Abstract: This article examines what is an applied discipline and how does it matter to library and information science that it is an applied, not a basic, discipline. To use the distinction made popular by the philosopher Isaiah Berlin applied disciplines tend to attract foxes and basic disciplines tend to attract hedgehogs. Michael Seadle has always identified himself as a fox, and his scholarship confirms this self-identification, as it has dealt with a broad array of approaches to library and information science problems, ranging from highly technical issues in long-term digital archiving to ethnographic studies of the cultures of information users. This article identifies some hazards that successful foxes in applied disciplines must overcome, with respect to both individual scholarship and the management of groups of scholars in academic institutions.

Keywords: Applied Science; Isaiah Berlin; Library and Information Science

1 Introduction

What is an applied discipline and how does it matter to library and information science that it is an applied, not a basic, discipline? Applied disciplines typically support the work of a particular profession or economic sector by solving problems relevant to that profession or sector, while basic disciplines are more involved in developing knowledge for its own sake. For example, biology is a basic discipline, while medicine is applied. Biologists can investigate questions like, “How does brain activity in birds produce song?”1, while medical scientists investigate questions like, “Which of two cancer treatments results in higher five-year survival rates?” Similarly, economics is a basic discipline, which can ask questions like, “How are time preferences and risk preferences related?”2, while finance and accounting are applied disciplines that ask questions like, “What distribution of decision rights between parent and subsidiaries results in the best financial performance in multinational firms?”3.

Although an applied discipline may have a predominant association with a particular basic discipline (as with medicine and biology), applied research often draws from multiple basic disciplines. As Richard Scott pointed out, basic research explores concepts and causal relations, while “Applied research is driven by an interest in solving some identified problem – low morale or productivity, high turnover – and is willing to incorporate any factors, whether economic, psychological, or technical, that may shed light on it. Thus, applied studies are much more likely
to be interdisciplinary: practical problems do not respect disciplinary boundaries.”

Consider, for example, a type of question that might be addressed in information science: How can we best make a particular kind of information available to a particular population? Specific forms of this question could include questions about digitizing archives, training individuals to use databases, creating knowledge-management systems in organizations, and so on. These are practical problems that do not respect disciplinary boundaries and need to draw on many basic disciplines in order to arrive at an effective solution.

Computer science provides guidance about technically efficient and reliable means of storing and retrieving the information. Psychology provides guidance about making the interface and information structure compatible with the way target audience’s minds work, so that access is cognitively (not just technically) efficient. Economics provides guidance about the likely costs of alternative ways of providing the information and can assist in estimating benefits when cost-benefit analyses are required to justify investments in information. A variety of social and organizational theories provide guidance about how novel information systems with broad organizational implications can be implemented and managed, given the prevailing laws, social norms, and organizational structures.

To use the distinction made popular by the philosopher Isaiah Berlin⁵, applied disciplines tend to attract foxes and basic disciplines tend to attract hedgehogs. The locus classicus for the distinction is a fragment of ancient Greek poetry that says: “The fox knows many things, but the hedgehog knows one big thing.” Intellectual hedgehogs see the world through the lens of one big idea, while intellectual foxes are pluralists, willing to live with multiple ideas that may not fit neatly together.

The eclectic nature of applied disciplines can be attractive. “Interdisciplinary” is a label for research that appeals to granting agencies and university administrators – and with reason, because multiple approaches to a question can often bring us closer to a good answer than a single approach can. But being a good fox is not easy: as Erasmus⁶ said, commenting on the Greek fragment, the fox’s many wiles do not always save him from the hunter’s dogs, while the hedgehog’s spines are reliably dog-proof and simple to operate (at least for hedgehogs).

Michael Saddle has always identified himself as a fox, and his scholarship confirms this self-identification, as it has dealt with a broad array of approaches to library and information science problems, ranging from highly technical issues in long-term digital archiving to ethnographic studies of the cultures of information users.

This article identifies some hazards that successful foxes in applied disciplines must overcome, with respect to both individual scholarship and the management of groups of scholars in academic institutions (universities, professional organizations, and publication outlets). It is based in part on the author’s thirty years of experience with another applied discipline, accounting, which has a long history of intensively social-science-based research and thus has provided opportunities for scholars to identify and contend with these problems.

The intent of an applied discipline is to provide support for people who work in a particular field: for example, librarians, accountants, nurses, foresters, or computing professionals. The question is then: How can an academic institution best do this? What (if anything) should differentiate academic research about an applied field from journalism about the field or from reports by for-profit consultants?

An answer often given is that academic research is “more rigorous” than journalism or consulting. Rigor in research means the existence of well-developed theory – that is, unambiguous general explanations that stand up to logical challenge – and well-developed methods for collecting and analyzing the evidence that supports or challenges the theory, rather than mere casual observation and homemade analysis.

2 Scholarly Hazards

The sections that follow argue that the quality of research in applied disciplines suffers if they make too little use of basic disciplines, but also if they allow themselves to be dominated by a single basic discipline in ways that distort the practical questions the applied scholars are trying to solve. These are the two scholarly hazards that the clever fox must overcome. The intensive use of multiple basic disciplines is helpful in overcoming these two hazards, but it can pose problems for the upper-level managers of the scholarly world – the deans and editors and institute directors who must allocate resources and settle disputes among scholars with different and sometimes conflicting basic-discipline allegiances.

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2.1 Scholarly Hazard 1:
Underuse of Basic Discipline

Underuse of basic disciplines can take two forms. One form consists of attempts to develop the applied area as an independent scholarly domain, without drawing on basic disciplines. The other is dependence on basic disciplines coupled with such a shallow knowledge of their theories and methods that the dependence is as likely to mislead scholars as to aid them.

2.1.1 Attempts at Independence

Scholars in applied disciplines can easily become frustrated at the difficulty of adopting theories and methods from basic disciplines. The theories and methods that the basic disciplines supply often correspond only partially with what applied scholars need to address their practical problems. Applied scholars often chafe under their dependence on basic disciplines that have different interests and priorities than their own. Thus calls sometimes arise in applied disciplines for “breaking free” from the basic disciplines, for “developing our own theory and methods”, and so on. When desires for independence are strong, university curricula in applied disciplines tend to close in on themselves intellectually and reduce requirements that students take high-level courses in basic disciplines.

If “developing our own theory and methods” means starting with a blank slate, independent of the basic disciplines, then this strategy’s prospects for success are not high. Applied disciplines like library and information science or the business disciplines deal with human behavior. Basic research in anthropology, economics, psychology, political science, and sociology has provided a good deal of knowledge about human behavior, and it is highly improbable that none of this knowledge is relevant to the specific behavior that takes place in (for example) libraries or financial firms or publishing houses. Applied disciplines will be more successful if they make good use of relevant theories and research methods that are already available. Not only is it unnecessarily time-consuming to re-invent the wheel, but also newly-invented wheels are rarely as effective as those that have been modified and refined over time.

Scholars in applied disciplines sometimes understate the relevance of basic research to the problems that interest them, because the basic disciplines have unfamiliar terminology or unfamiliar ways of structuring questions. In consequence, a casual search of basic-discipline literature may appear to yield no relevant material when in fact there is much that is relevant. To take a simple example, the (applied) human-resource or personnel psychology literature has been much concerned with issues of “person-organization fit”. A personnel psychologist who was interested in discovering what economic theories of organization had to say on this point might (falsely) conclude that economics had nothing to say, because economics uses different terms. Searching a major economics journal (the American Economic Review) for articles that mention “person-organization fit” in the last twelve years yields zero results. A search on “sorting”, however, – an economic concept that has a considerable (if not complete) overlap with what human-resource scholars mean by “person-organization fit” – will yield scores of results.

Applied researchers not only need to know unfamiliar terminology in order to make use of the knowledge available from basic disciplines; they also need to be aware that familiar terminology often has specialized meanings in basic disciplines, different from the meaning of the terms in everyday usage. Lack of this awareness can lead to an inappropriate dismissal of whole areas of basic research as irrelevant to applied problems when in fact these research areas can be highly relevant.

For example, naïve participants in a number of applied disciplines in the 1980s were sometimes puzzled about their colleagues’ interest in the psychology of memory. They objected, “Surely memory is not very important in professional work. It’s so easy to search information systems now, memorizing is not an important skill.” They were unaware that “memory” in cognitive psychology means more than memorizing facts: the study of memory in psychology addresses (for example) the way that people mentally organize their knowledge about the world (knowledge structures), how their use of new information depends on the way that it calls other information to mind (spreading activation), differences between conscious and unconscious thought processes (explicit and implicit memory), and factors that affect how much cognitive capacity people have for working on current tasks (working memory). These are all research topics that have important implications for human judgments and decisions in applied areas.

Thus conclusions that a basic discipline has little to contribute to practical problem-solving in an applied area can easily be premature. More appropriate conclusions require either some significant knowledge of the basic discipline or assistance from colleagues with the necessary knowledge and the ability to communicate it effectively to applied researchers.

2.1.2 Shallow Knowledge of Basic Disciplines

If scholars in applied disciplines accept the potential relevance of basic disciplines, then they have a double task. They need to know both the world of their application – library institutions or tax laws or highway engineering – and the theory and methods of one or more basic disciplines. Under the pressure of professional life, one or the other part of this double task can sometimes receive inadequate attention. If it is the basic discipline that receives inadequate attention, applied researchers may have only a shallow knowledge of the basic discipline and thus may make vigorous, extensive, and erroneous use of its theories and methods.

Common misuses of basic disciplines arise from insensitivity to the assumptions and contexts within which the relevant basic discipline works, as well as insensitivity to distinctive terminology in a discipline. Consider, for example, the problems faced by a library researcher who is interested in the causes of rapidly rising scientific-journal prices and the effects of these rising prices on university libraries. The researcher, realizing that the increase in journal prices arises in part from the quasi-monopoly power of certain publishers, might want to explore what economists have to say about causes and effects of monopolistic power. This exploration can provide valuable general ideas about the consequences of monopoly and the forces that work effectively for and against it. But this literature can also be misleading if the researcher is not fully aware of standard assumptions in economics and their implications.

To take only a single example: very many economic models (i.e., models that are not explicitly labeled as dynamic analyses) are models of equilibrium. That is, they identify the conditions that will exist when “everything has settled down”, when individuals and organizations have fully adapted to any past changes, and stability can be expected in the absence of some new shock from outside. These equilibrium analyses often appear to be predicting the immediate effects of changes: for example, what happens when the monopolists’ input costs rise or fall, or the purchasers’ budgets become tighter? But these predictions (comparative static analyses, in economists’ terms) are in fact not predictions of the process of change or of what happens in the short term: they only identify the beginning and end of what may be a long transition from one equilibrium to another. The transition might be a smooth trajectory from point A to point B, but it might also be a volatile trial-and-error process with starts and stops and significant moves in the wrong direction. In environments subject to rapid change and/or relatively slow adaptation (perhaps due to institutional constraints), comparative-static predictions have limited applicability. The economics literature typically does not provide warning labels about this limitation of equilibrium analysis, because the literature is aimed at readers who already know about these limitations. Applied researchers with shallow knowledge can therefore be misled.

Shallow knowledge can be a problem in adopting methods as well as theories from basic disciplines. If our hypothetical library researcher gathers data from many libraries about rising journal prices and their effects (e.g., changes in the offering of various library services), she can benefit in principle by performing statistical analyses on these data. But she may well wonder: if I want to know what the effects of rising journal prices are, what control variables do I need in my statistical model? What does it mean when my results differ, depending on which control variables I use? Does it really matter that the data are not normally distributed? What if there is measurement error in some of the variables? What if the cause-effect relations I am looking at are not linear? One or two statistics courses are hardly sufficient to equip the researcher to answer these questions reliably herself. She needs a deeper knowledge of the discipline of statistics – not necessarily to answer all the methodological questions herself, but to know that they exist, to be able to answer some of them, and to be able to get and interpret expert assistance with the questions she cannot answer.

2.2 Scholarly Hazard 2: Dominance of a Basic Discipline

At the opposite end of the spectrum from under-use of basic disciplines is excessive enthusiasm for a single basic discipline. This enthusiasm has the benefit of encouraging applied researchers to gain a deeper knowledge of the basic discipline’s theory and methods. The risk is that the assumptions and priorities of the basic discipline will distort applied research by leading researchers to ignore or
Basic disciplines often work at a more abstract level than applied disciplines and thus excessive attachment to them can lead to what the philosopher Alfred North Whitehead called “the fallacy of misplaced concreteness”: that is, taking the abstractions or models employed in a particular discipline as fully correspondent with reality, and failing to acknowledge any reality in the area of application that does not correspond to the abstractions.

Any abstraction or model omits some elements of reality that are deemed less important, and the elements that are unimportant from the basic discipline’s point of view can be important in specific applied disciplines. For example, basic economic research aimed at discovering how well-designed financial markets work in principle has tended to abstract away from specific cultural and individual-cognitive failings that can wreak havoc with the operation of markets in practice. But applied research that is designed to support the work of market regulators in a specific place and time is likely to offer poor advice if it does not incorporate the effects of these failings.10

Different disciplines, with their different theories, methods, and research paradigms, provide different partial views of the world. As Mingers argues, for the domain of information systems research:

“Adopting a particular paradigm is like viewing the world through a particular instrument such as a telescope, an X-ray machine, or an electron microscope. Each reveals certain aspects, but each is blind to others. Although they may be pointing at the same place, each instrument produces a different, and sometimes seemingly incompatible, representation. Thus, in adopting only one method, one is often gaining only a limited view of a particular research situation. For example, attending only to that which may be measured or quantified, or only to individuals’ subjective meanings and thus ignoring the wider social and political context.”11

A basic researcher can reasonably say, “My job is to find out what (partial) contributions a particular theory or method can make to a variety of problems: I simply do not address those aspects of the world that my theory or method does not illumine, because my job is to develop this particular theory or method.” Solving the practical problems that applied researchers address, however, often requires information from a variety of viewpoints. A proposed solution based on one viewpoint only is likely to be faulty.

Because researchers cannot be expected to have a deep knowledge of their own applied area and of a broad range of basic disciplines, multiple viewpoints are most likely to be brought to bear on a problem when scholars with different basic-disciplinary allegiances work side by side and address similar problems. Their views may be brought together either through explicit teamwork on a common project, or in the daily give-and-take of colleagues in an academic unit, or in the periodic discussions of scholars who cluster around a particular journal or conference series. How well these interactions function depends in part on how well academic leaders can manage the problems of multiple basic disciplines’ relevance to applied disciplines.

3 Management Hazard: Multiple Basic Disciplines

Scholars deeply embedded in one viewpoint sometimes find it difficult to evaluate or cooperate with the work of scholars who are deeply embedded in a different viewpoint. The theories and methods of anthropologists can seem unpersuasive to economists and vice versa. This poses problems, not only for scholars who would prefer to take a broader view, but also for individuals in academic leadership positions who must allocate resources (faculty and support positions or journal pages) among individuals with different viewpoints.

There are three ways of handling the problems of multiple basic disciplines within an applied area, each of which has advantages and disadvantages. One way is to emphasize breadth: to have representatives of as wide a range of relevant theories and methods as possible in (for example) an institute or an editorial team. This guarantees the existence of multiple viewpoints, but unless the academic unit is very large, this strategy is likely to result in a lack of critical mass in any given set of theories or methods. Although it will provide scholars with the opportunity to learn from others whose viewpoints and approaches are different, it reduces the equally important opportunity for them to learn from colleagues who are doing work that is very similar to theirs. Problems posed by a particular theory/method combination are often best worked out by a team of people who are all expert users of this combination.

At the other end of the spectrum is a strategy that emphasizes critical mass but not breadth: for example, journals that specialize in only one research approach, or academic units in applied disciplines where most or all of the researchers are trained in the same basic discipline and are relatively inattentive to others. This strategy can result in work that is high in quality because it is based on the interactions of scholars who thoroughly understand what they and their peers are doing and can therefore critique each other’s work effectively. Not surprisingly, it can also result in narrowness and “blind spots” with respect to what is missing from the viewpoint that the researchers have adopted.

Between these two extreme strategies – but not always a successful compromise – is the strategy of concentrating on a diverse but limited number of research approaches. For example, instead of having one representative each from a large number of approaches, the academic unit can include multiple representatives of (say) three different groups with different base-discipline allegiances. This strategy provides both critical mass and diversity. The potential hazard is paradigm wars, with the subgroups contending, sometimes bitterly, against each other for resources and honors. (Although units that employ the first, “one-of-everything” strategy can also experience contention, the conflicts are likely to be more intense in the “multiple-mass” setting, because the contenders feel themselves supported by others who share their views.) In order to realize the potential of this strategy, strong academic leadership is required to encourage interchanges among different viewpoints and prevent them from degenerating into time-wasting factional strife.

Thus the successful academic leader in an applied discipline needs to be particularly fox-like in “knowing many things” and being able to understand a variety of different limited viewpoints and to communicate among them. Scholars are somewhat inclined to be hedgehog types, each curled up with outward-pointing spines around his or her “one big idea”. But an applied discipline, even more than a basic discipline, is an ecosystem that needs a substantial population of foxes in order to flourish.

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