Information Access Influence in Science and Technology Productivity

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ABSTRACT: *This paper summarizes the observations of the more notable developments of the discussion in order to 1) place in context the agenda of the resulting users' perception and 2) present the issues of principal concern or "preconceptions" on the use of information technology in science productivity from the perspective of the various and distinct stakeholders prior to meeting to discuss a national perspective with respect to gulf countries. The discussion was subsequently organized into several common themes.*

1. Introduction

Information and Communication Technology deployment has been used a criterion to assess the information use culture and application among individuals, and in institutions and Governments. Studies are carried out extensively and consistently that indicate that there exist significant variations in the levels of access. In order to describe the wide range of variations in information access, requires an organized and systematic analysis of the factors which appear to influence the deployment. This study investigates and addresses the important considerations for explaining the levels of information access in gulf countries. The inferences are available with respect to the levels of information use have been offered with two perspectives. First, we probe to document whether the differences in the information access pattern which are available are attributable to variations in the individual background characteristics of the users or to the organizational environment. Both perspectives have supported their positions with the studied data and collected in the real situations. In this study the important focus of concern is to identify factors explaining information access pattern of users. Hence other factors are excluded in the scope of the study.

A few visions of the understanding of the information access are germane to a deeper study of analyzing the use patterns and evolving suitable framework for designing information organization in future.

The first would emphasize the role of information which has the effect as a resource for any development particularly in the diffusion of technologies into practice. The second view considers the view that higher the use of information more is the rate of progress.

2. Related work

For a specialized information access, one may need to select the processing mechanism as much as the resource to be accessed.

This implies a knowledge and understanding of the differing characteristics of different access mechanisms available, with which resources they can be used, and how to use them, singly or in combination. This knowledge is inadequately developed, as Belkin and Croft [1] have given a better focus.

2.1 Access Protocols

It is now possible to access databases at remote sites as well as databases at one's local computer centre. This pattern needs at developing good infrastructure and bringing communication and use of good languages. A significant new development is the creation of national (e.g. US NISO Z39:50) and international standards (ISO 10162/10163) for computer-to-computer access standards. The adoption of these standards will enable one to delegate to one's local retrieval system the extension of a search to some other, different retrieval system. The access standards translate searches from one retrieval command language to another [2, 3].

This kind of issue arises with records in different databases that may or may not represent the same group of related information pieces [4]. More generally, in extended access processes particularly in heterogeneous databases, the users are concerned with the retrieval of related material but the nature of the relationship may be difficult to define or to determine.[5,6]. From the above overview it is possible to conclude that the information technology broadly includes the computing infrastructure, the communication infrastructure, and by extension of these, the institutional infrastructure (e.g., multi-campus consortia) and the instructional infrastructure (a range of courses from small classes taught by one faculty member to large, team taught or distance learning courses). [7].

3. Research Questions

For the current study we set and identified a few significant needs/issues to be addressed by or impacting on the various constituencies in the undergraduate enterprise, given the possible future directions of information access using information and communication technology.

• What research is needs to be done to give validity to what might be termed an "appropriate" use of information and communication technology for enhance information access?

• What are the implications of widespread use current information access on an institution's infrastructure, both human and capital? What will be the implications inherent in the possible future directions of information access?

The rapid and seemingly ubiquitous increase in "the role of technology" in the halls of higher education has raised many justifiable concerns – will technology displace essential person-to-person and face-to-face interaction? – will technology intrude on content? – is the rush to embrace tomorrow's technology preventing us from analyzing and refining our use of today's technology? – will time and dollars be spent on technology at the expense of less glamorous but more fundamental components of the educational enterprise? This workshop was convened to discuss the coherent, thoughtful, and responsible use of information technology tools together with other tools in the classroom. Our ultimate purpose is to assure and enhance the educational experience of students.

4. Methods

In the data gathering period, the end-users were given the additional charge, to develop a set of "goals for the undergraduate community" with regard to the use of information and communication technology, perhaps targeting its various constituencies (e.g., students, faculty, industry/business, campus administrators). These goals would be developed under the assumption that they would present areas or opportunities for the information professionals to exercise orientation in the use of information and communication technology to improve access, use and application in various sectors such as science, mathematics, engineering, and technology.

The users should begin early in the product cycle, with test sites, pilot programs, prototypes, and mock-ups. They can be created by continuing feedback on appropriately designed products.

The response of the time of the users for the implementation of ICT is found to be more. This has far reaching impact on the performance. It takes considerable time for the users to understand the changes in ICT tools and applications for information

access. Deployment of newer and updated tools makes the existing ones obsolete and the study recorded an increasing replacement resulting the garbaging of available tools and technology.

5. Discussions

This study will lead to document some major inferences gained. We provide the descriptions based on the users' access survey as below.

The following issues for Education-Based Constituencies are crucial to consider in the use of Current Information Technology.

We have found increasing evidences for the support for the development of information access tools that engage and interact with the users while information transaction activities are held.

It is somewhat surprising to note that not only novice but even expert users need to undergo access enhancement and technology building capabilities while consistently and constantly accessing resources. Such an exercise will lead to ensure guided, organized and intuitive access to information.

Despite the development and availability of technology, the inequity in information access is surfaced and it is evident from a large number of studies.

It is interesting to note that smaller institutions will face pressure to specialize their offerings, and network these to partner institutions. It is pertinent to mark and ensure that the quality will be maintained as prestige institutions face disproportionate demand for their services?

There are equations for the questions such as "How will institutions respond to the opportunity to hire distance faculty, and will this lead to increased faculty employment, an increase in part-time or as-needed assignments, or a concentration of employment of those faculty most in demand?"

All institutions will be challenged in terms of lowering the boundaries between courses, curricula, and institutions, control and accountability that have impact on information access. Access to information technology must be broad-based, extending off campus. Commuter institutions will face more rapid and substantive changes than residential campuses.

The expectations and process of information access in off-campus versus on-campus must be addressed.

Based on the observations of the end users involved in the study we found that the following are the important requirements.

• Cost of the future information technology infrastructure.

• The role/mission of the university.

• The role of the academics to that of a leader/coach in a dialogue or problem solving exercise, more cognizant of societal needs and those of the workplace.

• Universal and equal access to learning, and how this will affect the leadership of the United States in education and research.

• Information technology as a facilitator for interdisciplinary integration and communication.

The users reveal that the Information technology increases the variety of needs for training, including: the use of information technology itself, applications, teaching techniques, evaluation of available materials, indexing, and the training of graduate students. This development requires multiple sources of support, including individual faculty, departments, institutions, professional societies, industry, government, and foundations. Faculty development must be long-lived via communities of support. Innovators must aspire to, and be rewarded for, increased efforts for dissemination of effective technology to commercial publishers and via professional societies.

The change in culture and infrastructure required can only succeed through long-lived support groups and communities that span institutional and disciplinary boundaries. Wherever possible, the training should include hands-on use and application of the technology being discussed. Beyond the innovators and those willing to implement information technology (with or without proper support), there will invariably be a certain class of faculty who will resist any kind of change.

The World Wide Web was lauded as a mechanism for delivering the materials to a diverse population. However, the benefits of this delivery is contingent upon an accompanying training and support system for end-users. For there to be continued and more substantive "*community action*" on the use of information technology, a greater focus of effort is required. Whether it be in a particular discipline, a given area of technology, or in response to an established national need for such development and implementation.

While institutions and faculty have a paramount role in the use and application of the technology, professional societies and associations were suggested as extremely important organizations required to coordinate evaluation and dissemination, particularly within a particular discipline. There was also a call for more research into the actual or realized costs for various information technology scenarios to assist institutions in their planning and budgeting. In turn, institutions could do much more to assist their distance learning constituents by providing integrated access of things such as record keeping, articulation of credits, and billing. Government sponsorship at the state and federal level was also viewed as essential to providing coherence and credibility to the large-scale, national implementation of these technologies. Several participants specified the involvement of NSF as essential to coordinating this task - not only as a guiding hand or federal policy maker, but also in "adding respectability" to local efforts while serving to coordinate a system of nation-wide dissemination.

6. Conclusion

Now more than ever, the American standard of living depends on innovation. To be sure, companies are the engines of innovation and the United States has an outstanding market environment to fuel those engines. Yet firms and markets do not operate in a vacuum. By themselves they do not produce the level of innovation and productivity that a perfectly functioning market would.

Even indirect public support of innovation in the form of basic research funding, R&D tax credits, and a strong patenting system, important as it is, is not enough to remedy the market failures from which the innovation process suffers. At a time when gulf countries' historic lead in innovation is shrinking, when more and more high-productivity industries are in play globally, and when other nations are using explicit public policies to foster innovation, the gulf countries cannot afford to remain complacent. Relying solely on firms acting on their own will increasingly cause the gulf countries to lose out in the global competition for high-value added technology and knowledge-intensive production.

References

[1] Belkin, N. J., Croft, W. B. (1987). Retrieval Techniques, *Annual Review of Information Science and Technology* 22. 109-145.

[2] Buckland, M. K., Lynch, A. (1987). The Linked Systems Protocol and the Future of Bibliographic Networks and Systems, Information Technology and Libraries 6, 83-88.

[3] Buckland, M. K.,. Lynch, C. A. (1988). National and International Implications of the Linked Systems Protocol for Online Bibliographic Systems, *Cataloging and Classification Quarterly* 8, 15-33.

[4] Buckland, M. K., Hindle, A., Walker, P. M (2005). Methodological Problems in Assessing the Overlap between Bibliographic Files and Library Holdings, *Information Processing and Management* 11, 89-105.

[5] Buckland, M. K., Norgard, BA., Plaunt, C (1992). Design for an Adaptive Library Catalog, *In*: Networks, Telecommunications, and the Networked Revolution. *In:* Proceedings of the ASIS 1992 Mid-Year Meeting May 27-30, Silver Springs, Md.: American Society for Information Science, p. 165-171.

[6] Lynch, A. (2002). Online Searching on the Internet: The Challenge of Information Semantics for Networked Information*, In*: Proceedings of the National Online Meeting, New York, Medford, NJ: Learned Information.

[7] National Science Foundation, (2008). Information Technology: Its Impact on Undergraduate Education in Science, Mathematics, Engineering, and Technology Report on an NSF Workshop. p.55.