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Development of SAS Standard Macro Systems



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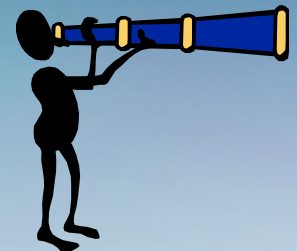
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Introduction

- Performance
 - Reduced validation effort
 - Standardized programs / results
-
- CRO:
 - „source generator“
 - to-sell-software



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Macro System Paradigms

- „Toolbox“ - bunch of tools
 - Daily needed small tools
 - Supporting macros
- „open“ macro systems
 - Very flexible, complex
- „closed“ macro systems
 - Create standard with low complexity and flexibility



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Macro System Paradigms

- Example for Graphics
 - Axis calculations („Toolbox“)
 - Boxplot with options („open“)
 - Dataset, variables, selections, axis, layout options, ...
 - Boxplot according standard („closed“)
 - Standard ECG boxplot
 - Different subgroups



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Macro System Paradigms

- SAS Macros called in SAS
- SAS Macros called by a GUI
- SAS Macros called via Web

- User groups
- Efficiency
- System confidence



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Macro System Paradigms

- In house development
 - Internal expertise
 - Motivation
- External development
 - Use available expertise
 - Less internal resources



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Macro System Paradigms

- Design Models

- Waterfall Model

- (Requirements, Design, Implementation, Verification, Maintenance)

- V Model

- (Concept, Architecture, Detailed Design, Test & Verifications)

- Rapid Prototyping

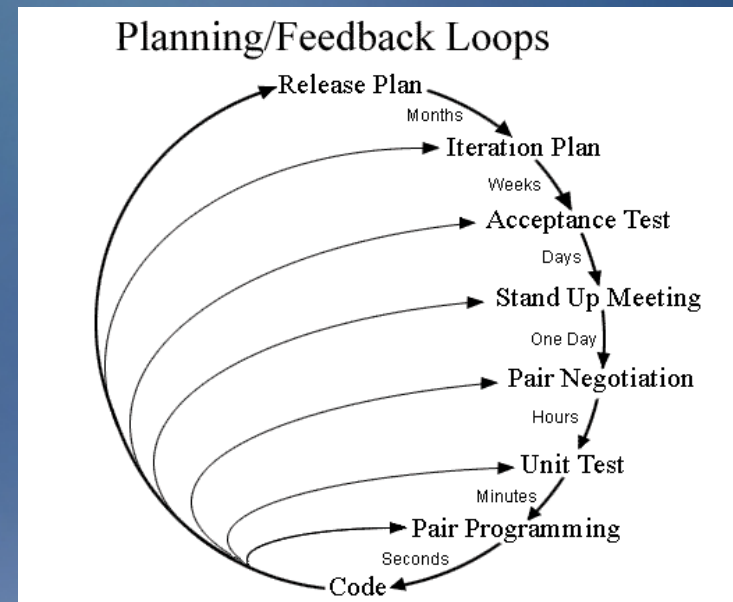
- Extreme Programming (XP)



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Macro System Paradigms

- Extreme Programming (XP)
 - Frequent releases
 - Short development cycles
 - Changing customer requirements
 - High user acceptance
 - Quick wins



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Specifications for Macro Systems



How the customer
explained it



How the analyst
designed it



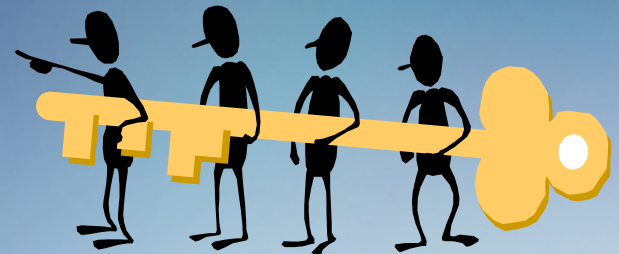
What the customer
really needed



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Specifications for Macro Systems

- Who is creating specifications (specifications via group)
 - Technical / expertise knowledge
 - Size
 - Small → efficient
 - Large → comprehensive
 - Types
 - Enforced ⇔ pleased
 - Skills
 - Functions
 - Empowered



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Specifications for Macro Systems

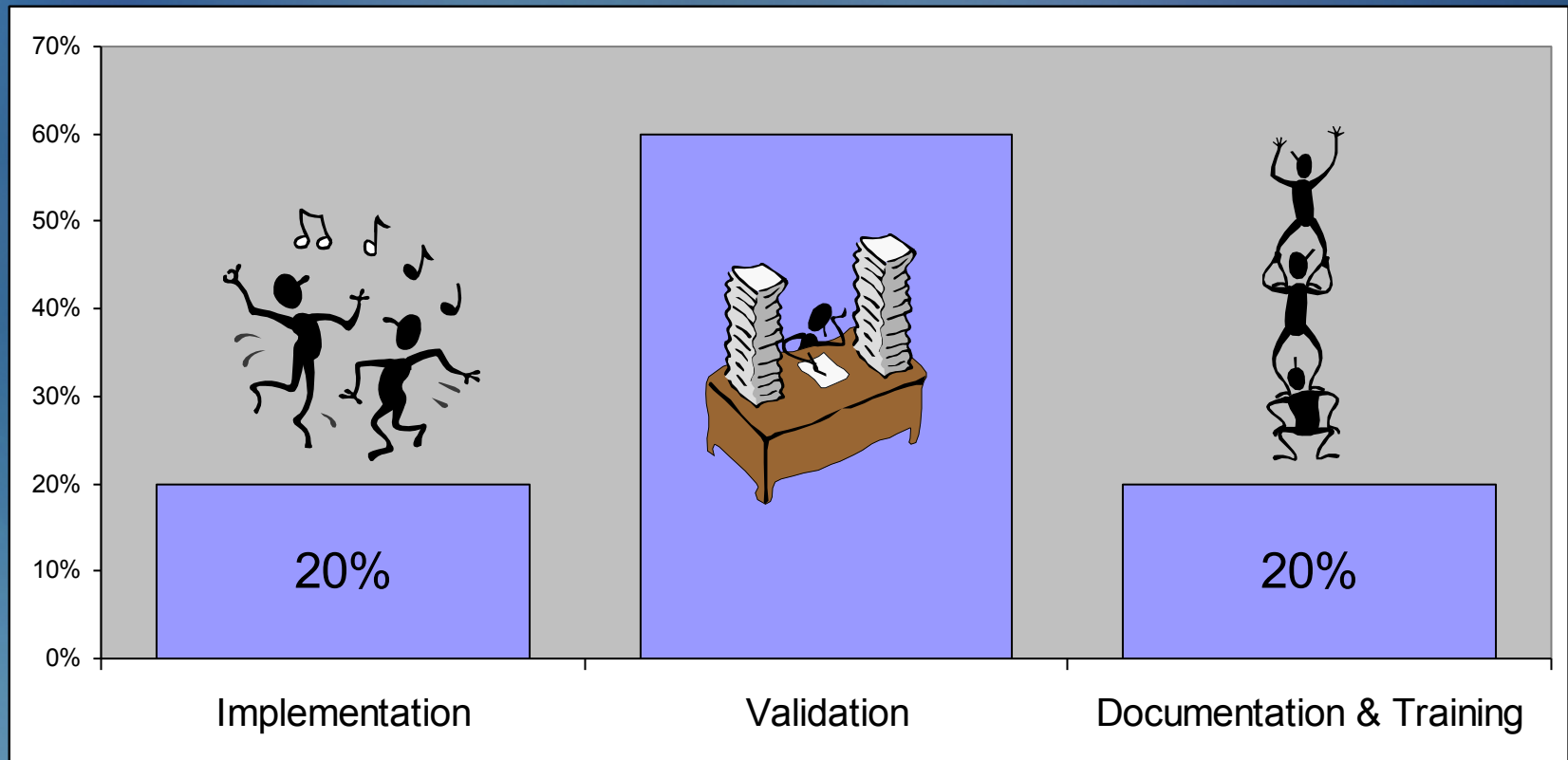
- How is the specification
 - Technical, content wise
 - Detailed, strict, interpretation open
 - Exception handling



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Implementation

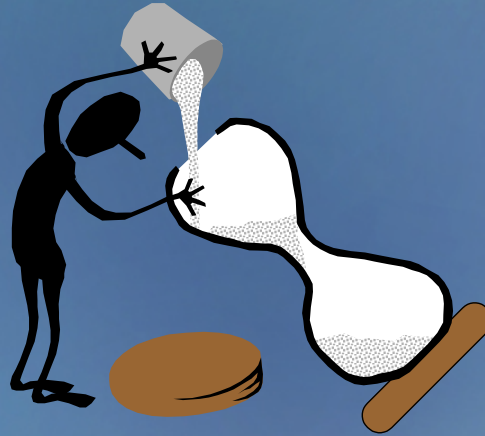
- Phases and motivation during implementation



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Rollout – Background of Users

Daily work



Training sessions

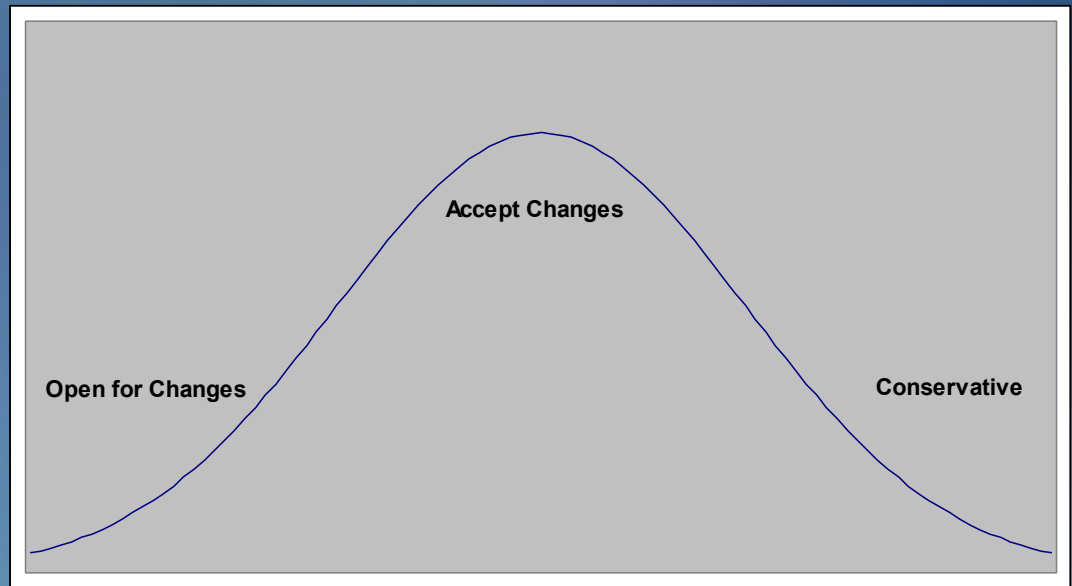
Learning Curve



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Rollout – Background of Users

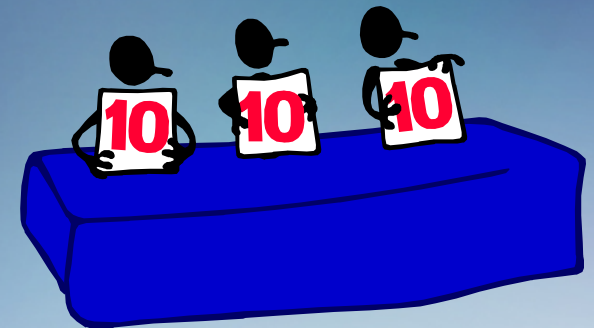
- Open for changes
- Accept changes
- Conservative



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Rollout – Motivation of Users

- “Fun” part
- User-friendly
- From-Ourselves-For-Ourselves
 - Specification / Implementation
- Embedding in enhancement cycle
 - Change request lists (easy to address)
- Management support
 - Enable / force learning time
- Confidence into the system
 - No black box



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Additional Tips

- Collect any idea
- Get new ideas through students
 - Investment will gain value
- Focus on users



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Summary

- General principles (SAS macros, GUI, inhouse, ...)
- Teams as small as possible
- Rapid Prototyping / Extreme Programming for fast benefits
- Continues improvements through user ideas
- Focus on Users



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Make your users happy!!!

