The identity of information science

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Abstract

Purpose – This paper offers a definition of the core of information science, which encompasses most research in the field. The definition provides a unique identity for information science and positions it in the disciplinary universe.

Design/methodology/approach – After motivating the objective, a definition of the core and an explanation of its key aspects are provided. The definition is related to other definitions of information science before controversial discourse aspects are briefly addressed: discipline vs. field, science vs. humanities, library vs. information science and application vs. theory. Interdisciplinarity as an often-assumed foundation of information science is challenged.

Findings – Information science is concerned with how information is manifested across space and time. Information is manifested to facilitate and support the representation, access, documentation and preservation of ideas, activities, or practices, and to enable different types of interactions. Research and professional practice encompass the infrastructures – institutions and technology –and phenomena and practices around manifested information across space and time as its core contribution to the scholarly landscape. Information science collaborates with other disciplines to work on complex information problems that need multi- and interdisciplinary approaches to address them.

Originality/value – The paper argues that new information problems may change the core of the field, but throughout its existence, the discipline has remained quite stable in its central focus, yet proved to be highly adaptive to the tremendous changes in the forms, practices, institutions and technologies around and for manifested information.

Keywords Information science, Identity, Core, Manifested information, Infrastructures, Michael Buckland Festschrift

Paper type Article

Motivation

Disciplines need to occasionally re-assess where their field is going and how it is positioned in the landscape of scholarly discourse. We ask whether the identity of the discipline has changed, moved, become obsolete or subsumed. In one outcome, the discipline will be reaffirmed and researchers can be certain of their impact in the scholarly universe. In another outcome, early recognition of needed change and adaptation will allow researchers to act accordingly and remain relevant.

Even if we reaffirm the scope and fundamental questions of the field, it is still necessary to review our position in the landscape and update the definition of the discipline based on current terminology to explain the principal premises of the domain. This does not mean that we forget or reject what came before, but that we frame our understanding within a current

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scholarly context. Sometimes, this exercise shows that the fundamentals of the discipline have not changed as much as the development dynamics seem to indicate. For this paper, I'd like to acknowledge that nothing I posit here is new, albeit a current outlook on the field is presented.

This paper identifies the core of our discipline and offers an encompassing definition of information science. I argue that this viewpoint aligns with most definitions of the field, but most strongly resonates with Michael K. Buckland's perspectives (Buckland, 1980, 1991, 1996a, b, 2012, 2018; Arafat *et al.*, 2014), which inspired this paper.

The article starts with a description of the core of the field – the concept of manifested information and the practices and phenomena around it. The text describes why this focus is important and how information science research areas can be grouped around the core. It will discuss other disciplinary definitions and controversial aspects of disciplinary identity. The paper concludes by arguing why interdisciplinarity is an approach, not the foundation of the field.

Core
When defining the identity of the discipline, I start by describing a core, a central focus – around which most research questions and scholarship in the field can be centered. The core of a discipline encompasses a unique perspective on a problem area with its respective theories, models and approaches. While the problem area is also studied by other disciplines, it is the combination of perspective, theories, models and approaches that gives information science a unique space in the disciplinary landscape. When the perspective and problem area are relevant to society and the core is sufficiently different from other disciplinary perspectives, we can speak of the field covering its own research ground – having its own identity.

Describing a core bears two advantages: (1) we can describe information science's unique contribution to research problems that often need more than one disciplinary perspective in an increasingly overlapping and multidisciplinary research landscape and (2) we can identify boundary areas, where information science overlaps with other disciplines.

Not every research problem or study in the field can be considered core, but this does not mean that it does not provide valuable contributions to the field. Research that is further away from the core is usually less frequently represented and also more difficult to categorize as being uniquely information science research because it overlaps more with other disciplinary perspectives. To define a core, "a center of gravity", is an attempt to identify information science's unique claim to a disciplinary space, while acknowledging the many contributions from other disciplines necessary to study it.

When developing this description of the field, I was motivated by a graphical representation of the iMovement (Wobbrock *et al.*, 2009). The authors argue that information is not an independent entity (a "third thing"), but only exists where people and technology meet. They urge us to focus on concrete things like people (described as the social science domain) and technology (the computing domain) and declare the intersection between these areas as the purview of information science. The accompanying figure shows information science in-between social science and computing, focusing on the non-separate (from people and technology) entity of information. Is information science really "just" concerned with the intersection between two other disciplines? And how can information not be a "thing", when memory institutions and other information infrastructures have documented and preserved things most people call information? This may just be a question of how information is defined, but it seems to imply that information science does not have an identity outside the intersection of two other disciplines. I will return to this question later, but for now, focus on information.

Most discussions on the identity of the field are concerned with the nature and many meanings of its main concept: information (Bawden and Robinson, 2022; Furner, 2015).

Information science, as implied by the name, could be defined as the discipline that studies information in all its forms and theoretical conceptions. The scholarly discussions on the nature of information in the field (Hjørland, 2022; Dinneen and Brauner, 2015; Bates, 2010) demonstrate that this is an important concern of the discipline. However, there are many other disciplines that can lay claim to studying aspects of information.

In this paper, I argue that information science's unique core focuses on one particular aspect or subset of information, where the discipline adds a particular perspective to the research space and where most of information science's scholarly output is directed towards.

Information science is concerned with how information is manifested across space and time. Information is manifested to facilitate and support the representation, access, documentation and preservation of ideas, activities, or practices, and to enable different types of interactions between people and other agents, for example, communication and exchange. Even if humans are not the initial creators or consumers of manifested information, information science considers all phenomena and practices around manifested information across space and time within its purview.

This definition, which focuses on an object (manifested information) and a particular aspect (across space and time), will guide the discussion below.

Why does it matter?
Why does a discipline concerned with manifested information and the phenomena and practices around it matter? The functions of manifested information are helpful to consider. These immediately come to mind: (1) to provide and maintain a record or memory, (2) to organize processes and structures and (3) to support learning. Manifested information supports these functions across space, time, groups of people and other agents.

For almost all human interactions, it is helpful to have a record – to remember the past, to coordinate the present and to prepare for the future. While oral traditions maintain some forms of memory, cultural and other heritage is transmitted and transported via manifested information: documents, monuments and objects that have a meaning to a particular culture or society.

A culture persists not only through people, but also through the manifested information it creates or designates as important. Societies agree on rules of engagement, which are usually manifested and agreed upon in documents – no individual or group can be relied upon to remember all the details. Boyd Rayward writes: "information science deals with something that is now and ever has been fundamental to human society. Managing information [. . .] is intimately and intricately bound up with the cultural imperatives, the modes of thought, belief and investigation, the interrelated economic, social, political, administrative, recreational and educational systems that are characteristic of different times and places." (Rayward, 1996, p. 11).

Manifested information helps people to learn, to gain knowledge. Michael Buckland writes: "we all have a substantial vested interest in a knowledgeable society. We need people who are well-informed, who know about what they are doing." (Buckland, 2012, p. 5). Wilson's concept of "second-hand knowledge" (Wilson, 1983) explains why we need manifested information to help people become informed: first-hand knowledge does not suffice in a complex world and second-hand knowledge needs to be imparted on a large scale, which is only possible through manifested information and only, if it persists across space and time.

A discipline that studies these phenomena or practices and designs processes and infrastructures for it should be important to society.

We will now look at the four parts of this definition: (1) manifested information, (2) across space and time, (3) people and other agents and (4) how = phenomena, practices, processes and infrastructures.

Manifested information

Information has been shown to have many, sometimes incommensurable meanings. This is not surprising as many academic disciplines address the concept in one way or another (Hjørland, 2022; Bates, 2010). This paper does not provide an encompassing or new definition of information. The concept of manifested information delineates those forms and aspects of information, where information science's core resides in the research landscape.

Information science is mostly focused on the type of information that exists outside a human being. Variably and with slightly different delineations, this has been called recorded information (Bates, 1999), information-as-thing (Buckland, 1991), documents (Buckland, 1997, 2018), knowledge in action (Kuhlen, 2013), resources (Glushko, 2016) or documented evidence (Marchionini, 2023).

I will use the term "manifested information" to denote any form of exosomatic and non-ephemeral information that is communicated, documented, exchanged and possibly long-term preserved: analog or digital, text or multimedia, antelopes in zoos (Buckland, 1997). One could debate about adding relevance to this definition, but then some may argue that data, which has no assigned meaning in some definitions, does not belong to this category. Manifested information transports something informative, which includes data as well. The term "recorded information" implies intentionality (the information was intended to be recorded). The term "document" is often reduced to written texts, even though the new documentation movement uses the term in a much more encompassing matter (Lund, 2009). "Manifested information" is a vocabulary choice that uses information as the term most associated with the discipline, while being strongly connected to the documentalist tradition.

Some theoretical approaches separate an abstract concept of information and the representation of information in an object or carrier (Dinneen and Brauner, 2015). The concept of manifested information highlights the combination: information science's core focuses on those practices and phenomena where the manifestation of information in a physical or digital representation is a central aspect of the interaction.

I am not the first to use this terminology. Jesse Shera declares: "Information science is, or should be, involved with the whole concept of knowledge in whatever form its manifestations may take." (Shera, 1973b, p. 286). The FRBR/LRM standard (Riva *et al.*, 2018) also uses manifestation as the concept that is the physical embodiment of an expression of work, but since the standard mostly focuses on bibliographic entities, it is narrower than the concept of manifested information used here.

There are phenomena in human communication that do not involve manifested information, for example conversational exchanges, but that are clearly of interest when studying information behavior. These should not be excluded from information science as a domain of study, but they are not the focal point around which most of the discipline is centered. The primary and unique core of information science – where most design and applied work focuses – is on the phenomena around manifested information. With this distinction in mind, Marcia Bates writes: "Our primary, but not sole focus, is on recorded information and people's relationship to it." (Bates, 1999, p. 1048).

Across space and time

In information science and its related professions, we care in particular that manifested information – in this context also associated with knowledge, culture, or memories – can be exchanged and used across space and time. While communication and information exchange also happen ephemerally, manifested information can and needs to persist for personal, cultural, legal, political, scientific, commercial and many other reasons. It is this characteristic of manifested information – to persist beyond individuals and moments – that makes it so valuable to society.

Still, the concepts of space and time can vary widely in the different contexts of information science studies. The length of time periods and the scale and location of space depends on the context and scenarios we are studying or designing.

People and other agents
Why do we care about manifested information in the first place? In the most abstract sense, we use manifested information in any form to support us in our private and professional lives, in coordinating groups, organizations, societies, nation-states and anything that requires information exchange and communication to be able to function. We use manifested information to express ourselves creatively and to entertain. Information science is fundamentally not only about information as an entity but about how information is communicated, documented, exchanged and transported between people, for which it needs to be manifested. For this core definition of the discipline, people and other agents – such as organizations and software – are usually at either end of a practice or process using manifested information.

Phenomena, practices, processes and infrastructures
The concern with how information is manifested delineates several areas of interest within the field. We study:

(1) *The forms of manifested information*: from analog to digital, from text to multimedia to objects. This includes, among others, the history of the book or book illustrations, the development of digital storage media, or differences between synchronous and asynchronous information exchange formats, e.g. the development from letters to emails to social media messages.

(2) *The infrastructures for managing and exchanging manifested information*: I divide the concept of infrastructure into two areas: the institutions and organizations and the technologies of information access, transfer, processing and management.

   • Institutions include memory institutions such as libraries, archives and museums, but also all other organizations that deal with manifested information: records management and knowledge management in companies are good examples. Digital infrastructures such as virtual reality spaces or social media platforms can be easily included. Last, but not least, personal information spaces are also studied, e.g. when studying casual leisure information seeking and private collecting.

   • The many technologies – their design, development, production and maintenance – around manifested information are part of the field: information retrieval systems, library management systems, personal information management systems, social media platforms, AI systems and the devices to consume them: from mainframes to personal computers, handhelds, cell phones, wearable devices like smartwatches, etc.

(3) *The practices and processes for and interactions of people with the forms of (manifested) information and their infrastructures*: this ranges from information organization and description, information access, information management, information visualization, publishing to preservation. It encompasses, among others, the phenomena and practices of information interaction and behavior: information needs, information use, information seeking and other information interactions, information literacy, information overload, misinformation,

disinformation, etc. It also includes studies of the changing roles and functions of institutions and infrastructures in peoples' lives, e.g. the library as a third place or the impact of social network recommendations on information behavior, and the critical technical practices needed to shape these developments (Shaw, 2019).

(4) *Meta-, cultural or societal level information practices and processes*: data and information life cycles, informational networks, knowledge and memory construction in groups, cultures or societies, informational interdependencies and impacts, scientometrics and bibliometrics, open access and open science, data and privacy protection, information ethics, policy and governance, among others, are common concerns for information science.

Figure 1 is a graphical representation of the core of the discipline. It emphasizes that manifested information is situated between agents across space and time. Infrastructures – both institutions and technologies – support, provide, impact and monitor the flow, transfer or preservation of manifested information. Both manifested information and infrastructures enable informational practices such as communication or documentation for people and other agents across space and time. At its core, information science studies the forms, practices and phenomena around and behind this fundamental interaction: this can be done with perspectives on groups, societies, cultures or the individual, institutions and domains (Hjørland and Albrechtsen, 1995).

The information science core: multi-method and multi-theory
This focused view on manifested information, the infrastructures (both institutional and technological) and the (behavioral) phenomena and practices around it distinguish information science from other disciplines also concerned with information.

Hjørland (2019) summarizes a number of studies that study the scholarly output or other characteristics of the discipline and categorizes the associated research areas. The core perspective can be applied to most identified subdisciplines within the field.

A recent example are studies by Järvelin, Vakkari and colleagues who developed a decimal classification of library and information science (LIS) topic areas (Järvelin and Vakkari, 1990, 2022). Their content analysis of research publications in the field found that scientific and professional communication, in which scientometrics/bibliometrics is a major
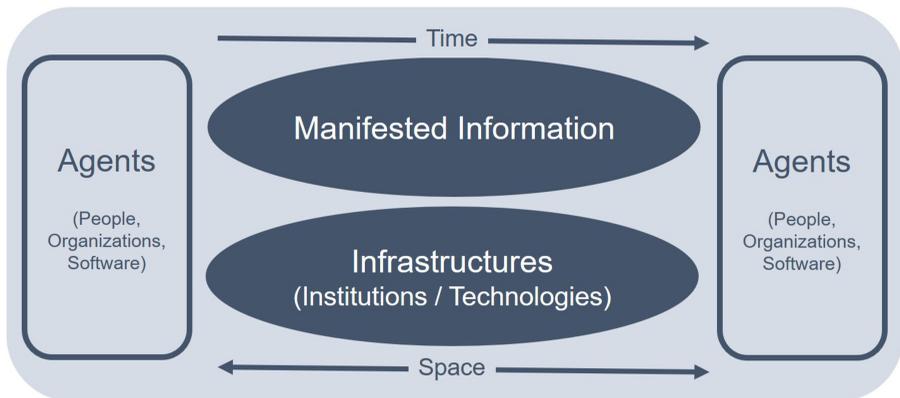
Figure 1.
The core of information science: the phenomena, practices, forms and infrastructures of how information is manifested for agents across space and time

Source(s): Figure by author

area, produces the most research output, followed by research on information search and retrieval, library and information-service activities and information-seeking (Järvelin and Vakkari, 2022). Similar results, albeit with slightly different categorizations of research areas within LIS were found with topic modeling approaches (Figuerola *et al.*, 2017; Han, 2020). These empirically found research areas align with the above-defined core of information science.

Associated with the studies on research areas, Vakkari and colleagues also analyzed the distribution of authors and influences from within and outside the discipline (Chang, 2018; Vakkari *et al.*, 2022, 2023) and found that authors with affiliations outside information science increasingly publish in LIS journals. It is an open question, whether the multidisciplinary treatment of information science topics leads to fragmentation of the discipline or whether these topics need a multidisciplinary treatment, where the information science perspective is one that maintains its space beside other disciplines.

Information literacy is a good example of a problem space that appears in several disciplines. There are studies on information literacy in education, psychology, media studies and many more (Hicks *et al.*, 2022; Haider and Sundin, 2022). These are examples of disciplinary treatments of the same problem, but with different perspectives, where information science contributes to the overall problem space.

A multitude of theories and methods that support the study of manifested information, information infrastructures and its phenomena can and should be part of the discipline. The different approaches lead to a better understanding of the object and phenomena under study. Triangulation of methods has long been argued to improve scholarly insights (Mathison, 1988; Olsen, 2004). Different theories were adapted or developed in information science to frame research in the field (Vakkari, 1994; Hjørland, 2019). In her overview, Marcia Bates describes 13 metatheories or methodological approaches represented in information science (Bates, 2005). Tuomaala *et al.* (2014) distinguish empirical research strategies (further categorized into historical, survey, qualitative strategies, or citation analyses), conceptual research, mathematical or logical strategies, system and software analysis and design and literature reviews. Different research strategies are more or less frequently used in the discipline over time (Tuomaala *et al.*, 2014; Järvelin and Vakkari, 2022) and different theories have come to the forefront with varying research trends. Still, these multiple theories and methods are used with a unifying focus on the phenomena and practices of manifested information.

In her reflections on developing theoretical perspectives for information science, Carol Kuhlthau asks: "Is library and information science about seeking meaning or about retrieving information? Can the field be about both?" (Kuhlthau, 2016, p. 82). A multi-method, multi-theoretical discipline view allows both algorithmic research on search and retrieval as well as social research on information seeking without having to choose one over the other. The identity of the discipline is based on its particular perspective on the problem area, not on any particular theory or method.

Comparison to other definitions

Other definitions overlap or partly overlap with the definition of information science presented here, demonstrating that this perspective is not new, but reframed. These different definitions do not contradict each other necessarily, but they focus on different aspects of our field. A broad perspective and interpretation can encompass most of them. I focus on a selection of definitions by scholars in the field. Historical overviews of disciplinary writings are provided by Buckland and Liu (1998), Vakkari (1994) and Shera and Cleveland (1977).

Michael Buckland, in discussing "What kind of science can information science be?", provides this definition: "Enabling people to become better informed (learning, becoming

more knowledgeable) is, or should be, the central concern of information studies." (Buckland, 2012, p. 5). A "knowledgeable society" (Buckland, 2012, p. 5) is of utmost interest to the public and a discipline that is concerned with what and how people know – and how to understand and support people in getting to know and to learn – represents a strong societal need. This concern is one of the reasons why information science exists: it focuses on the human activities of knowing and learning but implies that manifested information and the surrounding infrastructures are the structures that enable informing activities. Buckland also argues for "methodological versatility" (Buckland, 2012, p. 5) and claims that cultural context and therefore cultural inquiry are important aspects that are not adequately captured by disciplines that only focus on technologies.

One of the earliest and often cited definitions of information science is Harold Borko's article in American Documentation: "Information science is that discipline that investigates the properties and behavior of information, the forces governing the flow of information, and the means of processing information for optimum accessibility and usability. It is concerned with that body of knowledge relating to the origination, collection, organization, storage, retrieval, interpretation, transmission, transformation, and utilization of information." (Borko, 1968, p. 3). Borko emphasizes both theoretical approaches ("a pure science component, which inquires into the subject, without regard to its application", (Borko, 1968, p. 3)), and applied approaches and states that the discipline's goal is to improve "institutions and procedures dedicated to the accumulation and transmission of knowledge" (Borko, 1968, p. 4). Although Borko lists "behavioral studies of users" (Borko, 1968, p. 4) as one of the research areas of information science, his definition focuses mostly on the technical aspects of information processing and management, but it can be easily encompassed by the core definition presented here, as long as we understand Borko's terminology of "information" and "knowledge" (which he seems to use interchangeably) as "manifested information". This is consistent with the research areas he lists as the purview of information science: information needs and uses, document creation and copying, language analysis, translation, abstraction, classification, coding and indexing, system design, analysis and evaluation, pattern recognition and adaptive systems.

In her 1999 article on the invisible substrate of information science and subsequent writing, Marcia Bates formulates a definition for information science, with which the presented definition in this article is very much aligned: "Three Big Questions can be identified within the above framework: (1) the physical question: What are the features and laws of the recorded-information universe? (2) The social question: How do people relate to, seek, and use information? (3) The design question: How can access to recorded information be made most rapid and effective?" (Bates, 1999, p. 1048). While, as Bates writes, the social question on information behavior also needs to study all kinds of information (not just recorded), most research in the field primarily deals with recorded information. Bates' defines recorded information as "communicatory or memorial information preserved in a durable medium" (Bates, 2006, p. 1039) and distinguishes collection sciences (part of information science) that deal with recorded information and curatorial sciences such as museum documentation (cousins to information science) that deal with embedded objects and embodied phenotypes. The latter contain information, but are not "recorded" – they were not created to "communicate or memorialize" (Bates, 2007). My definition of manifested information includes both Bates' recorded information as well as the embedded and embodied information objects when they are used in and for communication in the documentalist tradition of Suzanne Briet (Briet, 2006; Buckland, 1995), and Paul Outlet (Rayward, 1991). Bates explains that the reason for the development of information science arose from the need to "retain informational resources" (Bates, 2007), which is one of the reasons presented above. The definition presented here is more encompassing in its core object and its motivation for information science as a discipline but is especially closely aligned in describing the areas of study in information science. In later work, Bates develops seven topical facets to

describe different areas of the "information discipline": services and functions, subject information, institutions, policy and management, information technology, history and geography (Bates, 2015). These can be directly mapped to the model developed above.

In his 2009 article in the Encyclopedia of Library and Information Science, Tefko Saracevic presents the following definition: "Information science is the science and practice dealing with the effective collection, storage, retrieval, and use of information. It is concerned with recordable information and knowledge, and the technologies and related services that facilitate their management and use. More specifically, information science is a field of professional practice and scientific inquiry addressing the effective communication of information and information objects, particularly knowledge records, among humans in the context of social, organizational, and individual need for and use of information." (Saracevic, 2009, p. 2570). Drawing heavily on Bates' three big questions for information science (Bates, 1999), Saracevic distinguishes two branches of information science: the system-oriented information retrieval and the user-oriented human information behavior and metric studies. The focus on "recordable information" or "knowledge records" and the phenomena around it are equivalent to the definition presented here, only the differentiation between system- and user-oriented branches cannot be easily transferred. System- and user-oriented approaches can be found in any of the four research areas that are grouped in this paper.

In working through the subject matter of the subdisciplines of information behavior, information retrieval, informetrics, information organization and information ethics, Jonathan Furner argues that "information" is not an accurate enough concept to describe their research focus (Furner, 2015). He discusses more concrete concepts (data, knowledge, metadata, representation, relevance and finally collection, preservation and access studies), most of which I would aggregate under my broader concept of information science. On the research interests of the field, Furner writes: "In addition to what we learn from measurements and computations, we want to know about ways of eliciting individual persons' requirements and desires for resources of all kinds; about ways of interpreting individual resources so that we can make sensible appraisal decisions and create useful metadata; and about ways of evaluating the extent to which members of specified social and cultural groups are prevented from accessing the resources they want. We want to know about the ways in which individual people construct representations of the natural and cultural world with which they interact, and we want to understand the very nature of representation and interpretation. We want to know how people create new ideas by bringing stuff together in new ways, how people organize stuff for future use, and how people find the stuff they are interested in. We want to know about document and record, about remembering and forgetting, about sensemaking and storytelling, about testimony and ritual, about the practices of everyday life." (Furner, 2015, p. 375). Most of this list fits into the definition presented here as well, even if Furner speaks of representations that can be manifested or not. While Furner finely differentiates aspects of information and cautions about descriptive accuracy, I attempt to summarize these fine-grained aspects with the goal of delineating a core for the field. He argues strongly that the name of the field is a mistake, whereas I believe that a new name will not change the identity problem that the field seems to have with itself. In providing a definition for the discipline, this attempt and Furner's are following opposing strategies and use a different framing, but when comparing the described concerns of the discipline, they overlap.

In their introductory textbook to information science, Bawden and Robinson describe four conceptions of information science that are concerned with (1) computing and data science, (2) information and communication technologies, (3) information as a physical and biological identity and (4) "information recorded in documents, with meaning and knowledge" (Bawden and Robinson, 2022, p. 1). The focus is on the last one when they define: "Information science is a field of study, with recorded information and documentation as its concern, focusing on the components of the information communication chain, studied through the perspective of

domain analysis." (Bawden and Robinson, 2022, p. 3). Bawden and Robinson posit Floridi's philosophy of information (Bawden and Robinson, 2018) as the primary theoretical foundation and Hjørland's domain analysis (Hjørland and Albrechtsen, 1995) as the main methodological approach of information science research. This is broadened in the definition here, but the core concern is equivalent.

Information science's identity in the scholarly ecosystem

Within the field, a number of definitory aspects around the identity are controversially discussed: discipline vs. field, science vs. humanities, library vs. information science and application vs. theory. This section addresses these points of conflict briefly, but overall, the paper argues that information science's identity is based on its core research focus and the societal importance of these concerns.

Discipline, metadiscipline, or field of study?

Bawden and Robinson cite philosopher of education Paul Hirst, who distinguishes disciplines, "based on a unique form of knowledge, such as mathematics and physical sciences", practical disciplines, based on one form of knowledge but "oriented to solving practical problems, such as engineering or medicine", and fields of study, "focused on a topic or subject of interest, using any of the forms of knowledge" (Bawden and Robinson, 2022, p. 2). Information science is focused on particular research problems and uses a variety of methods and theories and can therefore be categorized as a field of study in this framework.

Today, Hirst's categorization of the scholarly landscape is difficult to apply, as all disciplines now draw on several "forms of knowledge" in order to gain further insights into their own field, admittedly some more than others. The term "field of study" also seems to imply a less stable and more loosely connected research area and community than a term such as "problem-focused discipline" that would be on par with other types of disciplines. I posit that the distinction between the concepts of "discipline" and "field of study" is not productive for defining an identity for the field.

Some argue that information science does not have its own genuine theories or methods, but borrows and bases its research work on theories and methods from other disciplines (Bawden, 2016). Conversely, document theories, classification theories, information behavior theories, information retrieval theories, relevance theories and bibliometric theories have been pointed out by others as genuine contributions of the field (Hobohm, 2022; Sonnenwald, 2016). Other contributions construct theory or a metatheory for information science specifically (Hjørland, 1998; Bawden and Robinson, 2018). Hirst's categorization hinges on a specific definition of theory and method ("unique form of knowledge"), but these are controversially discussed concepts (Gregor, 2006; D'Andrade, 1986). Which discipline currently works with just one method or theory and which discipline can really claim a method as uniquely theirs? Basing the distinction between disciplines and fields of study on their use of single or multiple methods is increasingly difficult.

Another pragmatic consideration to avoid the distinction between these terms is the current structure of the social system of scholarship. Rudolf Stichweh considers disciplines "the primary unit of internal differentiation of the modern system of science", not only a "classificatorily generated unit of the ordering of knowledge", but "a genuine and concrete social system of scientific communication" (Stichweh, 1992, pp. 3-4). While research can be done within and outside disciplinary boundaries, the institutionalized systems of scholarship, for example, academic departments, funding programs, journals and conferences, are still mostly discipline-specific (Stichweh, 2013), although a slow increase in interdisciplinarity was shown in bibliometric studies of publications (Van Noorden, 2015; Porter and Rafols,

2009). As long as the "discipline" is the primary unit of differentiation in the social system of scholarship, it is only strategic for information science to claim its status as one.

Marcia Bates posits that information science – alongside education and journalism – is a metadiscipline, characterized by cutting across the subject matter of other disciplines with a particular "rhetorical character" (Bates, 1999, p. 1044) and a domain that is valuable for society. Bates adds that metadisciplines are research disciplines that also have distinct professional cores and defines information science's domain as the "universe of recorded information". While Bates' definition of information science very much aligns with the view presented here, the distinction of information science as a metadiscipline moves it outside the disciplinary canon, which makes it more difficult to position it beside other disciplines. Within the disciplinary canon, most researchers categorize information science as a social science, but some argue for a placement within the humanities (Buckland, 1996a).

The underlying assumption of this paper is that information science has an independent core and locus in the canonical scholarly universe: a discipline. A discipline is more stable than a conglomerate of researchers interested in a particular problem at a particular time. The latter can also become its own stable discipline and we could argue that information science is still in the process of establishing itself as a discipline for those who are intent on these differences. For this paper, I argue that the distinction is not beneficial for establishing a unique identity.

Science or no science?

Not only do we argue about the demarcation between discipline and field of study, another contested concept is the word "science" in the most frequently used name of the field: information science. For some researchers, the word "science" – at least in the modern English-speaking world – only denotes a particular group of disciplines, the natural and life sciences. A large part of the scholarly approaches in information science does not follow the empirical, experiment- and observation-based approaches of the natural and life sciences and therefore would not be adequately represented with a disciplinary naming of "science" (Buckland, 2012; Furner, 2015).

Isaac Newton referred to his emerging discipline of physics as "natural philosophy", using the vernacular of his time (Newton, 1687). Political science (a social science [sic!]) and computer science (an engineering discipline) do not seem to have this problem of association. No one claims that information science is (only) a natural or life science (Vakkari, 1994). The German word "Wissenschaft", commonly translated as "science" in English, denotes all forms of disciplines. When information science was first named, it may have been named with particular aspirations towards being a "hard" natural science in comparison to librarianship. Now, it appears prudent to maintain the established name, but consider it in the spirit of "Wissenschaft" or "social science".

Library and/or/vs information science

There is an assumption that disciplines arise from scholarly interest in a problem if and when time and resources allow to study it. Conferences, journals and academic departments follow in chronological order. Sometimes, a nation-state will push and support academic departments and other scholarly infrastructures in the field, because there is a national interest for a discipline to be developed. The latter can be seen in the establishment of an institutional information science in Germany (Ockenfeld, 2022) separate from library science. Information science was institutionalized to support the ever-increasing need for documentation and access to research information, presented more and more in the form of journal and conference articles, a service that was – at the time – not covered by libraries. In the 1960–1970s, information science – both defined as the technical algorithmic part of processing information and the documentation part of documenting objects that were more specific – was presented in opposition to librarianship or library science also in North

America and elsewhere (Rubin *et al.*, 2020). However, Jesse Shera, amongst others, saw the technical aspects of information science as part of a wider library science and tried to incorporate it there (Saracevic, 2009).

There is an incentive to put oneself in opposition to another field to justify your existence. This was certainly the case in the early years, when documentation and information science developed distinct perspectives and approaches for the information problem (Shera, 1973a; Buckland, 1996b), but appears anachronistic today, particularly because digitization and the Web have connected these areas so closely as to be intertwined. Likewise, library science is sometimes distinguished from information science as studying the libraries' function in society and communities with a particular user-oriented perspective and approaches. Since information science also analyzes information infrastructures and their functions in societies (for example how search engines create biases) and also applies user-oriented perspectives and approaches to them, it is hard to draw a dividing line. Still we encounter beliefs that libraries are not included in research and scholarship if only information science is in the name of the academic department or school that represents it.

From the presented core perspective, it is not possible to draw a definite and coherent line differentiating library science from information science, unless information science is somehow defined by excluding libraries and other memory institutions. It is impossible to define a discipline that deals with manifested information and its phenomena and exclude an area around and on institutions and their activities and functions that provide access to manifested information and that see it as one of their primary tasks to help people "get informed". For the perspective presented here, libraries are a specialized subject area in the wider field of information science. This is congruent with what some representatives of the disciplines described much earlier (Buckland, 1980; Vakkari, 1994). The name library AND information science is redundant for this definition, but links to the historical roots of the fields and is now often used to represent a school's particular focus on libraries in the disciplinary problem space.

Theory and practice: information science as an applied discipline
Information science is strongly linked to professions and practical applications in the memory institutions, cultural heritage sector, scholarly, research and commercial information infrastructures as well as all organizations that focus on organizing, documenting and processing manifested information. The immediate relationship with a profession (for information science the information professions, incl. librarians, archivists, research data managers, records managers, information architects and many more) – which is not unique to information science as a discipline – is sometimes the scene of intense scrutiny and conflict.

Applied disciplines focus on practical problems and objectives. It is inherent that a relationship to practice exists and works to mutual benefit. Being an applied discipline is an advantage for information science. It provides an unlimited supply of practical problems to work on, it widens the potential base of researchers (practitioners can do research, too!) and provides career paths for graduates outside of the academy. It is a built-in gauge of the societal utility of the discipline's output and research directions, although this does not mean that the discipline should not and could not also explore new applications and theoretical models.

There is a long-standing tradition in the field that some practitioners decry theory for not being immediately applicable and vice versa, that practice does not catch up or apply what insights the academic disciplines have gained (Williamson, 1931). Theory must be allowed to live without an immediately visible application. Conversely, theory also needs to incorporate empirical evidence and influences from practice creating a circle rather than a unilateral flow from one domain to the other (Wimmer, 2015). It is in information science's and the information professions' best interest to value each other's contributions to the problem space and help to build its identity (Buckland, 1980).

Interdisciplinarity

An often-repeated conjecture is that information science is an interdisciplinary field drawing experts from different disciplines to work on information problems. These information problems are so complex that they cannot be covered by a single discipline, which is why an interdisciplinary treatment is necessary. This argument allows for interdisciplinary collaborations and multiple approaches and viewpoints on the problem. It also justifies hiring outside disciplinary lines, considered much harder in other departments that have longer and more stable disciplinary traditions. It has also created interesting discussions on the nature of interdisciplinarity in the field (Arafat *et al.*, 2014). While interdisciplinarity is a necessary component for many scholarly problems (not just information) and interdisciplinary research projects can and will result in innovative insights, I'd like to argue that it poses a problem when interdisciplinarity is the defining foundation of a field. Information science has a disciplinary identity that does not preclude it from engaging in interdisciplinary research.

If disciplines are the primary unit of differentiation in the current scholarly ecosystem, then an interdisciplinary field will be "inter", that is "in-between" other fields and can only be defined by its "in-betweenness" between other disciplines or fields. This implies that (1) it is dependent on those disciplines that it sits in-between and (2) it does not represent its own "primary unit" in the landscape. If there is no genuine and unique identity, then information science departments and iSchools are purposeful interdisciplinary aggregations that can be as easily dismantled as they are built. Researchers have a "home" discipline, from where they approach the information problem. But what is the home discipline of information science and iSchool graduates, if information science is not it? How can they develop a disciplinary understanding and identity, if there is none to be claimed at their own department or school? As other interdisciplinary programs have demonstrated, this is not a stable model and it will be hard to assess any type of progress made in the field, if it is assessed in a disciplinary ecosystem. It also neglects that there is an information field that has been around for more than hundred years that seems to have maintained a persistent core, even if methods, terminology or tools have changed.

As other authors have claimed, studying information-related issues and collaborating with different disciplines opens our perspectives (Floridi, 2022). I believe that using theories and methods from many disciplines is a virtue of the field and shows its openness to adapt to new research avenues. Methodological diversity is not interdisciplinarity, as was argued above. We experience a "rapidly mutating" (Nardi, 2016, p. 210) and dynamic information landscape. Particularly the types and formats of information exchange and the tools to process them change frequently, while people, behaviors and processes adapt with some latency or sometimes not all. It is crucial that we keep adapting and integrating new perspectives and approaches to the information problem. But that does not mean that we have to forego information science's own identity.

This paper argues that information science is its own discipline, has been so for more than a century and has its own disciplinary identity while operating in an interdisciplinary problem space. It is up to information science to define its contribution and perspective to this problem space. I contend that we are able to do this without having to resort to juxtapose information science to other disciplines or to be in-between.

Conclusion

The unique research focus of the discipline justifies its existence, because of its value to society and its separate status in the scholarly universe. The phenomena and practices of manifesting information across space and time, its surrounding infrastructures (institutions and technologies) and human behaviors represent a core, which gives information science its unique identity. It allows information science to take its position together with other

disciplines that deal with information in other forms or with other scholarly perspectives. Information science collaborates with other disciplines to work on complex information problems that need multidisciplinary and interdisciplinary approaches to address them. This can happen in iSchools, departments of library and information science, interdisciplinary research centers and many different professional domains.

Traditionally, library and information science departments and iSchools have been very open in welcoming other disciplines in their midst to work on information problems. In an optimistic interpretation, information science has therefore long realized the value of multi- and interdisciplinary work and is very well positioned to adapt to new research challenges.

New information problems may change the core of the discipline. Throughout its existence, the discipline has remained quite stable in its central focus on the described phenomena, yet proved to be highly adaptive to the tremendous changes in the forms, institutions and technologies around and for manifested information. Yet, as argued above, a critical perspective of the discipline's core needs to be maintained.

The explicit objective of this paper was to provide a unifying and encompassing definition of the core of the discipline, not to distinguish every possible variation in the field's approaches and research problems. The encompassing definition provides an identity, around which researchers and scholars who identify as information scientists can position themselves.

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