

CONTENTS

Preface	ix
1 Introduction	1
1.1 Focus of the Book	1
1.2 Structure of the Book	6
2 Communication Models	11
2.1 Introduction	11
2.2 Models of Communication Systems	12
2.3 Models of Scholarly Journals	14
2.4 Models of Information Seeking	22
3 A Communications Framework for Engineers	27
3.1 Introduction	27
3.2 Time Engineers Spend Communicating	29
3.3 Engineers' Communication Channels	31
3.4 Factors Affecting Engineers' Communication Choices	35

4	The Engineering Profession and Communication	37
4.1	The Engineering Profession	37
4.2	How Industry and Government Engineers Spend Their Time	38
4.3	The Importance of Information Resources to Engineers' Work	38
4.4	The Value of Reading	41
4.5	The Impact of Information on Innovation	44
4.6	Organizing Information for Better Use in the Workplace	46
4.7	Engineers' Adaptation to Information Innovations	52
5	Engineers' Information Seeking and Use	57
5.1	Introduction	57
5.2	Engineers' Channels for Information Seeking and Use	58
5.3	Resources Used by Engineers for Information Seeking	63
6	Factors Affecting Information Seeking and Use	71
6.1	Introduction	71
6.2	Effects of Geographic and Cultural Differences on Information Seeking and Use	72
6.3	Effects of the Nature of Work on Information Seeking and Use	74
6.4	Effects of Organization Policies on Information Seeking and Use	83
6.5	Effects of Personal Characteristics on Information Seeking and Use	85
7	Information Output by Engineers	89
7.1	Introduction	89
7.2	Channels Engineers Use to Communicate Information Output	91
7.3	Resources and Tools Engineers Use for Communicating Information Output	94
7.4	Communicating the Written Word	95
8	Engineering Education and Communication Skills	99
8.1	Introduction	99

8.2	Improving Engineers' Communication Skills	100
8.3	Improving the Use of Communication Channels and Sources	108
9	The Engineering Scholarly Journal Channel	113
9.1	Introduction	113
9.2	Engineering and Science Journal Characteristics: 1977, 1995, and 2001	114
9.3	Engineers' and Scientists' Authorship and Reading of Scholarly Journals	117
9.4	Changes in Information-Seeking and Reading Patterns Following Electronic Journals	126
10	Engineers' Journal Information-Seeking and Reading Patterns in an Emerging Electronic Era	133
10.1	Introduction	133
10.2	Use, Usefulness, and Value of Articles to Engineers	135
10.3	Where Engineers Get the Articles They Read	139
10.4	Format of Articles Read	140
10.5	How Engineers Learn About the Articles They Read	141
10.6	Age of Articles Read	143
10.7	Factors That Affect Use	144
11	Engineering Communication Patterns Compared with Science and Medicine	149
11.1	Introduction	149
11.2	Professions of Engineering, Science, and Medicine	151
11.3	Communication Channels Used by Engineers, Scientists, and Medical Professionals	155
11.4	Resources and Tools Used by Engineers, Scientists, and Medical Professionals	158
12	The NASA/DOD Aerospace Knowledge Diffusion Research Project	163
12.1	Introduction	163
12.2	Focus on Commercial Aircraft Manufacturing in the United States	164

viii CONTENTS

12.3	Communication by U.S. Aerospace Engineers and Scientists	166
12.4	Other Related Work	175
12.5	Summary	179
13	Summary	181
	Bibliography	187
	Index	253
	About the Authors	265