Introducing Component-Based Templates into a Game Authoring Tool

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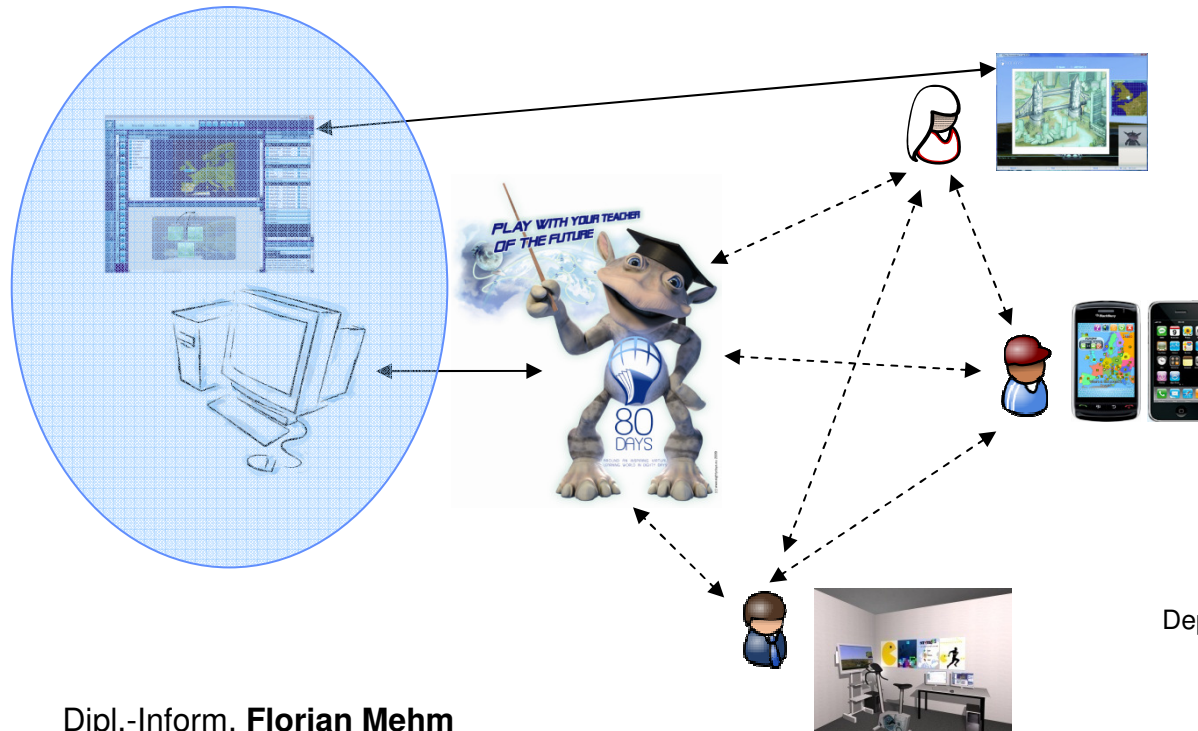
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Hessian Telemedia Technology
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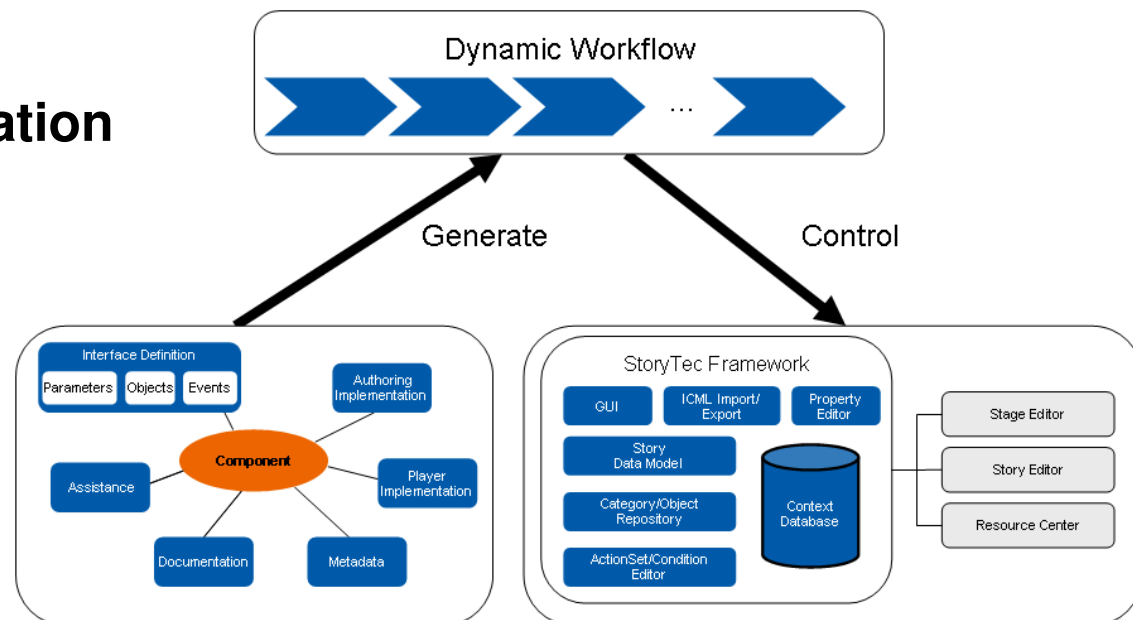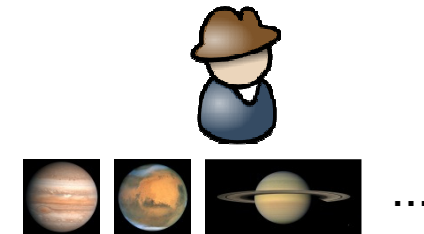www.KOM.tu-darmstadt.de

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Overview

- **Motivation**
- **Concept**
  - StoryTec Framework
  - Dynamic Workflows
  - Components
- **Prototypical Implementation**
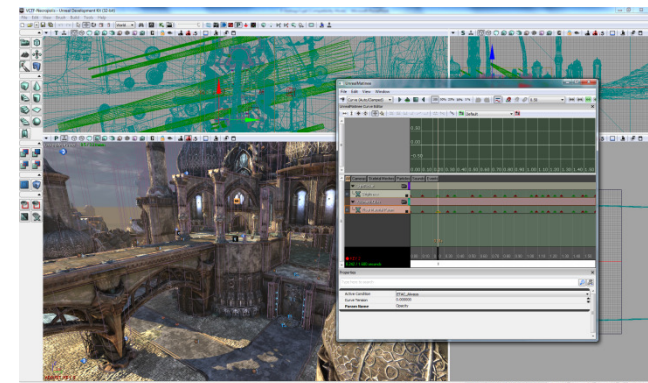- **Conclusion**

Motivation

Subject Matter Expert

- Has learning content
- Wants to integrate it into a Serious Game
- Has no programming experience

Common game authoring tools are complicated

- Specialized
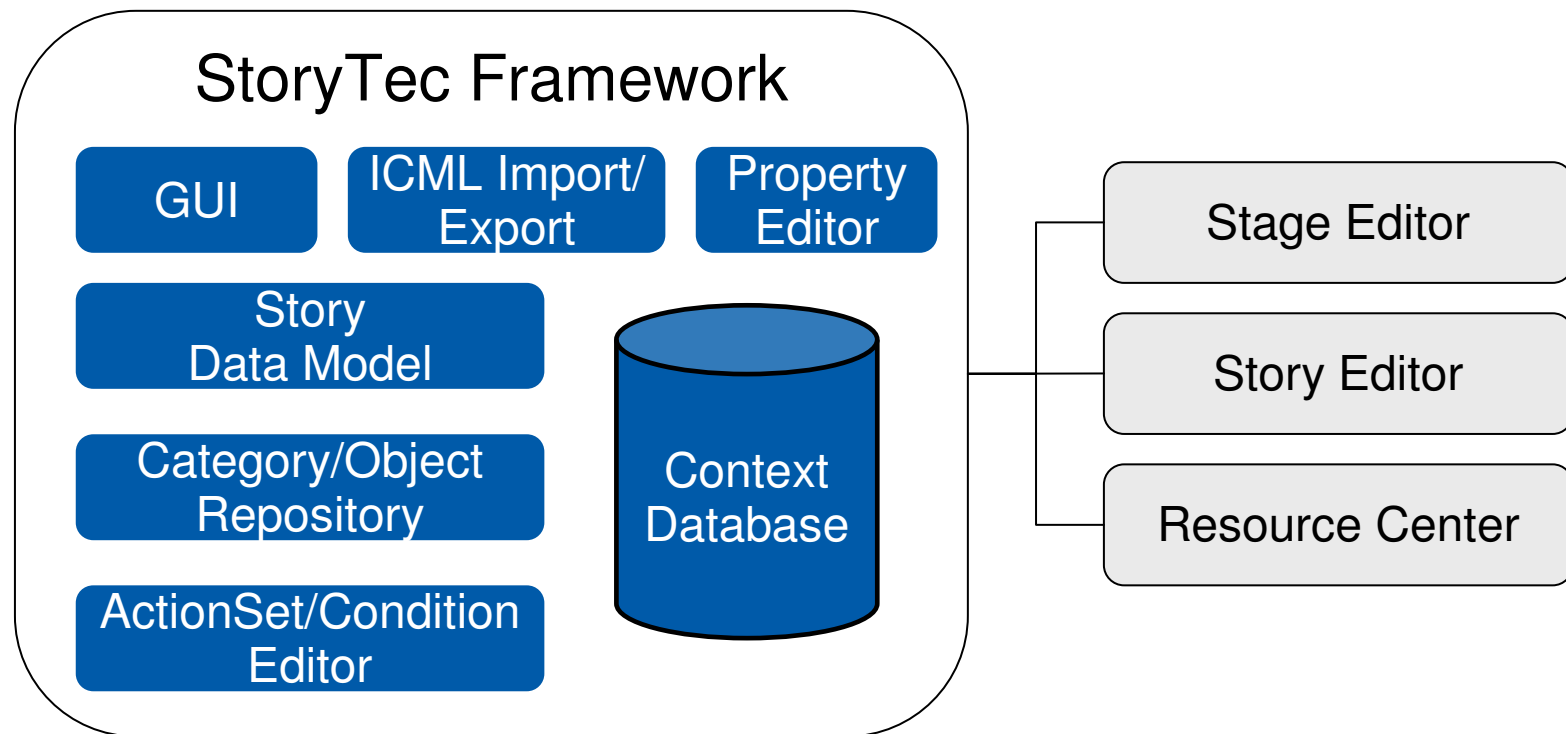- Rely on programming languages

Various target platforms

Previous Results (ECGBL 2010, …)

Narrative Game-Based Learning Objects

Testing environment for Serious Games (Bat Cave)

StoryTec Framework

| GUI | ICML Import/Export | Property Editor |

Story Data Model

Category/Object Repository

Context Database

ActionSet/Condition Editor

Stage Editor

Story Editor

Resource Center

Extended Motivation

Authoring for different purposes

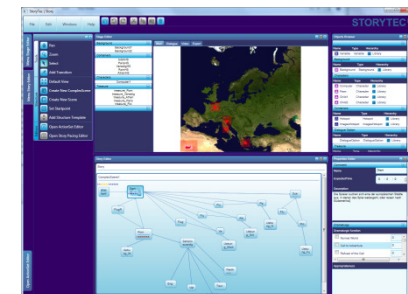- Digital Educational Games
- Games for Health
- Vocational education
- …
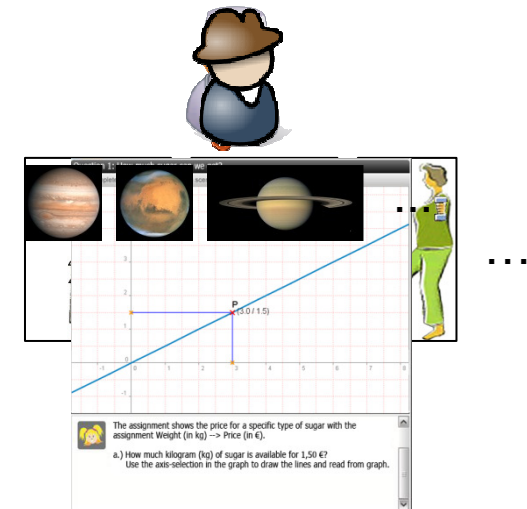
StoryTec still too complicated (for some)

- Introduce novices
- Reduce the authoring complexity

Concept

Dynamic Workflow

Generate

Control

Interface Definition

Parameters | Objects | Events

Authoring Implementation

Component

Assistance

Player Implementation

Documentation

Metadata

StoryTec Framework

GUI | ICML Import/ Export | Property Editor

Story Data Model

Category/Object Repository

Context Database

ActionSet/Condition Editor
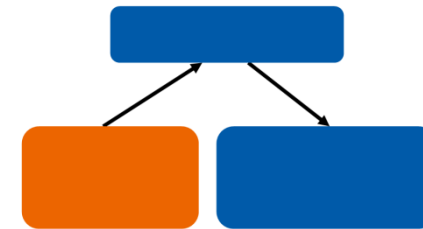
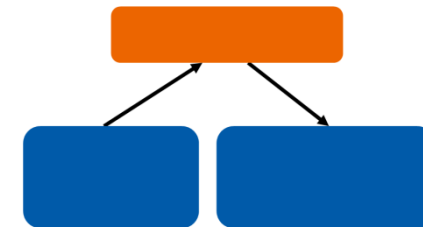Stage Editor

Story Editor

Resource Center
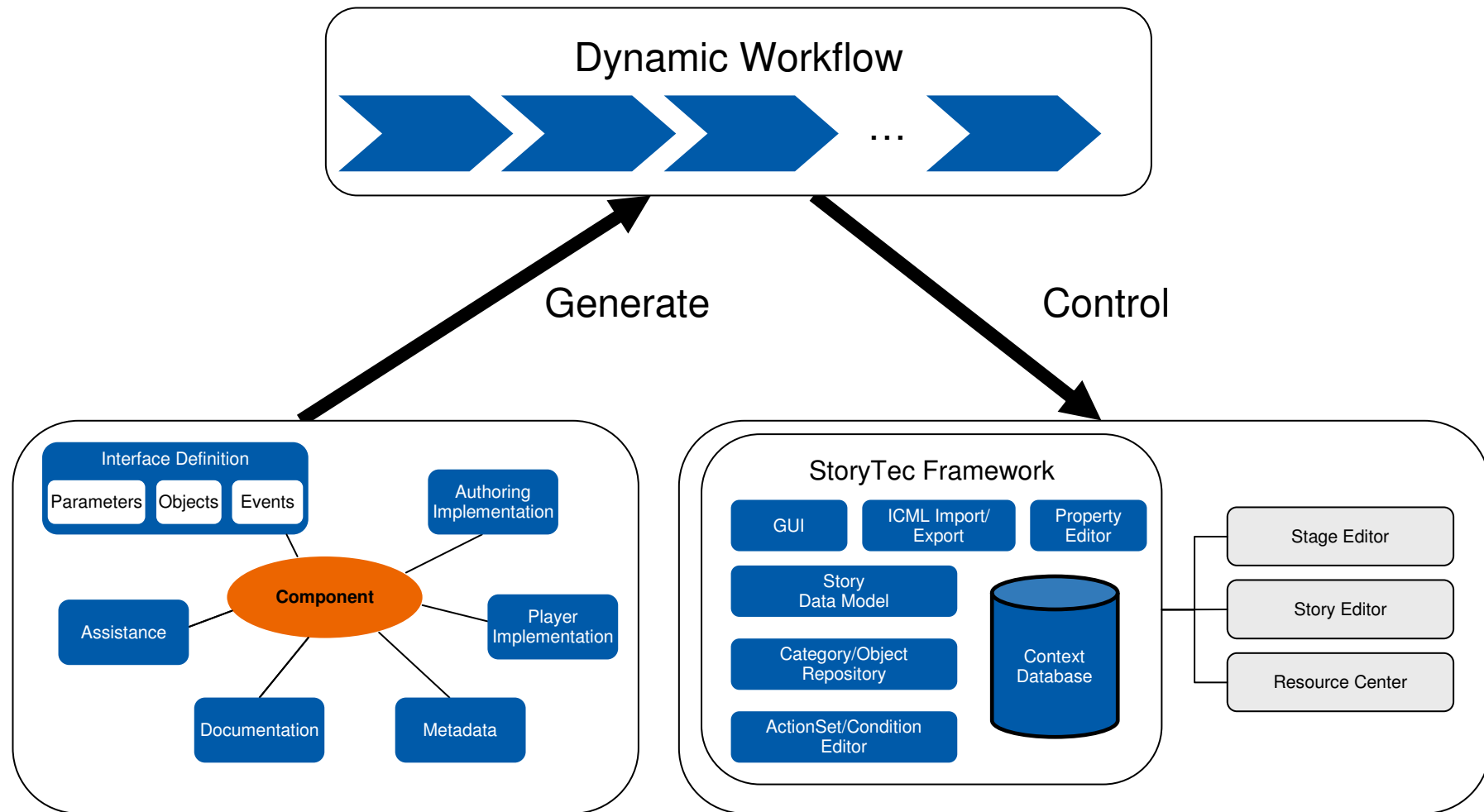
Related Work

Components in Game Development/Authoring

- EDoS: An authoring environment for serious games design based on three models [TGM10]
- Living Machinery - Advantages of Webble Technologies for Teaching and Learning [FH+10]
- Interactive Multimedia Learning. Shared Reusable Visualization-based Modules. [ElS01]
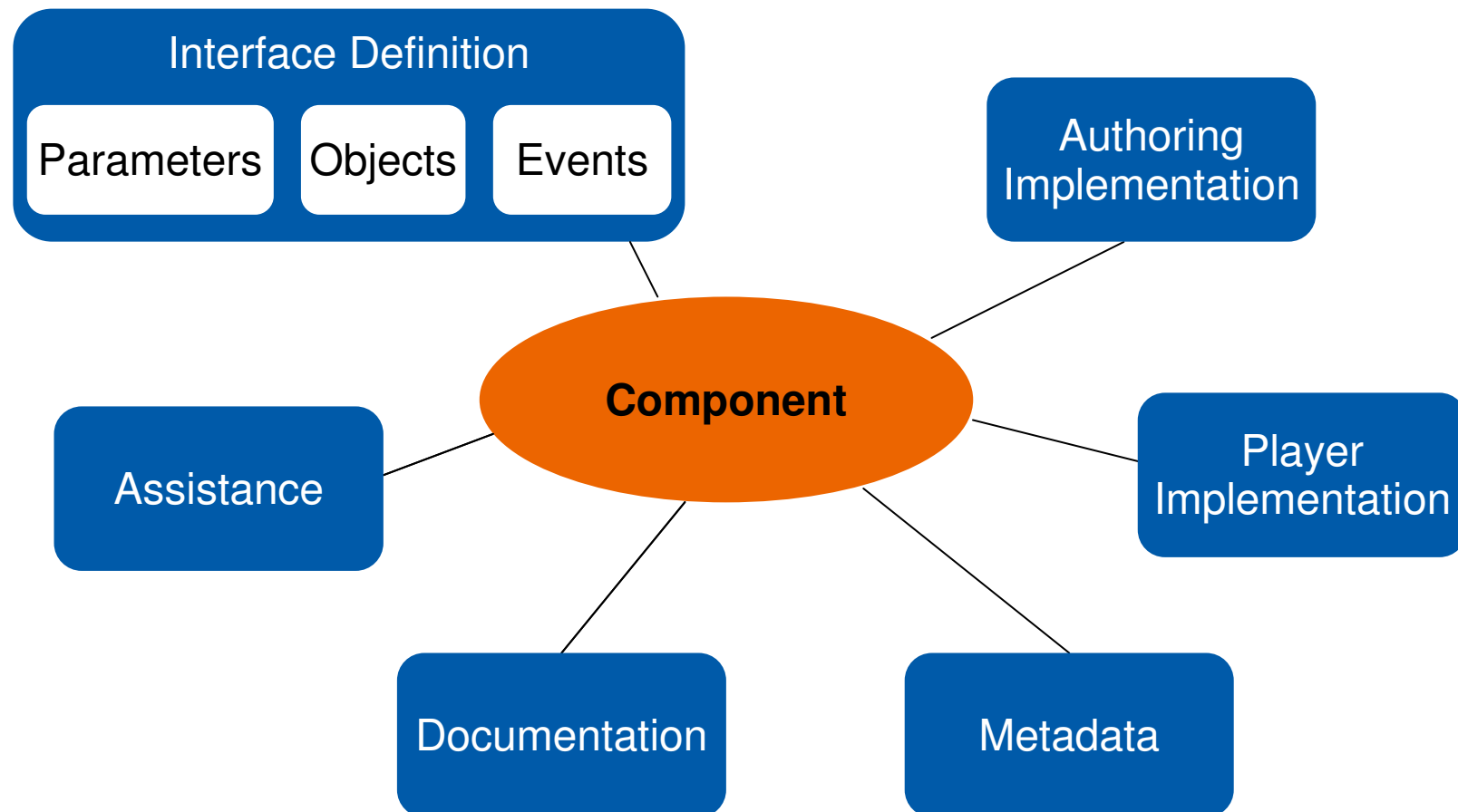
User Assistance in (Game) Authoring

- Stencils-based tutorials: design and evaluation [KP05]
- e-Training DS: An Authoring Tool for Integrating Portable Computer Science Games in e-Learning [TM+10]
- Pattern-basierte Prozessbeschreibung und -unterstützung: Ein Werkzeug zur Unterstützung von Prozessen zur Anpassung von E-Learning-Materialien [Z08]

Game Components - Overview

Interface Definition

Parameters | Objects | Events

Component

Authoring Implementation

Player Implementation

Assistance

Documentation

Metadata
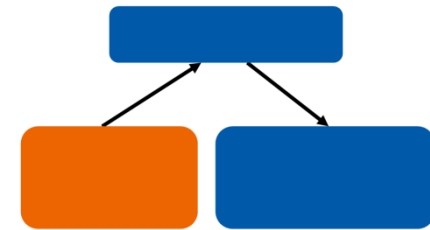
Concept Considerations

Frame Games [ST80]

- Board game templates that can be filled
  with educational content

→ **Implementation in game authoring tools as software components**

Utilize aspects of components (cf. [Szy97])

- Separation of concerns
- Substitutability
- Self describable
- Tool support

Separation of Content and Presentation

Authoring in an abstract and easy environment

Variation of interaction by different implementations

- 2D authoring vs. 3D gameplay
- Different interaction types
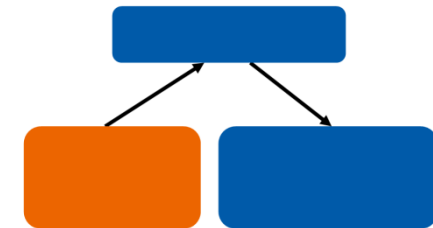
Portability

- Programmers utilize well-defined interfaces
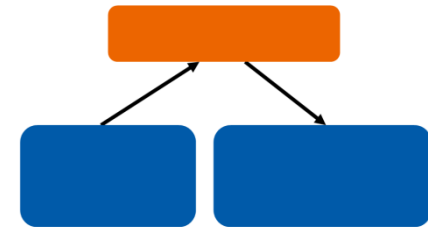- Possibility for different interpretation or adaptation of content for different platforms

Documentation

Assist in choice and correct usage

- Short summary
- Demonstration video
- Required content
- Involved object types

Can partly be automated

- Required content/object types from interface definition
- Steps required to fill with valid values (based on wizard)

Assistance for Novice Users

Wizards

- Standard tool for automating software for novice users
- Can be partly automated (based on interface definition)
- Users can follow the automated processes to learn about the system
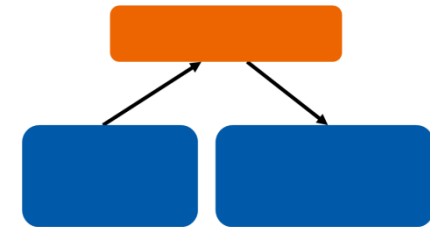
Task Lists

- For processes too complex for a wizard structure
- Overview of all (optional) tasks
- Sub-Tasks carried out by individual wizards
- Contextual information
- Indicators for progress (where is action necessary)

Example: „Buchstabensalat"

The objective is to arrange the letters to form the correct word („Datterich")

Alternative representation: 3D with individual letters on turnable wheels

A 4-step workflow can be generated:

Choice → Content → Parameters → Events

Codewort9_L2
Time complete game 00:02:36 | Time scene 00:01:23

d h t c i C C d h

Vorhandene Buchstaben:d,a,i,c

Codewort9_L2
Time complete game 00:03:34 | Time scene 00:02:21

d a t t e r i d h

Vorhandene Buchstaben:d,a,i,c

Example Workflow – Choice of Component

Choice → Content → Parameters → Events

Interface Definition

Parameters | Objects | Events

Documentation

Choose gameplay

Please choose the gameplay for this scene:

Word Puzzle
First Person Adventure
Pidgeon Hunt

Word Puzzle

Description: Arrange letters to form the correct word.

Preview:

d a t t e r i d h

Vorhandene Buchstaben:d,a,i,c

Required objects: Background Image (1)

Parameters: Correct Word

Events: Correct Solution, Incorrect Solution

Use this gameplay!

Example Workflow: Content Integration
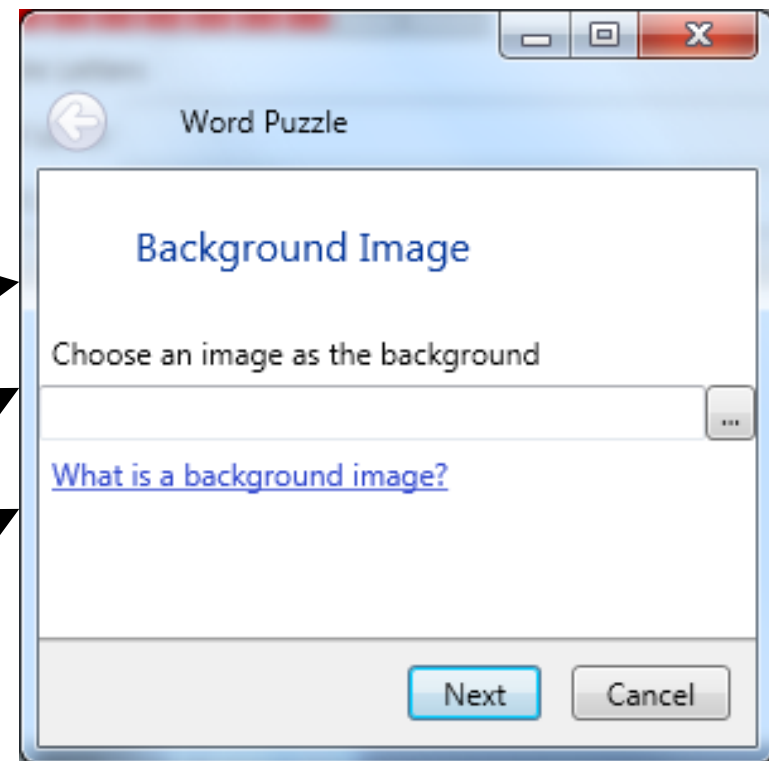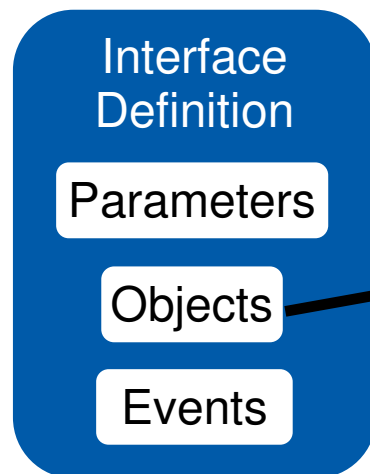
Example Workflow: Parameters

Choice   Content   Parameters   Events

Interface Definition

Parameters

Objects

Events

Assistance

Documentation

Word Puzzle

Correct Solution

Please enter the correct word:

Datterich

What`s this?

Next   Cancel
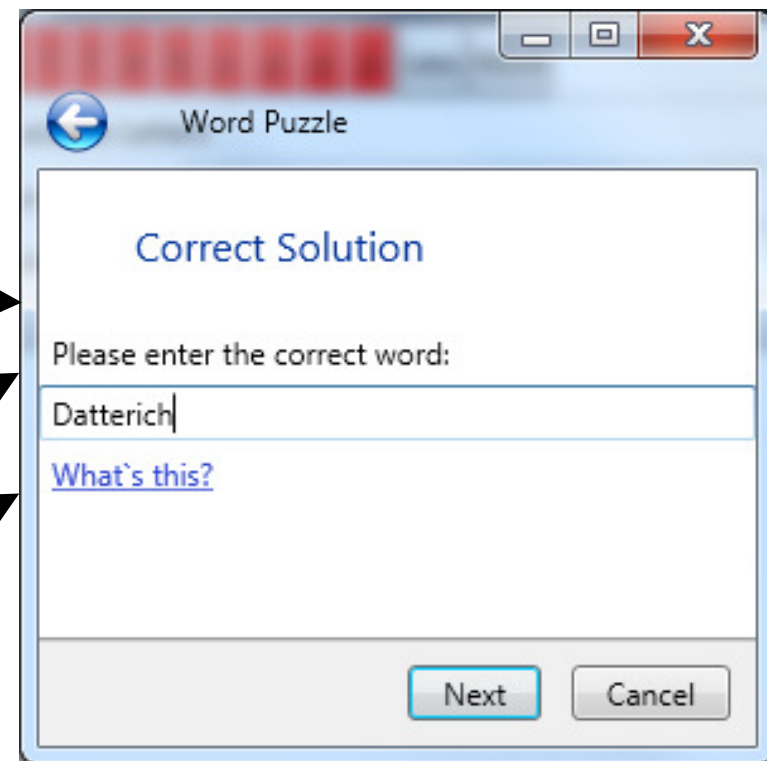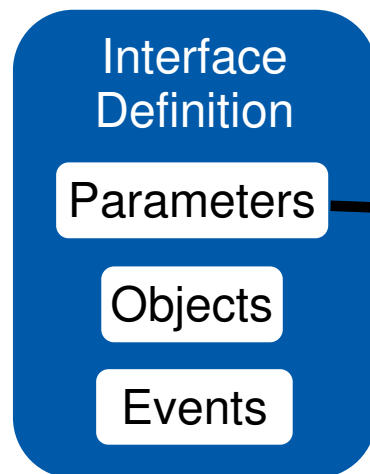
Example Workflow: Events

Choice   Content   Parameters   Events

Interface Definition

Parameters

Objects

Events

Assistance

Documentation

Word Puzzle

Event

Please choose the reaction to the event

Correct solution [A]

What`s this?

Next   Cancel
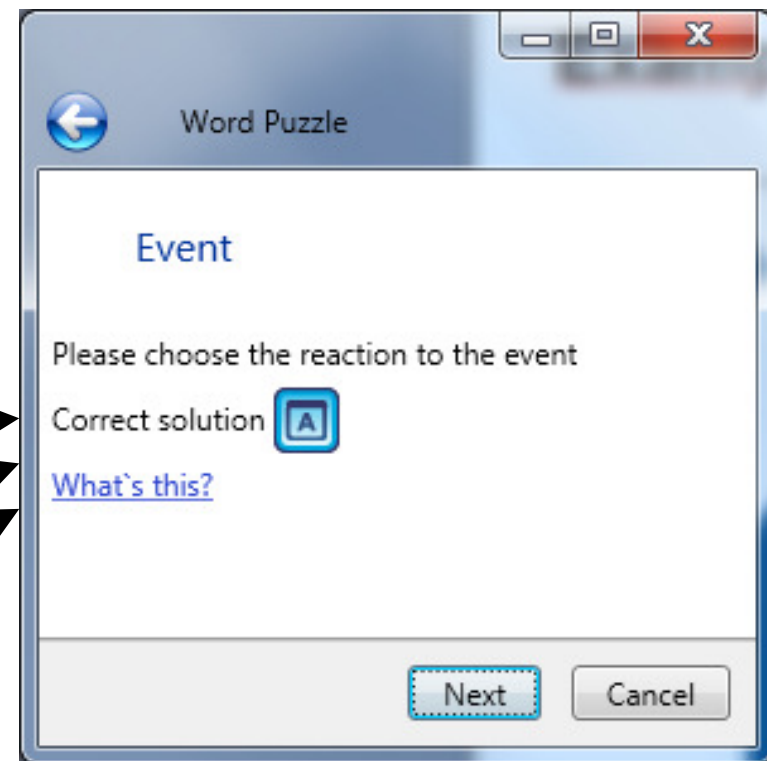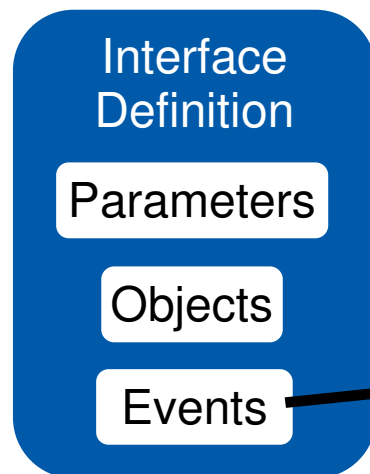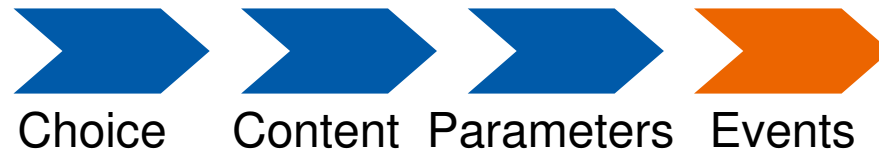
Summary
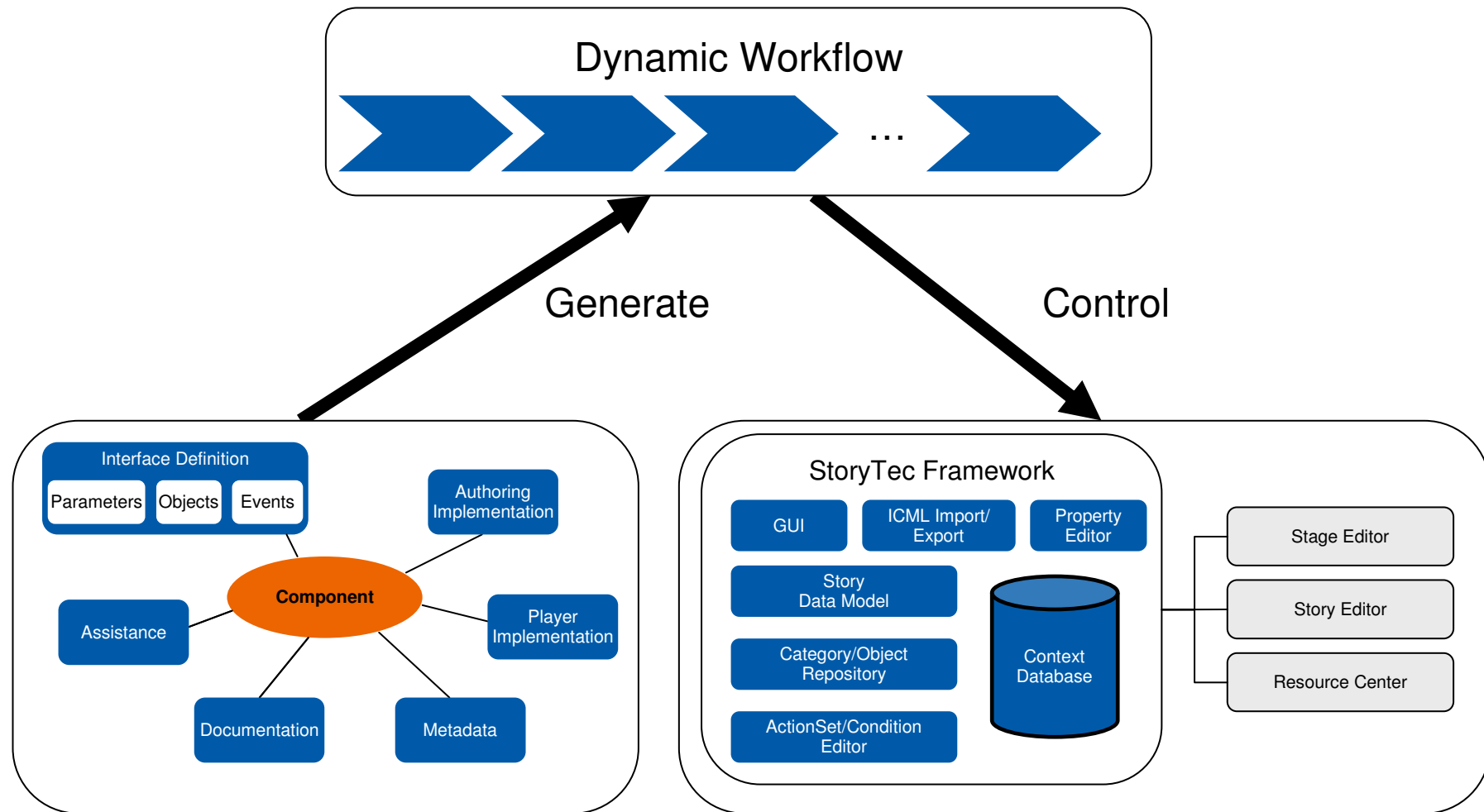
Results – Authoring Tool

StoryTec tool implementation has substantially grown

Public presentation

- Trade fairs
- Conferences [Meh10], [MG10], [MGS10], [MWGS10], [MWR+10]
- Dedicated web site www.storytec.de
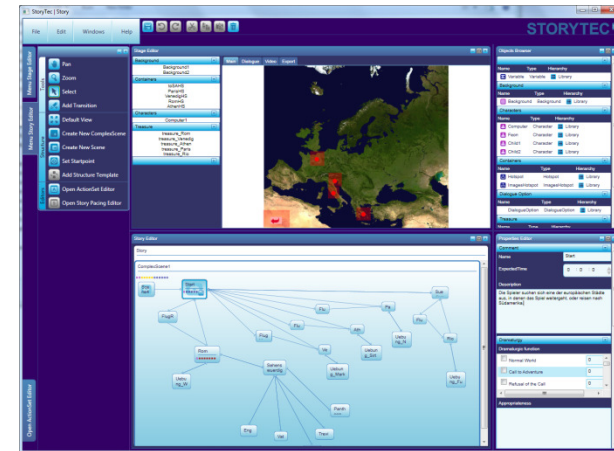
Evaluation

- 2 usability studies
- 1 focus group study

Results – Proof of Concept

Re-Authoring of a commercial Digital Educational Game [MWR+10]

- Adaptation & personalization
- Maintainability and extensibility
- Rapid prototyping and testing using Bat Cave
- Portability

Separation of content and presentation

- Different interaction paradigms for different devices
- Abstract authoring in 2D for 3D gameplay

Results – Existing Components in StoryTec

Prototype in Bat Cave

- Game Design called for very specific gameplay
- Simulation of a flight across the Earth
- More efficient to implement directly than to solve generically
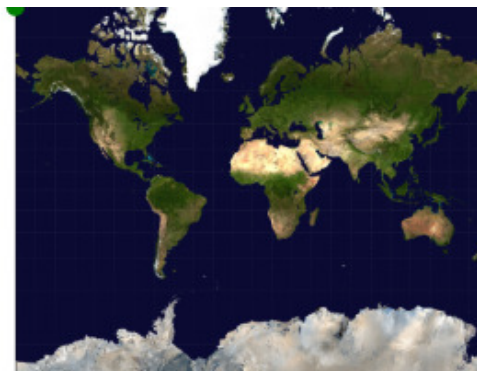
Distance to target: 16.000 km
Flight speed: 695 km/h

Enter departure time:

Later

29.02.2012 18:00:00

Earlier

Start Simulation

Results – Testing Environment

„Bat Cave" demonstrator realized using StoryTec

- Authoring effort small for a practiced user
- Rapid prototyping and authoring
- Proof of concept for Narrative Game-Based Learning Objects concept and technical platform

Bat Cave Player application as a testing and evaluation platform [MWGS10]

- Simple games and interactive presentations
- Monitoring and tweaking of algorithms

Conclusion

Concept

- Components in game authoring
- Dynamic workflows for leading novice users
- Utilize component properties
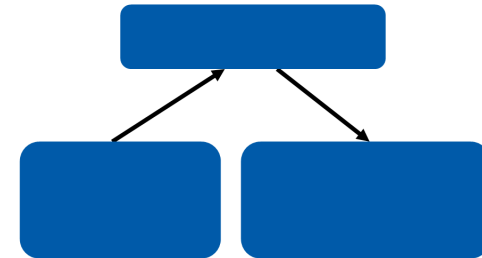
Results

- Concept partially validated in projects and publications
- Prototypical implementation as basis for further steps
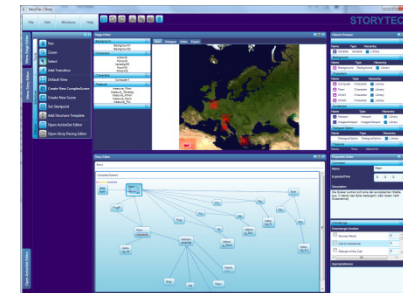
Evaluation

- First studies indicate that authoring effort can be reduced using this approach

Thank you for your attention.
Any questions?

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[Z08] B. Zimmermann: *Pattern-basierte Prozessbeschreibung und -unterstützung: Ein Werkzeug zur Unterstützung von Prozessen zur Anpassung von E-Learning-Materialien*. **2008.**

Appendix: Image sources

Slide Motivation

Saturn: http://en.wikipedia.org/wiki/File:Saturn_during_Equinox.jpg

Mars: http://en.wikipedia.org/wiki/File:Mars_Hubble.jpg

Jupiter: http://en.wikipedia.org/wiki/File:Jupiter.jpg

Sicher zu Hause bewegen - Sturzgefahren erkennen und vorbeugen. AOK. wdv Medien und Kommunikation GmbH. Bad Homburg. 2007