

Contents

Part I Usability Engineering: Definitions, Methods, and Challenges for Integration

1	On Usability and Usability Engineering	3
1.1	Interactive Systems and User Interface	3
1.2	Usability: A Quality Attribute of the Whole System, Not Just the User Interface	6
1.3	Usability in Traditional Software Quality Models	8
1.4	Other Specific Measurement Models	8
1.5	Cost–benefits of Usability Engineering	10
1.6	Involving the End-User is Central, but Not Enough	11
2	Usability Engineering Methods Plethora	15
2.1	Possible Theories for Usability Engineering	15
2.2	Pure Usability Engineering Methods	16
2.2.1	A Taxonomy of the Most Popular Usability Engineering (UE) Methods	17
2.2.2	Expert-Based Evaluation	18
2.2.3	Prototyping Techniques	20
2.2.4	Usability Testing	20
2.2.5	Subjective Assessment	21
2.3	UE Methods and the Development Lifecycle	22
2.4	Other Usability Engineering-Sensitive Methodologies	23
2.4.1	Scenario-Based Design	24
2.4.2	Contextual Design	24
2.4.3	Star Lifecycle	25
2.4.4	Usability Engineering Lifecycle	26
2.4.5	Usage-Centered Design	27
2.5	Extensions to Traditional Software Engineering Methods	27
2.5.1	Adding Usage Scenarios to Object-Oriented Analysis and Design	28

2.5.2	Task Analysis Versus Object-Oriented and Use Cases Models	30
2.5.3	UML Notation for User Interface Modeling	30
2.5.4	Enhancing Use Cases for User Interface Prototyping	31
3	Pitfalls and Obstacles in the Integration and Adoption Path	35
3.1	The Fallacious Dichotomy Between User Interface and System Functionality	35
3.2	The Cultural Gap Between Psychologists and Engineers	37
3.3	User-Centeredness is an Organizational Learning Process	38
3.4	The Usability of Usability Engineering Methods	39
3.5	The Lack of Process Support Tools	41
3.6	Collecting Best Practices in UE is Missing	42
3.7	Educational Gap Between Software Professionals and Usability Professionals	42

Part II ACUE Fundamentals, Architecture and Components

4	Usability Engineering Integration as an Adoption Problem	47
4.1	Key Milestones in the Adoption Process	47
4.2	On the Development of Adoption-Centric Usability Methods	49
4.3	Difficulties of Building an Empirical Driven Adoption Method	51
4.4	Adoption-Centric Usability Engineering – Key Principles	55
5	ACUE Architecture and Components	59
5.1	UE Method Kits	59
5.2	Project Context Profile	61
5.3	USEPacks: Knowledge About UE Methods	62
5.3.1	USEPack Textual Description	64
5.3.2	USEPack Reusable Artifacts	65
5.3.3	USEPack Context Profile	65
5.3.4	Acceptance Model	65
5.3.5	Context Model vs. Context Profile	68
5.4	Configuration of a Method Kit to a Specific Project	68
5.5	USEPack Assessment	71
6	ACUE Formal Description	73
6.1	Foundations for ACUE Formalization	73
6.1.1	Fuzzy Sets	74
6.1.2	Multi-Criteria Decision-Making	75
6.1.3	Modeling Context Profiles as Fuzzy Sets	76
6.1.4	Context-Based USEPack Selection as a MCDM Problem	78
6.2	USEPack Assessment Using the Acceptance Model	81

6.3 USEPack Context Profiles Adaptation 82

6.4 Alternative Approaches for Formalizing ACUE 84

Part III Operationalization and Validation

7 How Effective Is ACUE? An Empirical Case Study 89

7.1 Overview of the Study 89

7.1.1 Goals of the Study 90

7.1.2 Materials: The UE Method Kit 90

7.1.3 Subjects 91

7.1.4 Method 91

7.2 Results 92

7.3 Process Sketches 92

7.4 Matching of the Method Kit with Practiced Development Processes 96

7.5 Discussion 98

8 Putting it into Practice: The ProUse Tool 101

8.1 Constraints for Operationalizing the ACUE 101

8.2 Structure and Main Feature 102

8.3 ProUSE Portal 105

8.4 Method Kit Configuration 107

8.5 Method Guidance 109

8.6 Method Capturing and Maintenance 110

9 How Well do ACUE and ProUse Work? Overall Evaluation 113

9.1 Evaluation of ProUSE 113

9.1.1 Context of the Evaluation 113

9.1.2 Subjects 114

9.1.3 Method 114

9.1.4 Data Collection Techniques 115

9.1.5 Tasks 116

9.1.6 Procedure 117

9.2 Results of the Studies and Recommendations 117

9.2.1 Characteristics of the Subject Groups 117

9.2.2 Understandability of the Proposed ACUE 120

9.2.3 ACUE Perceived Usefulness 120

9.2.4 ACUE Perceived Ease-of-Use 122

9.3 Interviewee Statements on the Practiced Software Development Process 123

9.3.1 Overview 123

9.3.2 Knowledge About the Software Development Process 123

9.3.3 Process Models Used by Subjects 123

9.3.4 The Usability Engineering Process 125

9.3.5 Subjects’ Roles as Project Team Members 125

Part IV ACUE in Software Engineering: Current Stage and Perspectives

- 10 ACUE and the Existing Software Engineering Methodologies 129**
 - 10.1 USEPacks Versus Other Approaches for Reusing
UE Knowledge 129
 - 10.2 ProUSE Versus Other Tools for Reusing UE Knowledge 130
 - 10.3 Overall Comparisons Between ACUE and Software Engineering
Approaches 134
 - 10.4 ACUE in Relation to Process Improvement Approaches 135
 - 10.5 ACUE as an Approach to Improve Research Utilization 137
 - 10.6 ACUE and Agile Process Concepts 138

- 11 Conclusion and Perspectives 141**
 - 11.1 Conclusion and Limitations 141
 - 11.2 Some Avenues to Explore 142
 - 11.3 A Forum for Cross-Domain Discussion is Needed 143

- References 145**

- Index 153**