## **Contents**

vii

PREFACE TO THE SECOND EDITION	xiii
ACKNOWLEDGMENTS	XV
BIOGRAPHIES	xvii
04 Cammuz S.	
CHAPTER 1 Introduction	1
1.1 What Is User Experience	4
1.2 What Are User Experience Metrics?	6
1.3 The Value of UX Metrics	8
1.4 Metrics for Everyone	9
1.5 New Technologies in UX Metrics	10
1.6 Ten Myths about UX Metrics	11
Myth 1: Metrics Take Too Much Time to Collect	11
Myth 2: UX Metrics Cost Too Much Money	12
Myth 3: UX Metrics Are Not Useful When Focusing on	
Small Improvements	12
Myth 4: UX Metrics Don't Help Us Understand Causes	12
Myth 5: UX Metrics Are Too Noisy	12
Myth 6: You Can Just Trust Your Gut	13
Myth 7: Metrics Don't Apply to New Products	13
Myth 8: No Metrics Exist for the Type of Issues We Are Dealing with	13
Myth 9: Metrics Are not Understood or Appreciated by Management	14
Myth 10: It's Difficult to Collect Reliable Data with a Small	
Sample Size	14
122 Comment of the Co	
CHAPTER 2 Background	15
2.1 Independent and Dependent Variables	16
2.2 Types of Data	16
2.2.1 Nominal Data	16
2.2.2 Ordinal Data	17
2.2.3 Interval Data	18
2.2.4 Ratio Data	19
2.3 Descriptive Statistics	19
2.3.1 Measures of Central Tendency	19
2.3.2 Measures of Variability	21
2.3.3 Confidence Intervals	22
2.3.4 Displaying Confidence Intervals as Error Bars	24
2.4 Comparing Means	25
2.4.1 Independent Samples	26
	27
2.4.2 Paired Samples	21

viii

	2.4.3 Comparing More Than Two Samples	29
2.5	Relationships Between Variables	30
	2.5.1 Correlations	30
2.6	6 Nonparametric Tests	3:
	2.6.1 The $\chi^2$ Test	3:
2.7	Presenting your Data Graphically	32
	2.7.1 Column or Bar Graphs	33
	2.7.2 Line Graphs	35
	2.7.3 Scatterplots	36
	2.7.4 Pie or Donut Charts	38
	2.7.5 Stacked Bar or Column Graphs	39
2.8	3 Summary	40
	# FIST	
CHAPTE	ER 3 Planning	41
	L Study Goals	4:
	3.1.1 Formative Usability	4:
	3.1.2 Summative Usability	43
3.2	2 User Goals	4
	3.2.1 Performance	44
	3.2.2 Satisfaction	4
3.3	Choosing the Right Metrics: Ten Types of Usability Studies	4
	3.3.1 Completing a Transaction	4
	3.3.2 Comparing Products	4
	3.3.3 Evaluating Frequent Use of the Same Product	4
	3.3.4 Evaluating Navigation and/or Information Architecture	48
	3.3.5 Increasing Awareness	48
	3.3.6 Problem Discovery	49
	3.3.7 Maximizing Usability for a Critical Product	50
	3.3.8 Creating an Overall Positive User Experience	5:
	3.3.9 Evaluating the Impact of Subtle Changes	5:
	3.3.10 Comparing Alternative Designs	5
3.4	Evaluation Methods	5
	3.4.1 Traditional (Moderated) Usability Tests	53
	3.4.2 Online (Unmoderated) Usability Tests	54
	3.4.3 Online Surveys	50
3.5	5 Other Study Details	5
	3.5.1 Budgets and Timelines	5
	3.5.2 Participants	58
	3.5.3 Data Collection	60
	3.5.4 Data Cleanup	60
3.6	S Summary	6:
	2.3.2 Measures of Variability	
CHAPTI	ER 4 Performance Metrics	63
4.1	L Task Success	6
	4.1.1 Binary Success	66
	4.1.2 Levels of Success	70

4.1.3 Issues in Measuring Success	13
4.2 Time on Task	74
4.2.1 Importance of Measuring Time on Task	75
4.2.2 How to Collect and Measure Time on Task	75
4.2.3 Analyzing and Presenting Time-on-Task Data	78
4.2.4 Issues to Consider When Using Time Data	81
4.3 Errors	82
4.3.1 When to Measure Errors	82
4.3.2 What Constitutes an Error?	83
4.3.3 Collecting and Measuring Errors	84
4.3.4 Analyzing and Presenting Errors	84
4.3.5 Issues to Consider When Using Error Metrics	86
4.4 Efficiency	86
4.4.1 Collecting and Measuring Efficiency	87
4.4.2 Analyzing and Presenting Efficiency Data	88
4.4.3 Efficiency as a Combination of Task Success and Time	90
4.5 Learnability	92
4.5.1 Collecting and Measuring Learnability Data	94
4.5.2 Analyzing and Presenting Learnability Data	94
4.5.3 Issues to Consider When Measuring Learnability	96
4.6 Summary	96
4.0 Summary	
CHAPTER 5 Issue-Based Metrics	99
5.1 What Is a Usability Issue?	100
5.1.1 Real Issues versus False Issues	101
5.2 How to Identify an Issue	102
5.2.1 In-Person Studies	102
5.2.2 Automated Studies	103
5.3 Severity Ratings	103
5.3.1 Severity Ratings Based on the User Experience	104
5.3.2 Severity Ratings Based on a Combination of Factors	105
5.3.3 Using a Severity Rating System	106
5.3.4 Some Caveats about Rating Systems	107
5.4 Analyzing and Reporting Metrics for Usability Issues	107
	108
5.4.1 Frequency of Issues Participant	109
5.4.2 Frequency of Issues Per Participant	109
5.4.3 Frequency of Participants	110
5.4.4 Issues by Category	111
5.4.5 Issues by Task	111
5.5 Consistency in Identifying Usability Issues	113
5.6 Bias in Identifying Usability Issues	115
5.7 Number of Participants	115
5.7.1 Five Participants Is Enough	117
5.7.2 Five Participants Is Not Enough	
5.7.3 Our Recommendation	118
5.8 Summary	119

CHAPTER 6 Self-Reported Metrics	121
6.1 Importance of Self-Reported Data	123
6.2 Rating Scales	123
6.2.1 Likert Scales	123
6.2.2 Semantic Differential Scales	124
6.2.3 When to Collect Self-Reported Data	125
6.2.4 How to Collect Ratings	125
6.2.5 Biases in Collecting Self-Reported Data	126
6.2.6 General Guidelines for Rating Scales	126
6.2.7 Analyzing Rating-Scale Data	127
6.3 Post-Task Ratings	131
6.3.1 Ease of Use	131
6.3.2 After-Scenario Questionnaire (ASQ)	132
6.3.3 Expectation Measure	132
6.3.4 A Comparison of Post-task Self-Reported Metrics	133
6.4 Postsession Ratings	137
6.4.1 Aggregating Individual Task Ratings	137
6.4.2 System Usability Scale	137
6.4.3 Computer System Usability Questionnaire	140
6.4.4 Questionnaire for User Interface Satisfaction	141
6.4.5 Usefulness, Satisfaction, and Ease-of-Use Questionnaire	142
6.4.6 Product Reaction Cards	144
6.4.7 A Comparison of Postsession Self-Reported Metrics	145
6.4.8 Net Promoter Score	146
6.5 Using SUS to Compare Designs	147
6.6 Online Services	147
6.6.1 Website Analysis and Measurement Inventory	148
6.6.2 American Customer Satisfaction Index	148
6.6.3 OpinionLab	149
6.6.4 Issues with Live-Site Surveys	152
6.7 Other Types of Self-Reported Metrics	154
6.7.1 Assessing Specific Attributes	154
6.7.2 Assessing Specific Elements	156
6.7.3 Open-Ended Questions	158
6.7.4 Awareness and Comprehension	159
6.7.5 Awareness and Usefulness Gaps	160
6.8 Summary	161
CHAPTER 7 Behavioral and Physiological Metrics	163
7.1 Observing and Coding Unprompted Verbal Expressions	163
7.2 Eye Tracking	165
7.2.1 How Eye Tracking Works	165
7.2.2 Visualizing Eye-Tracking Data	167
7.2.3 Areas of Interest	170
7.2.4 Common Eye-Tracking Metrics	172
7.2.5 Eye-Tracking Analysis Tips	174

7.2.6 Pupillary Response	175
7.3 Measuring Emotion	176
7.3.1 Affectiva and the Q-Sensor	176
7.3.2 Blue Bubble Lab and Emovision	179
7.3.3 Seren and Emotiv	180
7.4 Stress and Other Physiological Measures	182
7.4.1 Heart Rate Variance	182
7.4.2 Heart Rate Variance and Skin Conductance Research	183
7.4.3 Other Measures	183
7.5 Summary	185
7.5 Summary	100
CHAPTER 8 Combined and Comparative Metrics	187
8.1 Single Usability Scores	187
8.1.1 Combining Metrics Based on Target Goals	188
8.1.2 Combining Metrics Based on Percentages	189
8.1.3 Combining Metrics Based on Z Scores	196
8.1.4 Using Single Usability Metric	198
8.2 Usability Scorecards	200
8.3 Comparison to Goals and Expert Performance	204
8.3.1 Comparison to Goals	204
8.3.2 Comparison to Expert Performance	206
8.4 Summary	208
EXE.	3.02
CHAPTER 9 Special Topics	209
9.1 Live Website Data	209
9.1.1 Basic Web Analytics	210
9.1.2 Click-Through Rates	213
9.1.3 Drop-Off Rates	215
9.1.4 A/B Tests	216
9.2 Card-Sorting Data	218
9.2.1 Analyses of Open Card-Sort Data	219
9.2.2 Analyses of Closed Card-Sort Data	224
9.2.3 Tree Testing	227
9.3 Accessibility Data	228
9.4 Return-On-Investment Data	232
9.5 Summary	236
3.3 Summary	250
CHAPTER 10 Case Studies	237
10.1 Net Promoter Scores and the Value of a Good User Experience	238
10.1.1 Methods	239
10.1.2 Results	240
10.1.3 Prioritizing Investments in Interface Design	241
10.1.4 Discussion	242
10.1.5 Conclusion	243
References	244
Riographies	244

10.2 Measuring the Effect of Feedback on Fingerprint Capture	244
10.2.1 Methodology	245
10.2.2 Discussion	252
10.2.3 Conclusion	253
Acknowledgment	253
References	253
Biographies	254
10.3 Redesign of a Web Experience Management System	254
10.3.1 Test Iterations	255
10.3.2 Data Collection	256
10.3.3 Workflow	257
10.3.4 Results	261
10.3.5 Conclusions	262
Biographies	262
10.4 Using Metrics to Help Improve a University Prospectus	263
10.4.1 Example 1: Deciding on Actions after Usability Testing	264
10.4.2 Example 2: Site-Tracking Data	267
10.4.3 Example 3: Triangulation for Iteration of Personas	269
	270
10.4.4 Summary	270
Acknowledgments	270
References	270
Biographies Biographics	271
10.5 Measuring Usability Through Biometrics	271
10.5.1 Background	
10.5.2 Methods	272
10.5.3 Biometric Findings	273
10.5.4 Qualitative Findings	274
10.5.5 Conclusions and Practitioner Take-Aways	275
Acknowledgments	276
References	276
Biographies	277
CHAPTER 11 Ten Keys to Success	279
11.1 Make Data Come Alive	279
11.2 Don't Wait to Be Asked to Measure	281
11.3 Measurement Is Less Expensive Than You Think	282
11.4 Plan Early	282
11.5 Benchmark Your Products	283
11.6 Explore Your Data	284
11.7 Speak the Language of Business	285
11.8 Show Your Confidence	285
11.9 Don't Misuse Metrics	286
11.10 Simplify Your Presentation	287
REFERENCES	289
INDEX	297