

SECOND EDITION

CURRICULUM WEBS

Weaving the Web
into Teaching and Learning

CRAIG A. CUNNINGHAM

National-Louis University

MARTY BILLINGSLEY

The University of Chicago Laboratory Schools



Boston ■ New York ■ San Francisco ■ Mexico City
Montreal ■ Toronto ■ London ■ Madrid ■ Munich ■ Paris
Hong Kong ■ Singapore ■ Tokyo ■ Cape Town ■ Sydney

Senior editor: Arnis E. Burvikovs
Editorial assistant: Kelly Hopkins
Marketing manager: Tara Kelly
Manufacturing buyer: Andrew Turso
Cover designer: Rebecca Krzyzaniak
Production coordinator: Pat Torelli Publishing Services
Editorial-production service: Stratford Publishing Services
Electronic composition: Stratford Publishing Services



For related titles and support materials, visit our online catalog at www.ablongman.com.

Copyright © 2006, 2003 Pearson Education, Inc.

All rights reserved. No part of the material protected by this copyright notice may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without written permission from the copyright owner.

Between the time Website information is gathered and published, some sites may have closed. Also, the transcription of URLs can result in unintended typographical errors. The publisher would appreciate notification where these errors occur so that they may be corrected in subsequent editions.

Many of the designations used by manufacturers and sellers to distinguish their products are claimed as trademarks. Where those designations appear in this book, and Allyn and Bacon was aware of a trademark claim, the designations have been printed in initial or all caps.

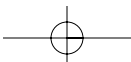
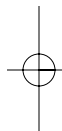
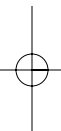
To obtain permission(s) to use material from this work, please submit a written request to Allyn and Bacon, Permissions Department, 75 Arlington Street, Boston, MA 02116 or fax your request to 617-848-7320.

Library of Congress Cataloging-in-Publication Data

Printed in the United States of America

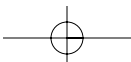
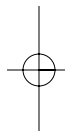
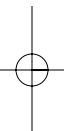
10 9 8 7 6 5 4 3 2 1 09 08 07 06 05

CAC: To Cheryl
MB: To my parents



SHORT CONTENTS

CHAPTER ONE	Planning Curriculum for the Web	1
CHAPTER TWO	Creating a Simple Curriculum Web	20
CHAPTER THREE	Identifying Curriculum Goals	35
CHAPTER FOUR	Laying Out an Effective Web Page	70
CHAPTER FIVE	Choosing Learning Activities	92
CHAPTER SIX	Planning Instruction and Assessment	116
CHAPTER SEVEN	Gathering Web-Based Resources	136
CHAPTER EIGHT	Designing an Effective Web Site	163
CHAPTER NINE	Using Multimedia	179
CHAPTER TEN	Constructing Interactivity	196
CHAPTER ELEVEN	Evaluating and Maintaining Curriculum Webs	222
CHAPTER TWELVE	Teaching with Curriculum Webs	233
APPENDIX	An Overview of Web Technologies	249
Glossary	257	
References	267	
Index	273	



LONG CONTENTS

List of Figures	xix
Preface	xxi
WHO SHOULD READ THIS BOOK?	xxi
HOW TO USE THIS BOOK	xxii
WHAT THIS BOOK IS AND WHAT IT IS NOT	xxiii
ENHANCEMENTS IN THE SECOND EDITION	xxiv
Acknowledgements	xxv
About the Authors	xxvii

CHAPTER ONE

Planning Curriculum for the Web	1
OVERVIEW	1
WHAT IS A CURRICULUM WEB?	1
WHY BUILD CURRICULUM WEBS?	4
SOME EXAMPLE CURRICULUM WEBS	7
STANDARDS AND CURRICULUM WEBS	9
ACTIVITY 1A: Exploring NET-S	12
EASING INTO BUILDING CURRICULUM WEBS	14
OVERVIEW OF CURRICULUM PLANNING	15
ACTIVITY 1B: Reflecting on Reflection	17
CHAPTER SUMMARY	18
QUESTION(S) FOR REFLECTION	18
YOUR NEXT STEP	18
FOR FURTHER LEARNING	19

CHAPTER TWO**Creating a Simple Curriculum Web 20****OVERVIEW 20****ACTIVITY FORMATS FOR THE WEB 20****WHAT IS A WEBQUEST? 21****ACTIVITY 2A: Examining Some WebQuests 23****THE IQ WEBQUEST: AN ELABORATED EXAMPLE 23****The IQ WebQuest Teaching Guide 24**

Introduction 24

Aim 24

Rationale 25

General Goals 25

Subject Matter Description 25

Learner Description 26

Prerequisites 26

Learning Objectives 26

Materials 26

Instructional Plan 27

Plans for assessment and evaluation 27

The IQ WebQuest: Measuring The Inquiry Quotient Of WebQuests 28

Introduction 28

Task 29

Process 30

Resources 30

Evaluation 30

Conclusion 33

ACTIVITY 2B: Complete the IQ WebQuest 33**CHAPTER SUMMARY 33****QUESTION(S) FOR REFLECTION 34****YOUR NEXT STEP 34****FOR FURTHER LEARNING 34**

CHAPTER THREE**Identifying Curriculum Goals 35****OVERVIEW 35****A PROCESS FOR IDENTIFYING GOALS 35**

THE RELATIONSHIP BETWEEN ENDS AND MEANS	36
GENERAL GOALS	38
Examples of General Goals	41
“Our United States” General Goals	41
“Who am I?” General Goals	41
“Building a Curriculum Web with Dreamweaver” General Goals	41
ACTIVITY 3A: Describing Your General Goals	42
LEARNER DESCRIPTIONS	42
Example Learner Descriptions	44
“Our United States” Learner Description	44
“Who am I?” Learner Description	44
“Building a Curriculum Web with Dreamweaver” Learner Description	45
ACTIVITY 3B: Writing Your Learner Description	45
SUBJECT MATTER DESCRIPTIONS	45
Subject Matters of Curriculum Webs	46
Centering Your Curriculum Web	48
Subject-Centered Curriculum	48
Learner-Centered Curriculum	49
Problem-Centered Curriculum	50
Example Subject Matter Descriptions	51
“Our United States” Subject Matter Description	52
“Who am I?” Subject Matter Description	53
“Building a Curriculum Web with Dreamweaver” Subject Matter Description	53
ACTIVITY 3C: Describing Your Subject Matter	55
LEARNING OBJECTIVES	55
How to Write Learning Objectives	56
Sources of Learning Objectives	57
Example Learning Objectives	58
“Our United States” Learning Objectives	59
“Who am I?” Learning Objectives	60
“Building a Curriculum Web with Dreamweaver” Learning Objectives	60
ACTIVITY 3D: Writing Your Learning Objectives	61
PREREQUISITES	61
Example Prerequisites	62
“Our United States” Prerequisites	62
“Who am I?” Prerequisites	63
“Building a Curriculum Web with Dreamweaver” Prerequisites	63
ACTIVITY 3E: Listing Your Curriculum Web’s Expected Prerequisites	63

AIMS 64

- Example Aims 64
 - “Our United States” Aim 64
 - “Who am I?” Aim 64
 - “Building a Curriculum Web with Dreamweaver” Aim 65
- ACTIVITY 3F:** Writing your aim statement 65

RATIONALES 65

- Example Rationales 66
 - “Our United States” Rationale 66
 - “Who am I?” Rationale 66
 - “Building a Curriculum Web with Dreamweaver” Rationale 67
- ACTIVITY 3G:** Writing Your Rationale 67

CHAPTER SUMMARY 68**QUESTION(S) FOR REFLECTION 68****YOUR NEXT STEP 68****FOR FURTHER LEARNING 69****CHAPTER FOUR****Laying Out an Effective Web Page 70****OVERVIEW 70****WHAT IS HTML? 70****CASCADING STYLE SHEETS (CSS) 72**

- A Note on File Names 72
- Backing Up 73

BASIC PAGE DESIGN PRINCIPLES 73**USE OF WHITE SPACE ON THE PAGE 74**

- Vertical White Space 74
- Indentation 75
- Horizontal White Space 75
 - Creating Margins with CSS 77
- ACTIVITY 4A:** Laying Out Your Teaching Guide 78
- Layout of Text and Graphics 78
- Understanding the SRC Attribute 79

USE OF COLOR 80

- Background Color and Images 81
- Text Color 82

LONG CONTENTS

xi

Link Color	83
How to Specify Color Codes	83
Use of Horizontal Lines or Boxes	84

STYLING TEXT 84

Choosing a Font Face and Size	84
Headings	87
ACTIVITY 4B: Formatting Your Teaching Guide	87
Hypertext	87
Graphical Links	88
ACTIVITY 5C: Creating a Table of Contents	89

MAKING ACCESSIBLE PAGES 89**CHAPTER SUMMARY 90****QUESTION(S) FOR REFLECTION 91****YOUR NEXT STEP 91****FOR FURTHER LEARNING 91**

CHAPTER FIVE**Choosing Learning Activities 92****OVERVIEW 92****THE COMPLEXITY OF LEARNING 92****DIFFERENTIATING THE CURRICULUM 94**

ACTIVITY 5A: Considering Curriculum Differentiation	99
--	----

GROUPING LEARNERS 99

ACTIVITY 5B: Planning for Cooperative Learning	100
---	-----

SELECTING LEARNING ACTIVITIES 101

Criteria for the Reflective Selection of Activities	101
Suggested Learning Activities for the Web	106
Project-based Learning	108
ACTIVITY 5C: Brainstorming Activities for Your Curriculum Web	109
Sequencing Learning Activities	110
ACTIVITY 5D: Thinking About the Sequence of Learning Activities	113

CHAPTER SUMMARY 114**QUESTION(S) FOR REFLECTION 114****YOUR NEXT STEP 114****FOR FURTHER LEARNING 115**

CHAPTER SIX**Planning Instruction and Assessment 116****OVERVIEW 116****PLANNING INSTRUCTION 116**

- Examples of Instructional Supports 117
- Scaffolding Learning 118
 - ACTIVITY 6A:** Writing a Plan for Scaffolding Learning 119

EMBEDDING ASSESSMENT 119

- Performance Criteria 120
 - ACTIVITY 6B:** Writing performance Criteria for Learning Objectives 122
- Rubrics 122
- Self-Assessments 126
- Online Assessments 127

INSTRUCTIONAL PLANS 129

- Example Instructional Plans 129
 - “Our United States” Instructional Plan 129
 - “Building a Curriculum Web With Dreamweaver” Instructional Plan 130
 - ACTIVITY 6C:** Writing Your Instructional Plan 131

LISTS OF MATERIALS AND EQUIPMENT 131

- Example List of Materials and Equipment 132
 - “Our United States” List of Materials and Equipment 132
 - “Building a Curriculum Web with Dreamweaver” List of Materials 133
 - ACTIVITY 6D:** Writing Your List of Materials 133

PLANS FOR ASSESSMENT 133

- Example Plans for Assessment 134
 - “Building a Curriculum Web with Dreamweaver” Plan for Assessment 134
 - ACTIVITY 6E:** Writing Your Plan for Assessment 134

CHAPTER SUMMARY 134**QUESTION(S) FOR REFLECTION 134****YOUR NEXT STEP 135****FOR FURTHER LEARNING 135**

CHAPTER SEVEN**Gathering Web-Based Resources 136****OVERVIEW 136****WHY USE EXISTING RESOURCES? 136**

ACTIVITY 7A: Creating a List of Potential Resources 138

BOOKMARKING FAVORITES 138

How to Copy Information from the Web 139

Creating a List of Bookmarks or Favorites 140

ACTIVITY 7B: Designing a Bookmark or Favorites
Folder Structure 141

SEARCHING THE WEB 142

Directories and Search engines 142

Directories 142

ACTIVITY 7C: Using Directories to Look
for Relevant Sites 144

Clearinghouses 144

ACTIVITY 7D: Looking for a Relevant Clearinghouse 144

Search Engines 144

ACTIVITY 7E: Using a Search Engine to Find
Relevant Topics 145

Multiengine Search Tools 145

ACTIVITY 7F: Using a Multiengine Search Tool 146

The Invisible Web 146

ACTIVITY 7G: Searching the Invisible Web 146

Search Terms 147

Qualifiers 148

ACTIVITY 7H: Creating a Precise Search String 149

EVALUATING WEB-BASED RESOURCES 149**COPYRIGHT ISSUES 152**

Citations 153

The Basics of Copyright 154

The Copyright Law 154

Creating a Copyright 155

Penalties for Copyright Violation 156

Fair Use 156

Photocopying Under the Fair Use Doctrine 157

Works in the Public Domain 158

Copyright Law in the Creation of Curriculum Webs 158

What about Linking to Copyrighted Materials? 159

Alternatives to Obtaining Permission 160

ACTIVITY 7I: Self-Testing Your understanding
of Copyright 160

CHAPTER SUMMARY 161

QUESTION(S) FOR REFLECTION 161

YOUR NEXT STEP 161

FOR FURTHER LEARNING 162

CHAPTER EIGHT

Designing an Effective Web Site 163

OVERVIEW 163

THE STEPS OF WEB SITE DESIGN 163

STEP 1: PLANNING FOR YOUR AUDIENCE 164

ACTIVITY 8A: Thinking About Your Learners' Needs 164

STEP 2: GATHERING INFORMATION AND MATERIALS 165

STEP 3: ESTABLISHING A VISUAL METAPHOR OR THEME 165

ACTIVITY 8B: Brainstorming Visual Metaphors 167

STEP 3: CHUNKING 167

ACTIVITY 8C: Creating a Concept Map of Your
Subject Matter 168

STEP 4: PLANNING SITE NAVIGATION 168

Major Parts of a Web Site 170

ACTIVITY 8D: Weaving Your Web 171

STEP 5: BUILDING SITE STRUCTURE AND NAVIGATION TOOLS 171

Frames Versus Tables 173

How to Implement Frames 175

ACTIVITY 8E: Implement Your Site Structure 175

ACTIVITY 8F: Insert Content Into Your Site Structure 176

CHAPTER SUMMARY 176

QUESTION(S) FOR REFLECTION 176

YOUR NEXT STEP 177

FOR FURTHER LEARNING 178

CHAPTER NINE**Using Multimedia 179****OVERVIEW 179****WHAT IS MULTIMEDIA? 179****GRAPHICS FILE FORMATS 179**

- JPEG Details 181
 - Progressive JPEGs 181
- GIF Details 182
 - Interlacing 182
 - Transparency 182
 - Animated GIFs 182
 - “GIF” or “JIF”? 184

ACQUIRING IMAGES 184**CREATING IMAGES 184**

- Using Images for Headlines 185
- Scanned Artwork and Photographs 185
- Digital Photos 185

PLACING IMAGES 186**IMAGE MAPS 188**

- ACTIVITY 9A:** Add Images 189
 - Incorporating Sound 189
- ACTIVITY 9B:** Brainstorming Sounds 191

INCORPORATING VIDEO 192

- ACTIVITY 9C:** Brainstorming Video 194
- Streaming AV 194

PDF FILES 195**CHAPTER SUMMARY 195****QUESTION(S) FOR REFLECTION 196****YOUR NEXT STEP 196****FOR FURTHER LEARNING 196**

CHAPTER TEN**Constructing Interactivity 196****OVERVIEW 197****WHAT IS INTERACTIVITY? 197**

JAVASCRIPT 198**COOKIES 200****AIDS TO NAVIGATION 200**

- Rollover Text 200
 - Implementation 200
- Rollover Images 201
 - Implementation 202
- Text Status Messages 202
- Breadcrumbs 204
- Jump Menus 205

FORMS 205

- Form Elements and Layout 206
- Forms that E-mail Data 208
- Processing Forms with CGI Scripts 209
- Processing Forms with PHP 210
- Processing Forms with JavaScript Functions 211
- Creating Interactivity with Layers and Behaviors 213
- Interactive Cursors 214

INTERACTIVE ANIMATION WITH FLASH 215**BLOGS AND WIKIS 216****ALTERNATE PAGES 218****CHAPTER SUMMARY 219****YOUR NEXT STEP 220****QUESTION(S) FOR REFLECTION 220****FOR FURTHER LEARNING 220**

CHAPTER ELEVEN**Evaluating and Maintaining Curriculum Webs 222****OVERVIEW 222****PLANS FOR EVALUATION 222**

- Curriculum Evaluation 223
- Web-Design Evaluation 225
 - Heuristic Evaluation of Curriculum Webs 226
- Example Plan for Evaluation 226
 - “Building a Curriculum Web Using Dreamweaver” Plan for Evaluation 227
- ACTIVITY 11A: Writing a Plan for Evaluation 227**

MAINTAINING, REVISING, AND UPDATING	227
Update the Content	227
Links	228
Tracking Site Usage	228
Publicizing Your Curriculum Web	228
Publicizing with Directories	229
Publicizing with Search Engines	229
Getting Listed on Educational Web Sites	230
ACTIVITY 11B: Adding Metatags	230
ACTIVITY 11C: Telling the World	231
CHAPTER SUMMARY	231
QUESTION(S) FOR REFLECTION	231
YOUR NEXT STEP	231
FOR FURTHER LEARNING	232
<hr/>	
CHAPTER TWELVE	
Teaching with Curriculum Webs	233
OVERVIEW	233
PEOPLE	233
Teacher(s)	233
Learners	234
Special Needs Learners	236
CLASSROOMS	236
Computers	238
COMPUTER LABS	240
CONNECTIVITY	241
SOFTWARE ISSUES	242
Filtering Software	242
E-mail	244
ENSURING SUCCESSFUL TEACHING WITH A CURRICULUM WEB	245
ACTIVITY 12: Writing a Plan for Teaching with Your Curriculum Web	246
CHAPTER SUMMARY	246
QUESTION(S) FOR REFLECTION	247
YOUR NEXT STEP	247
FOR FURTHER LEARNING	247

APPENDIX**An Overview of Web Technologies 249****OVERVIEW 249****WEB SERVERS, CLIENTS, AND BROWSERS 249**

How do Servers Work? 249

How do Web Browsers Work? 250

Caching 250

BANDWIDTH 251

A Note on Bits and Bytes 252

INTERNET NAMES AND URLS 252

Communications Protocol 253

Host Name 253

Path 254

Filename 254

Filename Extension 255

Glossary 257**References 267****Index 273**

LIST OF FIGURES

- FIGURE 1.1 A typical curriculum web front page. 2
- FIGURE 1.2 Our United States curriculum web. 8
- FIGURE 1.3 Who Am I? curriculum web. 9
- FIGURE 1.4 Building a Curriculum Web with Dreamweaver curriculum web. 10
- FIGURE 2.1 A WebQuest with a very compelling activity. 22
- FIGURE 3.1 One of the pages in a problem-centered curriculum web called Real-World Math. 52
- FIGURE 3.2 The “Who Am I?” subject matter description. 54
- FIGURE 4.1 A web page with unformatted text. 77
- FIGURE 4.2 The same web page as Figure 4.1 formatted with vertical and horizontal white space. 78
- FIGURE 4.3 An image aligned left of a block of text. 79
- FIGURE 4.4 A web page that aligns text and graphics by means of nested tables. 80
- FIGURE 4.5 A web page created with two different backgrounds. 82
- FIGURE 4.6 A graphic resembling the distance scale of a map, used repeatedly in the “Our United States” curriculum web. 85
- FIGURE 4.7 The web page shown in Figure 4.1 and Figure 4.2, with font formatting added. 86
- FIGURE 5.1 An undifferentiated learning path. 96
- FIGURE 5.2 A learning path with two paths based on the results of a preassessment. 97
- FIGURE 5.3 A complicated learning path in a differentiated curriculum. 98
- FIGURE 5.4 A hierarchical learning sequence. 113
- FIGURE 6.1 A sample online quiz in which the user chooses the wrong answer. Feedback is immediately supplied at the top of the window. 127
- FIGURE 6.2 When the user clicks on the correct answer in the online quiz, feedback is provided and the running score is automatically computed. 128
- FIGURE 7.1 A starting bookmark or favorites folder structure for developing the “Our United States” and “Who Am I?” curriculum webs. 141
- FIGURE 8.1 A web page for one of the sections of the Web Institute for Teachers 2003. Notice the use of a bulletin board as a visual metaphor. 166
- FIGURE 8.2 A linear navigation scheme. 169
- FIGURE 8.3 A nonlinear navigation scheme. 169
- FIGURE 8.4 A visual representation of the “Our United States” curriculum web. 172
- FIGURE 8.5 The entry page of “Our United States,” implemented using tables. Notice that when the user scrolls down to see the map, the navigation elements scroll up almost out of sight. 173

- FIGURE 8.6 The same page, implemented using frames. The navigation bar stays in place, even when the user scrolls the page up to see the map. 174
- FIGURE 8.7 A web page implemented using tables (left) and frames (right). 174
- FIGURE 9.1 A photograph saved in JPEG format (left) and GIF format (right). 180
- FIGURE 9.2 A banner headline saved in JPEG format at the lowest quality (top), in JPEG format at high quality (middle), and in GIF format (bottom). 180
- FIGURE 9.3 Web page displaying an animated GIF of the phases of the moon. 183
- FIGURE 9.4 Snapshots of frames that make up an animated GIF. 183
- FIGURE 9.5 Detail of an image map in which each state is a link to a different web page. 188
- FIGURE 9.6 A web page with an embedded QuickTime movie. 193
- FIGURE 10.1 A typical JavaScript segment. The segment displays a quote selected at random from a set of quotes. 199
- FIGURE 10.2 Rollover images used in a navigation bar can change color when the mouse is over them. 202
- FIGURE 10.3 Detail of the status bar of a web page when the mouse pointer is over a link. 203
- FIGURE 10.4 Detail of a status bar that lists information about a link when the mouse pointer is over the link. 204
- FIGURE 10.5 An example of breadcrumbs used to show location of a web page within a site. 205
- FIGURE 10.6 Screen shot showing a jump menu, used for navigating quickly within a web site. 206
- FIGURE 10.7 Part of a feedback form. 207
- FIGURE 10.8 A simple guestbook form. 210
- FIGURE 10.9 A form that allows users to try out various HTML tags. 212
- FIGURE 10.10 An example of layers and behaviors in which layers with explanatory text appear when the user clicks on different parts of the body. 213
- FIGURE 10.11 A web page used in an art class to allow students to experiment with the arrangement of shapes. 214
- FIGURE 10.12 Using CSS to change the browser's cursor to a question mark. 215
- FIGURE 10.13 Screen shots of an interactive Flash animation that reacts to user input. 217
- FIGURE 12.1 The home page of a curriculum web that uses audio to provide instructions. 235
- FIGURE 12.2 A curriculum web designed to teach sequencing to severely disabled students through the steps of doing the laundry. 237
- FIGURE A.1 Relative bandwidths of different parts of the Internet. 251
- FIGURE A.2 The parts of a URL. 253
- FIGURE A.3 A hierarichal file system on a server. 255

PREFACE

.....

This book helps teachers, curriculum developers, and teachers-in-training to utilize the World Wide Web as a central resource to facilitate learning.

The title of the book refers to curriculum webs. A curriculum web is a web page or pages designed to support a curriculum, or a “plan for a sustained process of teaching and learning” (Pratt, 1994, 5). This book describes the process of building curriculum webs from the early planning stages through to design of the web pages, and using the finished product in classrooms. It also includes discussion of WebQuests, a simple form of curriculum web that makes it easy for teachers to begin to use the Web more effectively with their students.

The contents of this book reflect our understanding of what preservice and inservice teachers and other educators need to learn how to create curriculum webs. This understanding arises from eight years of experience training teachers in the Web Institute for Teachers, an intensive summer professional development experience hosted by the University of Chicago.

The effective use of the Web to support teaching and learning requires ongoing attention to explicit reflection and planning. Only such reflection and planning will produce desired learning outcomes—knowledge, skills, and attitudes—in diverse students in a rapidly changing world. A successful teacher or other web-based curriculum developer understands the phases of curriculum development and routinely considers a range of issues involved in building web sites to support the needs of learners while taking advantage of the ever-expanding possibilities of the Web. He or she also pays careful attention to how the curriculum web is used by learners, and makes ongoing modifications in order to help a range of learners to reach desired outcomes. Through participation in this cycle of creation and reflection, he or she exemplifies what it means to be a professional educator.

On the companion web site, curriculumwebs.com, you will find example curriculum webs that can serve as an inspiration to you as you work toward creating your own curriculum web, as well as a series of Hands-On Lessons that will teach you the basic steps of creating a curriculum web using several popular web-page editors.

WHO SHOULD READ THIS BOOK?

Anyone who wants to increase student learning will want to learn how to build curriculum webs.

This book will be helpful to teachers in schools and those who are learning to teach, curriculum developers working for educational organizations such as school districts and museums, and parents who are homeschooling their children. Our greatest hope is that this book will help individual teachers or groups of teachers who want to create webs to support unique or locally significant learning activities, or educators who want to take

advantage of variably occurring “teachable moments” that crop up continuously in their local community or in the global village. We also hope that nonschool curriculum developers, who create web-based learning materials for federal, state, and local agencies, non-profit organizations, historical sites, parks, and museums will read this book and use its concepts and procedures to produce more effective materials.

We believe that every teacher should know how to build web pages to support their ongoing teaching as well as the unexpected learning needs and specialized interests of their particular students. A basic familiarity with computers, a willingness to put time and energy into planning and design, and this book are all that is required.

We use the words *teacher*, *planner*, *developer*, and *designer* more or less interchangeably in this book. The only difference between the first and the other two is that teachers will be developing the curriculum knowing that they will actually be using it with their students, and so we expect teachers to be the most diligent, careful, and effective curriculum developers and web designers of all.

HOW TO USE THIS BOOK

This book includes all the information you need to plan effective learning activities on the Web. The Hands-On Lessons found on the companion web site at curriculumwebs.com provide software-specific instructions that guide you through the actual process of constructing the pages of your curriculum web.

The best way to use this book is to read it from beginning to end, doing the activities along the way and completing the appropriate Hands-On Lesson after reading each chapter. In a series of professional development workshops or a college course the participants could read one chapter and complete one Hands-On Lesson per week. If you are using the book on your own, you might want to read all of the chapters first, and then cycle back to the Hands-On Lessons, referring to the book again to learn more about general principles and procedures related to the lessons.

Each chapter includes several features designed to help you learn:

- *Overview*: provides a summary of what will be covered in the chapter.
- *Activities*: solidify your understanding of key concepts or procedures along the way.
- *Question(s) for reflection*: helps you to think about the content of the book in terms of larger questions having to do with professional and personal growth.
- *Your next step*: suggests how to use the Hands-On Lessons that accompany the book and prepares you for subsequent chapters
- *Chapter summary*: reviews what was covered in the chapter.
- *For further learning*: guides you to additional print and web resources. Full citations are listed in the References at the end of the book.

In addition to the chapters, this book contains a number of features that will help you:

- The *appendix* (An Overview of Web Technologies) tells you everything you need to know about web servers, bandwidth, file names, and other technical aspects of

using the Internet. Read this appendix if you find yourself at sea with some of the terms or concepts that we assume of our readers.?

- The *glossary* contains definitions for words that appear in **boldface** the first time they are introduced in the book or in the lessons. A lot of nontechnical terms are also included here as a way of demystifying some philosophical and pedagogical concepts found throughout this book.
- An extensive set of *references* includes citations for all the sources consulted in preparing this book. Citations in author-date format are given through the text.
- An extensive *index* is useful if you want to use this book as **hypertext** (you'll find a definition in the Glossary); that is, if you want to use it as a reference tool rather than read it from cover to cover.

Don't forget to use the companion web site—curriculumwebs.com—to find links relevant to many of the topics in the book, to access additional information about HTML and cascading style sheets, (CSS) to download the Hands-On Lessons and related resources, to see example curriculum webs, or to contact the authors.

WHAT THIS BOOK IS AND WHAT IT IS NOT

This book covers the entire process of planning curriculum, creating web pages and using web pages to support teaching, so readers will be able to benefit from this book even if they have never created a web page or used the Web with students.

Successful use of this book has several prerequisites. We assume that you are computer literate. The book therefore does not cover basic computer skills such as saving, copying, and deleting files, installing hardware or software, or connecting your computer to the Internet. We assume that you are already familiar with operating your computer, creating folders or directories, saving and moving files, and browsing the Internet. (For some background on these topics, see the Appendix.) We also assume you are comfortable and excited about learning new approaches to using the computer (even if you are a little intimidated). You do not have to know anything at all about building web pages.

We provide detailed guidance and step-by-step procedures for using popular web-page editors such as Macromedia Dreamweaver, Microsoft FrontPage, and Mozilla Composer in a series of Hands-On Lessons, available at curriculumwebs.com/lessons. These lessons tell you exactly what buttons to press or what menu choices to select—in all of these software programs—to produce the essential design elements of curriculum webs. We do not cover every function of the more advanced software packages, but the lessons cover numerous procedures and include advice for learning more.

Even if you are a computer wiz, fully versed in web design, you can still benefit from our coverage of curriculum planning, learning activities, assessment and evaluation, and using the Web with students. Web-page designers can use this book to help them reflect on and design better learning environments.

The book itself does not include any click steps, and only a few addresses of web sites. The Web is evolving so rapidly that web site contents and addresses often change or become obsolete. We want this book to remain useful even as specific resources change or become unavailable. We have included a few web sites that have maintained

their same address for at least two years and are maintained by established organizations and are thus likely to remain stable. You can find many additional links to relevant online resources on our companion web site at [curriculumwebs.com](http://www.curriculumwebs.com). We encourage you to send us additional resources if you find them useful.

ENHANCEMENTS IN THE SECOND EDITION

This new edition of *Curriculum Webs* includes several important enhancements that reflect the feedback from our readers and what we have learned from our ongoing work with teachers and others who are developing curriculum webs. The order of the chapters has been changed to reflect better the sequence of steps that the developers of curriculum webs actually follow when they work. A new chapter (Chapter Two) has been added covering WebQuests and other activity formats for using the Web to enhance teaching and learning. Greater attention has been given throughout to the importance of teacher reflection and continuous improvement. Each chapter includes one or more Questions for Reflection to encourage this important process. We've included more examples throughout the book and on the companion web site at [curriculumwebs.com](http://www.curriculumwebs.com). We've added many new activities to support the application and practice that will truly teach you how to create a dynamic and effective curriculum web. The Hands-On Lessons have been completely rewritten to reflect our new sequence of topics and procedures, and to incorporate changes in the software. All of the content has been updated to reflect current technologies. We pay a lot more attention to CSS, and have included a CSS reference on the companion web site. Our HTML Reference has been moved from the book to the web site to make it easier to use and to allow more space in the book for discussion of streaming audio and video and new approaches to interactivity. The References have been updated and expanded, as have the Glossary and the Index.

We believe the second edition is a stronger and more useful book. We hope you agree.

ACKNOWLEDGMENTS

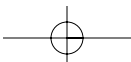
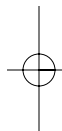
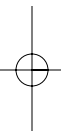
Many people have made this book possible. The authors take full responsibility for any remaining errors or inadequacies.

This book initially arose out of the Web Institute for Teachers (WIT), a professional development program for teachers held each summer from 1997 through 2004 at the University of Chicago, when we could not find a suitable text. The single most important person in making WIT possible is Professor Don York, noted astronomer and director of the Chicago Public Schools/University of Chicago Internet Project (CUIP). Don's astronomer-like attention to detail, combined with his persistence and vision, have connected numerous schools, teachers, and children to the Internet. His work exemplifies the moral responsibility of universities in a democratic society.

Mitchell Marks, technical coordinator extraordinaire for CUIP and WIT, made it possible for us to have a reliable and easily configurable server for WIT and for the development and hosting of curriculumwebs.com. Mitch exemplifies the technical support that universities can provide to the public schools. Russ Revzan, a veteran teacher in a Chicago public school and longtime WIT mentor, became an expert in FrontPage while helping to produce and revise the Hands-On Lessons. Sharon Comstock, another WIT mentor and a youth librarian, provided us with important insights and useful suggestions for incorporating the concepts of inquiry and reflection into the second edition. Tamar Friedman and Janet Gray-McKennis (also former WIT mentors) made detailed suggestions for the second edition. Christie Thomas (another WIT mentor), Caitlin Devitt, and Janet Geovanis provided useful feedback and suggestions as first edition of the text was initially written.

Arnis Burvikovs, our editor at Allyn & Bacon, has maintained his optimism about this project from the start, and has given us helpful and considered advice at every stage. We would also like to thank the following reviewers for their helpful comments about the first edition of this book: Robin Burke, DePaul University; Ralph Cafolla, Florida Atlantic University; Maria Teresa Fernandez, United States International University; Diane McGrath, Kansas State University; Jean Morrow, Emporia State University; Catherine M. Ricardo, Iona College; and Paula Zeszotarski, UCLA and ERIC Clearinghouse for Community Colleges.

Most of all, we want to thank the hundreds of teachers who have been mentors and learners in WIT during the past eight years. These teachers have taught us much about the nature of teaching and learning, and about how to use the Web as a teaching tool.



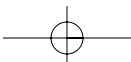
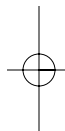
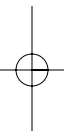
ABOUT THE AUTHORS

Craig Cunningham is associate professor in the Technology in Education program, National College of Education, National-Louis University, and is founder and director of the University of Chicago's Web Institute for Teachers. Before joining the National College of Education, he was research associate at the Center for Urban School Improvement, University of Chicago, and curriculum director for the Chicago Public Schools/University of Chicago Internet Project (CUIP). Craig has a Ph.D. in philosophy of curriculum from the University of Chicago. He has taught at Northeastern Illinois University, the School of the Art Institute of Chicago, DePaul University, Chicago State University, the University of Chicago, Hyde School (Bath, Maine), and the Hyde Leadership School of Greater New Haven, and has published papers on moral education and technology integration. See Craig's web site at craigcunningham.com.

Marty Billingsley chairs the computer science department at the Laboratory Schools of the University of Chicago, where she has taught for 10 years. She has a B.S. in computer science from Montana State University, and has worked as an engineer for Hewlett-Packard and Tektronics. In 1999–2000, Marty served as assistant director and webmaster of the Web Institute for Teachers, and she was a mentor again in 2003. See Marty's web page at mbillingsley.com.

The two authors come from different backgrounds that intersect in this book. Craig's background in teaching and in the philosophy of education has prepared him to look with a critical eye at contemporary educational structures, practices, and innovations, and to be constantly on the lookout for new possibilities and potentialities for learning. As a teacher, researcher, and reformer, Craig has always seen technology as tool rather than an end in itself. Marty, however, comes from a background as a software engineer. Her primary interest has been computer science—not the application of computers for productivity, but on how computers themselves work and their application in problem solving. This is the focus of her ongoing learning and also what she is most passionate about teaching to others. When Craig's interest in educational improvement is combined with Marty's interest in how computers work, the result is a stereoscopic view on how computers can be used to support teaching and learning. We hope you find our dual perspectives helpful.

Let us know how you like the book, and tell us about the curriculum webs you make! You can contact us at curriculumwebs.com.



CHAPTER 1

.....

PLANNING CURRICULUM FOR THE WEB

Overview

This chapter introduces you to the concept of curriculum webs, explores why they might support teaching and learning, and offers initial guidance on how to build—and use—them. This chapter also acts as an invitation to reflect on your own use of computers both within and outside of the classroom; to reflect on your own teaching; and to, perhaps, revisit some of your assumptions about what “works” in your classes.

WHAT IS A CURRICULUM WEB?

As educators, most of us have a pretty good notion what “curriculum” is. For our purposes here, we are defining a **curriculum*** as “a plan for a sustained process of teaching and learning.” It describes a coherent set of intentions, subject matter, activities, and methods for determining whether students have learned (Pratt 1994). A curriculum usually consists of a number of different learning activities, linked together in a coherent sequence that builds toward a defined set of learning objectives.

A **curriculum web** is a **web page** or **web site** designed to support a sustained process of **teaching** and **learning**. Generally, a curriculum web includes instructional guidance for students; thoughtful and relevant information that may include text, images, or other multimedia; and external **links** to other valuable resources. A complete curriculum web includes the following components:

- A carefully developed *curriculum plan* that defines the purposes and learning activities of the curriculum;
- A front or *home page* that is the main entry point into the curriculum web;
- Student *activity pages* that describe specific learning activities for students and lead them to appropriate resources;
- A *teaching guide* that contains information useful to the teacher (and which includes elements of the curriculum plan);

*Words printed in **boldface** in this book are defined in the Glossary, beginning on page 257.

- Online **rubrics** and *self-assessments*, so students can test—and reflect on—their new knowledge or understanding;
- *Feedback mechanisms* so students can communicate with the teacher or curriculum creator, allowing for enhanced engagement and individualization; and
- *Selected links* to relevant web sites that have been carefully evaluated and determined to support learning.

See Figure 1.1 for a screen shot of a typical curriculum web home page. This curriculum web, “Beaks and Feet,” is designed to support an inquiry into biological diversity by English-language learning kindergartners and their third-grade buddies.

Every curriculum web is based on a **curriculum plan**. It should come as no surprise that the more elaborate the curriculum web, the more elaborate the curriculum plan that lies behind it. In fact, the key to creating successful learner-centered activities that harness the power and excitement of the **World Wide Web** is careful forethought and ongoing **reflection**. Our experience has been that we never really “finish” a curriculum web: we plan, create, reflect, and revise throughout—before, during, and after the learners use it. This book stresses the importance of reflection and **planning** during the entire **development**—and implementation—process. We encourage you to create a written curriculum plan that serves as a blueprint for the curriculum and the curriculum web you are building. Effective plans will have a common set of **elements** that we describe in detail in this book. Writing this plan during the curriculum development

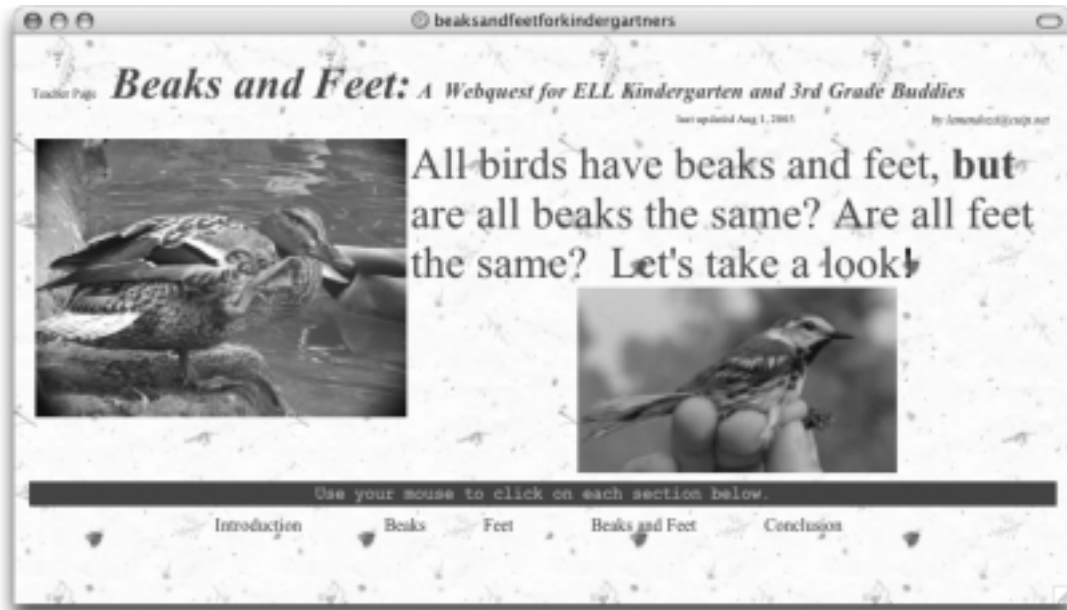


FIGURE 1.1 A typical curriculum web front page.

Source: Courtesy of Laura Mendoza, cuip.net/~lemendoza/beaksandfeetforkindergartners.html

process helps you to organize the many factors that influence the structure and content of the curriculum web.

Don't think that the curriculum plan is somehow set aside once you start building your curriculum web. The written plan you've created during development of the curriculum web then becomes an online **teaching guide** in the final curriculum web, providing helpful suggestions for the teacher or other users (much like the annotations given in the teachers' edition of a textbook). The teaching guide is especially helpful for other teachers using your curriculum web who were not personally involved in its development, offering a window on the curriculum's assumptions, goals, and structure. The teaching guide can also prove invaluable to parents, students, and administrators, by enabling them to see the thinking behind the curriculum web: how the web site *reflects the planning*. The teaching guide also serves as an opportunity for you to reflect on your own curriculum building process as an artifact of what you have learned during the process.

Each curriculum web discussed in this book (or linked on *curriculumwebs.com*) includes a teaching guide that has all of the elements listed in Table 1.1. Again, the teaching guide is not an add-on created after the curriculum web has already been developed; rather, it emerges directly out of the curriculum plan that is produced before and during development.

Well-planned curriculum webs embody *both* an effective curriculum plan *and* a well-designed web site that supports that plan. In this book, we take you through the development of both. We cover the process of planning your own curriculum web, discuss aspects involved at each stage in planning, and describe principles and procedures for designing an effective web site to support your plan. Of course, we also provide many specific examples in the book and on the companion web site at *curriculumwebs.com*.

TABLE 1.1 Elements of a Complete Curriculum Plan and Teaching Guide

An <i>introduction</i> that provides an overview of the curriculum web (optional for the curriculum plan; necessary for the teaching guide)
A summary of the developer's broad educational <i>goals</i>
Description of the target <i>learners</i> and their needs
Description of <i>subject matter</i> or content
A listing of the expected <i>prerequisites</i> for successful use of the curriculum
A list of specific <i>learning objectives</i>
A concise statement of <i>aim</i> or purpose
A <i>rationale</i> , justifying the aim
An <i>instructional plan</i> (describing how to use the web site with students), including a list of the equipment and <i>materials</i> necessary
A plan for <i>assessment</i> of learning and for <i>evaluation</i> of the curriculum web itself
<i>Contact information</i> for the author, and <i>acknowledgements</i> of sources utilized in building the web site

WHY BUILD CURRICULUM WEBS?

As stated before, a curriculum web is a tool for using the **Web** to enhance teaching and learning. Like all tools, it is good for some tasks but not for others. Here are some of things curriculum webs may be good for, and some compelling reasons why teachers may want to learn how to create and use them:

- Curriculum webs can guide **learners** to resources that have been preselected for having high educational value relative to the desired learning objectives. This avoids the mindless **surfing** students sometimes engage in when given access to the Web.
- **Teachers** can provide information or instructions to individuals or small groups of students when the students are ready for that communication, without having to repeat instructions or other information for each student or group. Each student accesses a given page in the curriculum web only when he or she is prepared to utilize it, that is, “just in time.”
- Different individual learners or groups of students can work through the curriculum web at their own pace, and the teacher can focus on helping individual students or groups of students to master the specific challenges they face. This capacity to differentiate instruction is one of the most compelling features of curriculum webs.
- It is also possible to use web pages for whole-classroom activities in which all the students are accessing a web page or web site together, using a computer **projector** connected to an **instructor station** or over a computer **network**.
- A curriculum web can become a replacement for—or an enhancement to—workbooks, textbooks, chalkboards, slide projectors, overhead projectors, calculators, certain manipulatives, software, trips to the library, and (through **streaming** of video over the Web) film projectors and VCRs.
- Developing curriculum webs involves many tasks that teachers already engage in: lesson planning, giving instructions, providing examples, and assessing learning. Thus, it does not take much additional work to move from traditional media to the Web.
- Curriculum webs are easy to make, given a basic understanding of curriculum development and mastery of the basics of web page creation. Once a teacher or other curriculum developer has produced a few simple curriculum webs, he or she will be ready to incorporate increasingly sophisticated technical and pedagogical techniques. Curriculum webs provide a natural pathway for teacher growth and professional development, while helping the teacher to keep up with technological and curricular changes.
- A teacher well versed in building curriculum webs can respond to “breaking news” or local events by quickly creating a relevant lesson or curriculum on the Web. The capacity to respond to the unexpected enhances schooling enormously. Traditional textbooks could never be used for this purpose; book libraries could help with background materials; newspapers could provide news summaries. Now, with the Web, teachers can immediately incorporate breaking news stories, background information, maps, images, video, and sound into the

daily lesson, thus making learning more interesting, immediate, and relevant to the students' lives.

- Curriculum webs can allow individual students to pursue their own interests within wider curriculum goals. Webs can be structured in such a way as to allow individual choice of particular topics or resources to be used for learning activities. This is especially useful when dealing with gifted or advanced students—or students with special needs—within the regular classroom.
- Curriculum webs can save money. Obviously, schools must undergo the large expense of getting connected to the **Internet**, purchasing adequate computers, and accessing sufficient electrical power. But once these are in place, curriculum webs can cut down on the costs of schooling by replacing textbooks, workbooks, paper, and other consumables.
- Curriculum webs can be effectively integrated with real world experiences. Clearly students also need to practice the sorts of things that people actually do, such as getting around in the world, and maintaining one's body/mind/spirit through participation in real physical, emotional, and social experiences. The Web cannot replace these experiences, but it can make them more educative, by providing background information and facilitating communication and understanding before and after the experiences.
- Since web pages can sit on a **web server** indefinitely, they become a perennial resource for schools and teachers. And because their developers can quickly, efficiently, and naturally update their curriculum webs, they provide ongoing support year after year while eliminating (at least the appearance of) yellowed index cards.
- Curriculum webs do not usually require special software or hardware to be used. Rather, all that is needed is a **web browser** and an Internet connection, and occasionally one or more widely available and free **plug-ins** to access special content. Indeed, curriculum webs can be easily accessed using any Internet-linked computer, whether the computer is a Macintosh or PC. This nearly universal compatibility is not often the case with commercially available educational software.
- Curriculum webs help schools and teachers to meet national, state, and local **standards** for technology integration in the curriculum. For example, the National Educational Technology Standards for Students (NETS-S), produced by the International Society for Technology in Education (ISTE), call for students to “use technology to locate, evaluate, and collect information from a variety of sources,” including the Internet. (See page 9 for more information about the relationship between curriculum webs and standards.)
- Parents can participate more actively in the education of their children. They can see the curriculum, try out the activities, understand teacher expectations and intentions, and communicate more freely with the teacher.
- Students can communicate with one another and with the teacher, even when everyone has gone home or is on vacation. The simplest way of facilitating student-to-student communication is by providing them with e-mail, although other options, such as web-based chat rooms and bulletin boards, can also be used. But curriculum webs also eliminate the limitations of place, time, or physical materials. Students who are homebound or temporarily unable to

participate in the classroom, or who have lost their book, worksheet, or assignment, can access the curriculum web from home or anywhere else with Internet access. This helps these students to keep up with missed work, and provides a way for teachers to support students who, for various reasons, are learning at a different pace than the rest of the class. (Curriculum webs are, of course, especially useful for **distance education**, where they are already widely used.)

- Schools and school districts can manage student learning. When curriculum webs are woven together on a school web site, they form a “school web,” which can facilitate participatory and cooperative learning among all the students of the school, at every grade level and in every subject. Schools do not have to start out with the ambitious goal of creating a complete school web. One teacher or group of teachers can start building a section of the school web at any time. The technology of the Web is not going away; time is certainly on your side!
- Students can build curriculum webs as a **culminating project** to a learning unit. We all know that teaching something is one of the best ways to really learn it. If students have the opportunity to consider the many factors that go into the creation of an effective curriculum web, especially if they design the curriculum web for a group of younger students or other learners who will actually use the curriculum web, they will come to a better understanding of the underlying concepts and structure of the subject matter, and may also gain increased motivation for learning the material at a high level.

In addition to these benefits, perhaps the most significant effect of curriculum webs is their effect on the teacher or curriculum developer who builds them. We believe that teachers can improve their teaching through the ongoing creation of curriculum webs. Building an effective curriculum web is pretty good preparation for teaching an effective curriculum unit. Teacher involvement in curriculum development and web design fosters improvements in teaching and in teachers. We are not saying that this is the only way teachers can improve, but it is one way, and it is one that is timely and increasingly available to teachers in schools and in colleges of education. Building a web site for learning is itself a process of learning in which meaning is created. Meaning consists of associative relations among concepts or experiences. As people learn, these relations, or meanings, intertwine in complex mental webs that are built in the medium of ongoing experience. Designing a web site is like creating a web of meaning around a set of experiences. In order to design the site, the developer/designer/teacher who creates a meaningful curriculum web becomes at the same time a more knowledgeable and effective teacher, with a more sophisticated mental map of the subject and enriched ideas about how to foster learning.

The availability of information on the Internet and World Wide Web leads to a new role for teachers. In the classroom, teachers who develop their own curriculum webs can become facilitators of learning experiences specifically designed for their students, based on a careful **assessment** of the students’ needs, rather than standardized deliverers of information or skills training. By engaging in the process of curriculum reflection and planning, teachers grow as teachers and as learners, modeling the process for the students as they grow.

This is not to say that traditional schools will easily accommodate this new role for teachers. As Brunner and Tally (1999, 7) write:

Schools need to be wired humanly even more than they need to be wired electronically; that is, schools need to be supported by better, more informed, and more trusting relationships between parents, teachers, students, administrators and community members. Technologies can help create the conditions for these relationships and these conversations to happen, but a school's rules, norms, and values—especially those around who gets to speak, to whom, and for what purposes—are the more important preconditions.

Teacher **habits**—whether good or bad—are often fostered or maintained by the organizational realities of schools. Different aspects of schools interrelate in ways that are mutually reinforcing. For example, tracking students by ability in math often causes them to be tracked effectively in other subjects as well. In another example, the decision whether to give students **e-mail** accounts at school affects other decisions about instructional planning and student empowerment.

Perhaps the biggest obstacle to changing the role of teachers through the use of curriculum webs is time. Because teachers were traditionally expected only to deliver curriculum created by others (mostly textbook publishers), schools are not well organized to encourage teachers to create and maintain curriculum webs. Especially when they are just learning how to use a web-page editor, teachers also need a lot of technical and pedagogical support. This is why we believe the best way to encourage use of curriculum webs is to bring teachers to the school or other setting during the summer to work for several weeks on their first curriculum web, under the guidance and support of experienced mentor teachers. This is the model we have followed in the Web Institute for Teachers (WIT) at the University of Chicago. (More information about WIT can be found at webinstituteforteachers.org.)

SOME EXAMPLE CURRICULUM WEBS

To help you to better understand what a curriculum web is and how it works, we have created three example curriculum webs. These examples can be examined online by visiting curriculumwebs.com, and clicking on “Example Curriculum Webs.” We refer to these three examples throughout the book, and it would be a good idea for you to spend some time looking at them.

The three example curriculum webs are:

- “Our United States,” a curriculum web designed for middle school students. It takes them on an exploration of the relationship between geography and economic and recreational activities. See Figure 1.2 for a screen shot of the home page of this curriculum web.
- “Who Am I?,” a curriculum web designed for high school students to explore self-identity while learning about how to use the Web to support research and writing. See Figure 1.3 for a screen shot of the home page of this curriculum web.

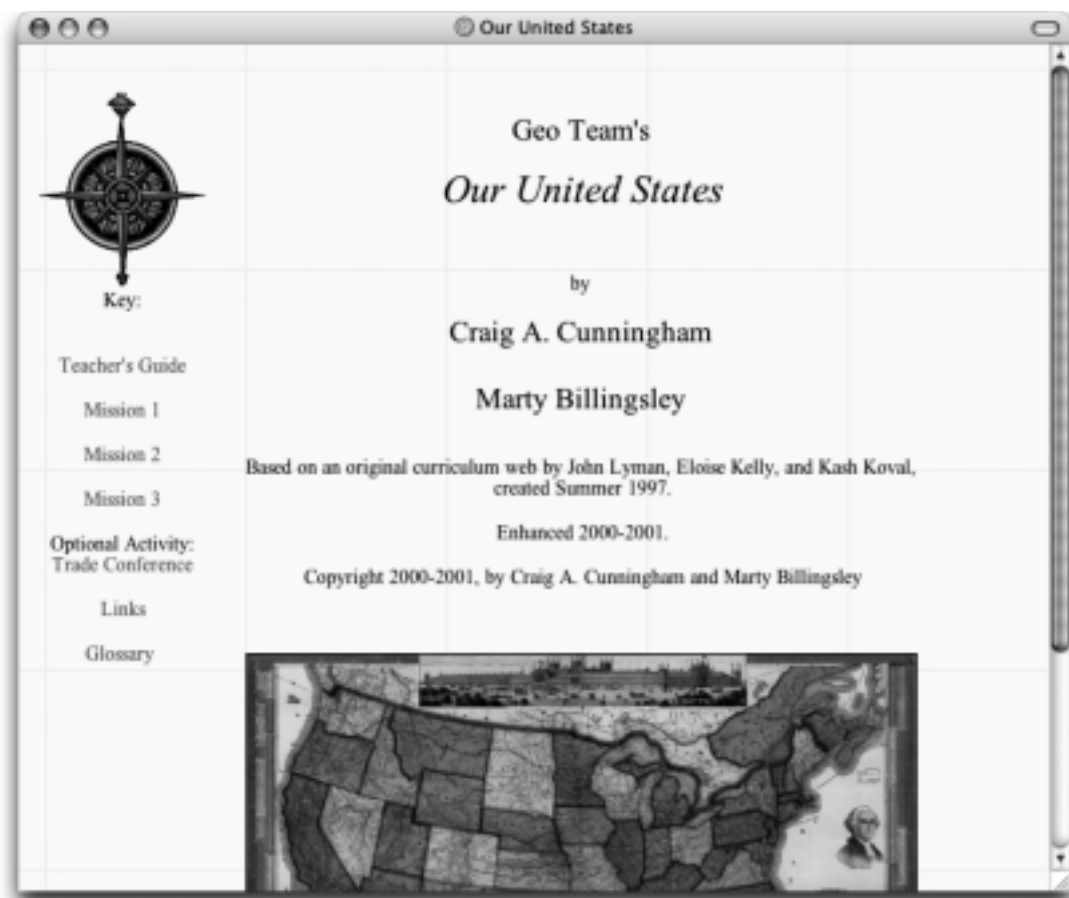


FIGURE 1.2 “Our United States” curriculum web.

- “Building a Curriculum Web with Dreamweaver,” a curriculum web designed for adults (teachers) to help them learn how to use the web-editing software Dreamweaver to build curriculum webs. See Figure 1.4 for a screen shot of the home page of this curriculum web.

As you look at these three curriculum webs, you will notice that they share a few common features:

- A home page or **entry-point** that introduces the curriculum web and provides links to all the activities and resources within the web site.
- A consistent look and feel within the web site that makes navigation easy and that distinguishes the curriculum web from other web sites.
- A teaching guide that contains the elements listed in Table 1.1.



FIGURE 1.3 “Who Am I?” curriculum web.

- A set of **learning activities** designed to lead the learner to the **learning objectives** listed in the teaching guide. These activities sometimes take the learner into the wider Web by including links to sites that have been previously selected to be relevant to the curriculum web.
- A mechanism for the learner to contact the curriculum web developer or the teacher to submit work, give feedback, or ask questions.

Any curriculum web you develop should share these basic features.

STANDARDS AND CURRICULUM WEBS

The most significant development in education during the past twenty years—besides the widespread availability of personal computers and the Internet—has been the

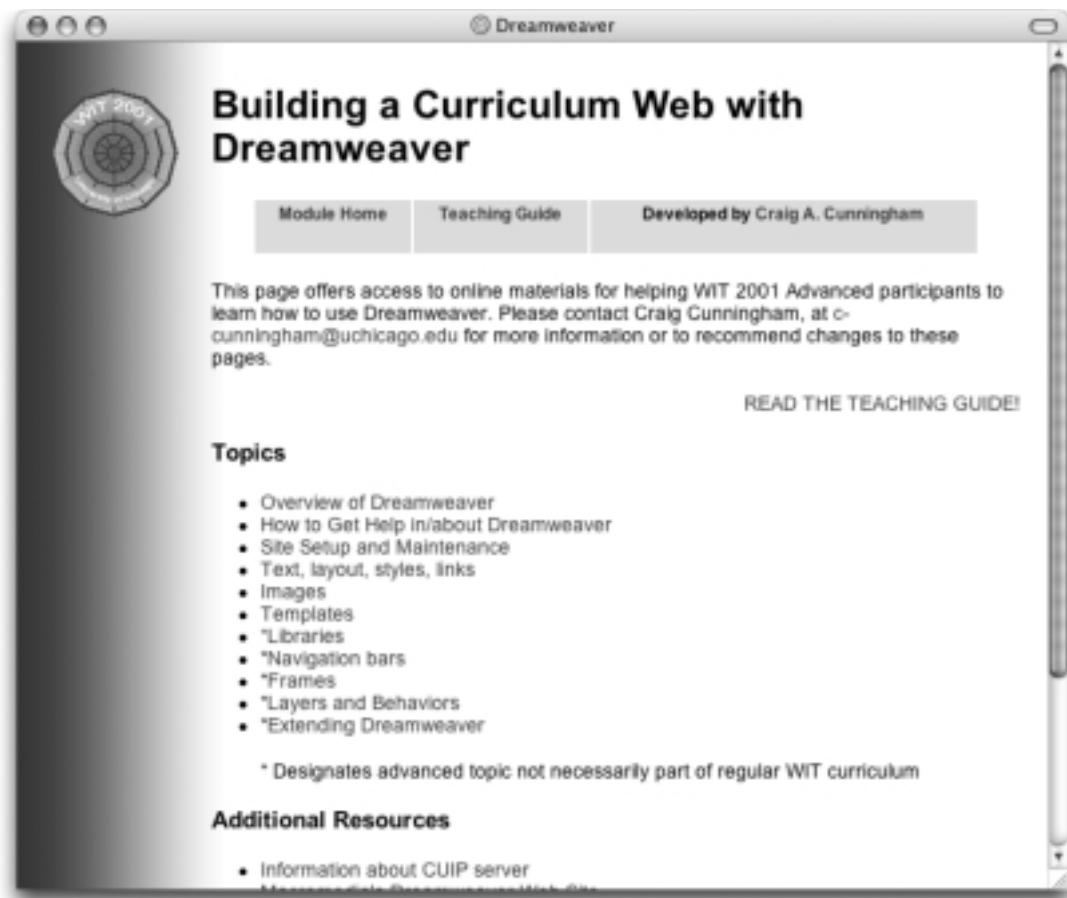


FIGURE 1.4 “Building a Curriculum Web with Dreamweaver” curriculum web.

development of educational standards by almost every state and by many national and international organizations such as the National Council of Teachers of Mathematics and the American Association for the Advancement of Science. These standards are designed to create shared expectations of what students will learn in each grade and subject area, so that teachers and schools will know what to teach as well as how to assess whether teaching and learning have been effective.

In Illinois, for example, the state board of education coordinated the development of the Illinois Learning Standards in 1997 and subsequently organized the development of performance descriptors and classroom assessments tied to the standards. The performance descriptors describe the kinds of tasks that students will be able to do when they have reached certain stages in meeting the standards, and are designed to help schools and teachers to develop curriculum that will move students through 10 stages in developmentally appropriate ways.

For example, Illinois Learning Standard 1A for grades 1–5 is “Apply word analysis and vocabulary skills to comprehend selections.” The general performance descriptor for this standard is “Students who meet the standard can apply word analysis and vocabulary skills to comprehend selections.” Notice that at this general level, the performance descriptor is just a restatement of the standard in terms of what students can do. However, Illinois also provides detailed descriptions of the stages of development students are likely to progress through in meeting the standard. The detailed descriptions include specifics on the use of phonics, root words, synonyms, meaning in context, and the use of additional resources. Teachers or others who are developing an elementary school language arts curriculum can look at the standards and performance descriptors to determine the appropriate learning objectives (and often, learning activities) for a given audience of students in any subject area. Although the assignment of “standards” to lesson plans is often treated as a routine activity without a lot of careful thought, it is our experience that spending real time reading and reflecting on these documents can truly help teachers to focus on what has been carefully selected as important for students to learn. We will say more about this process in Chapter Three on identifying educational goals, beginning on page 35.

In addition to subject area standards, curriculum webs also provide ideal opportunities to meet standards related to student use of technology. Many states have developed or adopted technology standards for their students. We believe that these standards are best learned (and applied) in the learning of subject matter and content that goes beyond technology itself. For example, word-processing skills may be learned best while engaging in activities in the language arts, social sciences, and even science and math, rather than learned separately in so-called computer class. Curriculum webs devoted to a variety of educational goals will—by their very nature and the ease of including web-based resources—help to meet these technology standards.

The most comprehensive and widely followed set of technology standards for students has been developed by the International Society for Technology in Education. Known as the National Educational Technology Standards for Students, or NETS-S, these standards may be considered *the standard* (so to speak) for student technology standards. In addition to standards for student learning, NETS-S also provides a list of the essential conditions that schools must create for effective student learning (these conditions are listed in Table 1.2), and profiles that illustrate what students should be able to do on meeting the standards. The profiles include performance indicators that serve a similar function to the performance descriptors described above.

The NETS-S themselves are organized according to six categories—basic operations and concepts; social, ethical, and human issues; technology productivity tools; technology communication tools; technology research tools; and technology problem-solving and decision-making tools—and are given in four grade-level ranges: preK–2, 3–5, 6–8, and 9–12.

For example, prior to grade 2, NETS-S call for students to “gather information and communicate with others using telecommunications, with support from teachers, family members, or student partners.” By the end of grade 5, they should “design, develop, publish, and present products” (including web pages), “collaborate with peers, experts, and others using telecommunications,” and “research and evaluate the accuracy, relevance,

TABLE 1.2 The Essential Conditions of School Technology Use, as Defined by the International Society for Technology in Education

Vision with support and proactive leadership from the education system
Educators skilled in the use of technology for learning
Content standards and curriculum resources
Student-centered approaches to learning
Assessment of the effectiveness of technology for learning
Access to contemporary technologies, software, and telecommunications networks
Technical assistance for maintaining and using technology resources
Community partners who provide expertise, support, and real-life interactions
Ongoing financial support for sustained technology use
Policies and standards supporting new learning environments

Source: http://cnets.iste.org/students/s_esscond.html.

appropriateness, comprehensiveness, and bias of electronic information sources concerning real-world problems.” Before graduating from grade 8, students should be able to “use content-specific tools, software, and simulations” (including web tools) “to support learning and research,” as well as “design, develop, publish, and present products” (including web pages), in addition to meeting the goals set for the end of grade 5. Finally, before finishing high school, students should be able to “routinely and effectively use online information resources to meet needs for collaboration, research, publications, communications, and productivity” (ISTE 2000a).

ACTIVITY 1A ■ Exploring NETS-S

1. Visit the NETS-S web site at cnets.iste.org
2. Using a word-processing program or spreadsheet, create a table of the performance indicators listed on that page.
3. Structure the table so that you can compare them by grade level.
4. Choose 1 of the 10 performance indicators and examine the changes in the indicator as you move from preK–2, through 3–5, 6–8, and 9–12 grade levels.
5. For the performance indicator you have selected, make an ordered list of what students will have to master in order to demonstrate that they have mastered the performance indicators at each grade level.
6. Brainstorm the kinds of learning activities that students will have to complete as they move through a school system that helps them to meet the standards.

The International Society for Technology in Education has also developed a set of standards for the training of teachers in technology. These National Educational Technology Standards for Teachers (NETS-T) set forth what teachers should be able to do at three levels: before starting their student teaching; after their student teaching and internship; when they are ready to take over their own classroom; and at the end of

the first year of teaching. The list of proficiencies is long. It includes broad familiarity with technology and resources and how to use them with students. (You can find the NETS-T at cnets.iste.org/teachers.)

The NETS-T note that there are three “foundations for effective use of technology” by teachers. These can be thought of as the prerequisites for teacher utilization of technology in schools. They are:

- Basic computer/technology operations and concepts
- Personal and professional use of technology
- Applications of technology in instruction

The best way for teachers to learn the first two of these skills is by using computers themselves while they are students. The third foundation will probably be laid only in the preservice teacher education program itself, either integrated into early methods classes or in a separate course on educational technology. (Some research suggests both a separate course and integration into methods courses is most effective. See Bielefeldt 2001.) Once the teacher has mastered these foundations, he or she is ready to learn how to teach with the technologies in schools. Somewhere along the way, the teacher will learn how to (among other things):

- “Engage in planning of lesson sequences that effectively integrate technology resources and are consistent with current best practices,” and
- “Plan and implement technology learning activities that promote student engagement in analysis, synthesis, interpretation, and creation of original products” (ISTE 2000b).

These and the other skills outlined in the NETS-T are precisely the ones that can be furthered by having teachers develop their own curriculum webs:

- Critical thinking
- Data collection
- Ethical behavior
- Assessing and selecting resources
- Planning effective learning activities aligned to standards
- Developing methods for getting hardware, software, and technical support
- Arranging for equitable access for students
- Creating assessment activities to generate information that can help to improve instructional planning, management, and implementation of learning strategies
- Using technology tools to collect, analyze, interpret, represent, and communicate data for the purposes of instructional planning and school improvement.

We’re not suggesting that curriculum webs are a panacea. In order for teachers to be able to create and use them, they not only need the skills that can be learned through this book, but the conditions listed in Table 1.2 need to be fulfilled in your school. Computers (in classrooms or **computer labs**), Internet access, electrical upgrades, and technical support all have to be paid for and maintained. (See Chapter Twelve for discussion of

some of these essentials.) Superintendents, principals, colleagues, parents, and even students need to be convinced that new approaches to teaching and learning are wise and effective. Inequitable access to resources remains a huge obstacle to educational quality (and one of the great moral issues of our times), and this must be addressed through the political process. In the meantime, we expect curriculum webs to be used by more and more teachers, in more and more schools, where the conditions and supports are present.

EASING INTO BUILDING CURRICULUM WEBS

Fortunately, it does not take much to design and create web pages that are useful for teaching and learning. The actual creation of the pages themselves is a straightforward and simple process, once the curriculum has been planned. Web-page editing software is easy to use, especially for the moderately computer-literate person who has used a variety of computer software and who has ready access to a computer to practice new skills. Most people will need to invest some time up front to learn the software, which is often best done (using this book) as part of a course in preservice teacher education or as a series of inservice workshops after school or during the summer. Once the software and the process of building curriculum webs is mastered, the teacher or curriculum developer will find the creation and use of curriculum webs to be second nature, and they will wonder how they ever did their jobs before!

In this book, we will take you through many of the steps necessary to create a curriculum web using **HTML** (HyperText Markup Language), or “raw code.” However, most web developers use specially designed software—web-page editors—to create and maintain their web sites, using HTML only for tweaking the code created by the software when it won’t do exactly what they want it to do. We cover the code in the book because of its universality—HTML is HTML no matter how it is created—and because we believe everyone who creates web pages should have at least some familiarity with what goes on “under the hood.” In the Hands-On Lessons available on *curriculumwebs.com*, we also show you everything you need to know about using three popular web-page editing packages: Macromedia’s Dreamweaver, Microsoft’s FrontPage, and Mozilla Composer. By the time you finish this book, you will be able to create almost any web page that you can envision. (One thing we don’t cover is the creation of complex graphics or **animations**.)

The most challenging part of building curriculum webs is, we think, to tie curriculum reflection and planning together with web creation. These processes are usually treated separately, with web design sometimes handled by techies rather than educators. But this need not be the case, and we believe that reflective planning and implementation by educators is crucial for the success of a curriculum web. Enabling teachers to master and combine both of these skills is our goal in this book.

If you are a teacher who wants to use the Web in your teaching, you do not need to jump in with both feet. There are ways of easing into Web use. The first stage could be using the Web as a resource to support you as you develop lessons that will be delivered using traditional media. You can begin by familiarizing yourself with materials that are available on the Web already, and the tools required for accessing these materials. Your school librarian or media specialist may be willing to help you with this process. He or

she may help you to use a search tool such as *www.yahoo.com* or *www.google.com* to look for materials. Simply typing “Causes of the Civil War” or a similar phrase into a popular **search engine** can give you a sense of the kinds of resources available on any given educational topic. For many topics, a search will generate a large number of links to a huge quantity of information. Some of these links will be useful to you, while a lot of the material will have nothing to do with the topic. Wining the information becomes an important skill. Again, your librarian will know how to help. By searching and browsing the Web, or collaborating with a librarian to collect materials, you can learn a lot about a given subject in preparation for teaching about that subject. Such preplanning is not only a great starting point for building a curriculum web, but it’s also a good way to prepare yourself for teaching any subject in any medium, with technology or not. (With time and practice, you can improve your searching skills, and learn to find resources that are more relevant and useful. We discuss effective searching and winnowing techniques in Chapter Seven.)

A second stage for teachers is to visit one of the many explicitly educational sites on the Web. Included on most of these sites are lesson plans, generated by teachers on many topics and available to be copied and sometimes modified for use. A number of educational sites specifically designed for students can facilitate a teacher’s first use of the Web in the classroom. Our companion web site at *curriculumwebs.com* lists some links to excellent sites, where teachers can find well-organized information related to a wide variety of subjects and learning objectives.

A third stage, slightly more complicated, is for a teacher to create a page for students that contains a list of web sites relevant to a particular topic, giving the students a starting point for further **inquiry**. The list of starting points, or links (sometimes called a “hotlist”) can be created automatically during the process of the teacher’s own Web search. We will show you how to do this in Chapter Seven and in the Hands-On Lesson that accompanies that chapter.

At a fourth stage, teachers can create a simple web-based lesson, involving just one or a few web pages. This is a good way to learn and practice the skills required in building larger web sites. In Chapter Two we introduce you to WebQuests, a fairly simple structure for creating curriculum webs that has proved to be the most popular approach to building web-based lessons.

Once you’ve built one or more WebQuests, you are ready to build a complete curriculum web. That process is covered in the remainder of the book.

OVERVIEW OF CURRICULUM PLANNING

Following Ralph Tyler’s classic *Basic Principles of Curriculum and Instruction* (1949), we think of curriculum planning as involving four fundamental questions or phases (plus a fifth one we’ll add below). The four questions are:

- What educational purposes should your curriculum seek to attain?
- How can learning activities be selected that are likely to be useful in attaining these objectives?

- How can learning activities be organized for effective instruction?
- How can the learning that results be assessed?

Developers of curriculum webs need to keep these questions in mind throughout the planning process, and also while designing the web site to support their curriculum plans.

It is possible to think of the process of curriculum planning for traditional media as a linear process, in which the curriculum planner first answers the first of the questions listed above, and then moves on to the second question, and so on; however, we know that in actual practice these questions are intertwined with one another. Planning for assessment, for example, can inform the choice of learning activities or the order in which you want students to complete them. Or, you may decide to embed assessment into learning activities, thus changing the nature of the activities themselves.

When the issues and procedures of designing a web site to support a curriculum are considered, the process is even less likely to resemble a step-by-step linear process. For example, you may discover that there are resources available on the Web that you had not previously considered, causing you to rethink your selection of learning activities. Or you may discover that the Web's capacity to support nonlinear navigation opens the possibility of a less traditional manner of sequencing activities. In our experience, building a curriculum web is more **iterative** than linear. Later aspects of the process often result in adjustments to decisions made earlier. Plus, a curriculum web is never really finished. The developer—especially if the developer is a teacher—will be tempted to improve it again and again as new groups of learners use it and provide feedback on what works and what does not work, and as new resources appear on the Web or emergent technologies and greater skills at web design open new possibilities.

For this reason, we suggest a fifth fundamental question to add to Tyler's famous list:

- Do the learning activities you have selected inspire your students toward further learning?

This question is at the heart of teacher reflection, which we define as the process of considering whether selected actions have led to desired consequences, and what to do about that. Reflection was critical to the philosophy of John Dewey, who believed that **educative experience** is a combination of action and reflection in which reflection contributes toward a refinement of action so that subsequent actions are more and more likely to lead to desired goals. This theory was further developed by Donald Schön in his 1983 book on the reflective practitioner. Schön differentiated between reflection-in-action, which occurs during the implementation of a plan and attempts to understand what is going on in light of prior experiences, and reflection-on-action, which is retrospective and takes place after results or consequences have actually occurred, allowing for deeper consideration of the wider causes of results and often leading to new approaches or theories. Both types are required by teachers (and by curriculum developers who actually pay attention to the ways their curriculums are used by learners), and both are essential to the effective development, implementation, and refinement of

curriculum webs. Reflection examines not only the direct consequences of actions, but also their personal, ethical, and political implications, and often goes beyond consideration of any one event or experience to consideration of the effects of institutions or cultural practices. For individual teachers, reflection represents the single most important source of professional development: the creation of an evolving sense of meaning and purpose to one's actions that tie them together into a coherent and motivated whole. For this reason, we believe that the reflective teacher is by definition the effective teacher.

On a less profound level, any curriculum web will be successful to the extent that the teacher or developer can keep up constant interaction among curriculum planning, web design, and the learning that actually occurs when learners use the curriculum web. This is one of the reasons we want teachers to learn how to build curriculum webs: teachers, above all people, understand the challenges and possibilities of curriculum development and are in the best position to build effective web sites to support teaching and learning. It is also why we support the need to assess student learning—so that teachers and curriculum developers can see whether or not their curriculum plans are effective in practice and use that information to improve them. Teacher-developed assessments (discussed further in Chapter Six) that are used during and immediately after the students' learning experiences are often better instruments for determining whether students have met objectives than more universalized and standardized assessments mandated by state and federal law. Because their results are often available immediately to a teacher or other developer of a curriculum web, they can be used to make quick modifications to a curriculum web so that other students will benefit. (Teachers may wish to avoid the tendency to “wait until next year” to make improvements, so that they can reflect on assessment results and make modifications while the experience of using the curriculum web is still fresh in their minds.) In general, we believe, the entire process of web-based teaching, from determining student needs, to developing curriculum plans and curriculum webs, to facilitating learning with the curriculum webs, to assessing learning and revising plans and web sites, should be teacher-driven. This reveals, perhaps, our not-so-secret agenda for educational reform: to put the teacher in the center of curriculum development, not the textbook companies or impersonal testing organizations. Curriculum webs represent one important strategy toward that goal.

ACTIVITY 1B ■ Reflecting on Reflection

Robert Greenaway (2004), an expert on outdoor education, has examined a large number of models of the role of reflection in learning. Whereas many writers prefer fairly complex models of the process, Greenaway makes a strong argument for a simple, three-stage model of “Plan, Do, Reflect.” This simple model can inform the process of developing curriculum webs.

Read about Greenaway's work at www.wilderdom.com/experiential/ExperientialLearningCycle.htm or via a link at curriculumweb.com. Write a short summary of his reasons for preferring a three-stage model over the more complex models he describes. Do you agree or disagree? Why or why not? If you are using this text as part of a course, discuss this with your class.

Chapter Summary

.....

This chapter:

- Gives reasons for using the Web as part of teaching and learning. Specifically, the Web has multiple *resources*, can support a variety of kinds of learning *activities*, enhances *communication*, and is conducive to *critical thinking and analysis* skills.
- Talks about our vision for how teaching and learning will change with the incorporation of the Web into education.
- Suggests that teachers should plan, develop, implement, and reflect on their use of curriculum webs.
- Describes a sequence of stages that teachers can go through in becoming more proficient in using the Web to support teaching and learning.
- Describes the four traditional phases of curriculum planning, and the iterative nature of the process of developing curriculum webs, and suggests adding a fifth phase focused on teacher reflection.

Questions For Reflection

.....

Have you ever participated in an individualized or highly differentiated process of learning, in which you got to choose or select learning experiences or topics rather than doing what everyone else was doing? If you can't think of an example from your schooling experience, think about nonschool educational experiences such as athletics, music, or community service. How was this individualized learning experience different from, or better than, standardized learning experiences? What was the role of the teacher or teachers, and how did that differ from other situations? How does your consideration of these questions affect your motivation to learn and to use curriculum webs in your teaching?

Your Next Step

.....

If you have not already looked at the example curriculum webs on *curriculumwebs.com*, then do so now.

Also, it is time to choose a web-page editor and begin to learn how to use it. Download Hands-On Lesson 1 and either read it on your screen or print it out. Once you know which package you are going to use, download a trial version of that software or purchase and install the full package. You will begin to learn how to use the software in Hands-On Lesson 2, after you have read the next chapter.

For Further Learning
.....

- See *curriculumwebs.com* for some links pertinent to the topics in this chapter.
- These are excellent books about curriculum development and planning: Pratt 1994, Ornstein and Hunkins 1998, Tanner and Tanner 1985, Jackson 1992, and Wiles 1999.
- To learn more about the uses of computers in instruction, see Druin and Solomon 1996, Provenzo et al. 1999, Jonassen 2000, Schofeld and Davidson 2002, and Bruce 2003.
- Several authors (besides us!) have written good books about designing web-based teaching and learning materials for K–12 learners. Our favorites are Harris 1998 and Warlick 1998.
- See Rubin 1996 for a nice overview of how educational technology can facilitate inquiry-based learning.
- See Burbules 2004 for a discussion of the role of reflection in evaluating educational quality.
- See Clandinin and Connelly 1992 for a discussion of teachers as curriculum makers.
- See Krough 1990 for a very different conception of the meaning of a “curriculum web,” as a framework for developing nonlinear lesson plans for early childhood education.

CHAPTER 2

.....

CREATING A SIMPLE CURRICULUM WEB

Overview

This chapter provides an overview of the process of building a curriculum web by introducing you to WebQuests, a well-structured, easy-to-create form of curriculum web. After reading this chapter and completing Hands-On Lesson 2, you will better understand the concepts and processes involved in constructing more elaborate curriculum webs. In addition, you'll be able to use many of the page-editing features of your web-editing software.

ACTIVITY FORMATS FOR THE WEB

Curriculum webs represent the epitome of web-based learning approaches. A complete curriculum web, designed to support a unit of instruction, can contain many pages, links, resources, activities, and assessments. Most people will not want to start their creation of web-based lessons with such a curriculum web. Fortunately, curriculum webs can be much simpler, containing perhaps two or three activities and about 10 total web pages.

Simpler still are web-based lessons, which usually contain one activity or a closely related set of activities, designed to be completed in one or at most three or four class sessions. A variety of approaches to constructing web-based lessons has been developed. (See March 2001 for a thorough discussion.) These include:

- *Topic Hotlists:* These are a set of links, usually annotated, and related to a topic, allowing for guided student exploration of the topic in preparation for another activity, or as a supplement to activities using more traditional **media**. Often a teacher will create a hotlist, post it to a web site, but then provide instructions to students through a handout or worksheet. In Hands-On Lesson 7 we will show you how to convert your bookmarks, or favorites, into a hotlist.
- *Multimedia Scrapbook:* This is a collection of links, pictures, audio, or other media files related to a topic, allowing students to choose content that is relevant to their particular project. These differ from a hotlist in that the learners use the listed resources to build something on their own, not only to explore the topic. For example, the students may create their own **multimedia** projects using a software

program such as Hyperstudio or eZedia. Rather than have them find resources on their own (which can take a lot of time), the teacher collects the resources in advance, linking them to a web page.

- *Treasure Hunt*: In this format, the teacher not only collects relevant resources or links, but also provides a structured activity, on the web page itself, that leads students to examine the collected resources. Having an exciting or interesting question that inspires the students to learn is the key ingredient. One approach is to include a number of factual or opinion-based questions that lead to a larger, overarching question that culminates the activity.
- *Subject Sampler*: Here, you also collect relevant resources, but they are ones that serve as a sampler of the kinds of information, resources, topics, and media that pertain to a particular subject. This is a great way to start a new unit, by having students explore several different perspectives or topics that will come later within the unit. The best Subject Samplers appeal to student emotions and interests, inspiring curiosity.

To experiment with these activity formats, visit our companion web site at curriculumwebs.com. We have collected some examples and other resources for each format.

The line between the simple activity formats listed here and curriculum webs is the difference between a lesson and a curriculum unit, which is more sustained. A sustained experience takes place over a period of time that is longer than one to three sessions. We also consider curriculum webs to extend beyond web-based lessons not just in terms of time spent, but also how deeply they go into a topic or a problem. A curriculum web should encourage learners to consider multiple perspectives, tools, issues, theories, or solutions, rather than just one, and to apply multiple modes of thinking, such as restating, summarizing, comparing, simplifying, or evaluating facts or points of view. A curriculum web should also appeal to a wider range of learning styles.

A WebQuest is a form of web-based lesson that begins to transcend the limitations of a single lesson and move into the kinds of possibilities that come with a curriculum web. Therefore, we turn to them now as a transitional form that can be simple or complex, as needed by your subject matter, as appropriate to your learners, and as fitting to your own emerging web creation skills.

WHAT IS A WEBQUEST?

WebQuests were originally developed by Bernie Dodge and Tom March of San Diego State University as an easily adaptable lesson format for structuring student learning around inquiry. Dodge and March have refined the format tirelessly to make it easy for teachers to create and implement WebQuests, and have helped spread the concept through a variety of approaches, including conducting workshops and building an online library of existing WebQuests, templates, and other resources. Due to their influence—and the ease of creating and using them—WebQuests are the most popular approach to building web-based lessons. See Figure 2.1 for a screen shot of a very well-designed WebQuest.

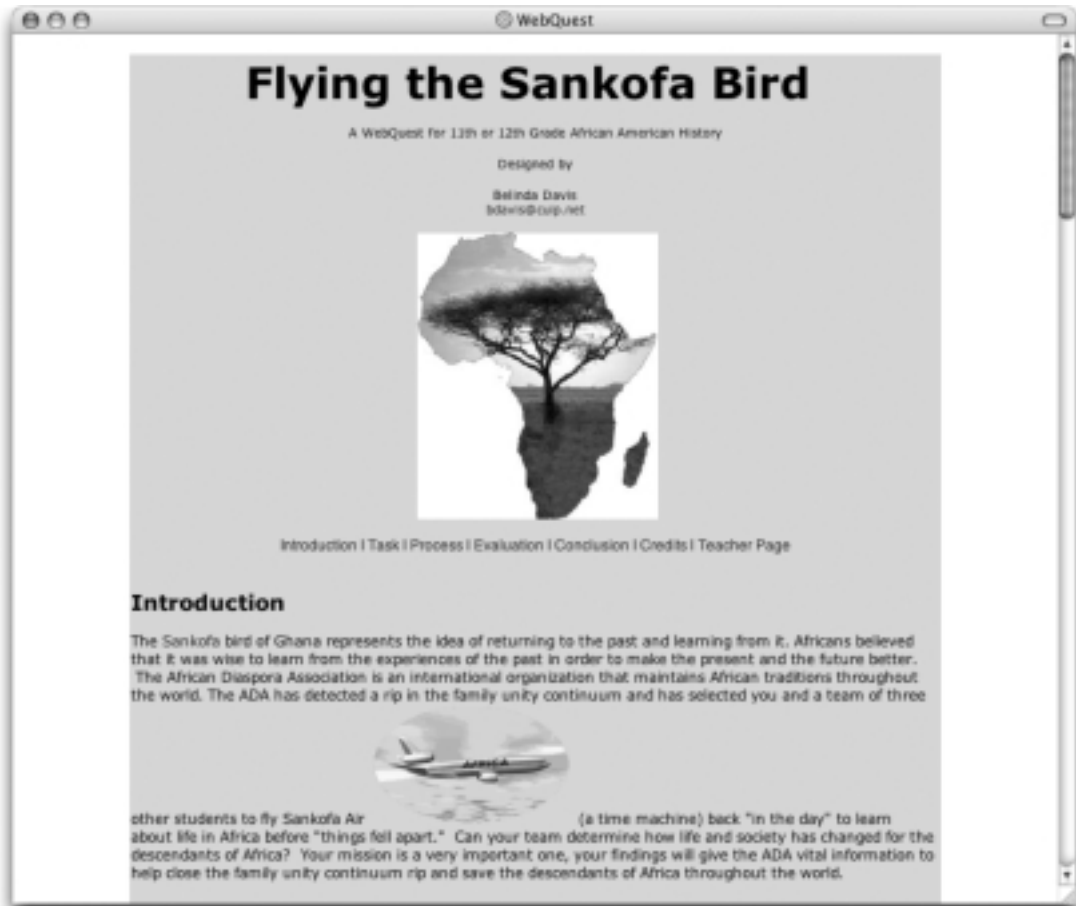


FIGURE 2.1 A WebQuest with a very compelling activity.

Source: Courtesy of Belinda Davis, <http://webinstituteforteachers.org/~bdavis/webquest.html>.

Although WebQuests can be designed as either short-term or long-term activities—that is, as units of instruction ranging from one class session to a curriculum unit covering many weeks—most WebQuests are created on the short-term model, with activities designed to be completed in one to three class periods. The length of time it takes learners to complete a WebQuest depends on the complexity of the task and the process necessary to complete it. Long-term WebQuests—examples of which are hard to find—require more elaborate web sites than short-term ones that can be contained within one web page. Long-term WebQuests are curriculum webs that incorporate the WebQuest standard structure and approach while allowing for unique modifications to suit learners, subject matter, or available resources.

WebQuests are organized around a question, issue, case, or problem that requires students to use web resources to complete an inquiry or investigation involving **higher-order thinking**. A well-designed WebQuest guides students to make

comparisons, evaluations, or syntheses of existing information, resulting in new theories, creative solutions, or custom-designed products.

All WebQuests embody a similar structure, or set of elements, which makes it easy to use **templates** in the construction of new WebQuests. A variety of templates exist that allow teachers or other novices the option of basically filling in a form to create a WebQuest. Some of these templates and a huge array of additional resources about WebQuests can be accessed on our companion web site at *curriculumwebs.com* or directly at *webquest.org*.

The basic elements of a WebQuest are:

- *Introduction* (a statement that sets up the problem, putting it in context, and often includes an **essential question**)
- *Task* (a statement of what is to be done to complete the WebQuest)
- *Process* (a detailed step-by-step guide to completing the WebQuest)
- *Evaluation* (an explicit statement of how any products resulting from the WebQuest will be judged, often in the form of a rubric or rubrics)
- *Credits* (links to web-based resources and citations to print-based resources that will be used by the learners to complete the WebQuest)
- *Conclusion* (a statement that ties the WebQuest together, perhaps leading to additional questions or encouraging learners to continue to increase their understanding of the subject matter)
- *Teaching Guide* (information for teachers about the purposes and structure of the WebQuest, including the elements discussed throughout this book)

You can see links to each of these elements in the WebQuest pictured in Figure 2.1.

ACTIVITY 2A ■ Examining Some WebQuests

Visit *curriculumwebs.com* and navigate to the resources related to Chapter Two. We've provided links to some example WebQuests. Examine the WebQuests to get a sense of how the various components work together. Think about how you might use these WebQuests with your students. What hardware and other resources would be required? What prior training in use of the Web or other tools would your students need to be successful with these WebQuests? How do the WebQuests compare to paper-based learning materials?

THE IQ WEBQUEST: AN ELABORATED EXAMPLE

To explain the components of a WebQuest and describe how they work together to create an effective learning opportunity, we have created a WebQuest about WebQuests, called "Measuring IQ: The Inquiry Quotient of WebQuests," or the "IQ WebQuest" for short. By completing the IQ WebQuest, you will experience firsthand the way that WebQuests foster higher-order thinking, while also learning more about WebQuests and preparing to create your own WebQuest in Hands-on Lesson 2.

You'll find the IQ WebQuest—complete with links to the necessary resources—on our companion web site at *curriculumwebs.com*. We've also included most of the IQ WebQuest (without live links, of course) in this chapter, so you can follow along with our description whether or not you are sitting at a computer. You'll find two different forms of the WebQuest on the companion web site: a one-page version in which all of the elements are contained on one page with a menu at the top of the page containing links to the elements, and a multipage version with each element on a separate page, each linked to a home page. Generally, the one-page format is more suitable for short-term WebQuests and the multipage format for long-term WebQuests, although it is really a matter of personal preference as well as the sophistication of your web-editing software and skills.

Note that the Teaching Guide is a component that is often missing from WebQuests. We believe that this is a fundamental mistake. As we discussed in Chapter One, the Teaching Guide is useful not only to any teachers who use the WebQuest with their students, but is also the natural outgrowth of a systematic process of planning during the construction of the WebQuest. Since the process of construction requires attention to the **aims**, goals, **objectives**, subject matter, **audience**, **prerequisites**, instructional plan, and assessment of learning, it is smart to create an explicit description of these components, as a blueprint for the construction and as the eventual Teaching Guide included with the completed WebQuest. Here, we reproduce the IQ WebQuest Teaching Guide and include some annotations that will help you to understand the planning process that went into creating this WebQuest. We also reproduce most of the WebQuest itself, again with annotations. (We don't include the Resources section here, because these **URLs** may change and the book—unlike the companion web site—cannot be easily updated. You will find a current version of the Resources section on the companion web site at *curriculumwebs.com*.)

If you prefer, you can read the WebQuest online, rather than in the book, in preparation to completing Activity 2B on page 33. However, if you do read it online, be sure to read our annotations (available in the online versions by pointing your mouse to the word *note* in the margin of the pages).

The IQ WebQuest Teaching Guide

Note: Remember that the teaching guide starts as a curriculum plan, and later is repurposed and included in the finished curriculum web as the teaching guide.

Introduction. This WebQuest is designed to introduce teachers to WebQuests by focusing on the question of what makes WebQuests different than other forms of lesson plans. Specifically, the WebQuest helps teachers to ask what features or qualities in a WebQuest lead students to inquiry.

Note: The introduction to the teaching guide provides an overview of your curriculum web so that readers can quickly get a sense of the whole.

Aim. This WebQuest introduces teachers and other potential developers of curriculum webs to WebQuests and specifically to the challenges involved in creating learning activities based on inquiry.

Note: Like all aim statements, this one states very concisely *who* will be taught *what*. See page 64 for more about aims.

Rationale. Because WebQuests are easy to create from templates, and because they are so popular, there are many, many examples of WebQuests available on the Internet. (In September 2004, a simple Google search for “WebQuest” revealed 444,000 references.) For many teachers, WebQuests are the first type of web-based lesson or unit that they create. Some sites make it incredibly easy to set one up with web-based forms and templates. (See, for example, *landmark-project.com/slate.php3*, which suggests that a WebQuest can be designed and created in about 45 minutes.) This means that many WebQuests have not emerged out of much careful thought or effort. Even a cursory look at some of the WebQuests that have been created and posted to the Web reveals many that are unlikely to lead to higher-order thinking by the students. Many simply ask students to fill in the blanks on worksheets, or to make simple lists, or to complete a relatively simple task that is taught directly or through a set of examples. It seems that some teachers who create WebQuests don’t fully understand what it means to construct or facilitate an inquiry, as opposed to the mere collection of facts or mastery of fairly low-level skills. The IQ WebQuest is an antidote to this lack of understanding. We hope that teachers who have completed this WebQuest will build their own WebQuests with careful regard for what it takes to include inquiry as a learning activity.

Note: Rationale statements outline the reasons why a particular aim is important. Thus, they are written to defend the aim against any skeptics, and also to draw in the learner by describing the benefits of meeting the learning objectives. See page 65 for more about rationales.

General Goals

- Introduce the structure of WebQuests and their promise as an approach to learning how to construct curriculum webs
- Emphasize the importance of curriculum planning
- Expose the reader to a variety of activity formats including WebQuests and curriculum webs
- Engage the learner in an inquiry that explores the qualities of inquiry-based learning

Note: General goals provide a context for the curriculum web by outlining the larger purposes of the teacher, classroom, or course. See page 38 for more about general goals.

Subject Matter Description

- The structure of WebQuests
- The features of inquiry
- The construction of rubrics for evaluating complex situations

Note: Subject matter descriptions state the kinds of knowledge, skills, and attitudes around which the curriculum web is focused. See page 45 for more about subject matter descriptions.

Learner Description. Readers of *Curriculum Webs* who are preservice or inservice teachers, or others who wish to design instructional plans that incorporate web-based resources. Expectations for those learners are described in this book's Preface.

Note: **Learner descriptions** describe the audience or audiences of the curriculum web, including any special features of the learners. See page 42 for more about learner descriptions.

Prerequisites

- Facility with a web browser
- Familiarity with the basic structure and purposes of WebQuests and curriculum webs
- Interest in learning how to build effective curriculum webs
- Understanding of the content of Chapter One and Chapter Two of *Curriculum Webs*

Note: The statement of prerequisites lists the knowledge, skills, and attitudes that are assumed to be present in the learners. Sometimes, this section will also list ways the curriculum web can be modified for those who do not meet the prerequisites. See page 61 for more about prerequisite statements.

Learning Objectives. On completing this WebQuest, learners will be able to:

- Describe the purpose of each component of a WebQuest
- Be able to list at least five qualities or features of inquiry-based learning activities
- Create a rubric that can be used to distinguish inquiry-based learning activities from other forms
- Describe inquiry in general terms that help others to distinguish inquiry from other modes of learning

Note: **Learning objectives** state precisely what learners will be able to do on completing the curriculum web. See page 55 for more about learning objectives.

Materials

An Internet-linked computer with a web browser

The IQ WebQuest, found at *curriculumwebs.com*

The web-based resources listed in the IQ WebQuest Resources section at *curriculumwebs.com*

Note: This section lists the web-based, print, and other materials and equipment necessary to complete the curriculum web. See page 131 for more about lists of materials.

Instructional Plan. This WebQuest is designed to allow the learner to use it on his or her own, without the assistance of a teacher or facilitator. So, the “instructional plan” is that the learners will access the WebQuest and follow the directions they find there. The activities that learners will follow include:

- Developing a working definition of inquiry
- Developing a rubric that can be used to evaluate the “inquiry quotient” of a WebQuest
- Using the rubric to evaluate 10 existing WebQuests
- Revising the rubric
- Developing a WebQuest task that exemplifies the features of inquiry that have been discovered
- Using Hands-On Lesson 2 to create a complete WebQuest built around the task that has been developed

Teachers who are in a position to facilitate learners’ experiences with this WebQuest can do any of the following:

- Lead a group discussion about the qualities of good working definitions. You might start with an example that is somewhat easier than inquiry, for example “education” or “learning.”
- Lead a group discussion about the features of inquiry as a learning activity. You will find a lot of background material for this discussion in the web sites listed in the Resources section of the WebQuest.
- Collect several examples of WebQuests that do a good job of incorporating inquiry, and discuss these with the group. You will find some very good ones at *webquest.org* in a variety of subject areas.
- Collect several examples of good rubrics and discuss the features, including the criteria, categories, and scoring. Some excellent examples of rubrics can be found using some of the web sites listed in the Resources section of the WebQuest.
- Use the tasks that are developed in step 5 of this WebQuest to foster a discussion of how inquiry can shape learning. Ask the learners to brainstorm other activities, besides inquiry, that can support thinking as well as, or better than, inquiry.

Note: The instructional plan contains a description of the activities necessary for learners to complete the curriculum web, from the perspective of the teacher who will be supporting the learning. See page 129 for more about instructional plans.

Plans for Assessment and Evaluation. Learning that results from this WebQuests is assessed through an evaluation of the products that the learners produce. This WebQuest requires four products: a working definition of inquiry, a rubric that can be used to evaluate the inquiry quotient of existing WebQuests (which is revised later), an evaluation using that rubric of ten existing WebQuests, and a newly developed “Task” for a new WebQuest that meets the criteria in the revised rubric. The evaluation

criteria for each of these products are found in the Evaluation section of the WebQuest itself. Because we want to illustrate alternative forms of evaluation, each product is evaluated in a slightly different way.

This WebQuest can be evaluated by the learners by having them submit a feedback form, a link to which is found at the bottom of the Conclusion section. (It was reviewed and critiqued by several teachers and non-teachers prior to publication.)

Note: This section spells out how learning will be assessed, and how the curriculum web will be evaluated. See page 133 for more about plans for assessment and page 222 for more about plans for evaluation.

The IQ WebQuest: Measuring the Inquiry Quotient of WebQuests

Note: This is the text of the IQ WebQuest itself. You will also find this at *curriculum-webs.com*; the online version also includes numerous links and interactive features.

Introduction. WebQuests are the most popular form of web-based lesson because of their simple yet adaptable structure. Teachers can easily create them by filling in templates provided on the *webquest.org* portal and elsewhere.

Ideally, WebQuests are designed to foster inquiry in which students do not just collect existing information or resources from the Web, but use those resources to solve problems or develop new theories or products.

Unfortunately, the ease of creating WebQuests does not guarantee consistently high-quality products. Although extremely compelling inquiry-based tasks can be found, many more examples exist that do not require higher-order thinking at all, and in fact that primarily involve mere regurgitation of already existing information.

This WebQuest facilitates examination of the question, “What features or qualities makes a WebQuest effective, in terms of whether it fosters inquiry and higher-order thinking as opposed to mere regurgitation?” To answer this question, we first need to ask “What is inquiry?”

Note: This introduction begins by talking in general terms about WebQuests, and describing the problem that many WebQuests do not seem to use inquiry as the basis of student learning. It poses the question of what features WebQuests should embody in order to foster inquiry and higher-order thinking, and raises a larger, essential question—what is inquiry?

Essential questions are not an original feature of WebQuests; rather, they were added to the structure later by Tom March, probably because he realized that the inclusion of such questions made it more likely that the creators of a WebQuest have considered inquiry as a mode of learning. Wiggins and McTighe (2000) provide a good overview of essential questions and their construction. Among the qualities of good essential questions are:

- *They have actually been asked (and continue to be asked) by experts in the discipline or area of study.* Essential questions are perennial questions, the asking of which is

central to the pursuit of understanding in a given discipline. For example, the essential question here, “What is inquiry?”, is a question that has been addressed in detail by philosophers beginning with Plato and Aristotle, through Hume and Kant, to the present day.

- *There is no one right answer.* The reason these questions keep popping up through history and continue to be asked is because different answers can be given—and justified—depending on the assumptions under which the question is asked and the state of the discipline at different points in time. The questions themselves are subject to interpretation and argument about what is being asked and what kind of answer is sufficient (March 1998b). Because “inquiry” has been analyzed by so many philosophers and other thinkers, there are many different answers to the question, “What is inquiry?”.
- *They go beyond what is given.* One cannot go out on the Web and “find” the answers to essential questions. Rather, they require the student to think beyond what he or she finds, to analyze, synthesize, or evaluate information. Thus, essential questions require students to think for themselves. Our question, “What is inquiry?”, might lead some learners to simply copy a definition from a book or web site, but because the IQ WebQuest requires not simply a definition but a rubric that can be used to evaluate other WebQuests, applying the rubric to the evaluation of some WebQuests, and revising the rubric in light of what they learn, it will almost definitely require learners to think beyond what they find.
- *They inspire learning.* Essential questions will stick in the mind of learners, provoking them toward thinking and inquiry, not just during their participation in a WebQuest, but continually, motivating lifelong learning. Because most participants in the IQ WebQuest will be teachers or others engaged in developing curriculum, we expect that the question of what inquiry is and how the inquiry quotient of a learning activity can be evaluated will become a central question throughout their careers (or at least we hope so!).

Task. Develop a working definition of inquiry and use it to construct a rubric for evaluating existing WebQuests in terms of whether they contain no inquiry, contain some qualities of inquiry, or exemplify inquiry. Evaluate 10 WebQuests using the rubric. Revise the rubric based on what you’ve seen. Then, use the rubric as a guide to the development of your own WebQuest Task that embodies the best qualities of the tasks you’ve seen.

Note: The task here has been carefully designed to ensure that it cannot be completed simply by copying a definition of inquiry from a dictionary or from the Web. The learners have to not only develop the definition, but need to operationalize it into a rubric that can be used to evaluate WebQuests in terms of whether they embody inquiry as a mode of learning. In order to ensure that the rubric can actually be used for this purpose, we ask the learners to apply it to a number of existing WebQuests, and then revise it based on what they learned during this application. Finally, to ensure that the rubric is not simply an academic exercise, we ask the learner to use it to construct the task of his or her own WebQuest, to be further developed in Hands-On Lesson 2, as a stage in learning how to build a curriculum web.

Process. The process consists of six steps, as follows:

1. Develop a working definition of inquiry that can be used to evaluate whether any given learning activity is based on inquiry. Examine the web sites listed in Resources under “About Inquiry.” Paying close attention to the criteria of good working definitions found in the Evaluation section, write a definition that successfully distinguishes inquiry from other types of learning activities.
2. Develop a rubric for evaluating the inquiry quotient of existing WebQuests. Pay close attention to the web sites listed in the Resources section under “About Rubrics.” Your working definition may provide enough criteria for the rubric, or it may not. You may need to add additional features of inquiry in order to have a suitable rubric. The goal is to be able to differentiate among WebQuests using the rubric.
3. Use your rubric to evaluate the IQ (inquiry quotient) of 10 existing WebQuests found in the Resources section under “Lists of Existing WebQuests.” You should select WebQuests that address the same subject area—preferably a subject area you are familiar with and have taught or will teach. For each WebQuest, rate each criterion on your rubric, and compute a final score, or “Inquiry Quotient.” Then rank-order the WebQuests from highest Inquiry Quotient to lowest.
4. Revise your rubric in light of what you’ve seen in the best WebQuests you’ve evaluated, and in light of what you learned about your rubric by following the procedure described in the Evaluation section. If necessary, revise your ranking.
5. Develop a new WebQuest task that embodies the highest possible Inquiry Quotient. Choose a topic and grade level that you will actually teach soon, either the same as the WebQuests you’ve already evaluated or a new topic.
6. Create a complete WebQuest built around the task you developed in step 5. The technical steps necessary for this process are explained in Hands-On Lesson 2, found on the companion web site at *curriculumwebs.com*.

Note: The process provides details on how to complete the task.

Resources. Note: The resources for this WebQuest are listed at *curriculumwebs.com*. We don’t list them in the book because many of the URLs are likely to change.

Evaluation. As you complete the IQ WebQuest, you will produce four products: a working definition of inquiry, a (revised) rubric for evaluating the Inquiry Quotient of existing WebQuests, an evaluation and ranking of 10 existing WebQuests using your rubric, and a task for a new WebQuest.

Note: Because this WebQuest is designed not only to foster inquiry about WebQuests but to exemplify various approaches, we’ve included four different evaluation approaches here. The first lists a set of **criteria** for determining whether your working definition of inquiry is a good one. The second is a set of questions for determining whether your rubric is well designed and likely to be effective. The third relies on the development of an alternative measure of Inquiry Quotient that is then used to test the results of scoring WebQuests according to your rubric. The fourth simply applies your revised rubric to the evaluation of the WebQuest you create in Hands-On Lesson 2.

Evaluating the Working Definition of Inquiry. Good working definitions:

- Say what kind or type of thing it is as well as what distinguishes the particular thing from others of its kind or type. (For example, to define computer, you would need to say that it is an electronic device—the type of thing it is—but also that it is programmable—because that distinguishes it from other electronic devices.)
- Are concise. Good definitions define the term using as few words as possible.
- Are clear. Good definitions make sense, and do not confuse the reader.
- Are complete. Good definitions encompass multiple meanings of words and do not leave out meanings that are found in common usage.
- Are distinct. Good definitions show how a particular word is different from other similar words.
- Can be used to determine whether the word applies to a variety of situations. This is what makes a definition a “working” definition; that is, the definition can “do work” in the real world. In our case, we want the definition to work to distinguish inquiry from other forms of learning activities.

Now, using these criteria, evaluate your working definition of inquiry:

- Does your definition say what kind or type of thing inquiry is?
- Does your definition say how inquiry differs from other things of its kind or type?
- Is your definition concise? Is it as short as you can make it without becoming unclear?
- Is your definition clear? Does it make sense to others? Ask a few people to be sure.
- Is your definition complete? Does it encompass multiple meanings of the word inquiry? (One way to test this is to examine 10 examples of the appearance of the word inquiry on the Web, and see if your definition encompasses them all.)
- Does your definition distinguish inquiry from other similar words such as research, investigation, inquest, question, examination, scrutiny, exploration, review, or study? (It could be that some of these are real synonyms for inquiry, and that they cannot be distinguished.)

If your working definition meets all of these criteria, then it is a candidate for a good working definition. The next step is to see if it can distinguish inquiry from other learning activities. Does your definition provide criteria for distinguishing the following activities from inquiry?

- Fact-finding, such as finding specific answers to close-ended questions
- Responding only to questions raised by the teacher and not to one’s own questions or the questions of other students
- Activities that are solely of “academic” interest, without any correlation to activities undertaken in the real world, or connection to student interests
- Activities that are constrained to just one discipline or subject area

- Activities that can be completed in minutes
- Activities that can be assessed using simple check-off sheets or whether the answer is “right” or “wrong”
- Selecting examples of a thing or type of thing
- Creating artistic works that meet certain criteria
- Presenting information or concepts created by others
- Communicating information to others
- Mimicking the activities of others or creating similar products
- Giving opinions that do not contain carefully selected evidence
- Comparing two scenarios or situations without creating general principles that can be applied to new situations
- Accepting information or opinions without careful examination of the reasons that a particular person or organization would have that point of view
- Using technologies without paying attention to whether they are appropriate to the task

Evaluating the IQ Rubric. To evaluate your rubric, ask yourself the following questions.

Does the rubric relate to whether the WebQuest is centered on inquiry, rather than some other criterion? The rubric should not address aspects of WebQuests that are extraneous to the question of whether they involve inquiry.

Does the rubric include developmental levels that allow for a comparison of different WebQuests? Does the highest level actually describe the ideal WebQuests, containing the highest level of inquiry, even if no existing WebQuests reach that level?

Are the distinctions among various levels in any given criteria clear and easy to apply? Are multiple people applying the same rubric likely to come up with the same score?

Can the rubric be understood by teachers and other developers of WebQuests? Can it be explained without using jargon or concepts that are even more complicated than inquiry?

Is the rubric too time-consuming to be useful? Can a WebQuest be scored in a fairly reasonable amount of time—certainly less than 20 minutes? Are there redundancies or omissions that need to be corrected before the rubric is used?

Do the ratings that result from the rubric correspond with intuitive or alternative means of evaluating the Inquiry Quotient of a WebQuest?

Evaluating the Evaluation of Existing WebQuests. Once you have rank-ordered the 10 WebQuests, it is time to compare the results of using your rubric to another measure of each WebQuest’s use of inquiry as a learning activity. It is up to you what alternative measure you will use. One option is to ask a few of your colleagues to rank-order the WebQuests according to their own criteria of whether they involve inquiry. Another option is to have a classroom full of students rank the WebQuests. A third is to compare your ranking to the rankings produced by the rubric created by another student in your class. A fourth is to find an existing rubric that evaluates inquiry and compare the results of that rubric to your own.

If there are discrepancies between the ranking produced by the other measure and by your rubric, you will either want to revise your rubric or conclude that the other measure is not as good as your own (or both).

Evaluating the Inquiry Quotient of Your Task for a New WebQuest. The best tool for evaluating the Inquiry Quotient of the Task you created in the final step of the Process for this WebQuest is the rubric you created in step 2 and revised in step 4. Use this rubric to evaluate your task. Is it at the highest level? If so, you have been successful.

Conclusion. In this WebQuest, you explored the concept of inquiry and worked to develop a way of evaluating whether WebQuests embody inquiry or other forms of learning. Have you gained a greater understanding of the challenge of incorporating inquiry into your curriculum planning? Or, have you become so confused about inquiry and its use as an instructional method that you are about to give up on it? Either way, we hope you have also gained a good familiarity with the structure and functioning of WebQuests so that you are now about to consider creating one of your own.

Note: The Conclusion is a good place to raise further questions, to connect the topics covered in the WebQuest to further topics or further inquiries, or to go back to the Introduction and once again relate the WebQuest to the learners' prior experiences or skills.

ACTIVITY 2B ■ Complete the IQ WebQuest Now

If you can, pair with another teacher or reader of this book to complete this activity.

Go to curriculumwebs.com and complete the WebQuest according to the directions, except for step 6 of the Process, which you will do in Hands-On Lesson 2 following this chapter.

Chapter Summary

This chapter:

- Describes several activity formats that can be used for the creation of web-based lessons and discusses the differences among them
- Introduces WebQuests as an intermediary format between the typical web-based lesson and curriculum webs
- Discusses the Inquiry Quotient WebQuest Teaching Guide to exemplify the various elements of an effective teaching guide
- Uses the Inquiry Quotient WebQuest developed by the authors to illustrate the structure and components of a WebQuest and to highlight the challenges of creating WebQuests incorporating inquiry
- Prepares you to create your own WebQuest by helping you develop criteria for what makes an inquiry-oriented task

Questions For Reflection

.....

Can inquiry become the primary mode of student learning in the K–12 curriculum? Can you imagine a school where inquiry takes place every day for every student, and where students never merely fill in worksheets or regurgitate information that others have produced? If so, what would have to change about the structure of schooling or the training of teachers?

Your Next Step

.....

Download Hands-On Lesson 2 for your particular web-editing software package, and follow the directions found there for creating a one-page WebQuest based on the Task you developed in Activity 2B. Be sure to use what you have learned about WebQuests and about inquiry in this chapter. Seek to create a WebQuest that has the highest possible Inquiry Quotient according to the rubric you developed. Use your Inquiry Quotient rubric to evaluate your own WebQuest.

Once you have created your WebQuest, you will be ready to go on to the next chapter, which discusses in much more detail the identification of educational goals as the first step in planning a curriculum web.

For Further Learning

.....

- See our companion web site at *curriculumwebs.com* for additional examples of WebQuests and for more information on essential questions and inquiry.
- See SBC Filamentality 2003 and March 2001 for discussions of a range of approaches to incorporating the Internet into teaching and learning, most of them simpler to create than WebQuests.
- See Harris 1998 and her companion web site at <http://virtual-architecture.wm.edu> for some very useful background theory about types of learning activities fostered by the Web.
- See Dodge 2001, and March 1998a, 1998b, and 2000 for lots of useful information about the purposes, structure, and varieties of WebQuests.
- See Bernie Dodge's WebQuest portal, at webquest.org, for many examples and articles about WebQuest creation and use.
- See CPS 2000 and Wiggins and McTighe 2000 for excellent discussions of the criteria for good rubrics.