Perceived influence of the use of electronic information resources on scholarly work and publication productivity

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Background

- Substantial investments by governments for improving scholars' access to electronic information resources
- Provision of electronic information resources increased
- Increased provision and improved access will increase the use of those resources and lead to growth in scholarly productivity?
- To which extent the use of e-resources has changed the scholarly work and influenced on the publication productivity?

Earlier studies

- Positive relationship between the number of papers published and the use of SCIENCEnet, a computer network for oceanographers, especially in benefit of junior researchers (Hesse & al. 1993)
- Positive relationship between internet use for IR and communication, and research productivity in five disciplines within seven EU countries (Barjak 2006)

Earlier studies cont.

- The more Internet sites of libraries used by scholars, the more refereed journal articles published
- IR from e-journals and full-text databases correlated positively with the number of journal articles, conference presentations and reports published (Barjak 2006)

Limitations of earlier studies

- Limited number of academic disciplines
- Restricted ways of measuring how e-resource use benefits researchers and publication productivity
- Small samples
- Limited number of publication types observed

Research questions

- What are scholars' opinions about the influence of the use of electronic resources on their work
- How is scholars' opinion about the influence of e-resource use associated with their publication productivity

Data

- FinELib's annual user survey via www-questionnaires in April 2007adressed to the staff and students of all 22 Finnish universities
- 767 faculty members and full time doctoral students responded
- The data is biased towards humanities, social sciences and natural sciences, and towards doctoral students

FinELib

- National electronic library run by the National Library of Finland for a consortium of (all) universities, polytechnics and research institutes
- Selects e-material, negotiates about the license rights with publishers and provides access to material licensed
- Is the major supplier of e-literature to universities
  - Covered 84 % of acquisition of e-materials in 2004 at Finnish universities

Central indicators of material provision and usage

Indicators	2000	2006	Growth %
Electronic journals	6000	18600	210 %
Reference DBs	90	112	24 %
Printed articles	1 million	35,4 millions	440 %
Searches	8 millions	39,8 millions	398 %

Source: Annual Reports of FinELib 2000 and 2006

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Independent variables

How has the use of e-resources affected your work on a scale from "considerably" to "not at all":

1) Made it easier to find the material I need in my work
2) Made it easier to get hold of the material I need in my work
3) Extended the range of the material I need in my work that is available
4) Made it easier to keep up with developments in my own field
5) Improved the quality of my work (results)
6) Inspired new thinking/ideas
7) Saved my working time
8) Reduced the amount of browsing of resources in libraries

Dependent variables

- Self-reported number of publications by type during two years preceding the poll
  - # of internationally published refereed items
  - # of nationally published refereed items
  - total # of refereed items published
    - books vs articles

Controlled variables

- Academic status
  - 1) full-time PhD student; 2) assistant / researcher; 3) lecturer / teacher; 4) professor
- Perceived availability of a field's core resources in electronic format
  - How well does FinELib cover your own fields' core resources
  - a five-point scale: not at all - very well
- Discipline
  - 18 disciplinary categories collapsed into five

Major disciplinary groups

Humanities	Humanities, Art and Design, Music, Theology
Social Sciences	Social Sciences, Education, Psychology, Law, Economics
Natural Sciences	Natural sciences, Agriculture and Forestry
Engineering	Engineering
Medicine	Medicine, Dentistry, Veterinary Medicine, Pharmacy, Health Sciences, Physical Education

How has the use of electronic resources affected your work/study?

Dimensions of work	Considerably	To some extent	Not at all	DonÕt know	Total
Easier to find material	82	16	1	1	100
Easier to get hold of material	76	21	2	1	100
Extended the range of material	60	33	4	3	100
Easier to keep up to date	61	33	4	2	100
Improved the quality of work	38	44	6	12	100
Inspired new ideas	32	49	8	11	100
Saved working time	58	30	9	3	100
Reduced browsing in libraries	74	19	5	2	100

The distributions of responses on the influence of the use of e-resources on various dimensions of scholarly work (n=767) (%).

Perceived influence	Factor 1	Factor 2
Easier to find material	.399	.626
Easier to get hold of material	.232	.736
Extended the range of material	.588	.325
Easier to keep up to date	.682	.272
Improved the quality of work	.800	.194
Inspired new ideas	.858	.015
Saved working time	.159	.705
Reduced browsing in libraries	.055	.740

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Factors

- Factor I = *Content of scholarly work*
  - Reflects more the content of scholarly work and the aspects of availability of material related directly to that
- Factor II = *Access to information resources*
  - Reflects directly the accessibility of information resources and its consequences

Disciplinary differentiation

- Representatives of medicine and social sciences felt that the use of e-resources has a significantly greater positive influence on *the content of their work* compared to other disciplines
- Positive influence on *access* was greatest in medicine, followed by natural sciences, engineering and social sciences, humanists being the last influenced by the use of e-resources

Influence and publications

- Association between the influence factors and the number of publications was measured by calculating Spearman's rho correlation coefficient
- Only accessibility factor correlated with publication variables, not the factor reflecting the content of scholarly work

	Access to e-resources		
# of publicat	**Total**	**Internat**	**National**
All (767)	**.13*** **	**.17*** **	**-.06**
Discipline			
Human (149)	**.06**	**.09**	**-.02**
Social (238)	**-.02**	**.06**	**-.09**
Natural (193)	**.17***	**.14**	**.08**
Engineer (99)	**.25***	**.19**	**.21***
Medicine (65)	**.18**	**.19**	**-.06**

Spearman's rho coe fficients between the factor scores of access to e-resources, and the number of various types of publications.

# of publicat	**Total**	**Internat**	**National**
All (767)	**.13*** **	**.17*** **	**-.06**
PhD stud (253)	**.26*** **	**.31*** **	**-.04**
Assistants (280)	**.01**	**.10**	**-.16** **
Lecturers (119)	**.25** **	**.19***	**.09**
Professors (97)	**.01**	**.03**	**-.07**

Spearman's rho coefficients between factor scores of access to e-resources, and the number of various types of publications.

Limitations of the study

- Subjective opinions, not objective measurement of the changes in scholars' work
  - the distribution of opinions across influence variables is plausible, greater influence in accessibility than in the content of work
- Data biased towards humanities & social sciences and younger scholars
- Direction of causality
  - Differential effect benefiting younger scholars speaks for the influence of the use of e-resources

Limitations of the study

- To which extent the findings can be generalized?
- Finland is a small research intensive EU country
  - R&D expenditure 3rd in the world (%/GDP)
- Can be generalized to some extent to small and medium sized countries with well developed innovation infrastructure
- Barjak's (2006) findings from 7 EU countries correspond our findings

Conclusions

- The scholars feel that the use of e-resources has improved their work in several ways
- The influence of e-resource use on scholarly work consist of two dimensions
  - accessibility and the content of scholarly work
- Discipline has a differential effect on the dimensions of influence
- Improved access to e-resources has improved scholars' work by helping to keep up to date and by saving time (Brown&al. 2007)

Conclusions

- The perceived improved access to e-resources is positively associated with the number of international publications produced, among doctoral students in particular, but not among humanists
- The differential benefit for the younger scholars is in line with the findings in Hesse & al 1993
- Younger scholars have less social and intellectual capital than more senior peers (Meadows 1998)
  - e-resources compensate this lack of capital

Conclusions

- The perceived influence of the use of e-resources on the content of scholarly work was not associated with publication productivity (how about the quality of publications?)
- The results seem to imply that investments in academic digital libraries are beneficial for the researchers and for the universities also in terms of increased publication productivity