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# 'So wide and varied': The origins and character of British information science

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## Abstract

This paper examines some characteristics of the 'British School' of information science. Three main forces driving the development of the new subject in Britain are identified: the documentation movement; special libraries; and the need for better treatment of scientific and technical information. Five characteristics which, taken together, distinguish the early British approach to information science from those adopted elsewhere are identified: its subject-based nature; its broad approach to information and information science; its status as an academic subject with a strong professional remit; its involvement with, but distinction from, information technology; and its involvement with memory institutions. Lessons are drawn for the future development of the information sciences.

## Keywords

Documentation; information science; British; information science; history; special libraries; subject specialization

## 1. Introduction

This paper examines some characteristics of what we may call the 'British School'<sup>1</sup> of information science. It has been developed from a presentation given at a seminar on the origins and development of European information science [1]. In keeping with the theme of that seminar, celebrating 75 years of the American Society for information Science and Technology, originally the American Society for Information Science, it looks back at some of the distinctive characteristics of the British approach to the emerging discipline, contrasting them where appropriate with the situation in other countries. It then considers what lessons and potential benefits these characteristics may offer for the future of the discipline in general.

## 2. Origins

We will give here only a very brief account, focused on some major issues in the origins of British information science; more thorough reviews from different perspectives are available in the literature [2–12]. An interesting comparison of the French conception of information with the 'Anglophone' approach is given by Ibekwe-SanJuan [13].

Information science first became known as a discipline in Britain during the 1950s. The terms 'information science' and 'information scientist' were first used by Jason Farradane in the mid-1950s [14]. Although his initial concept of an information scientist was a specialist in the handling of scientific and technical information, Farradane pioneered the teaching of information science as a distinct subject, and was among those who argued for a 'true science of information', along the lines of the natural sciences [2, 5, 15]. The Institute of Information Scientists (IIS), the professional association for the new discipline, was formed in 1958; its associated newsletter, *The Information Scientist*, became the *Journal of Information Science* in 1967. However, it is arguable that this marked the conclusion of the process of discipline

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formation; Muddiman [16], for example, suggests that the launch by Aslib of *Journal of Documentation* and *Aslib Proceedings* in the 1940s marks the coming of age of the British documentation/information science discipline.

In terms of professional education, Farradane set up an evening course in 'collecting and communicating scientific knowledge' at Northampton College of Advanced Technology in 1961. This led to the establishment of a Masters course in information science at the Centre for Information Science when the College became City University London in 1965<sup>2</sup> [17].

We can identify, from the primary and secondary literature, three main forces driving the development of the new subject in Britain: the documentation movement; special libraries; and the need for better treatment of scientific and technical information. These have to be seen in the context of the time, with a number of other, more general, influencing factors identified by Robinson [18], including: the perceived 'information explosion' or 'publication explosion' [19, 20]; the availability of new technological tools to handle information [19–21]; the new 'information theory' of Shannon and Weaver, which offered the prospect of a sound theoretical basis for a science of information [2, 22]; and an increased awareness of information as a resource for governmental, industrial and military applications [23, 24]. However, it is the three forces noted above which, together, gave British information science a unique character, and we consider each of these in turn.

### 2.1. The documentation movement

The centuries-old desire for universal bibliographic control was pursued from the end of the nineteenth century by the 'documentation movement', pioneered by the Belgian scholars Paul Otlet and Henri La Fontaine. Making use of new intellectual tools for information organization – particularly through the Mundaneum documentation centre in Belgium, Otlet's influential book *Traité de documentation* of 1934, and the Institut International de Bibliographie (IIB), later renamed the International Federation for Information and Documentation established in 1895 – they can be regarded as main precursors of information science [2, 25–27].

This is not to claim that British information science was uniquely influenced by the documentation movement. It was an influence, for example, in the USA, where the American Documentation Institute, created in 1937, became the American Society for Information Science [28–30]. However, the British took on board fully and equally two main pillars of the documentation movement: the need to analyse and record information at a fine-grained level; and the consequent need for development of new forms of intellectual tool for this purpose, most notably the Universal Decimal Classification, developed by Otlet and his colleagues [31]. Elsewhere, particularly in the USA, it is commonly held that more emphasis was placed on new technologies as a solution to the problems raised by documentation concerns; this aspect will be discussed more fully later.

### 2.2. Special libraries

The increased awareness of technical information as a resource, for science-based industries in particular, led to the establishment of special libraries, and to the idea of 'information work' as distinct from librarianship, from the end of the nineteenth century [16, 23, 24]. These, compared with traditional libraries, had a much more pro-active role, a strong subject focus, and an interest in all forms of information, not just formally published documents [24, 32]. Their distinctiveness was summed up by JD Bernal [33, p. 20] as 'Old libraries were conceived as depositories of knowledge: the modern library should be a distributor and organiser of knowledge'.

In the UK, the Association of Special Libraries and Information Bureaux (Aslib), was formed in 1924 with the aim of coordinating the activities of specialist information services in the UK and with a role as a national intelligence service for science, commerce and industry [16]. National groups of special librarians were formed in many other countries, and it is not suggested that Britain had any unique interest in special libraries; on the contrary, the foremost international body for this sector, the Special Libraries Association, was founded in the USA in 1909 [29, 34]. However, as we shall discuss later, the special library influence was particularly strong in the development of information science in Britain. This was particularly so because of the very strong overlap in Britain between special librarians and those supporting the new documentation movement [16]; indeed it is difficult to make a distinction between them. The British organization affiliated to the IIB was the British Society for International Bibliography, founded in 1927, which merged with Aslib in 1948 [16]. It is worth noting that it was strongly supported by librarians, one of its main protagonists being SC Bradford of the London Science Museum library. This can be contrasted with the situation in the USA [29], where special librarians, generally from a 'general library' background, and documentation specialists had a degree of mutual distrust; Buckland [35] also discusses the lack of adoption of document movement ideas by US librarians.

### 2.3. Scientific and technical information

The ‘second industrial revolution’, typically dated from 1870 to 1914, or from 1870 to 1930, by which developments in metallurgy, chemistry and electricity led to the establishment of major science-based industries, led in turn to the development of special libraries serving this sector [16, 36, 37]. Scientific, technical and medical research in universities and research institutes also required a higher level of information service. One early sign of the consequent need for specialized scientific information capabilities was a course specifically for science graduates set up at University College London in 1929; although this closed for lack of interest in 1935, it was arguably the earliest example of education for information science [17].

The 1939–1945 conflict led to further realization of the economic and military value of science, and hence of scientific information [20]. ‘Our experience of the war’, wrote JD Bernal, a distinguished scientist with a strong interest in information matters, ‘has taught a very large number of scientists the vital place of an efficient information service’ [33]. This, and the need to deal with the ‘information explosion’, the very rapid expansion in publications of all kinds dealing particularly with scientific and technical information during and after the 1939–1945 war [38], was discussed at the influential 1948 Royal Society Conference on scientific information [39–41]. A wide variety of issues relating to improvements in scientific information provision – organizational, technical and intellectual – were discussed, and it may be said that, in many ways, this conference established the agenda for the development of information science.

Certainly, British information science in the beginning was very much concerned with the information of science [5, 42]. Many of its protagonists were themselves qualified scientists. As Vickery and Vickery [43] expressed it,

The term ‘information science’ first appeared in the guise of ‘information scientist’ ... some qualified scientists moved out of research, development or production into a new occupational role, that of providing an active information service to their colleagues. They regarded themselves as ‘information’ scientists rather than ‘research’ scientists. As this kind of work expanded and became formalized the need was seen to provide training for those who would enter the occupation. In time, the content of this training came to be called ‘information science’.

We will now consider some of distinctive characteristics of this new science.

## 3. Distinctive characteristics

Determining the ‘national characteristics’ of a discipline is a tricky business, particularly in light of efforts at international cooperation, of which the IIB is the best known of several such efforts in information during the period under consideration, and when individuals who made significant contributions were internationally mobile (as an example, see Hapke [44]). On the other hand, it seems clear that the information science did develop, by and large, nationally. Gilchrist [45] wrote in 1979 that ‘the subject still appears to be discussed predominantly on a national basis’, and Larivière et al. [6] show that the library/information literature still shows national distinctions. This is perhaps to be expected, since information science developed in an environment characterized by national scientific and information infrastructures that had developed since the nineteenth century; see MacDonald [46] and Ibekwe-SanJuan [13] for North American and French examples, respectively.

We can tentatively identify five characteristics which, taken together, give a distinctive ‘flavour’, distinguishing the early British approach to information science from those adopted in North America and in continental Europe. These are: its subject-based nature; its broad approach to information and information science; its status as an academic subject with a strong professional remit; its involvement with, but distinction from, information technology; and its involvement with memory institutions, comprising the GLAM (galleries, libraries, archives and museums) sector. Although none of these characteristics was unique to British information science, and may be seen in other countries, they were developed more strongly, and in a distinctive combination, in the British context.

We may also note, although we will not discuss it in detail, one further element that has been claimed as a distinctive feature of British information science: a political element, which sees the early development of the discipline as being strongly influenced by the left-wing atmosphere of the late 1940s, with the election of the Atlee government and a general belief in planning and centralization. Justice [39], for example, sees the ‘socialist science’ espoused by figures such as JD Bernal as having as great an influence on the Classification Research Group as the more evidently relevant views of figures such as Ranganathan. Despite the great influence of Bernal and those with similar views [41, 47, 48], this was never a universal viewpoint, and a decentralized and pluralized approach dominated the development of information science and its institutions: the proposed ‘British Institute of Information’ with a physical location in a Science Centre on London’s South Bank came to nothing [16, 47]. Nonetheless, it is worth remembering that British information science

developed in the context of governmental initiatives in a social democratic state, in a manner unlike that of any other country [12, 16].

We will now consider in turn the five characteristics noted above.

### 3.1. Subject-based

The best way to understand information in IS is to study the knowledge domains as thought or discourse communities ... Knowledge organization, structure, co-operation patterns, language and communication forms, information systems, and relevance criteria are reflections of the objects of the work of these communities and of their role in society. [49, p. 400]

Some qualified scientists moved ... into a new occupational role, that of providing an active information service to their colleagues. They regarded themselves as 'information scientists' rather than 'research scientists'. [43, p. 9]

Writing of the American pioneers of information science, Hahn [50] comments that they 'came from a variety of disciplines such as psychology, computer science, engineering, physics, philosophy, social science, mathematics, and library science'. As Williams [29] notes, many US special librarians had a generalist background, and were somewhat suspicious of the documentation movement's ideals. As Vickery's statement quoted above makes clear, the British originators were from a rather different background, which Coates [51] describes as 'the band of vocational migrants who, shortly after the end of the Second World War, entered the information professions from a background in the hard sciences'. With the exception of Bertie Brookes (a statistician) and Robert Fairthorne (a mathematician), most were natural scientists [8], and a remarkably high proportion, including Vickery and Farradane, were chemists, perhaps reflecting that discipline's long concern with the representation of its specialist information [44]. Many had a background of practice in library and information work in their disciplinary specialism. Many special librarians, particularly in scientific rather than business settings, had no library qualifications [24]. We can note here the distinction with the USA, where most special librarians had a general librarianship training [29].

The result of this was that, in its early stages, British information science was inextricably linked with the handling of scientific information, and only somewhat later did the idea that it might be a 'true science of information' emerge [5]. There followed a move to include other subject matter in the same way, particularly if it had a commercial importance; Vickery [52], for example, noted that, in his company, Imperial Chemical Industries, in the 1940s, 'the scientific information workers were impressed to find that "business intelligence" was as active as, and in some ways more sophisticated than, their own field of work'. For somewhat later advocacy of the idea that, although the field had originated within scientific information, its methods were equally applicable to other subjects, see Saunders [53]. The legacy was a strong belief that information and knowledge, documents and resources, can only be fully and properly understood in a disciplinary context. While this was to some extent over-shadowed in subsequent years, owing particularly to an enthusiasm for information technology, a concern for the need for subject specialism has been a constant theme over the years; see, for example [2, 54, 55]. It has arguably re-emerged in the new theoretical framework of domain analysis [18, 49, 56].

### 3.2. Broad approach

The field of study is so wide and varied. [57, p. 332]

One of the clear characteristics of the British approach to information science was that it should deal with all aspects of information. Brian Vickery repeatedly emphasized this aspect: 'It is essential to stress that information science is not solely concerned with science information, nor indeed only with the provision of information to academic and professional workers, but with all forms of information transfer in society ... [it is] the scientific study of the communication of information in society' [43, p. 11]. Several other authors at the time advocated that information science should be viewed as interdisciplinary, multi-disciplinary or as an 'integrating' science: see Robinson and Bawden [3] and Cronin [5] for reviews of these views. As Meadows [58], among others, has suggested, information science has always been unduly sensitive about exchanges with other disciplines, perhaps fearing being regarded as being without a substantial theory base of its own.

Although some authors, such as Ingwersen [59], have criticized this approach as exaggerated, and claiming too much for the subject, it seems clear that this has been a central tenet of the British approach. Webber [60] argues that British

information science, building on these broad and inclusive conceptions, exhibited ‘a more holistic envisioning of the discipline than was the case in the USA’.

This provides a strong contrast with the idea proposed by Machlup and Mansfield [61] – although only as a possibility, and not necessarily a desirable one – of a ‘narrow’ information science, or more precisely ‘an independent information science with a narrower focus – the problem of information linked neither to computer science nor to library science and also avoiding the vagueness associated with information science in its broadest sense’. By the ‘broadest sense’, they meant all aspects of the study of the information concept, from the psychological to the economic, and from the linguistic to the mathematical. Their narrower discipline focused on issues of patterns of communication, bibliometrics, classification, user studies, and so on – close to what might now be regarded as the core of the discipline [2].

However, while accepting the need to define the boundaries of the discipline, it is clear that the British pioneers were never happy to restrict the scope in such a way. In particular, they typically saw a need to respect the overlap with other information-related disciplines. This approach seems to have been proven justified, as multi-disciplinary study has gained greater importance over the years. As Dillon [61, p. 312] puts it: ‘to study information ... is to study human behaviour in the context of data creation and use, where the data is abstracted into an examinable record [i.e. a document]’. He points out the many disciplines and their different perspectives, including psychology, education and information systems, which have an interest in this, but argues that ‘such distinctions should not be firmly drawn: instead we should consider each of these (and the many other examples we could list) as manifestations of an underlying concern of [information] product with [information] process’. Or, in the words of Vickery, one of the pioneers, written in 2009, many years after he first advanced such views: ‘All the elements of the process of “becoming informed” ... are of interest to investigators other than “information scientists” ... The totality of activity related to information to information today is necessarily a multidisciplinary exercise’ [62, p. xxiii].

### 3.3. *An academic subject, with a professional remit*

Bertie Brookes and I shared a common view that, beyond the practical activities of information provision, there could be discerned a more general science of information. [8, pp. 24–25]

The founders of British information science were insistent that academic study and professional practice were indivisible. There was, as Brookes and Farradane said, above, a ‘general science of information’ or in Farradane’s 1976 words, a ‘true science of information’ [15]. There must be academic education, not just vocational training, a theme repeated from the earliest stages [5, 17]. The science must have a link to vocational activities, and a concern for the practitioner; the conceptual discipline underlies professional activity. ‘The theory of a science’, wrote Vickery, ‘should spring from deep immersion in practice’ [8, p. 29].

There was, in short, a strong disinclination, amounting to a refusal, to separate theory from practice, arguably stronger than in other countries. While the progress from vocational subject to academic discipline is seen in other countries – Larivière et al. [6] illustrate this internationally – the intertwining of theory and practice seems to have been more strongly felt in Britain. This may well be seen as a consequence of the backgrounds of the pioneers noted above: an academic background in science, followed by a move into information work, and then a search for the academic foundations of the new subject. It may also reflect the origins of the movement without a ‘professional home’ until the foundation of the IIS in 1958, at least a decade after the effective emergence of the new discipline, and hence a lack of prescribed education and certification of competence to practice; the two had to be devised together, from the ground up.

### 3.4. *Integrating information and technology*

The change from atoms to bits is irrevocable and unstoppable ... Computing is not about computers any more. It is about living. [63, pp. 4 and 6]

There is a story which is often told<sup>3</sup> about the origins of information science, although those who tell it agree that it is an over-simplification. This story states that the documentation movement provided an impetus to analysing information in fine detail, at the level, for example, of articles, chapters and sections, rather than whole books, and with great subject specificity for exact retrieval of precise topics, but that this process was approached in different ways. In Europe, including Britain, there was a building on the documentation movement’s enthusiasm for new intellectual tools, classification in particular, while in the USA these were rather neglected in favour of the development and application of new

technologies. La Barre [64, p. 246] quotes a typical view of the time: ‘classificatory research in the USA has taken a less spectacular form [than in Great Britain]’.

Although this is an admittedly crude presentation of a complex process, there is something in it. There was, in the early years of information science in Britain a strong focus on the process of detailed subject analysis, and the provision of new tools for doing so, in particular, those based on expansion of the ideas of SR Ranganathan on the applications of facet analysis [31, 39, 65, 66]. They included filing systems, developments of the UDC and Bliss classifications, and new tools such as the thesaurus and relational indexing. Strong impetus was given to this work by the activities of the Classification Research Group [39, 66], by the Dorking conferences and latterly by the Cranfield experiments. The latter, although rightly thought of as pioneering information retrieval experiments, were primarily a test of intellectual tools, including library-style classification [67, 68].

It is also true that most work on information technology, initially mechanized documentation systems and later computer applications, was centred in the USA [21]. It is telling that Vickery’s 1994 enumeration of American contributions in the early years of *Journal of Documentation* [52] show that these all dealt with aspects of document technology. Certainly, in the rather later development of online information systems, although these came to be widely used in Britain, and in continental Europe, most of the development was carried out in the USA [50, 69, 70] – although not necessarily by Americans: as Hahn [50, p. 45] puts it, ‘The genesis of online retrieval was, with a few exceptions, an American phenomenon. However many of the key pioneers were not American-born – the United States was the fortunate recipient of a significant brain drain from many other countries’. This is a reminder of the point made above, that we should be cautious in seeking national characteristics in an international endeavour.

On the other hand, there is evidence to show that the categorization is indeed too crude. There was activity in the USA concerned with innovation in intellectual tools for information organization, as evidenced by the work (sadly largely undocumented) of the Classification Research Study Group [64], by the development of the retrieval thesaurus concept [71], and by the development of special purpose languages such as the MeSH medical language [72].

Nor was Britain, and Europe in general, entirely lagging in technology development, although Otlet and his fellow documentalists had largely relied on the final flowering of the paper card-based systems, which had been the staple of information management for many years [73]. Buckland [74] describes in detail Emanuel Goldberg’s development of an automatic document handling device, which arguably preceded Vannevar’s Bush’s similar Memex [74], while Robertson gives examples of early UK adoptions of information technology [67]. Some of the earliest uses of edge-notched cards, both for data analysis and for information retrieval, came from English institutions [21], while Roberts [71] reports a positively heroic example of mechanized documentation devised at the Royal Radar Establishment in 1955, using an optical co-incidence system based around metal plates 12 inches square (roughly 30 × 30 cm), with holes created with an electric drill, and requiring three people to manipulate it.

However, we can conclude with confidence that, rather than a complete discontinuity, there was a different approach to the relation between information science and information technology in Britain. In an editorial in the first issue of *Journal of Information Science*, Alan Gilchrist [45] argued that ‘technology should never be allowed to dictate objects and procedures’; the study of user behaviour, information needs, information organization and the social role of information must take precedence. It is very difficult to imagine the British school of information science formally embracing information technology in the way that its US counterpart did when the American Society for Information Science added ‘and Technology’ to its name in 2000. Instead, there has been an emphasis on understanding implications of technologies, and of engaging with particular relevant technology applications, most obviously in information retrieval, digital libraries and repositories, and human–computer interaction, all of which have, at various times, been claimed as integral parts of information science [2].

### 3.5. Memory institutions and GLAM sector

The principles of information science apply, whatever the medium of transfer. [52, p. 9]

As we have seen, British information science came into being with a very strong and continuing link to libraries, and particularly special libraries. Several of what are rightly regarded as pioneering information science research projects were inspired and led by librarians [75]. It is therefore not surprising that one of its characteristics can be seen to be an integration with libraries, archives and other ‘memory institutions’ of the GLAM sector. It is true that some of the pioneers saw clear distinctions between the disciplines. Thus Dyson and Farradane [76] wrote that ‘the information scientist is primarily a scientist who is approaching the literature and other sources of information from the research standpoint, while the librarian, even though he may have studied science, is trained to approach the literature from the standpoint of a

custodian'. However, this distinction was not generally recognized by most commentators and practitioners; Farradane, in particular, was one of a minority who offered a vigorous defence of the 'specialness' of information science, as distinct from librarianship. Perhaps more typical, and in keeping with the broad approach discussed above, is the view of Vickery [77, p. 279]:

In the past, documentation has frequently been compared with librarianship, with some argument as to which comprehends the other. The field is more helpfully characterized if we take its scope to be all forms of document (i.e. any physical carrier of symbolic messages) and all aspects of their handling, from production to delivery. The document system then becomes very much wider than conventional librarianship – it includes publication and printing, distribution, some forms of telecommunication, analysis, storage, retrieval and delivery to the user.

The integrating tendency reached its logical conclusion when, in 2002, the Institute of Information Scientists merged with the (British) Library Association to form the Chartered Institute of Library and Information Professionals (CILIP). Although this caused dismay to some of the IIS's membership, it shows the extent to which the British information community considered itself part of a wider information world.

This contrasts strongly with the situation in Germany, described by Ockenfeld and Samulowitz [78], whereby there was a positive hostility for many years between librarianship and documentation, exacerbated by the lack of a strong special library sector, and with the USA, where information science, with its roots in documentation rather than libraries, moved in a technological direction.

We may see this as another example of British information science being ahead of the trend, given the emergence of the composite field of 'library and information science', with the amalgamation of two distinct camps [79], which Bates distinguishes as 'information sciences' and the 'disciplines of the cultural record' [80]. Increasing convergence (or perhaps reconvergence, since these institutions often began as united entities) between the 'memory institutions' of this sector, in an increasingly digital environment, emphasizes this overlap; see, for example, Davis and Shaw [28 chapter 13 and Given and McTavish [81]. The new subject of digital humanities has, in Britain, found a natural home in library/information departments [82]. In these respects, British information science has emphasized an overlap with the 'collection disciplines', rather than the technological disciplines [2, 83].

#### 4. Lessons for present and future

I like the dreams of the future better than the history of the past. (Thomas Jefferson, letter to John Adams, 1816.)

Consideration of some of the distinctive features in the development of British information science, while being of obvious historic interest, can also give some pointers with regard to the present and future of the discipline worldwide.

If we follow the advice, and practice, of the British pioneers we will, first and foremost seek to apply a broad and inclusive approach in all respects, tempered by pragmatism. We will be concerned with all aspects and instances of information, while keeping a focus on our own unique interest: recorded information in subject domains. In a disciplinary sense, we will seek broad, rather than narrow perspectives, and relish, rather than resent, engagement with other disciplines, being gratified rather than anxious when others take an interest in 'our' topics, and pleased when our field becomes a credible exporter of ideas [4]. Rather than seek to define and defend a 'niche' information science, we will follow the 30-year-old recommendations of Machlup and Mansfield [61], and make the term plural; we are involved in the information sciences. Convergence between disciplines and contexts makes this all the more important.

While being fully involved with technology, we should avoid being consumed by it. The social uses of information, the nature of information and knowledge in subject domains, and the technology-invariant features of information behaviours and practices will be more compelling drivers.

As information science academics, we should be appropriately academic and scholarly, but without forgetting the practitioner. Theory and practice should be synergistic, and reinforce each other naturally, the theory emerging, as Vickery puts it, from deep immersion in the practice [8].

We leave the last word to Tom Wilson, who encapsulates these ideas neatly [84]:

Let us not restrict ourselves to grubbing around in the garden patch of a limited, little information science, restricted to the relationship between information and machine. Instead, let us expand, reach out, embrace and explore the wider world of information, to develop a vision of information science as a central synthesising discipline in understanding not simply information, but the world we live in. Because the world we live in is surely a word of information.



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## Notes

1. We use the terms 'British' and 'Britain' for simplicity and ease of phraseology here, rather than the more formal 'United Kingdom' or 'British Isles', fully recognizing the contributions made by people from Ireland.
2. Nearly 50 years on, City University London still has a Centre for Information Science offering a Masters in Information Science.
3. For example by Tefko Saracevic at the American Society for information Science and Technology seminar at which this work was first presented.

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