Facilitating Scholarly Communication: cost and benefits of a Digital University Press

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Abstract

Firenze University Press (FUP) started in 2000 as the Digital Press of the University of Florence (Italy). It is focused on authors/readers, attempting to eliminate obstacles and barriers to effective scholarly communication. The performance indicators chosen for monitoring the service were: 1) customer satisfaction, 2) impact, 3) time, 4) cost. Quantitative and qualitative data were collected during 2000-2001 for improving the services and the products of the Digital Press. In a survey, the existing authors/readers were asked why they had chosen FUP; the potential authors/readers were asked what would persuade them to print/buy from FUP.

When considering the economics of a digital press it may be tempting to focus on financial factors that are directly related to digital press products and services, for example the price of publications and the services of the infrastructure. It is important, however, to be aware of other economic factors. Results of the evaluation indicated that a system-wide view of the costs and benefits of producing and delivering scientific publications must acknowledge the costs and benefits to users and the total costs to the institution. These include, for the user, the elimination of such obstacles as the lengthy editorial process, the cost of downloading bandwidth-hungry images, and the time spent filtering information; while for the university, they include the cost of collecting books in libraries and the cost of the infrastructure needed for the research. As well as facilitating the fixing of exact price, i.e. basing the price of information on the actual cost of publication, the electronic environment facilitates the communication between scholars.

Introduction

Firenze University Press (FUP) is a digital university press, started as a project at the beginning of 2000, inside the University Library System of the University of Florence, with the aim of supporting teachers in publishing and users in accessing the publications. The project was submitted by the University Library Coordinator to the Administration Committee of the University of Florence and since its beginning, the Firenze University Press has been inside the Library System but with budget autonomy. The staff was formed of part-time librarians and technicians.

The objectives of FUP are:

1. Protecting the Intellectual Property Rights (IPR) of both scholars and the University of Florence

The University should revisit the current model in which it ignores its ownership of intellectual property rights of its scholarly output. The new model of agreement between the University of Florence and its authors requires automatic granting of exclusive or non-exclusive licences for using the intellectual property of University teachers within the University, within a group of institutions, or within the national or international scholarly community. An agreement with the National Library of Florence has set the basis for voluntary legal deposit of electronic publications and long-term preservation of publications.

2. Providing assistance to create, convert, and access the publications of FUP

We chose to build a digital press that offered the option of printing the electronic publications on demand. At the start of the FUP project, the number of publications already published by University of Florence, using external publishers, was about 100 each year, with 30 journals in paper and with online tables of contents. In the first year, FUP has published two University journals, converting them into electronic journals, and about 30 other publications.

3. Basing quality on Peer Review

Peer review is greatly valued in the current system of scholarly communication as a mechanism for both quality and quantity control. However, it might be possible to see it less as an absolute prerequisite for publication, and more as a value that can be added after the publication of a scholarly work as it progresses through the new system of electronic publication.

4. Calculating prices on the actual direct costs to the FUP, and being predictable in costs both to authors and subscribers

The new system of electronic publication of FUP will not be free, but we must be self-financing. Significant costs can be removed in the electronic environment (e.g. paper, printing, packing, postage and, in the case of University of Florence, profit). Since neither volume of material nor volume of subscribers will significantly drive costs, there should be higher predictability in costs and pricing.
5. Assuring ease and speed in publication
A scholar-controlled, networking-based scholarly communication system should significantly avoid current delays between the submission of a paper and its appearance in final form. There will be no artificial gathering of information in “issues” or “volumes”; submissions can be “published” when ready; and delivery will be almost instantaneous.

Given that background, what does FUP produce? The first thing it produces is access to FUP publications. Our aim is to improve the diffusion of publications, using the Web and all other channels of the communication chain, such as databases, catalogues, reviews and publicity. Secondly, we produce support for publications. We provide help to authors for conversion of format, editorial services and user guidance. Next, we provide learning resource materials for students. There is, in fact, a reorganisation of teaching in Italian universities in which students must take responsibility for independent study, planned by teachers, with the realisation of learning resources.

Finally, I include two important activities of FUP that contribute to the visibility of publications. The first is the certification process that we guarantee for copyright and identity of copy for the long term and second is the metadata, both in Italian and English, that we produce for the indexing of electronic publications for better retrieval from search engines. Each publication record is sent to the national union catalogue at the National Library and input into the University of Florence Libraries’ catalogue and the specialised databases. All of the activities of FUP are illustrated in Fig. 1; I will return to them later, when speaking about cost centres.

The objectives of FUP and the activities that we engage in cannot be described in isolation but should be seen in the context of our institution (University of Florence) and in the framework of the scholarly communication flow. We have different stakeholders to whom we relate and our outcomes need to support both University outputs (simply saying teaching and research) and the facilitation of scholarly communication.
address the problems associated with the scholarly information explosion tend to focus more on alternative and cheaper formats for publication (Bot, et al. 1998; Fishwick et al. 1998; Harnad 1996; Harnad and Hemus 1997, O'Donnel 1996) than on reducing the quantity of published research output. We try to educate users on the trends and issues of the broader scholarly communication context.

Aspects of FUP performance

The outcomes of FUP should first of all give evidence of being relevant to the University of Florence. These include:

Financial soundness: the University administrators are much more concerned with this than others. Every year there is less money and publications are an expensive cost centre: about Lire 800.000.000 (euro 400.000) is spent each year by departments, paying external publishers for teachers publications.

Quality audit: the Nucleo di Valutazione (Evaluation Pool) is the University’s internal self-evaluation working group, interested in collecting quality data. Recruitment of students and competition between universities keep the money coming in.

Research quality assessment: this is clearly important and is based on a set of indicators, determined by the government, as: impact factor; internationalisation level; cost for publication; and self-financing capacity.

Teaching quality assessment: this preoccupies institutional managers particularly in this moment when higher education in Italy is restructuring teaching.

Are users satisfied with the services? Is FUP cost efficient? Is FUP doing what it has claimed to do?

Then there are various aspects of FUP performance to consider.

FUP quality assessment

Let us think about quality predominantly in terms of outputs rather than inputs. It is very clear the primary focus is on customers. Listening to the customers, looking at the services they need, measuring performance and then making continuous improvements. Are we doing what is needed? How well do we do it?

User requirements

Focusing on what our customers actually want from us should be the starting point for any effective service. To find this out, we tried to obtain, through an e-mail survey, input from users on service priorities. E-mail surveys are not very popular, so people have to be attracted by the potential positive returns. For our users it was an opportunity to influence, through their own feedback, the formation of priorities. We gave them the opportunity to let us know their expectations more clearly in relation to FUP and, ultimately, we hope, a more focused use of FUP services.

During the years 2000 and beginning of 2001 three different users surveys were done, one of which is near completion (the survey to all the Departments). The surveys’ objectives were:

Retrospectively assessing our performance in meeting requirements: the problem with user satisfaction, in addition to the problem of expectations, is that we are asking people about their attitudes towards FUP. We want to enable FUP to respond to user requirements effectively and to articulate to the University management what is required and how we intend to meet requirements.

Defining strategic and service goals to be targeted for the future: what is the impact of surveys and performance measurement on people? Some evidence that our efforts are well directed or, at least, a course of action is needed, leading to a clearer remit from our users.

Public relations (this is a less idealistic but equally valid reason for the survey): simply to be seen doing a user survey gives the right signals to our customers. If we are able to then act on the results of the survey, this is even better.

Coverage of satisfaction survey

The first e-mail survey was sent to authors who have used FUP services (Bertini 2001). The results obtained about the areas of investigation covered are:

<table>
<thead>
<tr>
<th>Area of Investigation</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is FUP good at?</td>
<td>60% Visibility, 30% Speed, 30% Ease, 30% Extended access</td>
</tr>
<tr>
<td>What does FUP need to improve?</td>
<td>30% Checking of draft papers, 20% Peer review</td>
</tr>
<tr>
<td>What types of publications are preferred?</td>
<td>90% Scientific publications, 60% Learning materials</td>
</tr>
<tr>
<td>What is the overall satisfaction with FUP?</td>
<td>100%</td>
</tr>
</tbody>
</table>

I should note that there is a strong interest on learning resources. About 30% of the survey respondents want to publish them and another 30% are contemplating such publications.

Satisfaction is high: all authors will consider publishing with FUP again; one author said he was happy to “leave a sign inside the University” noting his satisfaction.

What respondents preferred from FUP services is electronic visibility (with its extended access), together with speed and simplicity in publishing with FUP. What they think should be improved is: (30%) assistance in editing (proof checking) and (20%) an improvement in the peer review process. Until now we have not checked the proofs because it is very expensive, leaving this responsibility to authors.
User requirements surveys

Another investigation was focused on potential authors/readers to find out what would persuade them to publish with us. Two surveys were conducted: one limited to the scientific community of Sesto (a place close to Florence where the campus of the Faculty of Science is located), and one extended to all the Departments of the University of Florence. The Sesto community survey (Cotoneschi 2001) has been analysed and was reported on at the time of being conducted, initially by discussion inside the “Comitato editoriale” (Editorial Board) of FUP. The prime mechanism for consideration of survey outcomes once the second survey is also completed will be the “Nucleo di valutazione”, an internal working group, which is concerned with liaison and quality assurance issues. It includes representation from the faculty teams and other areas and is the internal group most concerned with the quality enhancement process.

Methodology

We selected a traditional questionnaire approach, offering easy and quick responses using tick boxes where appropriate. Survey respondents were encouraged to write as many comments as they would like. Within each of the questions, the opportunity for extended, unstructured explanatory responses was available.

One of our goals is to get users to make as much use as possible of the actual FUP services. This objective was the leading factor in questionnaire preparation. The management of FUP, however, is prepared to change when the outcomes of the surveys are analysed in the case that the users’ responses suggest that change is necessary.

Areas of investigation covered in the surveys:

1. information about respondents;
2. respondents’ area of study;
3. knowledge of the availability of the FUP services;
4. opinions on aspects of services (types of publications desired, quality review, e-print archives, impact, etc.);
5. opinions on new roles of publishers, university presses, and libraries in electronic publishing;
6. free-form comments.

The work is still in progress and, at the moment, we have collected the data from the first survey of the scientific community in Sesto (Faculty of Science). In particular, we have learned from teachers who had never used FUP services before which promotional factors actually influenced them to try the FUP.

Survey findings

These are the main findings:

**Primary promotional factors:**
- 43% Quality of peer review
- 40% Access control and copyright management
- 35% Published by a recognised publisher

Peer review was identified as the most important factor in overcoming the reluctance of scholars to publish electronically with FUP. Peer review is a process that has evolved over many generations of scholars; it has become the cornerstone of academic publication and is something that is highly valued in all scholarly activities (among them the pragmatics of academic review). We must recognise that peer review is necessarily, and appropriately, a conservative process and that any new scholarly endeavour will take time to gain general acceptance.

The two other factors in the table above are related to traditional print publications, with a well-managed flow of activities and certification of printing. This reveals the misunderstanding that authors continue to have about the relationship between impact (impact factor in particular) and the access control governed by publishers (in particular, a few of them in a globalised arena). The discussion of this problem could be very long and, for the objectives of this presentation lead us outside the borders I have fixed of the FUP evaluation; let me cite Harnad as the most important author who is trying to convince scholars to change their most traditional publishing behaviours (Harnad, 1991). There is awareness among the University of Florence faculty that copyright is the main obstacle to the diffusion of electronic publications. SPARC is focused on educating authors about these issues.

Secondary promotional factors:

The other factors identified by this survey are the same factors identified in the author’s survey:

- Visibility
- Ease of publication
- Speed

All these factors are considered are important opportunities for electronic publications and we know that these are the strengths of the availability of FUP services. The principal advantage of electronic publishing is rapid availability.

Respondents’ opinions of other aspects of services include:

1. **Credibility of electronic publications**

The choice of an electronic medium for the FUP project was not based on cost savings but on improving access. Our users, as readers who have become accus-
tomed to using the Internet, should also be convinced
to use the Internet for publishing. It is important to
realise that the problem of establishing the credibility
of electronic publications is, in one sense, circular.
Since established scholars are suspicious of the
medium, they are unwilling to publish in it; and
because they do not publish in it, the medium will
continue to lack credibility. This result was in some
sense surprising for us, because we had expected that
the scientific community would have had a more posi-
tive opinion of electronic publications. We also found
that young scholars are unlikely to take the risk of pub-
lishing in an electronic format.

A second concern was over the value that is
ascribed to electronic scholarship. Most members of
academic staff at Italian universities go through a peri-
odic (often annual) assessment of their academic per-
formance, largely based on “impact factor”. For many,
this assessment is tied to the process of granting merit
awards. Impact factor is an indicator related to print
publications and to the traditional communication
flow. Once again, the process is circular: the impact of
an established publisher of print on paper publications
is more highly valued and this situation is an obstacle
to the credibility of electronic publication. We should
remember that 20% of the journals have 80% of the
impact factor. As this indicator is currently calculated,
FUP has little chance of competing with these big pub-
lishers. Concern over the perceived value of electronic
publication will inevitably lead to decreased usage of
this method of dissemination.

2. Roles in electronic publishing
This part of the questionnaire was aimed at under-
standing what the community of Sesto envisioned as
the roles and relationships along the information chain
in the electronic publishing environment. The respond-
ents identified, in addition to the authors, three tradi-
tional roles with a more or less equivalent weight:
libraries, university presses, and publishers. They see
that there is some need for the specific characteristics
of each of them. Our findings are as follows: 43% of
respondents think that the university press has a role,
while 36% continue to believe in the role of publish-
ers. Considering that in Italy the academic presses do
not traditionally have an established role as publishers,
we think that this result is very good for us. The role
attributed to libraries is important too: 53% of the
respondents thought that libraries had a role in
publishing. In particular, 92% of the respondents
recognised a role in e-print management among the
traditional tasks of cataloguing, conservation and cir-
culation.

3. Types of documents
Electronic journals are of major interest; they represent
reliable, selected and quality-controlled sources of
knowledge and are also an important factor in career
assessment and funds assignments. The concept of
publishing is identified with journal articles, selected
by peer review and published by a recognised pub-
lisher. The e-prints produced are submitted for publica-
tion in journals or in conference proceedings, or are
part of project reports and deliverables. There is also
great interest in production of course notes for the
community of Sesto; these are now generally diffused
on the Web.

FUP performance indicators
It is evident that not only are we evaluating FUP out-
puts to improve our services, we are also hoping to
influence managers to provide financial support and to
influence people in their behaviour in electronic pub-
lishing. The FUP is not trying to produce academically
impressive reports on our performance. We must keep
in mind that there are a lot of different audiences for
FUP performance indicators and that they each have
different requirements.

Another complicated factor is the number of things
that go on at the FUP completing the full life cycle of
electronic documents. We have to make the effort of
evaluating and reporting proportionate to the possible
benefits, and go for the broad picture. For example, we
must measure the cost of publishing, while also consid-
ering the cost to libraries in acquiring resources or the
cost of doing research work, bringing a work to publi-
cation, and finally, the cost of readers for assessing the
publications. As the first step, we need to limit the
measures to actual costs incurred by the FUP.

What subjects should we put down for our list of
measures? FUP started with four key measures:

- • customer satisfaction, including both authors and
  readers;
- • impact, intending services and publications usage;
- • cost efficiency (relevance to University outputs);
- • time, considered as time until publication and time
  spent accessing publications.

From the surveys, we have learned that the quality
of scientific communication is very important for the
credibility of FUP services. In Italy, quality is confused
with impact factor at the moment. We want to stress
that there should be at least two quality indicators:

- • Impact; and
- • Peer review.

The impact of electronic publications is reliant on
easy and constant access to the materials because in
the electronic environment, access issues are as impor-
tant as the content of information. We decided to mea-
sure impact by monitoring the use of FUP publications.
This is again a quantitative indicator, extended to cita-
tion linking between articles and to usability surveys.
If we equate quality of scientific communication with quality of content, impact measures are not enough. Once, only peer review could be an indicator of content assessment. In the electronic environment, peer review could continue to be the traditional anonymous process preceding the publication, but we could instead rearrange the process so that review happens post-electronic publication, that is, after the publication is put on a server of the Web. Pre-peer review has the important result of limiting the quantity of publications; however, FUP wants to give authors the opportunity to publish immediately on an e-print server, leaving the peer review for later.

To date, only ten indicators have been calculated:

**IMPACT INDICATORS**

We are currently trying to distinguish between the impact indicators related to access and those related to use. We define access as accessibility, as traditional libraries usually organise their collection. At the moment, access to FUP publications is a "just in case" way of accessing an electronic collection, similar to a print collection, because we have not yet used all the possibilities of the Web. For FUP this means producing and making quality publications accessible on line, with the easiest interface we can offer. The use of our publications can be related to the output measures traditional libraries adopt. In particular:

**ACCESS INDICATORS**

- number of publications accepted / received;
- number of publications produced per type of publication, divided by subject;
- number of citations in data bases and catalogues;
- number of reviews;
- number of links to publications.

**USE INDICATORS**

- total use (number of times FUP site was hit);
- number of searches for title;
- number of unique IP addresses that accessed the title;
- number of articles downloaded;
- number of subscribers, orders received.

We would like to begin with one set of measures available for some Highwire Press titles and determine what they tell us about our own performance. The Highwire statistics provide some basic data as well as some meaningful novel data. What is particularly useful is the number of unique IP addresses that access this site. From this data we can conjecture that a wide range of researchers frequently use this resource. Thus, this type of reporting not only provides a sense of the volume, but also of the breadth of use for a particular title.

**TIME INDICATORS**

Timeliness is an important factor for our authors/readers and so we try to measure:

- Average time from submission to publication on the Web;
- Average time spent on research sessions.

Time is also an important factor because it is related to cost, both for FUP and for its customers. The cost measures are very important for FUP because we have to give clear accountability of what we do.

**COST MEASURES**

The cost measures are the only indicators we have already calculated. In particular we measure:

- cost of publication and the related: cost savings
- self-financing capacity and the related: cost recovery
- cost of publication / use and the related: cost/benefits to users

The cost for publication was calculated as:

\[
\text{Total direct costs + total indirect costs divided by total publications} = \text{cost per publication}
\]

We have considered all the costs involved, internal costs of structure and direct cost related to production of publications. At the moment we cannot measure the cost to libraries in acquiring resources, doing the research work, or for readers in accessing the publications. However, from the University of Florence's point of view, this kind of consideration of all the costs involved in scientific communication would be of great value.

The direct production costs of the first copy of the publication have been considered for the activities of editing, digitisation, conversion of format, indexing, management of digital document, distribution and promotion, management of access and administration of orders. Print on demand and distribution of print copies should also be added as a direct cost of publication. The indirect costs are staff time and FUP infrastructure (building, equipment, heating and so on). We have also considered the staff time spent in all the FUP activities (as illustrated in Fig. 1). It should be noted that FUP has used only facilities of the University of Florence, so these indirect costs would be, in any case, sustained.
The cost indicator has been used for calculating:

- **cost savings** gained by: (1) automating the editorial function, dispensing with editorial desk work such as marking up and proof reading; and of course, (2) distributing the material electronically;

- **cost-recovery mechanism:** it is important that journals and publications are priced at a level sufficient to recover costs. We are considering a form of charges for print on demand and making online publications available to users free for viewing.

It is interesting to examine how the costs for publication are distributed:

<table>
<thead>
<tr>
<th>Cost Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creation of publications</td>
<td>80%</td>
</tr>
<tr>
<td>Publication on the Web</td>
<td>3%</td>
</tr>
<tr>
<td>Promotion</td>
<td>7%</td>
</tr>
<tr>
<td>Administration</td>
<td>10%</td>
</tr>
</tbody>
</table>

It is evident that in the future, costs should be balanced among our priorities; that is, access on the Web and the creation of publications that now absorbs most of our efforts. However, we have obtained good cost savings compared to the cost of the print edition of the University of Florence journals we have converted into electronic editions. For example:

<table>
<thead>
<tr>
<th>Journal</th>
<th>Cost per year of electronic edition</th>
<th>% savings on paper edition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Bioethics</td>
<td>L. 9,000,000</td>
<td>56%</td>
</tr>
<tr>
<td>Without the cost of print on demand</td>
<td>L. 3,000,000</td>
<td>75%</td>
</tr>
</tbody>
</table>

A system-wide view of the costs and benefits of producing and delivering journal articles must acknowledge the costs and benefits to users. For example, the time that it takes to identify high-quality information and to download it to the desktop is a cost, as is the time spent learning to use a new interface. This is what we are trying to do now, by adding to the **Cost for publication** indicator the other **Cost for publication for impact indicator**.

**Conclusions**

Finally, let us quickly look into the future and see how new developments will affect the need to measure the FUP, in the broad context of higher education and scholarly communication change.

Higher education in Italy is changing rapidly. Above all, we shall not have large amounts of money to play with: there is therefore no use putting up projects that require spending lots of money. FUP is looking to the international market for a cost recovery mechanism while maintaining the quality of our services. We shall need to ensure that our measures are valid for every new and changing situation.

So, what are my final conclusions relating to performance measures for FUP? Firstly with all this change going in scholarly communication, it is foolish for us to try and do everything individually. When we do measure, it is particularly important to use a standard methodology so that results can be compared through benchmarking. This is why we want to share our experiences with other University Presses, to collaborate in finding a set of core measures where agreement can be found. Much of what we have done is an effort to find new measures for new University services with the point of view not of traditional publishers, but of librarians trying to facilitate communication, not looking for profit but limiting these attempts to cost recovery.

**References**


Massy, W. F., Zemsky R. Using information technology to enhance academic productivity. Available URL: http://www.educom.edu/program.nlii/keydocs/massy.html


Notes

1. Unimarc format is used for the record to be sent to the National Library and University central catalogue; Dublin Core for the record used for Web search.

2. Government indicators are listed in: Metodo di valutazione della ricerca svolta presso strutture scientifiche universitarie nell’ambito del macro-settore scientifico-disciplinare prevalente, Roma, CRUI, 1999, p. 9 and following.

3. The statistics provided by Highwire Press are among the most extensive on the market. The statistics include:
   - total use (number of times site was hit)
   - use of various parts of the journals including the table of contents, the abstracts, and the full-text articles
   - format of full-text, either HTML or PDF
   - number of searches
   - number of unique IP addresses that accessed the title
   - number of articles by section (e.g., Mini-Reviews, Communications, Enzymology, etc.)
   - top 10 articles viewed including how the article was accessed (HTML vs. PDF) and age of article in days