Knowledge in digital form offers unparalleled access to information through the Internet but at the same time is subject to ever-greater restrictions through intellectual property legislation, over-patenting, licensing, over-pricing, and lack of preservation. Looking at knowledge as a commons—as a shared resource—allows us to understand both its limitless possibilities and what threatens it. In Understanding Knowledge as a Commons, experts from a range of disciplines discuss the knowledge commons in the digital era—how to conceptualize it, protect it, and build it.

Contributors consider the concept of the commons historically and offer an analytical framework for understanding knowledge as a shared social-ecological system. They look at ways to guard against enclosure of the knowledge commons, considering, among other topics, the role of research libraries, the advantages of making scholarly material available outside the academy, and the problem of disappearing Web pages. They discuss the role of intellectual property in a new knowledge commons, the open access movement (including possible funding models for scholarly publications), the development of associational commons, the application of a free/open source framework to scientific knowledge, and the effect on scholarly communication of collaborative communities within academia, and offer a case study of EconPort, an open access, open source digital library for students and researchers in microeconomics. The essays clarify critical issues that arise within these new types of commons, and offer guidelines for future theory and practice.

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Understanding Knowledge as a Commons
This book is dedicated to the memory of Gerry Bernbom (1952–2003) who continues to be a source of inspiration and wisdom.
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In the spring of 2004, Charlotte Hess and Elinor Ostrom hosted a meeting titled “Workshop on Scholarly Communication as a Commons.” The idea of this working session grew out of several parallel events, including the discussions at the Conference on the Public Domain organized and chaired by James Boyle at Duke University in November 2001. It is also an outgrowth of the many years of research, case studies, and theoretical work on the commons undertaken at the Workshop in Political Theory and Policy Analysis (Workshop), Indiana University. While earlier work focused primarily on the study of natural resources as commons, more recent interest has developed at the Workshop on the scholarly information and digital media as commons, the erosion of those commons through recent legislation, and the necessity of building new institutions in order to sustain those commons. An early attempt at struggling with these issues was our development of the Digital Library of the Commons, which seeks to combine digital preservation of high-quality information, self-publication, and multimedia storage, while serving as the primary reference tool for interdisciplinary research on the commons.

The two-day event, funded by The Andrew W. Mellon Foundation, brought together leading interdisciplinary scholars to examine the current state of research and development of scholarly communication and the knowledge commons. Many of the participating scholars had already been thinking and writing about one of the many “commons” aspects of scholarly communication. The first objective of the meeting was to produce papers that could give other scholars as well as researchers and practitioners who create digital resources and affect digital policy, a sense of the current status of research on scholarly communication as an information commons, an idea of where it is headed,
and an awareness of critical dilemmas and policy issues. We deliberately assembled a group of scholars who could address both theoretical and empirical concerns—that is, who were able to ground discussion of future research and action in a thorough synthesis of current theory and practice.

The initial focus on scholarly communication as a commons was chosen to more carefully focus the subject and to allow for the integration of study areas that have been traditionally segregated, such as intellectual property rights, computer codes and infrastructure, academic libraries, invention and creativity, open-source software, collaborative science, citizenship and democratic processes, collective action, information economics, and the management, dissemination, and preservation of the scholarly record. Other important dilemmas within the information commons, such as globalization, complexity, westernization of knowledge, indigenous knowledge and rights, and the growing problem of computer waste were kept in mind. The group also explored the question of what models and frameworks of analysis are most beneficial in building a new research agenda for this complex commons.

Some of the questions posed were: Is it possible to transfer lessons learned from the environmental movement to the knowledge-commons ecosystem? What can research on the natural-resource commons teach us about the dilemmas of scholarly communication? How can legal scholars, social scientists, and librarians and information specialists best work together to preserve the intellectual commons? Can new technologies, rules, and self-governing communities help bridge the gaps between traditional libraries, publishers, researchers, and policymakers?

The concrete goals of the meeting were to

- Identify essential “commons” of concern within the vast terrain of scholarly communication
- Reach consensus on definitions
- Map some key knowledge gaps
- Discuss and apply an analytical framework, if possible
- Draft a report to The Andrew W. Mellon Foundation outlining a new research agenda for the study of information or scholarly communication as a commons
- Identify future actions to further this agenda
The group sought to integrate perspectives that are frequently segregated within the scholarly-communication arena, such as intellectual property rights; information technology (including hardware, software, code and open source, and infrastructure); traditional libraries; digital libraries; invention and creativity; collaborative science; citizenship and democratic processes; collective action; information economics; and the management, dissemination, and preservation of the scholarly record. Since that time, our ideas have grown and developed. We have been fortunate to add a couple of new scholars in the process, and regret that a few needed to withdraw due to previous commitments.

Our understanding of this complex commons has evolved considerably since the initial meeting. While our focus was originally on scholarly communication, we came to agree with Boyle, Lynch, and others that equating the knowledge commons with the “scholarly-communication” arena was too limiting and, perhaps, parochial. It became more and more apparent that any useful study of the users, designers, contributors, and distributors of this commons could not be cordoned off to the domain of the ivory tower. Who can any longer set the boundaries between scholarly and nonscholarly information? On the other hand, we found it useful to examine some of the long-enduring knowledge commons and related institutional rules, especially in the context of exponential technological change.

Participants included

James Boyle, William Neal Reynolds Professor of Law and Faculty Co-Director of the Center for the Study of the Public Domain, Duke Law School, Durham, North Carolina

James Cox, Noah Langdale Jr. Chair in Economics; Georgia Research Alliance Eminent Scholar; Director, Experimental Economics Center, University of Arizona

Charlotte Hess, Director, Workshop Research Library, and Digital Library of the Commons, Indiana University, Bloomington

Nancy Kranich, past president of the American Library Association; former Associate Dean of Libraries at New York University

Peter Levine, Director of CIRCLE, The Center for Information and Research on Civic Learning and Engagement; a research scholar at the Institute for Philosophy & Public Policy at the University of Maryland; Steering Committee Chair of the Campaign for the Civic Mission of Schools
Wendy Pradt Lougee, University Librarian and McKnight Presidential Professor, University of Minnesota, University Libraries, Minneapolis, Minnesota

Clifford Lynch, Director of the Coalition for Networked Information (CNI), Washington, D.C.; adjunct professor at the School of Information Management and Systems, University of California, Berkeley

Elinor Ostrom, Arthur F. Bentley Professor of Political Science, Indiana University; Co-Director, Workshop in Political Theory and Policy Analysis; Co-Director, Center for the Study of Institutions, Population, and Environmental Change

Charles Schweik, Assistant Professor, Department of Natural Resource Conservation, Center for Public Policy and Administration, University of Massachusetts, Amherst

Peter Suber, Policy Strategist for open access to scientific and scholarly research literature; Director, Open Access Project at Public Knowledge; Research Professor of Philosophy at Earlham College; Author of SPARC Open Access Newsletter; Editor of Open Access News Blog

Douglas Van Houweling, President and CEO of Internet2; Professor, School of Information, University of Michigan, Ann Arbor

Donald Waters, Program Officer for Scholarly Communications, The Andrew W. Mellon Foundation

The sessions were expertly moderated by Margaret Polski, Senior Research Fellow at the Institute for Development Strategies, Indiana University (IU). Some of the attendees and active contributors to the discussions were Blaise Cronin, Rudy Professor of Information Science and Dean of the IU School of Library and Information Science; Suzanne Thorin, Dean of the IU Libraries; Jorge Schement, Pennsylvania State University Distinguished Professor of Communications; Marco Janssen, Assistant Professor of Informatics; Robert Goehlert, IU Librarian for Economics and Political Science; Harriette Hemmasi, Associate Dean, IU Libraries; Laura Wisen, Coordinator of Workshop Research Library and SLIS graduate student; and Alice Robbin, IU Professor of Information Science.

While a couple of the original participants have dropped out due to previous commitments, as noted, we have been fortunate to add two outstanding thinkers on the commons:
David Bollier, Journalist, Consultant, Senior Fellow, USC Annenberg School for Communication, The Norman Lear Center, and Co-Founder and board member, Public Knowledge

Shubha Ghosh, Professor, Dedman School of Law, Southern Methodist University, Dallas

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Notes

I

Studying the Knowledge Commons
1

Introduction: An Overview of the Knowledge Commons

Charlotte Hess and Elinor Ostrom

Two monks were arguing about a flag. One said, “The flag is moving.” The other said, “The wind is moving.” The sixth patriarch, Zeno, happened to be passing by. He told them, “Not the wind, not the flag; mind is moving.”
—Douglas R. Hofstadter, Gödel, Escher, Bach

The Purpose of This Book

This book is intended as an introduction to a new way of looking at knowledge as a shared resource, a complex ecosystem that is a commons—a resource shared by a group of people that is subject to social dilemmas. The traditional study of knowledge is subdivided into epistemic areas of interests. Law professors argue the legal aspects of knowledge in regard to intellectual property rights. Economists consider efficiency and transaction costs of information. Philosophers grapple with epistemology. Librarians and information scientists deal with the collection, classification, organization, and enduring access of published information. Sociologists examine behaviors of virtual communities. Physical scientists study natural laws. Every discipline, of course, has a claim on knowledge; this is the common output of all academic endeavors. The focus here is to explore the puzzles and issues that all forms of knowledge share, particularly in the digital age. The intention is to illustrate the analytical benefits of applying a multitiered approach that burrows deeply into the knowledge-commons ecosystem, drawing from several different disciplines.

Brief History of the Study of the Knowledge Commons

The exploration of information and knowledge as commons is still in its early infancy. Nevertheless, the connection between “information” in its
various forms and “commons” in its various forms has caught the attention of a wide range of scholars, artists, and activists. The “information-commons” movement emerged with striking suddenness. Before 1995, few thinkers saw the connection. It was around that time that we began to see a new usage of the concept of the “commons.” There appears to have been a spontaneous explosion of “ah ha” moments when multiple users on the Internet one day sat up, probably in frustration, and said, “Hey! This is a shared resource!” People started to notice behaviors and conditions on the web—congestion, free riding, conflict, overuse, and “pollution”—that had long been identified with other types of commons. They began to notice that this new conduit of distributing information was neither a private nor strictly a public resource.

An increasing number of scholars found that the concept of the “commons” helped them to conceptualize new dilemmas they were observing with the rise of distributed, digital information. In the mid-1990s, articles suddenly started appearing in various disciplines addressing some aspect of this new knowledge commons. Some information scientists made inroads in new areas of virtual communities and commons (Rheingold 1993; Brin 1995; Hess 1995; Kollock and Smith 1996). Others explored commons dilemmas on the web, such as congestion and free riding (Huberman and Lukose 1997; Gupta et al. 1997). The largest wave of “new-commons” exploration appeared in the legal reviews. Commons became a buzzword for digital information, which was being enclosed, commodified, and overpatented. Whether labeled the “digital,” “electronic,” “information,” “virtual,” “communication,” “intellectual,” “Internet,” or “technological” commons, all these concepts address the new shared territory of global distributed information.

Study of Traditional Commons

For us, the analysis of knowledge as a commons has its roots in the broad, interdisciplinary study of shared natural resources, such as water resources, forests, fisheries, and wildlife. Commons is a general term that refers to a resource shared by a group of people. In a commons, the resource can be small and serve a tiny group (the family refrigerator), it can be community-level (sidewalks, playgrounds, libraries, and so on), or it can extend to international and global levels (deep seas, the atmosphere, the Internet, and scientific knowledge). The commons can be well bounded (a community park or library); transboundary (the Danube
River, migrating wildlife, the Internet); or without clear boundaries (knowledge, the ozone layer).

Commons analysts have often found it necessary to differentiate between a commons as a resource or resource system and a commons as a property-rights regime. Shared resource systems—called common-pool resources—are types of economic goods, independent of particular property rights. Common property on the other hand is a legal regime—a jointly owned legal set of rights (Bromley 1986; Ciriacy-Wantrup and Bishop 1975). Throughout this book, the more general term commons is preferred in order to describe the complexity and variability of knowledge and information as resources. Knowledge commons can consist of multiple types of goods and regimes and still have many characteristics of a commons.

Potential problems in the use, governance, and sustainability of a commons can be caused by some characteristic human behaviors that lead to social dilemmas such as competition for use, free riding, and over-harvesting. Typical threats to knowledge commons are commodification or enclosure, pollution and degradation, and nonsustainability.

These issues may not necessarily carry over from the physical environment to the realm of the knowledge commons. There is a continual challenge to identify the similarities between knowledge commons and traditional commons, such as forests or fisheries, all the while exploring the ways knowledge as a resource is fundamentally different from natural-resource commons.

With “subtractive” resources such as fisheries, for instance, one person’s use reduces the benefits available to another. High subtractability is usually a key characteristic of common-pool resources. Most types of knowledge have, on the other hand, traditionally been relatively nonsubtractive. In fact, the more people who share useful knowledge, the greater the common good. Consideration of knowledge as a commons, therefore, suggests that the unifying thread in all commons resources is that they are jointly used, managed by groups of varying sizes and interests.

Self-organized commons require strong collective-action and self-governing mechanisms, as well as a high degree of social capital on the part of the stakeholders. Collective action arises “when the efforts of two or more individuals are needed to accomplish an outcome” (Sandler 1992, 1). Another important aspect of collective action is that it is voluntary on the part of each individual (Meinzen-Dick, Di Gregorio, and