

# A Framework for Extending Usability Disciplines to Software Engineering

Models' Consolidation and Hybrid Approaches in Multidisciplinary Production  
Optimization, API-Usability Supportive CSC-Usability Essentials  
via Component-Based Platform



THESIS SUBMITTED IN PARTIAL FULFILLMENT  
OF THE REQUIREMENTS FOR THE DEGREE OF  
MASTER OF SCIENCE IN SOFTWARE ENGINEERING

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أَعُوذُ بِاللَّهِ مِنَ الشَّيْطَانِ الرَّجِيمِ  
I seek refuge in Allah from Satan, the accursed one

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ  
In the name of Allah, the Most Gracious, the Most Merciful

**Department of Computer & Software Engineering**  
**Bahria University, Islamabad**

**Approval Sheet**

It is certified that we have read the project titled “A Framework for Extending Usability Disciplines to Software Engineering – Models’ Consolidation and Hybrid Approaches in Multidisciplinary Production Optimization, API-Usability Supportive CSC-Usability Essentials via Component-Based Platform” submitted by **Muhammad Bilal Munir**, En#: 01-244102-023. It is our judgment that this project is of sufficient standard to warrant its acceptance by Bahria University, Islamabad for Master of Science in Software Engineering.

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“Allah is the light of the heavens and the earth; a likeness of His light is as a niche in which is a lamp, the lamp is in a glass, (and) the glass is as it were a brightly shining star, lit from a blessed olive-tree, neither eastern nor western, the oil whereof almost gives light though fire touch it not light upon light, Allah guides to His light whom He pleases, and Allah sets forth parables for men, and Allah is Cognizant of all things.”

Qur'an – **Surah An-Noor** [24:35] (*Ayat An-Noor*)

**Dedicated To**

**Respected Allah Almighty**

“Allah is the Only Lord and to Him belong all the Glorious Attributes.” [20:8]

**Praiseworthy Holy Prophets, Angels & Followers**

“Salam and Peace Be Upon All of Them.”

**Loving Parents, Family & Relatives**

(Family, Relatives, Sincere Friends & Honorable Community)

**Sharp Software Engineers, Computer Scientists,  
Quality & Usability Optimization Specialists**

(Experts from Software-Engineering, Computer-Science & Related Fields having Usability Essential  
Quality-Integration Goals for Technology Optimization in Theoretical & Applied Sciences)

**Keen Computer-Supported Collaboration Experts,  
Business & Process Optimization Engineers**

(Computer-Mediated Communication and Collaborative-Working Environment Essential Software  
Optimization Experts Focusing Global Industries' Domain Specific Technology Integration)

**A Dissertation Submitted to the  
Department of Computer and Software Engineering,  
Bahria University, Islamabad  
as Partial Fulfillment of the Requirements  
for the Award of the Degree of  
Master of Science in Software Engineering**

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## Abstract

The global software industry exhibits rapid technology growth-pattern that has created an ever-increasing technological-vacuum which calls for better production-optimization strategies, CSC-Usability optimal API-Usability integration into organization's collaborative infrastructure can help establish usability-focused-quality setup that introduces ease-in-use and maturity throughout the business-infrastructure. The framework research target's critical organizational 'workflow activity-streams' via 'models consolidation formulations' and 'hybrid design-calibration techniques' that can be set against 'traceable design workloads' to extract '*Component-Oriented Metadata*' beneficial to business-solutions in numerous perceivable manners; multidisciplinary-optimization and process-mining strategies used for generating tangible production-intelligence can help establish a valuable knowledge-mining platform that assures a firm's readiness against industrial challenges. This research aims at producing 'A Framework for Extending Usability Disciplines to Software Engineering' that utilizes 'Models Consolidation and Hybrid Approaches in Multidisciplinary Production-Optimization focusing API-Usability Supportive CSC-Usability Essentials via Component-Based Platform'; such production beneficial component-intelligence helps reveal in-depth product and process knowledge that can be used to refine various information-design techniques immensely. Hybrid adaptive meta-modeling using consolidated models' design-patterns can help develop design-maturity procedures across business-solutions, where a single model compromises others jump-in to compensate losses thus generating opportunities; component-oriented production jargon obtained can enhance multi-featured design incentives to introduce ease-in-use. A research-gap supportive methodology forms literature exploration-pattern surrounding the framework's directive-anatomy disciplines used for building usability-focused-quality mechanisms that help structure and integrate hybrid optimization formulations with critical process-streams that use usability-techniques, usability-modules, usability-consolidations, usability-apparatuses and usability-schemes thus enhancing framework convergent constructability and controllability. The 'Framework Design Guidelines' by 'Cwalina and Abrams' are used to support framework's research design guidance and qualitative heuristics-evaluation procedures involving mixed-methods for verification and validation. Triangulating end-user response helps explore a variety of angles regarding evaluation findings; multi-perspective feedback leads to relatively refined results' apprehension that can guide research benefactors towards its more appropriate utilization. Qualitative-analysis insights not only assert framework's credibility but elaborate its corrective use regarding 'models' consolidation approaches', 'hybrid stances' that facilitate building 'hybrid multidimensional traceability matrices' surrounding critical activity-streams. The component-intelligence via process-mining can therefore target technology establishments beyond a conventional data-warehousing environment that helps in formulation of business-solution beneficial production-intelligence, thus favoring readiness, reusability and quick design-simulation management etc. Framework's future-implications reveal research extension opportunities involving well-defined scripting-language development that focuses 'hybrid multidimensional expressions', 'smart-heuristics generative grammatical-conjunctions', 'design linguistic semantics' and 'multi-contextual pragmatics'. The framework research is a step towards improving '*Hybrid-Optimization Techniques*' featuring multifaceted API-Usability focused CSC-Usability via multidisciplinary hybrid meta-modeling in '*Directive-Ordinal Techniques*' that enhance '*Basic-Organizational Throughput*'.

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