It is interesting to compare data during essentially the same time (April 1998 – March 1999) on the use of Elsevier and Academic Press journals by OhioLINK. At the annual American Library Association meeting in June, 1999, Tom Sanville, Executive Director of OhioLINK, presented these average use figures for the 13 universities within OhioLINK:

- there were 1,345 Elsevier and Academic journals available, of which on average (at the institutional level) 362 were owned in print
- 1,035 journals had articles downloaded from them
- of the 1,035, 318 were held in print, 735 (about 70%) were not held in print (again, an average at the institutional level)
- there were 19,284 article downloads, of which 9,231 (48%) were from journals not held in print

This reinforced for us a essential message: there is tremendous value in finding ways to give people access to the entire database. Although there are some collection development librarians who have continued to argue strenuously on listservs that it is essential to select and acquire only on a title-by-title basis, the facts do not support that position. Clearly, in an era of limited funding and budgets inadequate to acquire everything needed by faculty and students, systems that make it easy to access a broad range of refereed information offer significant user advantages. Having said this, however, it is clear that there is still room for much more research in how users actually use services such as ScienceDirect, what value they place on what functionality and content and which enhancements they will appreciate most.

#### Transition from PEAK to ScienceDirect

Given this, there was a push by some PEAK participants for a continuation of the generalized model in the commercial ScienceDirect service. At Elsevier this was extensively discussed. While it would not be immediately possible to switch to a system where one “permanently” buys access at the article level, over the long term it was certainly possible to do this. Yet, to date we have not, preferring other ways of giving full access to the database.

The obvious question is: why not adopt the generalized model? The reason is that from the Elsevier perspective this model runs counter to what we would like to achieve. Our goal is to give people access to as much information as possible on a flat fee, unlimited use basis. Our experience has been that as soon as the usage is metered on a per-article basis, there is an inhibition on use or a concern about exceeding some budget allocation. The generalized model, although offering access to the whole database, is in the end simply a transaction model where the cost of the transaction has been discounted in return for non-refundable prepayment. It is a hybrid – a subscription-based transactional system. It also carries with it increased costs of selling, educating and general marketing to get to the point which a flat rate, all-you-can-use system automatically offers.

What, then, did we do in the transition from PEAK to ScienceDirect for those making the transition? We gave all PEAK customers, as thanks for participating in the experiment and as a way of continuing the transition, unlimited access through 2001 to all titles in the database, but with fees based solely on subscribed content in 1999. For some of the smaller institutions this was an incredibly generous offering. For all schools except Michigan (which would have “earned” a large free transaction allowance in any case) it was a significant improvement over either a normal ScienceDirect license or a PEAK generalized subscription model. The question has to be asked: what happens after 2001? The answer: we expect there will be new pricing plans in place as to ScienceDirect that will make a continuation of access to the whole database possible for the former PEAK – and all other ScienceDirect – accounts.

#### Longer term effect of PEAK on ScienceDirect

What, then, has been the effect of PEAK on Elsevier Science thinking? As was noted above, there were two outstanding lessons we took from PEAK. One is the value of access to the whole database, and that is core to our new product and pricing discussions in 2000. The second is the desire to have choices, to be able to tailor what is purchased to local needs.

In response to this second point, Elsevier moved in 2000 to introduce a second product line called ScienceDirect Web editions. This provides free access to PDF files for all titles subscribed to in paper. Currently, Web editions do not have all the functionality of the full ScienceDirect and they are limited to a nine month rolling backfile. For many libraries, this is the “choice” they want to have and they have decided to sign up for the Web editions rather than the full ScienceDirect. This is positive for Elsevier as well, as it meets more libraries’ needs, and it is likely that Web editions as a product will continue to be enhanced.

There are other product and pricing changes in discussion at Elsevier board level literally this week. The discussions leading up to these changes reflect what we have learned from ScienceDirect and PEAK to date. PEAK has provided significant input to the broad thinking process and we are grateful to the University of Michigan, and in particular to Wendy Lougee and Jeff Mackie-Mason, for their insight and persistence in

making this happen. We hope that the discussion of the pricing and packaging of electronic products, particularly journals, will continue in a spirited way.

### References

- 1 Full information on TULIP is available at <http://www.elsevier.com/locate/tulip>
- 2 Full information on PEAK is available at <http://www.lib.umich.edu/libhome/peak/>
- 3 Haar, John. *Project PEAK: Vanderbilt's Experience with Articles on Demand*. June, 1999 <http://www.lib.umich.edu/libhome/peak/Haar-Nasig.htm>