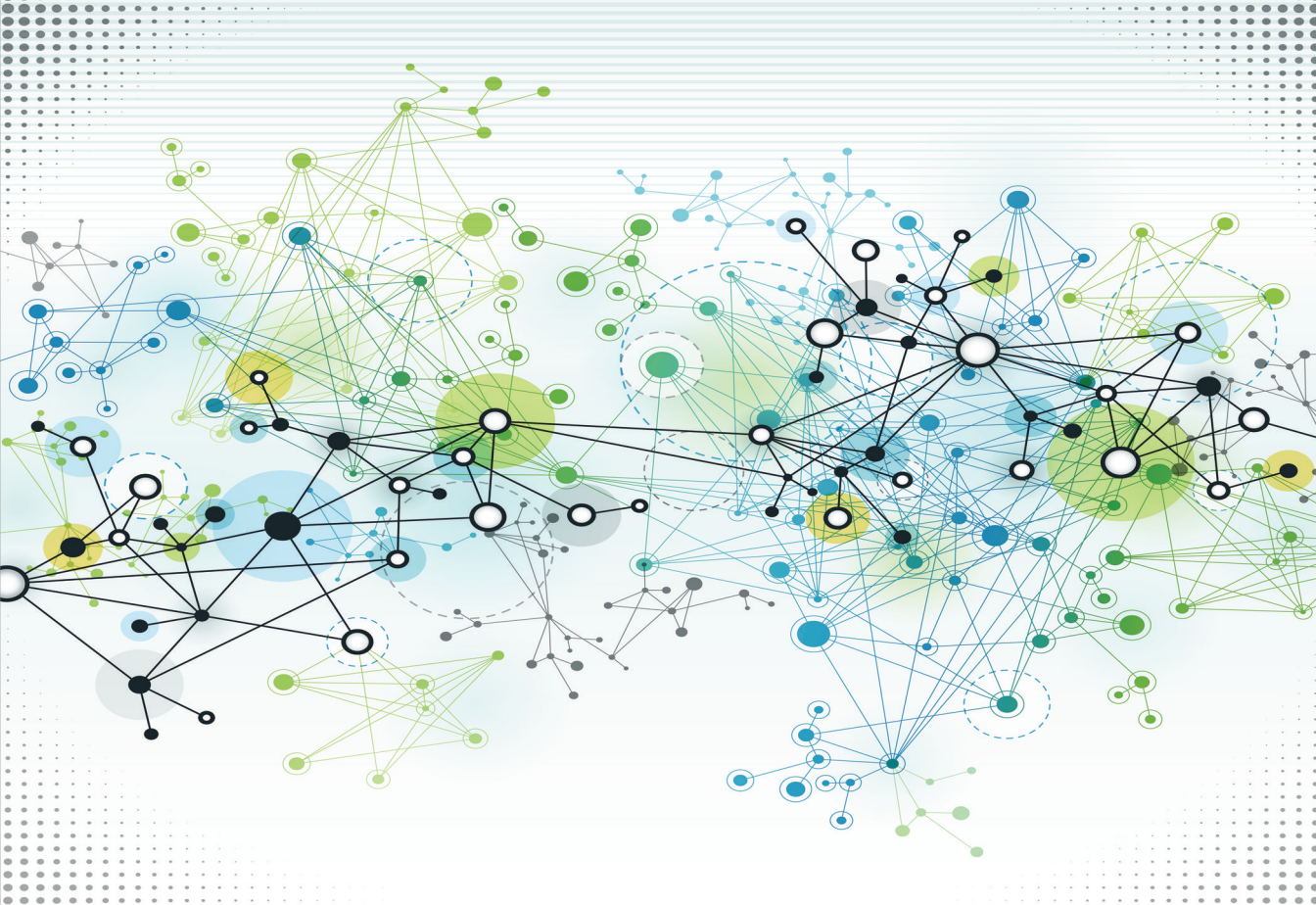




TEACHING AND LEARNING AT A DISTANCE

Foundations of Distance Education

SIXTH EDITION

Michael Simonson

Sharon Smaldino

Susan Zvacek

Teaching and Learning at a Distance

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Northern Illinois University

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Her scholarly work has been primarily in the field of educational technology, with publications and presentations at national and international conferences on topics such as higher order thinking skills, distance education, and the assessment of learning using online tools. She is one of the founding directors of the Exemplary Course Program for Blackboard, the longest running project of its kind, reviewing and recognizing outstanding course design for online and blended teaching environments. Consulting, workshops, and keynote presentations have taken her to the Czech Republic, Cyprus, Slovakia, Austria, Germany, Portugal, Estonia, and the United Kingdom, as well as across the United States. Dr. Zvacek holds a BA in speech from Iowa State University, a master's in education from the University of Utah, and a PhD in curriculum and instructional technology, also from Iowa State University.



BRIEF CONTENTS

PART I ■ FOUNDATIONS	1
Chapter 1 ■ Foundations of Distance Education	2
Chapter 2 ■ Definitions, History, and Theories of Distance Education	31
Chapter 3 ■ Research and Distance Education	60
Chapter 4 ■ Technologies, the Internet, and Distance Education	77
 PART II ■ TEACHING AND LEARNING AT A DISTANCE	 125
Chapter 5 ■ Instructional Design for Distance Education	126
Chapter 6 ■ Teaching and Distance Education	166
Chapter 7 ■ The Student and Distance Education	188
Chapter 8 ■ Support Materials and Visualization for Distance Education	204
Chapter 9 ■ Assessment for Distance Education	225
 PART III ■ MANAGING AND EVALUATING DISTANCE EDUCATION	 257
Chapter 10 ■ Intellectual Property: Ownership, Distribution, and Use	258
Chapter 11 ■ Managing and Leading a Distance Education Organization	279
Chapter 12 ■ Evaluating Teaching and Learning at a Distance	306
Index	323

CONTENTS

Preface	xv
Organization of the Text	xv
Features of This Edition	xvii
Additional Resources	xvii
Support Materials for Teaching and Learning at a Distance:	
Foundations of Distance Education	xvii
Acknowledgments	xxii

PART I ■ FOUNDATIONS 1

Chapter 1 ■ Foundations of Distance Education	2
Chemistry at a Distance? A True Story	2
Distance Education Today and Tomorrow	3
The Effectiveness of Distance Education—In Case You Wonder	7
What Is Distance Education?	9
Facts About Distance Education	10
Distance Education as a Disruptive Technology	10
Media in Education: Earlier Debates	11
Status of Distance Education	13
Worldwide Examples	13
United States	15
Telemedicine	18
Background	18
Applications	20
Impediments to Telemedicine	20
Characteristics of Distance Education: Two Visions	21
The First Scenario—Distance Education in Schools	22
The Second Scenario—Distance Education in the Corporation	23
Summary	26
Case Study	27
Discussion Questions	27
References	27
Suggested Readings	30
 Chapter 2 ■ Definitions, History, and Theories of Distance Education	 31
Defining Distance Education	31
Related Terms	33
Emerging Definitions	35
A Brief History of Distance Education	36
Correspondence Study	36
Electronic Communications	38
Distance Teaching Universities	39
Theory and Distance Education	40
The Need for Theory	40
Theory of Independent Study—Charles Wedemeyer	42

Theory of Independent Study and Theory of Transactional Distance—Michael Moore	43
Theory of Industrialization of Teaching—Otto Peters	44
Theory of Interaction and Communication—Börje Holmberg	46
Andragogy—Malcolm Knowles	48
A Synthesis of Existing Theories—Hilary Perraton	49
Equivalency Theory: An American Theory of Distance Education	49
A Theoretical Framework for Distance Education—Desmond Keegan	51
Fordism, Neo-Fordism, Post-Fordism: A Theoretical Debate	52
Summary	56
Case Study	57
Discussion Questions	57
References	58
Chapter 3 ■ Research and Distance Education	60
Distance Education Research: Setting a Foundation	60
The Focus of Distance Education Research	61
Learning Outcomes	63
A Recent Summary of the Research	63
Research Reported	64
Learner Perceptions	66
Learner Attributes	66
Interaction	67
Barriers to Distance Education	68
Telemedicine/Telehealth	70
Cost Effectiveness of Telemedicine	70
Telemedicine and Quality of Care	70
Patient Satisfaction With Telemedicine	70
Myths Regarding Distance Education Research	70
Summary	72
Best Practices in Distance Education: A Summary of Findings Reported in This Chapter	72
Case Study	73
Discussion Questions	73
References	73
Chapter 4 ■ Technologies, the Internet, and Distance Education	77
A True Story	77
A Model of Communication	78
The Cone of Experience	79
A Taxonomy of Distance Education Technologies	81
Correspondence Study	82
Prerecorded Media	83
Two-Way Audio	85
Two-Way Audio With Visuals	86
One-Way Live Video	86
Two-Way Audio, One-Way Video	87
Two-Way Audio/Video	89
Desktop Two-Way Audio/Video	94
A Look at Best Practice Issues	95
Wireless Canopies	95

Distance Education Classrooms	96
Two-Way Video/Audio Classrooms	96
Classroom Technologies for Online Instruction	98
Selecting Appropriate Technologies for Online Instruction	98
The Internet—Why Does it Matter?	102
Architecture of the Internet	103
Are the Terms “Internet” and “World Wide Web” Interchangeable?	104
Foundations Of Internet-Based Distance Education	104
Student-Centered Learning	105
Distance Learning Versus Distributed Learning	106
Advantages and Limitations of Online Learning	107
Technologies of Internet-Based Distance Education	108
Web 2.0	110
A Look at Best Practices—Web 2.0	112
Pedagogies of Internet-Based Distance Education	113
E-Learning Adoption Cycles	113
Fundamentals of Teaching Online	114
Future of Online Distance Education	117
Growth of Virtual Schools and Universities	117
Development of Standards and Learning Objects	118
Potential Impact of Open Source	120
Summary	120
Case Study	120
Discussion Questions	121
References	121
Best Practices	122
Podcasting ... or “Seeds Floated Down From the Sky”	122
And Finally, MOOC Madness	123

PART II ■ TEACHING AND LEARNING AT A DISTANCE 125

Chapter 5 ■ Instructional Design for Distance Education	126
“Signal Fires?”	126
Why Plan for Teaching at a Distance?	127
A Look at Best Practice Issues	127
Principles of Instructional Design Systems	129
Systematic Process	129
Planning for Instruction at a Distance	130
Issues to Address in the Planning Process	131
Who Are the Learners?	131
What Is Essential Content?	133
What Teaching Strategies and Media Should Be Used?	133
What Is the Learning Environment?	136
A Look at Best Practice Issues	137
Course Management Systems	137
Proprietary Versus Open Source	138
Planning to Teach at a Distance	139
How Do You Determine the Quality of the Instruction?	140
A Look at Best Practice Issues	140

What the Accreditation Community Is Saying About Quality in Distance Education	140
Other Issues to Be Considered	142
Student Handouts	142
Distribution of Materials	142
Models for Designing Online Courses	142
Best Practices in Course Design for Distance Education	146
Recommendations for Distance Delivered Instruction—The Unit-Module-Topic Model	153
Organizational Guidelines	153
Assessment Guidelines	154
Content Guidelines	155
Instruction/Teaching Guidelines	156
Course Management Systems	156
Components of a Course Management System	157
Products for Enhancing Course Management Systems	159
Other Tools Supporting the Management of Online Courses	159
A Look at Best Practices	160
Designing an Online Program	160
Summary	162
Discussion Questions	162
References	162
Best Practices for Distance Education: Designing the “Perfect*” Online Course	164
Chapter 6 ■ Teaching and Distance Education	166
Quality Instruction at a Distance	166
Teaching the Distant Learner	167
From Teacher-Centered to Student-Centered Learning	167
Creating Communities of Learners	168
Just-in-Time Teaching	169
Distance Learning Versus Distributed Learning	169
Aspects of Instruction	170
Structuring Instruction	171
Instructional Methods	175
Addressing Student Issues	176
Technology Considerations	177
Course Management Systems	177
MOOCs	178
Blogs and Wikis	178
Managing Distance Learning Courses	178
Policy Issues Related to Teaching at Distance	179
Faculty Issues	179
Intellectual Freedom and Ownership/Property Rights	181
Course Integrity	181
Student Support	182
Institutional Aspects	183
Legal Issues	183
Technical Policies	184
Teaching and Distance Education—The Time Commitment	185
Summary	185

Discussion Topics	186
Case Studies	186
References	186
Chapter 7 ■ The Student and Distance Education	188
An Emphasis on the Student	188
Traits of the Distance Learner	189
Adult Learners	190
K–12 Learners	190
Factors Influencing Learner Success	191
Attitude Factors	191
Experience	192
Elements of Success	194
Learner Responsibilities	195
Differences in Settings	195
Time for Class	196
Communication	197
Class Participation	198
Assignments	199
Assuming Responsibility for Own Learning	200
Equipment Requirements and Use	200
Generations of Learners	201
Summary	201
Discussion Topics	201
Case Studies	201
References	202
The Home Office	203
Chapter 8 ■ Support Materials and Visualization for Distance Education	204
Printed Media	204
Best Practices—E-books	205
Distance Education Syllabus	206
Course Logistics	206
Course Policies	206
Instructional Activities	206
Assessment Information	207
Additional Information	207
The Interactive Study Guide	207
Graphic Design Principles	210
Elements of Design	211
Principles of Design	212
Word Pictures	216
Visual Analogies	219
Summary	223
Discussion Questions	223
References	223
Chapter 9 ■ Assessment for Distance Education	225
Assessing Learning Gains	225

Purposes for Assessment	226
Assessment and Instructional Design	227
Characteristics of Useful Assessments	229
Categorizing Assessment Measures	231
Objective/Subjective	231
Formative/Summative	233
Assessment Strategies	234
Online Quizzes and Tests	235
Asynchronous Communication	235
Synchronous Communication	237
Portfolios	238
Papers and Multimedia Products	238
Problem-Based Activities, Games, and Simulations	239
Graphic Organizers	239
Implementation Strategies	240
Ongoing and Nongraded Assessment Measures	240
Rubrics	241
Facilitating Student Collaboration	243
Technical Difficulties	244
Selecting Appropriate Assessment Measures	244
Academic Misconduct	244
Verifying Student Identity	246
Plagiarism	246
Cheating	248
Deterring Academic Misconduct	248
Trends in Assessment	250
Peer Assessment	250
Competency-Based Education	251
Prior Learning Assessment	251
Summary	252
Discussion Questions	253
References	253

PART III ■ MANAGING AND EVALUATING DISTANCE EDUCATION 257

Chapter 10 ■ Intellectual Property: Ownership, Distribution, and Use	258
Introduction	258
Intellectual Property	258
Copyright Essentials	259
Misconceptions About Copyright	259
History of Copyright	260
Exclusive Rights of Copyright Holders	261
Fair Use	262
Public Performance and Display	263
Duration of Copyright	263
Public Domain	264
Guidelines	265
Copyright-Related Legislation	265
Digital Millennium Copyright Act	266

Technology, Education, and Copyright Harmonization (TEACH) Act	267
User Training	268
Copyright Applications in Distance Education	269
Printed Materials	269
Video	270
Photographs and Digital Images	270
E-mail, Course Websites, and Other Internet Resources	271
Obtaining Permission	271
Copyrighted Materials and Course Management Systems	272
Creative Commons Licensing	273
The Open Education Movement	274
Looking Forward	276
Discussion Questions	277
References	277
Helpful Websites on Copyright and Intellectual Property Issues	278
Copyright Law	278
Fair Use	278
Copyright Clearance	278
Open Educational Resources	278
Chapter 11 ■ Managing and Leading a Distance Education Organization	279
The Distance Learning Leader	279
Management Within the Context of Readiness	280
Organizational Readiness	280
Leadership and Direction for the Distance Education Program	281
Planning for Distance Education	281
Scope of Task in Developing Distance Courses and Programs	283
Student Support	283
Readiness of the Technology Infrastructure	285
Institutional Policies	287
Distance Education Policy	287
Accessibility	291
Quality Control	291
Regulatory Issues	293
Cost Issues	296
Faculty Readiness	297
Faculty Support	297
Intellectual Property	298
Other Faculty-Related Issues	299
Student Readiness	300
Looking Forward	301
Discussion Topics	301
References	302
A Look at Best Practice Issues	304
Distance Education: Eight Steps for Transforming an Organization	304
A Look at Best Practice Issues	305
U.S. Department of Education Technology Plan	305

Chapter 12 ■ Evaluating Teaching and Learning at a Distance 306

 Research and Evaluation 306

 Evaluation and Distance Education—Five Steps 307

 Level 1—Reactions (Did They Like It) 308

 Level 2—Learning 308

 Level 3—Transfer 308

 Level 4—Results 308

 Level 5—Return on Investment 308

 Evaluation and the Open University 309

 Quality Scorecard and Quality Matters 311

 Evaluating Programs and Courses 311

 The AEIOU Approach 311

 Component 1—Accountability 312

 Component 2—Effectiveness 312

 Component 3—Impact 313

 Component 4—Organizational Context 313

 Component 5—Unanticipated Consequences 314

 Program Evaluation: Examples 315

 South Dakota 315

 Iowa 316

 Student Evaluation of Distance Education Courses 317

 Summary 318

 References 318

 Suggested Reading 321

Index 323

Preface

Teaching and Learning at a Distance is written for introductory distance education courses for preservice or in-service teachers, and for training programs that discuss teaching distant learners or managing distance education systems. This text provides readers with the basic information needed to be knowledgeable distance educators and leaders of distance education programs.

The teacher or trainer who uses this book will be able to distinguish between appropriate uses of distance education. In this text we take the following themes:

The first theme is the definition of distance education. Before we started writing the first edition of *Teaching and Learning at a Distance* we carefully reviewed the literature to determine the definition that would be at the foundation of our writing. This definition is based on the work of Desmond Keegan, but is unique to this book. This definition of distance education has been adopted by the Association for Educational Communications and Technology and by the *Encyclopedia Britannica*.

The second theme of the book is the importance of research to the development of the contents of the book. The best practices presented in *Teaching and Learning at a Distance* are validated by scientific evidence. Certainly there are “rules of thumb,” but we have always attempted to only include recommendations that can be supported by research.

The third theme of *Teaching and Learning at a Distance* is derived from Richard Clark’s famous quote published in the *Review of Educational Research* that states that media are mere vehicles that do not directly influence achievement. Clark’s controversial work is discussed in the book, but is also fundamental to the book’s advocacy for distance education—in other words, we authors do not make the claim that education delivered at a distance is inherently better than other ways people learn. Distance delivered instruction is not a “magical” approach that makes learners achieve more.

The fourth theme of the book is equivalency theory. Here we present the concept that instruction should be provided to learners that is equivalent rather than identical to what might be delivered in a traditional environment. Equivalency theory helps the instructional designer approach the development of instruction for each learner without attempting to duplicate what happens in a face-to-face classroom.

The final theme for *Teaching and Learning at a Distance* is the idea that the book should be comprehensive—that it should cover as much of the various ways instruction is made available to distant learners as is possible. It should be a single source of information about the field.



ORGANIZATION OF THE TEXT

Teaching and Learning at a Distance has three types of chapters—foundation chapters, teaching and learning chapters, and managing and evaluating chapters. Chapters 1 through 4 provide a conceptual, theoretical, and research-based foundation for the rest of the text.

Chapters 5 through 9 provide educators with the practical skills and information they need to function in a distance learning environment. Chapters 10 through 12 discuss managerial and administrative concerns in distance education environments.

Chapter 1 discusses the status of distance education and also explains what distance education is and its impact on education. This chapter concludes with a vision for schools and learning that is possible because of distance education.

Chapter 2 reviews definitions of distance education that have been and still are used. Since distance education is a field with a long history, that background is discussed. This chapter covers the field, beginning with correspondence study and up through today. Finally, theories related to the practice of distance education are presented, including a proposed American theory of distance education called equivalency theory.

Chapter 3 reviews the extensive research on distance education, including specific areas of practice as well as more general and comprehensive summaries of what the research says. *Teaching and Learning at a Distance* is a research-based textbook based on a thorough study of the empirical information about distance education. This research-based approach is found in all chapters, but is emphasized in Chapter 3.

Chapter 4 presents comprehensive information about the technologies used in distance education systems. Technology generally, and instructional or communications technology specifically, are broadly defined, and this chapter includes discussions, explanations, and many visuals to provide the reader with practical knowledge about how information is communicated and how synchronous and asynchronous distance education systems operate. The use of the Internet and the World Wide Web for distance education is discussed extensively, also.

Chapter 5, the first of the teaching and learning chapters, presents instructional design, which is the systematic process of using technology followed by educators. This chapter presents the procedures to be followed when courses, or components of courses, are designed for distance delivery. In this edition the Unit-Module-Topic approach for organizing instruction is emphasized.

Chapters 6 and 7 explain the unique responsibilities of the instructor and learner involved in distance education. It is clear from the research and from practical experience that learning and teaching at a distance are not significantly different from traditional education. However, there are some special responsibilities and expectations for students and instructors involved in distance education.

Chapter 8 is one of the most important chapters of the book. Handouts, study guides, and visuals are important tools and techniques of the effective educator, generally, and the distance educator, specifically. The interactive study guide with its word pictures, visual analogies, and visualization is a significant tool used in distance education systems.

Chapter 9 presents thoroughly revised techniques for assessing learning, assigning grades, and determining academic progress of students in a distance learning environment. Many educators question the fidelity of assessment at a distance. This chapter provides research-based approaches for valid assessment of learning.

Chapter 10 deals with the rules, regulations, and procedures related to intellectual property that the distance educator needs to understand. This edition reflects major updates in the interpretation of intellectual property, ownership, and copyright case law, providing a more comprehensive and applied perspective. Distance educators transmit information, much of which may be copyrighted.

Chapter 11 illustrates how distance education has become an enterprise, even a business, and discusses the techniques for managing and leading an organization dedicated to

the delivery of distance instruction. Of special emphasis is the idea of the distance learning leader.

Chapter 12 discusses the evaluation of distance teaching and distance education systems, and gives specific examples of procedures to follow. New examples and approaches are included in this chapter. Assessment and evaluation are closely related, but evaluation is special to the distance educator.



FEATURES OF THIS EDITION

- Chapter **goals and objectives** provide an organizational plan for the student and structure the information.
- **A Look at Best Practice Issues**, a new feature found throughout the text, presents critical issues in the field of distance education. This feature is designed to be the starting point for discussions about how distance education is changing teaching and learning.
- Dozens of new **visuals** have been added to clarify ideas and explain procedures, and references and resources have been updated in each section and every chapter to make this book as current and relevant as possible.
- Chapter **scenarios** and /or **discussion questions** are provided to review key ideas.
- Stronger emphasis is placed on **how to design, deliver, and evaluate** online instruction as distance education has matured and the importance of online, World Wide Web–based instruction has grown.
- Increased coverage of **course management systems** is provided.
- Finally, each chapter has a comprehensive list of **references and suggested readings**. In some instances, nonprint resources, especially web locations, are provided.



ADDITIONAL RESOURCES

Support Materials for *Teaching and Learning at a Distance: Foundations of Distance Education*

The materials listed next were created by the authors of this book and are available for use by students and instructors using *Teaching and Learning at a Distance: Foundations of Distance Education* or by those interested in distance education.

Many additional materials, including PowerPoint slides, documents, links to references, and podcasts can be found at:

http://www.nova.edu/~simsmich/distance_ed_res.htm

Chapter 1: *Foundations of Distance Education*

- Simonson on the five themes at the foundation of *Teaching and Learning at a Distance: Foundations of Distance Education*

<https://vimeo.com/76984144>

- Simonson Discusses Richard Clark’s “Mere Vehicles” Statement

<https://vimeo.com/77513306>

- Distance Education in South Dakota – The Capital City Conclave on Distance Education
Part 1: <https://vimeo.com/49383526>
Part 2: <https://vimeo.com/49384048>
- Star Schools: Three Statewide Approaches to Distance Education
Part 1: <https://vimeo.com/49381680>
Part 2: <https://vimeo.com/49382319>
Part 3: <https://vimeo.com/49383086>
- Army and Navy Staff Officer Training and Distance Education
http://www.youtube.com/watch?v=m3B5jfm_vww&list=PLLfZk-j6DDwUq2lfiE-dgbt4YRxSyeJ1_&index=8
- Distance Education in Turks Caicos
http://www.youtube.com/watch?v=dJKr-baGi_s&list=PLLfZk-j6DDwUq2lfiE-dgbt4YRxSyeJ1_&index=9
- Wired for Success: Alabama’s ACCESS to Distance Learning
<http://www.youtube.com/watch?v=s73YkD09TGY>
- Global Collaboration for Healthcare
<http://www.youtube.com/watch?v=2CLIO0SEbww&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=11>
- Distance Education in Portugal – Interview with Dr. Pedro Reis
<https://vimeo.com/8100057>

Chapter 2: Definitions, History, and Theories of Distance Education

- Simonson on Equivalency Theory
<https://vimeo.com/77512842>
- Transactional Distance Theory
http://www.youtube.com/watch?v=Qph1gbQhK_8&list=PLLfZk-j6DDwUq2lfiE-dgbt4YRxSyeJ1_&index=3
- Definition and Background of Distance Education—a classic video from the Iowa Star Schools project
<https://vimeo.com/77514955>
- Research and Theory
<http://www.youtube.com/watch?v=WqbBBFnNUiA>

Chapter 3: Research and Distance Education

- Simonson on Trends in Instructional Technology and Distance Education
<https://vimeo.com/35260851>

Chapter 4: Technologies, the Internet, and Distance Education

Chapter 5: Instructional Design for Distance Education

- Simonson on Organizing Online Courses
http://www.youtube.com/watch?v=qzwRIMzZZdA&list=PLLfZk-j6DDwUq2lfiE-dgbt4YRxSyEJ1_&index=6
- The Curriculum—this classic video was produced as part of the Iowa Star Schools project
<https://vimeo.com/77516590>

Chapter 6: Teaching and Distance Education

- The Shadow technique for involving online students in their distance delivered courses
<https://vimeo.com/76985274>
- Simonson on Grading Threaded Discussions
http://www.youtube.com/watch?v=8VT_35m15Lc&list=PLLfZk-j6DDwUq2lfiE-dgbt4YRxSyEJ1_&index=7
- Retention of Students in Online Courses—A Presentation to Faculty
<https://vimeo.com/76984837>
- The Teacher—This video is part of the classic series produced as part of the Iowa Star Schools project
<https://vimeo.com/77515914>

Chapter 7: The Student and Distance Education

- Top Ten Tips for Student Success in Online Courses
<https://vimeo.com/50630107>

Chapter 8: Support Materials and Visualization for Distance Education

- Digital Media Single Concept Videos for Distance Education—a series of video definitions of terms used by distance educators in the creation of teaching and learning materials.
 - Narrowcasting
http://www.youtube.com/watch?v=NM2R_BYs-Rg&list=PLLfZk-j6DDwVk59HaCj45PlcjKXZNT6J&index=1

- Storyboards

<http://www.youtube.com/watch?v=NwjXTcfe1ck&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=2>

<http://www.youtube.com/watch?v=AmrTD9StoDM&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=8>

http://www.youtube.com/watch?v=mwoWqGd_KIE&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=27

<http://www.youtube.com/watch?v=v0aFjLE6Rpo&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=28>

<http://www.youtube.com/watch?v=cbr3LsLLR7w&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=29>

- Mash-up

<http://www.youtube.com/watch?v=tm4biZ69OR0&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=3>

http://www.youtube.com/watch?v=spOWx2ARm_I&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=20

- Podcasts

<http://www.youtube.com/watch?v=UZcu5m8zH64&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=4>

- Aggregators

<http://www.youtube.com/watch?v=jughwdnbaKA&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=5>

- VoIP

<http://www.youtube.com/watch?v=vCnVLRpv3-w&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=6>

<http://www.youtube.com/watch?v=zeiSiUJlwNw&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=18>

- Twitter

<http://www.youtube.com/watch?v=wTDRTGVkGyY&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=7>

- HD Technologies

<http://www.youtube.com/watch?v=VtqMRQMXaRc&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=9>

- CODEC

<http://www.youtube.com/watch?v=xiix10GIQjg&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=10>

- iTunes U

<http://www.youtube.com/watch?v=0zBe6RcrXRo&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=12>

- MPEG

<http://www.youtube.com/watch?v=eLyLBkn5-xk&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=13>
- PDA

<http://www.youtube.com/watch?v=bdqeXFu3QDM&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=14>
- QR Code

http://www.youtube.com/watch?v=S2t_wz-Rru4&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=15
- SCORM

<http://www.youtube.com/watch?v=Gwo0QmfvTtQ&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=16>
- Smartphones

<http://www.youtube.com/watch?v=IAJOrI7HzG4&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=17>

http://www.youtube.com/watch?v=_Z6S3vZzPI4&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=30
- .GIF

<http://www.youtube.com/watch?v=UYjpcOVuI6A&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=19>
- .mov

<http://www.youtube.com/watch?v=XlPP5Cn4PPU&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=21>
- Episodes

<http://www.youtube.com/watch?v=onzy2dqUHog&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=22>
- Screenshot

<http://www.youtube.com/watch?v=aAymX6ej43Q&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=23>
- White Balance

<http://www.youtube.com/watch?v=hdujeBDFxM4&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=24>
- Tilt

<http://www.youtube.com/watch?v=iFupyacdIuI&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=25>
- .MPG3

<http://www.youtube.com/watch?v=HcMyeRjIJXA&list=PLLfZk-j6DDwVk59HaCj45PIcjjkXZNT6J&index=26>

Chapter 9: Assessment for Distance Education

Chapter 10: Intellectual Property: Ownership, Distribution, and Use

Chapter 11: Managing and Leading a Distance Education Organization

- Introduction to the Virtual School Summit
<https://vimeo.com/8974652>
- Virtual Schooling: What Administrators Should Know
<https://vimeo.com/9024384>
- Virtual Schooling: Legal Issues
<https://vimeo.com/9023507>
- Virtual Schooling: Experiences
<https://vimeo.com/9003477>
- Virtual Schooling: Funding the Virtual School
<https://vimeo.com/9001271>
- Virtual Schooling: Teaching Online
<https://vimeo.com/8999696>
- Virtual Schooling: Selecting Vendors
<https://vimeo.com/8997446>

Chapter 12: Evaluating Teaching and Learning at a Distance

- South Dakota Evaluation Report—Simonson summarizes the evaluation process followed in South Dakota near the conclusion of that's State's Star Schools Project.
<https://vimeo.com/77514339>



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Foundations

Chapter 1

Foundations of Distance
Education

Chapter 2

Definitions, History, and
Theories of Distance
Education

Chapter 3

Research and Distance
Education

Chapter 4

Technologies, the Internet,
and Distance Education



CHAPTER 1

Foundations of Distance Education

CHAPTER GOAL

The purpose of this chapter is to discuss the importance of distance education and the impact that distance education has on the improvement of education.

CHAPTER OBJECTIVES

After reading and reviewing this chapter, you should be able to

1. Explain why students demand to learn at a distance even though they may prefer to learn in the classroom with the teacher and their classmates.
2. Define *distance education*.
3. Explain Coldewey's quadrants.
4. Discuss Richard Clark's "mere vehicles" quote as it relates to distance education.
5. Explain how Jim Finn might compare stirrups to distance education.
6. Give examples of how distance education is being used in several locations of the world and in the United States.
7. Discuss telemedicine and relate the topic to distance education. Explain a vision for education and schooling in the future.
8. Define disruptive technology and relate distance education to this concept.



CHEMISTRY AT A DISTANCE? A TRUE STORY

Chemistry is a hands-on, laboratory-based course that many consider one of the most rigorous in the average high school curriculum. Many students dread taking chemistry, and in many small communities there is only one chemistry teacher in the school.

Recently, four high school chemistry teachers decided that they could improve their basic chemistry course if they collaborated and team-taught. The only problem was that their schools were about 60 miles from each other.

This did not stop them, however, because their schools were connected with a fiber-optic network that permitted full-motion video signals to be sent between the four schools. The network also carried a high-speed Internet connection that allowed easy access to the World Wide Web.

Not only did the four teachers want to collaborate, but more important, they wanted their students to collaborate. To accomplish this, they decided on some basic objectives and then planned the curriculum.

The teachers decided that they would teach concepts cooperatively, act as laboratory supervisors for each other's students, and serve as partners with student collaborators. They also decided upon another important goal: to have their students cooperate across schools. Finally, they decided that the chemistry projects should be authentic and deal with local, real-world issues.

Next, the four teachers met to plan their curriculum. They identified eight modules that could be shared among the four

schools. These modules were taught by one or two of the four chemistry teachers, and required collaboration by the students from the four schools. The modules included live television instruction presented by one of the teachers, collaborative work by students who communicated with each other by television and the Internet, and class assignments that dealt with various aspects of a specific chemistry concept, such as the local ecology. Students investigated their portion of the problem and then shared results with their distant classmates. Each module ended with a live, interactive discussion, presentation, and sharing of information over the fiber-optic television network.

For all practical purposes, the students in the four schools became one large class, with subgroups of students who worked with classmates from their own school and also with distant friends. The teachers served as presenters some of the time, but most often as tutors who worked with subgroups of students. The Internet and e-mail were used to keep everyone communicating outside of class, and even outside of school.

By any measure, the course was a huge success. Students learned chemistry; test scores showed that. They also discovered how to collaborate as real scientists with colleagues at distant locations, and they discovered the power of distance education to open up their school to resources available elsewhere.

Telecommunications technology made this possible. Their chemistry classroom became a "room with a view," connected to other chemistry classrooms and to the resources of the world available through the Internet. The course became more like real chemistry—chemistry practiced to solve actual problems outside the school involving experts from a number of areas brought together because of their expertise, without regard for geography or time.

Distance education is one of the most dramatic of the recent technology-based innovations influencing education. The scenario just described is only one of thousands of examples of how distance education is changing learning and teaching.



Courtesy of AT&T Archives and History Center

DISTANCE EDUCATION TODAY AND TOMORROW

In the last few years, distance education has become a major topic in education. In a recent year, more than 100 professional conferences dealt with some aspect of distance education,

and almost every professional organization's publications and conferences have shown a huge increase in the number of presentations and articles related to distance education. Many educators are making grand claims about how distance education is likely to change education and training. Certainly, the concept of distance education is exciting, and recent hardware and software innovations are making telecommunications distance education systems more available, easier to use, and less costly. Distance education has entered the mainstream.

Whether distance education is a mainstream form of education has been examined for several years by the Sloan Consortium. *Digital Faculty* (Allen & Seaman, 2012) is a recent annual report by the Sloan Consortium, and presents the latest data about the growth and spread of online education in higher education in the United States. The first report, *Sizing the Opportunity* (Allen & Seaman, 2003), indicated that online and/or distance education was growing rapidly and was perceived positively by faculty and administrators. The authors of this report defined online learning to be courses where most or all of the content is delivered online. Typically, these courses have no face-to-face meetings. In 2013, it was reported that distance education was significantly more popular and mainstream.

One indication that online courses are a regular activity of institutions of higher education is the role of core faculty in online instruction. There has been a long-held belief that online courses are taught by adjunct professors, rather than full-time staff. *Growing by Degrees* (Allen & Seaman, 2005) refutes this perception. It reports that about two thirds of online courses are taught by regular faculty, a percentage that is often higher than the percentage of regular courses taught by core faculty.

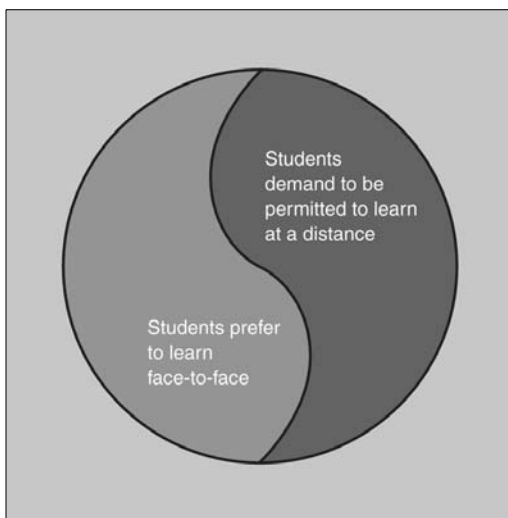
Another indicator of the growth of online education is the importance of this instructional approach to the long-term strategy of the institution. In 2013, approximately 70% of institutions indicated that online instruction was critical to their long-term plans, up from 49% in 2003. The only institutions that did not see online instruction as part of their long-term strategies were the smallest nonprofit colleges. In 2013, enrollment in online courses had increased to about 6.7 million from 2 million in 2003. Growth has been continuous, often exceeding the expectations of organizational planners. In other words, over 30% of colleges students are enrolled in at least one online course.

Another interesting report dealing with distance education in the Midwest was released by the Sloan Consortium (Allen & Seaman, 2007). This report indicated that:

- The 11 Midwestern states represent about 15% of online enrollment, with over 460,000 students taking at least one online course in fall 2005.
- The proportion of Midwestern institutions with fully online programs rises steadily as institutional size increases, and about two thirds of the very largest institutions have fully online programs, compared to only about one sixth of the smallest institutions.
- Midwestern doctoral/research institutions have the greatest penetration of offering online programs as well as the highest overall rate (more than 90%) of having some form of online offering (either courses or full programs).
- The proportion of people who think that online learning outcomes are superior to those for face-to-face learning is still relatively small but has grown by 34% since 2003, from 10.2% to 13.7%. This is okay, since distance education should not be considered as better but as equivalent.

The Sloan Consortium reports (Allen & Seaman, 2012) also provide excellent criteria for distinguishing between online courses, blended/ hybrid courses, and web-facilitated

FIGURE 1–1 There are conflicting pressures on distance educators—students prefer to learn in a classroom, but demand to be permitted to learn at a distance.



courses. An online course is one where most of the content is delivered online, which means at least 80% of the course content. A blended or hybrid course combines online and face-to-face delivery; thus, 30% to 79% of the course's content is delivered online. A web-facilitated course uses web-based technology, but less than 30% of the content is delivered online.

In spite of the phenomenal growth of distance education two conflicting pressures confront distance educators (Figure 1–1). First, *students say their first choice is not to learn at a distance*. When asked, they say they prefer meeting with the learning group and the instructor in the classroom, the lecture hall, the seminar room, or the laboratory. Students report that they value the presence of a learning group, and that the informal interactions that occur before and after, and sometimes during, a formal class are valuable components of the total learning experience. Second, and conversely, evidence suggests that *students are increasingly demanding to be allowed to learn at a distance*. They want to be able to supplement, and even replace, conventional learning experiences with distance education experiences. Learners say this is because many other considerations besides personal preferences motivate them, especially considerations about where and when they learn (Picciano & Seaman, 2007).

These opposing preferences pose a dilemma for the educational community. Should resources be dedicated to improving the traditional educational infrastructure of buildings, classrooms, laboratories, and offices, and should students be transported to these facilities? Or should money be used to develop modern and sophisticated telecommunications systems? The trend seems to be toward telecommunications. Because of advances in technology, effective educational experiences can be provided for learners, no matter where they are located. In other words, technologies are now available to develop cost-effective distance learning systems.

Virtual schools are becoming important in many locations (Berge & Clark, 2009). The Florida Virtual School, established in the late 1990s, offers a wide selection of courses



Compressed video systems use telephone lines and Internet connections to permit live, two-way, interactive televised instruction.

(Johnson, 2007). The Arkansas Virtual School is another successful example of a state-adopted distance education program (Falduto & Ihde, 2007).

Universities are also offering virtual schools. Indiana University High School and the University of Missouri's Columbia High School are examples of university-sponsored virtual schools. The North Central Association of Colleges and Schools has accredited both schools. The Indiana and Missouri schools are financially independent of their universities. Students pay tuition for courses that are developed and taught by certified teachers. A large number of other states are following the lead of Florida, Arkansas, Indiana, and Missouri. Concepts such as the virtual school have caused the practice of distance education to dramatically change in the last decade. Traditional approaches to distance education based on the delivery of print and broadcast media technologies are no longer as relevant to the field as it is practiced in the United States as they once were.

As a matter of fact, a redefinition of distance education has occurred. Distance education is now often defined as:

institution-based, formal education where the learning group is separated, and where interactive telecommunications systems are used to connect learners, resources, and instructors. (Schlosser & Simonson, 2009, p. 1)

This definition has also been adopted by the *Encyclopaedia Britannica* in 2009 (Simonson, 2009).



THE EFFECTIVENESS OF DISTANCE EDUCATION—IN CASE YOU WONDER

Many who begin studying distance education wonder about the effectiveness of this approach to teaching and learning, and while Chapter 3 discusses distance education research in depth, this section summarizes that research and briefly describes what we know about the effectiveness of distance teaching and distance learning. Simonson, Schlosser, and Orellana (2011) completed a review of research on distance education and concluded that “it is not different education, it is distance education” (p. 124), and “research clearly shows that distance education is an effective method for teaching and learning” (p. 139). Another indication that distance education has become a dominant trend in education and training is the publication of comprehensive references about the field. For example, Moore’s (2013) *Handbook of Distance Education* is in its third edition and contains 44 chapters and more than 700 pages.

Additionally, in 2009 the United States Department of Education published a meta-analysis and review of online learning studies and concluded that online learning students achieved better than traditional students because they tended to allocate more time to their studies. These studies build on and support previous research about the effectiveness of distance education.

According to the 248 studies that were compiled by Russell (1999), there is no significant difference between distance learning and traditional classroom learning. In other words, distance learning (can be) considered as effective as face-to-face learning, and our results support this conclusion. (Dean, Stahl, Sylwester, & Peat, 2001, p. 252)

Simonson et al. (2011) reported results that are indicative of the research on the field of distance education. Most who are deeply involved in the field of distance education are unsurprised by these summaries of the research. As a matter of fact, it is very clear that instruction delivered to distant learners is effective and that learning outcomes can be successfully attained when offered to students at a distance (Anglin & Morrison, 2000; Cavanaugh, Gillan, Kromrey, Hess, & Blomeyer, 2004; Hanson, Maushak, Schlosser, Anderson, & Sorensen, 1997; Simonson, 2002; Simonson et al., 2011).

In 2012 and 1983, Clark clearly stated that the media used to deliver instruction had no significant impact on learning. Clark stated that:

The best current evidence is that media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in nutrition ... only the content of the vehicle can influence achievement. (p. 445)

After more than a decade of criticism and attempts to refute his review of over 50 years of instructional technology research, Clark (1994, 2012) once again reviewed the research on technology used to deliver instruction and noted:

It is likely that when different media treatments of the same informational content to the same students yield similar learning results the cause of the results can be found in a method which the two treatments share in common ... give up your enthusiasm for the belief that media attributes cause learning. (p. 28)

Since the publication of Clark’s widely distributed comments, a number of researchers have attempted to find fault with his premise. They have not been successful. It is currently the consensus that “media are mere vehicles” and that we should “give up [our] enthusiasm” that the delivery media for instructional content significantly influences learning.

Unfortunately, some have misinterpreted the “no significant differences” phenomenon and assumed that instructional technology and distance education do not promote learning. This is incorrect. Actually, the evidence is quite clear that students of all ages can learn from instruction delivered using technology, and that distance education works.

In the first years of widespread growth of distance education in the United States, Hanson et al. (1997) summarized the research on distance education in a publication of the Association for Educational Communications and Technology. This widely distributed review concluded that:

comparative research studies on achievement tend to show no significant difference between different delivery systems and between distance education and traditional education ... several recent studies indicate a significant higher achievement level in those learning at a distance ... the accepted position is that the delivery system affects no inherent difference on achievement. (p. 22)

In other words, it is not the fact that instruction is delivered in a traditional, face-to-face environment or at a distance that predicts learning (Anglin & Morrison, 2000; Berge & Mrozowski, 2001; Darwazeh, 2000; Simonson, 2002; Simonson et al., 2011).

It is clear from the research literature that distance education works (e.g., Hanson et al., 1997; Simonson, 2002; Simonson et al., 2011). Why it works and how it works are important concepts to understand, however. The following conclusions about instruction delivered to distant learners are directly related to effectiveness:



Distance education efforts are increasingly being concentrated on K–12 education.

- Training in effective instructional strategies is critical for teachers of distant learners.
- Distance education courses should be carefully designed and developed before instruction begins.
- Visualization of ideas and concepts is critical when designing instruction to be delivered to distant learners.
- Adequate support systems must be in place to provide the distant learner with access to resources and services.
- Interaction between the instructor and students and among students must be possible and encouraged.
- Assessment should be designed to relate to the specific learning outcomes of the instructional experiences.

In summary, distance education can be as effective as any other category of instruction. Learning occurs and knowledge is retained. Students report that they have learned and that they think their distance learning experiences are as successful as more traditional education. The keys to successful distance education are in the design, development, and delivery of instruction, and are not related to geography or time.



WHAT IS DISTANCE EDUCATION?

It is the nature of questions that they are easier to ask than to answer. This is true of the question “What is distance education?” for at least several reasons. First, *distance* has multiple meanings, although this book advocates the definition presented earlier and in Chapter 2. *Distance* can mean geographical distance, time distance, and possibly even intellectual distance.

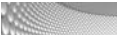
Second, the term *distance education* has been applied to a tremendous variety of programs serving numerous audiences via a wide variety of media. Some use print, some use telecommunications, and many use both. Finally, rapid changes in technology challenge the traditional ways in which distance education is defined.

Dan Coldeway, of South Dakota’s Dakota State University, provided a framework useful in helping to define four ways in which education can be practiced. This framework, which considers the two variables of time and place, gives insight into different approaches to the practice of education and distance education. Combinations of time and place result in four approaches to education: same-time, same-place education (ST-SP); different-time, same-place education (DT-SP); same-time, different-place education (ST-DP); and different-time, different-place education (DT-DP).

Traditional education takes place at the same time in the same place. This is typically the regular self-contained classroom that most often is teacher centered. Different-time, same-place education means that individual learning occurs in a learning center, or that multiple sections of the same classes are offered so students can attend the class in the same place at a time they choose. This is education that is available at different times to students but in the same place, such as the media center or computer laboratory.

The last two categories focus on education occurring in different places. Instruction can be delivered to different places at the same time when telecommunications systems are used. Often, television is used to connect the local classroom with the teacher and students to learners at a distance. Satellite, compressed video, fiber-optic systems, and webcasting are increasingly used for same-time, different-place education. Increasingly, web-based video systems such as Zoom are being used to deliver live instruc-

tion. This approach is also called *synchronous distance learning*. Students can also learn at different times and in different places. Coldewey has said that the purest form of distance education occurs at different times and in different places. In other words, learners choose when and where to learn and when and where to access instructional materials. Recently, World Wide Web courses have been offered to learners anywhere they have access and whenever they choose. This approach is called *asynchronous distance learning*.



FACTS ABOUT DISTANCE EDUCATION

- Eminent historian Frederick Jackson Turner ran the correspondence program of the University of Wisconsin in the late 1800s.
- The state of Iowa has a state-owned, 3,000-mile fiber-optic network, called the Iowa Communications Network, with over 1,000 high-tech classrooms for the purpose of offering distance instruction throughout the state.
- *Telemedicine* refers to medicine at a distance, and *telelaw* refers to law at a distance.
- Research on the effectiveness of distance education clearly shows that students who learn at a distance do not learn any worse, or any better, than traditional students.
- The United States Distance Learning Association is a professional organization of those involved in distance education.
- Universities such as the University of Chicago, the University of Wisconsin, and the University of Iowa championed correspondence education in the later years of the 19th century and early in the 20th century.
- Satellites used for distance education orbit approximately 23,000 miles about the equator at an orbiting speed that matches the rotation of the Earth. This geosynchronous orbit makes these satellites appear to be stationary on the surface of the Earth. The location where the satellites orbit is called the Clarke Belt, after science fiction writer Arthur C. Clarke, who wrote about communication satellites in geosynchronous orbit in a story published in the 1940s.
- The foundations of the Internet were begun by the U.S. Department of Defense and by a number of research universities as a way to share scientific and technical information between scientists.
- *IP* stands for *Internet Protocol*, the rules used to send information over the Internet.
- The Internet is a packet-switched network, meaning that messages are divided into packets that are disassembled and then sent to the distant site where the packets are reassembled into the complete message.
- Star Schools is the name of a program of the U.S. Department of Education that funded the implementation of distance education in schools and colleges in the United States. The term was coined by Senator Ted Kennedy, who was opposed to the use of satellites for “star wars,” so he advocated the use of satellites for education and proposed the Star Schools program. The Star Schools program provided millions of dollars for innovative distance education programs. It was terminated in 2005.

Distance Education as a Disruptive Technology

A technology or disruptive innovation is a technological innovation, product, or service that eventually overturns the existing dominant technology or product in the market. Dis-

ruptive innovations can be broadly classified into lower-end and new-market disruptive innovations. A new-market disruptive innovation is often aimed at nonconsumption, whereas a lower-end disruptive innovation is aimed at mainstream customers who were ignored by established companies. Sometimes, a disruptive technology comes to dominate an existing market by either filling a role in a new market that the older technology could not fill or by successively moving up-market through performance improvements until finally displacing the market incumbents. (Simonson, 2010, p. 74)

By contrast, “sustaining technology or innovation” improves product performance of established products. Sustaining technologies are often incremental.” Sustaining technologies maintain a rate of improvement, give users something more or better that they value (Teets, 2002).

Thus, technological innovations might be categorized along a continuum from *sustaining* to *disruptive*. In education, a sustaining technology might be a SmartBoard, which in most applications is a way to present information dynamically and efficiently—a sustaining upgrade to the chalk board and overhead projector.

As a matter of fact, most attempts to integrate instructional technology into the traditional classroom are examples of sustaining technologies—computer data projectors, DVD players, e-books—all which “improve product performance of *established* products.” Most integrated technologies sustain, and do not disrupt (Christensen, 2003).

On the other hand, distance education is certainly not a sustaining technology. Rather, distance education, virtual schooling, and e-learning are disruptive.

For example, distance education is aimed at students (older, working, remotely located learners) who are “ignored by established companies” (traditional schools). Distance education presents a different package of performance attributes that are not valued by existing customers. Distance education has come to “dominate ... by filling a role ... that the older technology could not fill” (Christensen, 2003).

Clayton Christensen (2003, 2008; Christensen, Anthony, & Roth, 2004) has written extensively about the concept of disruptive technologies. Christensen’s work has been widely embraced in business. His work helps explain why some established industries fail, and others spring up, seemingly from nowhere. No better example is the personal computer. Not a single minicomputer manufacturer has been a successful manufacturer of personal computers—they did not see the power of the new technology until others had captured market share.

Similarly, most in education have ignored the potential of looking at the ideas behind Christensen’s theory, and how disruptive technologies might transform education and training.

In Florida, there is a mandate that every public school district must establish a virtual K-8, and K-12 school (Simonson, 2008). Many have wondered why Florida legislators would pass such a sweeping law—perhaps the answer is disruptive technology. Whatever the reason for Florida to establish virtual schools, it is clear that distance education and virtual schooling are disrupting traditional education, and this may be a good thing. It might be a good idea for educators to become more cognizant of Clayton Christensen’s work, and the power of disruptive technologies to change education.



MEDIA IN EDUCATION: EARLIER DEBATES

The discussion about distance education is somewhat reminiscent of a recent debate in the educational technology field referred to previously that began when Richard Clark, a

researcher and theorist, published a classic article containing his now famous “mere vehicles” analogy.

Clark summarized over 6 decades of educational media research. It was obvious to him that many researchers were reporting about flawed studies involving media. Clark believed that many educators did not understand the last 60 years of research about media and learning.

Even more alarming was that many practitioners were making unrealistic claims about the impact of technology on learning. According to Clark, a large segment of the educational community felt that media-based instruction was inherently better than teaching when media were not used.

In 1983 (and 2012), Clark wrote in volume 53 of the *Review of Educational Research* that:

the best current evidence is that media are *mere vehicles* that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in nutrition ... only the content of the vehicle can influence achievement. (p. 445)

Clark’s 1983 article went on to convincingly claim that instructional media were excellent for storing educational messages and for delivering them almost anywhere. However, media were not responsible for a learning effect. Learning was not enhanced because instruction was media based. Rather, the content of the instruction, the method used to promote learning, and the involvement of the learner in the instructional experience were what, in part, influenced learning. Although many did not, and still do not, agree with Clark, his article caused a reassessment of how educators looked at the impact of media. Clark continued to implore the education community to “give up your enthusiasm for media effects on learning,” which was the theme of an additional publication on this topic (Clark, 1994, 2012). “Give up your enthusiasm” has become the new rallying cry for those who do not think there is a media effect.

Certainly, some distance educators claim that distance education is the best way to learn because it allows students to acquire knowledge when it is most relevant to them. However, most who have studied distance learning make few claims about the approach being better. Rather, they say it is a viable and important approach to learning and teaching that should be one option of many available.

A second analogy by another great technology pioneer also has relevance to distance education. In the 1960s, Jim Finn from the University of Southern California talked about the stirrup as a technological innovation that changed society. He often told a story that went like this:

The Anglo-Saxons, a dominating enemy of Charles Martel’s Franks, had the stirrup but did not truly understand its implications for warfare. The stirrup made possible the emergence of a warrior called the knight who understood that the stirrup enabled the rider not only to keep his seat, but also to deliver a blow with a lance having the combined weight of the rider and charging horse. This simple concept permitted the Franks to conquer the Anglo-Saxons and change the face of Western civilization. Martel had a vision to seize the idea and to use it. He did not invent the stirrup, but knew how to use it purposefully. (Finn, 1964, p. 24)

Finn (1964) summarized the implications of this story as follows:

The acceptance or rejection of an invention, or the extent to which its implications are realized if it is accepted, depends quite as much upon the condition of society, and upon the imagination of its leadership, as upon the nature of the technological item itself.... The Anglo-Saxons used the stirrup, but did not comprehend it; and for this they paid a fearful price.... It was the Franks alone—presumably led by Charles Martel’s genius—who fully grasped the possibilities inherent in the stirrup and created in terms of it a new type of warfare supported by a novel structure of a society that we call feudalism.... For a thousand years feudal institutions bore the marks of their birth from the new military technologies of the eighth century. (p. 24)

What Clark strongly proposed with his “mere vehicles” and “give up your enthusiasm” arguments was that media and technology did not directly affect learning. He forcefully argued that educators should not claim that technology-based learning, such as modern distance education systems, had any inherent advantage (or disadvantage for that matter) over other methods of learning. Like Finn, Clark proposed that technologies might provide ways of accomplishing tasks that are new and not readily obvious. Finn advocated that practitioners should attempt to identify unique approaches for change by using new technologies in new ways. Finn’s story explained that the stirrup not only made getting on and off a horse easier, but also made possible a new, previously unheard-of consequence—the emergence of the knight—and it was the knight who caused significant and long-lasting changes in society. Perhaps the correct application of distance education will significantly change and restructure learning and teaching on par with the societal change—called feudalism—needed to support the knight.

The implication of the arguments of these two educators is that when new technologies emerge, they often allow users to be more efficient. However, it is not technologies themselves that cause changes; rather, changes occur because of new ways of doing things that are enabled by technologies. The stirrup made riding horses easier and more efficient, but it was the knight who changed medieval society.



STATUS OF DISTANCE EDUCATION

Worldwide Examples

Distance education has a major and varied impact worldwide. Whereas politics and economics influence how distance education is employed, a strong demand exists in the world for distance education opportunities. The examples that follow illustrate some of the factors that influence distance education and show the demand for distance learning opportunities (Visser, Visser, Amirault, & Simonson, 2012).

1. Anadolu University in Turkey reaches over 500,000 distance education students, which makes it the largest university on Earth, according to the World Bank (Demiray, 2005; Macwilliams, 2000). The university was created in 1981 during a sweeping reorganization of Turkey’s higher education system. Its mission is to provide distance instruction to the citizens of Turkey. In 1983, it had almost 30,000 students in business administration and economics, making the university an immediate success. As of 2010, approximately 34% of the students that enrolled in the 2-year degree programs graduated in 2 years, and about 23% of those enrolled in 4-year programs graduated in 4 years. The vast majority of the students enrolled at Anadolu University were working adults with full- or part-time jobs. Distance education offered by Anadolu University has made postsecondary education a possibility for many in Turkey who would not have access to higher education.

Professors at Anadolu publish an online journal that can be accessed at <http://tojde.anadolu.edu.tr>.

2. The Open University of Hong Kong opened in 1989 to serve residents of that huge metropolitan area. Recently, the university has begun to market itself to learners in China, and it has thousands of students from the mainland (Cohen, 2000). Unlike Hong Kong's eight conventional universities, the Open University accepts all applicants. It has had over 100,000 students, of which approximately 10% have graduated. Administrators from the Open University of Hong Kong plan to offer distance education throughout China and Southeast Asia (Zhang, Perris, & Yeung, 2005).

3. In sub-Saharan Africa, political instability and economic depression have caused a decline in educational standards in some countries. As the population increased in these countries, a tremendous classroom shortage emerged, and both the number of qualified teachers and the availability of instructional materials became inadequate. Distance education is seen as having the potential to contribute to national reconstruction by providing economically feasible educational opportunities to many people. Collaboration with a variety of international distance education organizations has provided expertise and support for the practice of distance education. As a result, distance education at a basic level, as it is practiced in many regions of Africa, has expanded quite sharply. However, although growth in distance education in sub-Saharan African countries is evident, it does not yet have a wide impact. Lack of funding prevents distance education institutions from reaching many potential students (Day, 2005; Visser & West, 2005; Visser, Visser, & Buendia, 2005). According to Nsomwe-a-nfunkwa (2009), the enrollment in the French Digital Campus of Kinshasa (Congo) has more than doubled from 2004 to 2008.

4. China developed a national higher distance education program in the late 1970s and early 1980s in response to a growth in population and a high cost per capita for the craftlike approach to regular higher education in the country. Because China could not afford to meet the higher education needs of the expanding population, a national radio and TV university system was developed. By 1985, China had over 30,000 TV classes throughout the country and employed almost 25,000 academics. One in five students studying in higher education was enrolled in a radio and TV university. This national system incorporated a centralized approach to course development, delivery, and examinations. However, despite an increase in offerings, student numbers have significantly decreased. Recently, only 1 in every 13 students in higher education was enrolled in a radio and TV university (Li, Chen, & Wang, 2009).

Socioeconomic factors have caused changes in the mass market for higher education in China. The centralized approach to course development and delivery no longer meets the diverse needs of learners and does not adapt itself quickly to the new conditions. In response, China's radio and TV universities have changed from a central system of course development and delivery to a regionally responsive system that provides a wide variety of both diploma and nondiploma courses (Ding, 1994, 1995; Hurd & Xioa, 2006; Li et al., 2009; Yang, Wang, Shen, & Han, 2007).

5. Distance education has had a long history in European countries. The continuation of this tradition is evident in the vast array of programs offered by European Union countries. In some countries, open distance teaching universities offer the majority of the country's distance education programming. Spain's Universidad Nacional de Education a Distancia may be Europe's largest distance teaching university, with a current enrollment of about 130,000 students. In other countries, traditional universities deliver the majority of the courses. France, for example, has no national distance teaching university, but offers higher distance education through 22 offices within traditional universities. Recently,

34,000 students were enrolled in these programs. In some cases, governments provide substantial distance education training opportunities that do not lead to a university degree. France is a leader in this area, providing over 350,000 students a year with opportunities at a range of levels: elementary school, high school, technical and professional qualifications, teacher training, and university-level and postgraduate courses. In addition, 250,000 students are served by proprietary distance training providers in France (Keegan, 1994). Distance instruction in the European Union uses a wide variety of media to deliver courses. These range from traditional correspondence delivery, to computer conferencing, to two-way audio and video virtual classrooms (Holmberg, 1995; Keegan, 1995). Using these technologies, the established distance education and training organizations of Europe will continue to play a significant role in education in and beyond the European Union (Vrasi-das, 2008).

United States

Distance educators are often asked about the quality and extent of online education in the United States. Many individuals, especially new students, want to know if instruction delivered at a distance is of high quality, and if distance education is a passing fad or a viable approach to teaching and learning. The Sloan Consortium has attempted to answer these questions. The Sloan Consortium is a collection of “institutions and organizations committed to quality online education.” Their reports (Allen & Seaman, 2012) provide a wealth of information about the field of distance education in general, and about online instruction more specifically.

The Sloan reports used surveys to obtain information related to four fundamental questions:

1. Will students embrace online education as a delivery method?
2. Will institutions embrace online education as a delivery method?
3. Will faculty embrace online education as a delivery method?
4. Will the quality of online education match that of face-to-face instruction?

Almost 1,000 surveys (about 33% of those sent) were returned from chief academic officers from accredited degree-granting institutions of higher education in the United States. The report is interesting reading, and the results are important, if not surprising, to those in the field:

- The majority of chief academic officers believe that the learning outcomes in online courses will equal or exceed that of face-to-face courses within 3 years.
- The overall growth rate for enrollment in online courses is expected to be 20%.
- Profit institutions expect a growth rate that is faster than that of other institutions (40%).
- Private, nonprofit institutions expect to use online education less than other institutions.
- Given an option, students will enroll in online courses.
- Overall, attitudes of faculty remain conservative about the quality of online education.

Other interesting results show that over 90% of public universities offer online courses, and about half offer degree programs online. About 85% of public universities consider online education critical to their long-term academic strategies, as compared with about 50% for private institutions. Faculty at public universities are more accepting of the

value of online education than their colleagues at private universities, and public universities enrolled more than 2 million students in online courses.

The Sloan Consortium reports authenticate the amazing growth of distance education, yet they also identify the very important issues that still confront the field if distance education is to continue to grow in importance.

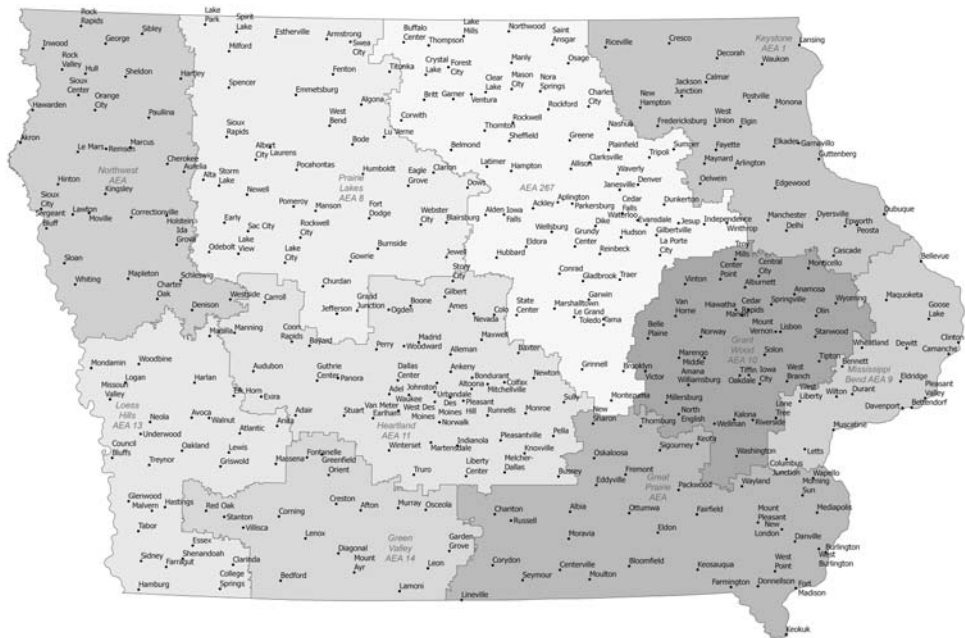
Simonson recently compiled a number of articles that deal with distance education in states and institutions (Simonson, 2013). At the university level, it is reported that distance education enrollment is in the tens of millions, nationally. This includes enrollment in courses offered by traditional universities and those offered by distance learning universities. The U.S. military is heavily involved in distance education technology because distance education is viewed as a cost-efficient way to deliver technical training to a large number of soldiers. The development of new weapons systems and other technologies increases the demand for this type of training. The army's Interactive Teletraining Network, the navy's Video Teletraining Network, and the air force's Teleteach Expanded Delivery System, and NASA's Digital Learning Network (Simonson, 2013; Tally, 2009) all provide distance training opportunities for personnel across the United States and around the world.

A focus on education in the primary and secondary schools separates American distance education from traditional European distance education. This emphasis on kindergarten through Grade 12 (K–12) students is demonstrated by the growth of virtual schools (Berge & Clark, 2005), and in the federally funded Star Schools projects. The U.S. Department of Education began the Star Schools program “to encourage improved instruction in mathematics, science, foreign languages, literacy skills, and vocational education for underserved populations through the use of telecommunications networks” (Simonson, 1995, pp. 3–4). Funding for the Star Schools program ended in 2005.

Although these projects are not limited to K–12 programming, their primary emphasis is on K–12 students and teachers. A variety of network technologies including satellite, cable, telephone networks, fiber optics, microcomputer-based laboratories, multimedia, and electronic networking technologies have been used to deliver instructional programming to more than 6,000 schools nationwide through the Star Schools project (U.S. Department of Education, 1995).

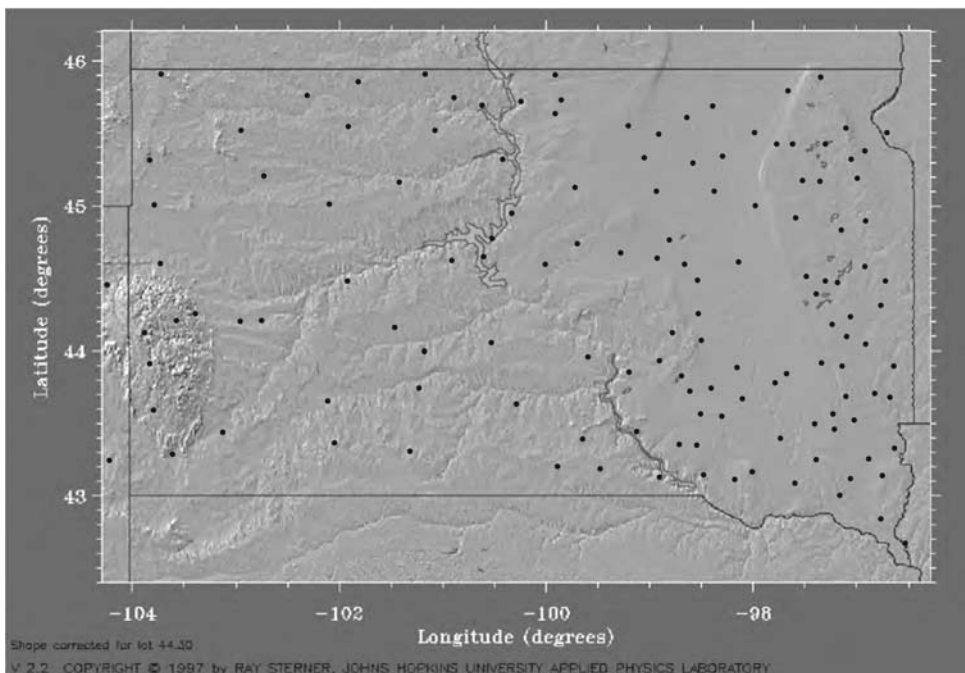
The Star Schools project sponsored several special statewide projects that fund the development of statewide infrastructures, allowing for synchronous interaction between students and instructors. The most comprehensive is in Iowa. Currently, Iowa's 3,000-mile statewide fiber-optic network connects more than 1,000 educational sites, with more sites to be added in the next few years. Hundreds of thousands of hours of K–12 programming are provided each year, in addition to teacher professional development and higher education course opportunities. Kentucky and Mississippi have joined Iowa in developing statewide systems that promote personalized interactive instruction and learning (Gillispie, Cassis, Fujinaka, & McMahon, 2013).

South Dakota is another state that has significantly committed to distance education for K–12 students. In South Dakota, the Digital Dakota Network links every school building to a compressed video network. Over 300 sites are located throughout the state (Figure 1–2). Teachers have been trained in special month-long Distance Teaching and Learning Academies, and teachers and university faculties have designed curriculum materials, including entire courses. South Dakota educators have also conducted major research and evaluation activities to document the impact of distance education in the state (Bauck, 2001; Simonson, 2005). As the examples show, distance education has a major impact worldwide. In addition to economics and politics, the growth and impact of distance education is directly linked to the availability of new technologies. “As technology links



Iowa Communications Network Video Classrooms

FIGURE 1-2 South Dakota has the Digital Dakota Network that links hundreds of sites in the state for interactive instruction.



Source: Ray Sterner of the Johns Hopkins Applied Physics Laboratory, licensed by North Star Science and Technology, LLC. [Online.] Available at: www.landforms.biz. Reprinted with permission.

distant sites in an electronic web of information and new communication channels, people around the globe are pulled together” (Thach & Murphy, 1994, p. 5). This type of communication has contributed to globalization. Globalization implies that people are connected more or less contemporaneously with distant events. The new computer-mediated communications and telecommunications technologies contribute to globalization.

Other significant distance education initiatives are Network Nebraska (Decker, 2008), Western Governors University (Eastmond, 2007), Capella University (Thornton, 2007), and Walden University (Shepard, 2008). Distance educators will be challenged both by globalization and by the emerging technologies. How they take advantage of these opportunities will give new meaning to the practice of distance education.

Accreditation. Many in traditional education worry about the quality of distance education programs. Some have called distance education institutions diploma mills, especially those that are profit-generating. A *diploma mill* has the following characteristics: no classrooms, untrained or nonexistent faculties, and unqualified administrators with profit as their primary motivation (Simonson, 2004).

Legitimate institutions have expended considerable effort to demonstrate the quality of their distance education programs. One of the most important activities involves accreditation. Probably the most important form of accreditation, which involves in-depth scrutiny of a school or college’s entire program by outside evaluators, comes from regional accrediting agencies, such as the North Central Association and the Southern Association of Colleges and Schools. The North Central Association and Southern Association of Colleges and Schools are examples of regional agencies that accredit institutions in their geographic areas. Generally, the same standards are applied to traditional and distance education programs. National accreditation agencies also accredit colleges.



TELEMEDICINE

Tele- means “at a distance,” so in its simplest form, *telemedicine* is defined as *medicine at a distance*. The Institute of Medicine defines telemedicine as *the use of electronic information and communications technologies to provide and support health care when distance separates the participants* (Grigsby & Sanders, 1998). Grigsby and Sanders (1998) define telemedicine as *the use of telecommunications and information technology to provide health care services to persons at a distance from the provider*. Actually, there exist in the literature dozens of definitions of telemedicine, but all contain these components:

1. Separation or distance between individuals and/or resources;
2. Use of telecommunications technologies;
3. Interaction between individuals and/or resources; and
4. Medical or health care.

Also, it is implied in most definitions that telemedicine refers to health care offered by recognized, formally accredited medical organizations. Organizational affiliation differentiates telemedicine from self-diagnosis, unsanctioned medical treatment, and quackery.

Background

The term *telemedicine* has become common in the medical literature during the last decade. However, most give credit for originating the term to Kenneth Byrd, who, along

with several other physicians, formed a video microwave network in 1968 from Massachusetts General Hospital to Boston's Logan Airport. There were a number of other projects at about the same time, but this effort is considered the modern launching of the concept of telemedicine.

Telemedicine is a growing field within the profession of medicine. It has journals, such as the *Journal of Telemedicine* and *Telemedicine Today* and *Telemedicine and e-Health*, has a professional association (the American Telemedicine Association, <http://www.atmeda.org/>), and holds an annual professional meeting.

Articles dealing with various aspects of telemedicine can be found in the journals of the various subdisciplines of medicine, and scientific research is being conducted and reported with increasing frequency in prestigious journals of the profession. Finally, federal and state governments and private organizations are funding telemedicine projects totaling tens to hundreds of millions of dollars. The communications revolution is having



Mobile videoconferencing systems increase access to medical information anywhere it is needed.



Ziggy Kallany/Getty Images Inc.-Stone Allstock

Physicians can consult with specialists using desktop video conferencing systems.



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Interactive telecommunications technologies expand the specialized information available to doctors.

an impact on medicine just as it is on education, training, government, business, and law (Tulu, Chatterjee, & Maheshwari, 2007). A recent meta-analysis dealing with telemedicine/telehealth indicated that there were positive effects related to clinical care, even in different patient populations (Dellifraire, 2008).

Applications

Kvedar, Menn, and Loughlin (1998) list four major applications for telemedicine: remote consultation, remote monitoring, remote education, and telementoring.

Remote consultation is the most common telemedicine application and what most refer to when they use the term *telemedicine*. This application implies one health care provider seeking the advice of a professional colleague or subspecialist to resolve a patient's problem.

Remote monitoring is a long-standing application where the most common use is to access a patient's vital signs at a distance using telecommunications technologies (telehomecare). Total cost, cost per patient, and cost per visit were all reduced by telehomecare (Rojas & Gagnon, 2008).

Remote education is increasingly important as the geographically concentrated expertise of a medical unit is redistributed to isolated practicing professionals and professionals in training.

Telementoring involves the development of techniques to share the output of surgical tools such as endoscopes and laparoscopes with distant locations.

The Institute of Medicine (Grigsby & Sanders, 1998) organizes applications of telemedicine differently and identifies five areas of emphasis: patient care, professional education, patient education, research, and health care administration.

Impediments to Telemedicine

The Institute of Medicine identifies five concerns that prevent and slow the growth of telemedicine: professional licensure; malpractice liability; privacy, confidentiality, and security; payment policies; and regulation of medical devices.

Professional licensure issues stem from the traditional view of professional practice as involving a face-to-face encounter between clinician and patient. Telemedicine breaks the physical link and may complicate where a telemedicine practitioner should be licensed if the professional and the patient are in different states. Currently, multiple state licenses are required.

Malpractice liability is usually described as a deviation from the accepted medical standard of care. For telemedicine practitioners, the subject of malpractice presents potentially complicated legal issues, since state law generally governs liability.

Privacy, confidentiality, and security issues relate to serious questions that have been raised about current legal protections for medical privacy and confidentiality. The Hippocratic oath requires that physicians keep silent about what they learn from patients, "counting such things to be as sacred secrets." Information and telecommunications links present new opportunities for privacy infringements.

Payment policies for telemedicine are a major barrier to the growth of telemedicine. Until 1999, telemedicine did not meet the requirements of the Health Care Financing Administration (now known as the Centers for Medicare and Medicaid Services) for in-person, face-to-face contact between providers and patients. Although most

medical consultations using telemedicine have been ineligible for payment in the past, guidelines for reimbursement are still evolving. Currently, Medicare covers interactive video systems (Grigsby & Sanders, 1998), and for this reason most health care organizations are using two-way videoconferencing for their initial telemedicine initiatives.

Regulation of medical devices is of concern because the federal Food and Drug Administration (FDA), through its center, regulates some of the devices used in telemedicine.

In summary, the issues that have slowed the growth of telemedicine are important and should be addressed. However, they are not necessarily unique within the medical profession. Rather, they are issues that are resolved continuously as the health care field adopts new technologies, both medical and informational.

Limited research is reported on the medical effectiveness and cost effectiveness of telemedicine. Current research seems to support the conclusion that telemedicine is effective when practiced correctly, but that additional evaluation and assessment activities need to be conducted.

Telemedicine will continue to be a dynamic influence within the profession of medicine. The benefits of this innovation will be in two primary areas: medical benefits and cost benefits. First, telemedicine is a logical extension of the growth of the technical and technological aspects of health care. The medical benefits of an active telemedicine program are related to how professionals use the technology. A modification of a famous analogy used in educational research when applied to telemedicine summarizes the medical impact of telemedicine. Telemedicine and information technologies are *mere vehicles* that permit the delivery of health services, but they have no greater impact on health care than, as Clark said and was discussed above, the truck that delivers our groceries has on nutrition. It is the content of the vehicle that permits effective health care, not the vehicle itself (Clark, 1983, 2012). Second, cost effectiveness is likely to be the most significant outcome of telemedicine. The significant costs of medical care and the increased requirements for services that are projected for the next several decades forecast a cost advantage for the organizations that understand and utilize technologies effectively. Certainly, telemedicine is only one category of technology, but it may soon be the “ears and eyes” of the health care organization.

In summary, telemedicine is a recognized subcategory of the health services profession. As a technique and tool in the modern medical center it has the potential to expand and accelerate the services offered and the impact made. Other professions, such as law, are moving cautiously to adopt distance education concepts. Nova Southeastern University’s law school was recently recognized as the “nation’s most wired law school.” Telecommunications technologies will have increasing impact on most fields of endeavor, not just education, as they improve and become more widely available.



CHARACTERISTICS OF DISTANCE EDUCATION: TWO VISIONS

Recently, a number of advances have been made in the study of learning and teaching that are providing educators with strategies for improving the educational experience. Often, these advances are considered to be in opposition to the common practices of distance education because of the misconception that teachers lecture to distant learners. This is changing dramatically, however, as distance education systems attempt to provide a learning site that is a “room with a view.”

The First Scenario—Distance Education in Schools

This emerging approach relies strongly on distance education and suggests a scenario for the school and classroom of the future similar to the following scenario, which implies that classrooms of the future will be rich in technology and will continue to have teachers who are responsible for the learning events that occur:

In every community and neighborhood there are schools surrounded by playgrounds and sports fields with trees and grass. The schools themselves look modern but very familiar. The schools are open 24 hours per day, every day, all year. Each is a part of a locally controlled and supported district that is one of several hundred that make up a technology-rich statewide educational system. Classrooms are considered rooms with a view. Every learner and teacher possesses a high-powered multimedia computer-device that is connected to a worldwide network containing virtually unlimited educational resources. The network connects the learner to multisensory multimedia resources that are accessible from school, home, and business. Education is learner and learning centered and technology supported. Schools are small, with about 600 to 800 students, and classes never exceed 25. In the evenings the classrooms are converted to learning laboratories that are used by the entire community. Each classroom has full-motion video links to state and national networks that permit true interactive learning. Students have desktop video access through their computer-devices, also. The educational philosophy of this school is to promote authentic, student-centered learning activities that are cognitively situated whenever possible in real-world events. The school and its classrooms are a community resource. Outside of school, students continue to learn, even when on vacation. A robust network connects students to their teachers and to the resources needed for learning. Schools provide computer-devices and access when students need them, and the high-speed network is a free wireless canopy that covers the community.

This scenario could be considered a dream rather than a vision. However, it is based on the following widely available and generally accepted techniques and technologies. First, instruction is learner centered. The networked computer-device permits the learner to access events of instruction that



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Businesses, including health organizations, are using videoconferencing to replace travel.



VTCL Products Corporation

Students can easily interact with students and teachers from remote sites using videoconferencing.