Concurrent Design Approach to the Design of Customized Corporate E-Learning

Thesis
for the degree of philosophiae doctor

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Trondheim, Norway

Outline

• Introduction
• Research Context and the R&D projects
• Research Questions
• Research Methods
• Papers
• Identified Contributions
• Connections in the Research
• Evaluation of the Research
• Concluding Remarks and Further Work
Introduction

- I have followed the PhD-program at the Department of Computer and Information Science (IDI) at NTNU.
- My employer has been the Faculty of Informatics and e-Learning (AIgE) at HiST.
- Supervisors
  - Arvid Staupe <> main supervisor.
  - Torbjørn Skramstad <> co-supervisor.
  - Geir Maribu <> co-supervisor.

An initial analysis of the title:
Concurrent Design Approach to the Design of Customized Corporate E-Learning?

- What is Customized Corporate E-Learning?
- What is a Concurrent Design Approach?
Research Context and the R&D projects

- **BITØK/EIK**
  - An internal project where HiST/AIteL, NTNU/IDI, and TISIP worked to deliver customized corporate e-learning within IT and economics.

- **CCeD**
  - A Norwegian project where HiST/AIteL, NTNU/IDI, and TISIP received financial funding from the Norway Opening Universities.

- **UnderstandIT**
  - An EU-based project where HiST/AIteL collaborated with six European partner institutions to develop customized training programs to increase ICT competencies among Vocational Education and Training teachers.

Research Questions

- **The overall research aim:**
  - To contribute with basic motivation, implementation experience, and requirements for practical realization, regarding methodological approaches for concurrent design of e-learning deliverables for corporate clients.

- **Research questions**
  - Research question I deals with basic motivation.
  - Research question II deals with implementation experience.
  - Research question III deals with requirements for practical realization.
Research Methods

Design-based research
(also called development research)

- Analysis of Practical Problems by Researchers and Practitioners
- Development of Solutions with a Theoretical Framework
- Evaluation and Testing of Solutions in Practice
- Documentation and Reflection to Produce “Design Principles”

Refinement of Problems, Solutions, and Methods

The Design-based Research Approach - Inspired by Thomas Reeves

Papers

- Paper one
- Paper two
  - Design of Customized Corporate E-Learning. Seminar.net - International journal of media, technology and lifelong learning
- Paper three
  - The Concurrent E-Learning Design Method. Proceedings of Global Learn Asia Pacific 2010
- Paper four
- Paper five
- Paper six

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Identified Contributions

• Contribution one
  Detected motivation and conditions for applying a concurrent design approach to the design of customized e-learning for corporate clients.

• Contribution two
  The concurrent e-learning design method.

• Contribution three
  Experience from using action research as a means of introducing new artifacts at higher education institutions.

• Contribution four
  - Requirements and guidelines for concurrent design of customized corporate e-learning. Which includes:
    - Part 1 – 16 principles of concurrent e-learning design.
    - Part 2 – Some prescriptive approaches that should be considered for distributed workspaces.

Connections in the research

Connections between Questions, Papers, and Contributions
Evaluation of the Research

• Evaluation of each research question, as well as the research methods used to answer them.
• Evaluation of each of the four research contributions.
• Evaluation of Trustworthiness
  – **Problem relevance** <> to what extent is there a need for the provided contributions.
  – **Utility and credibility** <> whether the presented solutions work and what evidence I possibly can show.
  – **Novelty** <> whether the solutions are sufficiently original and innovative.
  – **Generalizability** <> whether the results of this work may be used in another context

Concluding Remarks and Further Work

• The overall picture of the research presented in this thesis:
  – Initially, a basic motivation is identified.
    • This states that corporations have an increasing need for employees with appropriate competencies in today's knowledge-based economy, and that HEIs can take part in this market by offering e-learning-based training and education customized to the needs of the corporate clients.
  – Then, concurrent design is proposed as a topical approach to the design of holistic e-learning deliverables customized for corporate clients.
    • This approach involves collaboration between relevant stakeholders who use modern computer-supported tools and aim to produce high quality results in a time- and cost-effective manner.
  – Based on this, a concurrent design approach to the design of customized corporate e-learning is defined and described as a method (a design science artifact).
  – Next, this approach is tested in a number of specific (action research) projects.
    • Within these projects the educational provider collaborates with client representatives to design and develop e-learning deliverables.
  – Finally, the data collected during the previous phases of the doctoral project are the subject of a qualitative analysis.
    • This leads to a description of the requirements and guidelines for concurrent design of customized corporate e-learning.
Concluding Remarks and Further Work…

Further Work…

Questions?

Thank you for your time!

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What is Customized Corporate E-Learning?

Some requirements for successful implementation of customized corporate e-learning:

- Adaptation of academic content and learning outcomes.
- Adaptation of pedagogy and learning activities.
- Use of various technologies that support a range of activities relevant for learning, teaching, coaching, assessments, administration, evaluations, and marketing.
- Flexibility so that busy lifelong learners have the possibility to participate, preferably anytime and anyplace.
- A sustainable business model which contributes to attractiveness for all stakeholders.
- Access to services that allow participants to find answers and perform tasks that arise.
- Management involvement from both the customer and supplier.

What is a Concurrent Design Approach?

A Concurrent Design Approach

Facility

Process

Roles

Models

Infrastructure

Tools
The process

The process...
Roles

Management level

Supplier responsible
Client responsible

Steering level

Project manager
Facilitator
Steering committee

Execution level

Participating model developers
Student(s)
Customer representative(s)

Roles

Supplier responsible
Client responsible
Project manager
Facilitator
Steering committee
Participating model developers
Student(s)
Customer representative(s)

Subject matter expert(s)
Instructional designer(s)
Technical delivery expert(s)
Business expert(s)

Models

Knowledge model
Instructional model
Technical delivery model
Business model

Section I: The situation
Section II: Possibilities
Section III: Solutions
Section IV: Design
Section V: Completion

Design document

Models

Knowledge model
Instructional model
Technical delivery model
Business model

Section I: The situation
Section II: Possibilities
Section III: Solutions
Section IV: Design
Section V: Completion

Design document
Tools

Infrastructure
Research question I

--- Basic motivation ---

Why should HEIs apply a concurrent design approach when they aim to deliver e-learning to corporate clients?
Research question II

--- Implementation experience ---

How should a concurrent design approach for the development of customized e-learning for corporate clients be materialized? I.e. how should this approach initially be described, and how should it eventually be tested and evaluated?

Research question III

--- Practical realization ---

What are the key requirements for a concurrent design approach to the design of customized e-learning for corporate clients?
Analysis of Practical Problems
(by Researchers and Practitioners)

- Exploratory research to formulate research questions.
- Search for secondary data (literature review)
- Collection of primary data:
  - Observations
  - Surveys
    - Questionnaires
    - Interviews

Development of Solutions
(with a Theoretical Framework)

- Seven design science research guidelines from Allan Hevner et al. (2004):
  - Guideline 1 - Design as an Artifact
  - Guideline 2 - Problem Relevance
  - Guideline 3 - Design Evaluation
  - Guideline 4 - Research Contributions
  - Guideline 5 - Research Rigor
  - Guideline 6 - Design as a Search Process
  - Guideline 7 - Communication of Research
Evaluation and Testing
(of Solutions in Practice)

The Cyclical Process Model of Action Research
Inspired by Gerald Susman and Roger Evered

Documentation and Reflection
(to Produce “Design Principles”)

Use of NVivo 9 for Qualitative Data Analysis and Coding
Contribution one

- Detected motivation and conditions for applying a concurrent design approach to the design of customized e-learning for corporate clients.
- This includes the following:
  - There is a market for customized e-learning for corporate clients and it is natural for HEIs to join this market.
  - Multiple stakeholders (including customers) should ideally be involved in designing such educational programs.
  - We should involve experts who represent different aspects of the educational program, i.e. experts on themes such as the subject domain and the content, pedagogy, technical delivery, economics, and administration.
  - Such e-learning deliverables are typically made up of various ICT-based products and services.
  - A concurrent design approach seems to be applicable, and this requires detailed planning.

Contribution two

- The concurrent e-learning design (CCeD) method.
- CCeD is primarily based on experience of instructional design and industrial concurrent design and it is described along six dimensions:
  - The Process ↔ a Process Description that describes the focus areas for CCeD-projects throughout the project cycle.
  - The Roles ↔ a list of needed roles with corresponding responsibilities.
  - The Models ↔ the instructional model, the knowledge model, the technical delivery model and the business model.
  - The Tools ↔ general tools to help articulate the work and expert tools to produce design-deliverables.
  - The Facility ↔ a physical room with necessary technical equipment.
  - The Infrastructure ↔ a secure online workspace for the exchange of project information, documentation and other resources.
Contribution three

• Experience from using action research as a means of introducing new artifacts at HEIs. Here is a shortened version of the most important experience acquired in this regard:
  – Action research contributes to formalism and serves as a guideline.
  – An established agreement between researcher(s) and client(s) is important.
  – Detailed knowledge of client requirements and expectations helps to ease the project implementation.
  – It is recommended to follow the cyclical process model of action research.
  – It is important to provide information and training to the participants.
  – The three steps: (1) action planning, (2) action taking, and (3) evaluation must be repeated several times.
  – The reflecting step can typically be implemented as dedicated workshops.
  – Consider the use of several different techniques to collect most pertinent information.
  – Expect changes and be always prepared to re-plan the actions.
  – Take into account the dual imperatives of action research.
  – Action research is well suited when new artifacts are to be introduced and adapted into an organization.

Contribution four – part 1

• Requirements and guidelines for concurrent design of customized corporate e-learning.
Contribution four – part 2

- Requirements and guidelines for concurrent design of customized corporate e-learning.

Connections in the research - I

From Research Question 1 to Contribution 1
Connections in the research - II

From Research Question 2 to Contribution 2 and Contribution 3

Connections in the research - III

From Research Question 3 to Contribution 4
## Principle of Concurrent E-Learning Design

<table>
<thead>
<tr>
<th>Categories</th>
<th>Principles</th>
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<tbody>
<tr>
<td>Adaption to the Surroundings</td>
<td>The principle of defining project deliveries.</td>
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<td></td>
<td>The principle of defining participants and roles.</td>
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<td></td>
<td>The principle of defining activities.</td>
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<td></td>
<td>The principle of defining the project infrastructure.</td>
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<tr>
<td>Stakeholders</td>
<td>The principle of different roles and sufficient authority.</td>
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<td></td>
<td>The principle of multidisciplinary cooperation.</td>
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<tr>
<td>Activities</td>
<td>The principle of training and preparation.</td>
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<td>The principle of session plans.</td>
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<td>The principle of sessions.</td>
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<td>The principle of working activities between the sessions.</td>
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<tr>
<td>Infrastructure</td>
<td>The principle of a concurrent design facility.</td>
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<td>The principle of general tools.</td>
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<td>The principle of expert tools.</td>
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<td>The principle of common information spaces.</td>
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<tr>
<td>Results</td>
<td>The principle of requirements for intermediate results.</td>
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<tr>
<td></td>
<td>The principle of requirements for the final results.</td>
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Contributions for Understanding IT (UnderstandIT) project team