A Team-Approach to Putting Learner-Centered Principles to Practice in a Large Course on Human-Computer Interaction

Paper: http://cs.univie.ac.at/vda/publikationen/publikation/infpub/4765

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Learner-centered instruction

• Key ideas:
  - Primary focus on the learner
  - Active, reflective, and collaborative learning

• 14 Learner-Centered Psychological Principles by APA [1]

• General experience:
  - higher learning effects
  - higher effort to teach
  - Works well for small-ish classes (20-30 students)

How can we effectively and efficiently design large classes as learner-centered as possible?
Our Contribution

- **Case Study**
  - of putting 14 APAs learner-centered principles into practice in a large course (~200 students) on Human-Computer Interaction

- **(Primary) Method:**
  - Analysis of ongoing student feedback
  - **Reaction sheets** (overall 433 | avg.: 10.6 per unit)

- **Summative Evaluation:**
  - rated by students as the best large CS course in 2015
  - univie teaching award (best 6 out of 7000)

- **Goal**
  - inspire others in similar situations
Outline

1. Overview over Course Layout
2. 3 Core Building Blocks
3. Discussion & Limitations
Outline

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Human-Computer Interaction Class

• **Content:** Human-centered design process, usability, …

• **Student project:** Iteratively designing, implementing, and testing a mobile app
Human-Computer Interaction Class

• Scale
  - \textbf{200 students} (4 groups á 50 students)
• 3h mixed lecture-lab Bachelor course
• Many different components:
  - team project with 4 milestones
  - individual exercises
  - in-class exercises
  - online reaction sheets
  - etc.
Outline

1. Overview over Course Layout
2. 3 Core Building Blocks
3. Discussion & Limitations
Learner-Centered Layout [1]

1. Nature of the learning process
2. Goals of the learning process
3. Construction of knowledge
4. Strategic thinking
5. Thinking about thinking
6. Context of learning
7. Motivational and emotional influences on learning
8. Intrinsic motivation to learn
9. Effects of motivation on effort
10. Developmental influence on learning
11. Social influences on learning
12. Individual differences in learning
13. Learning and diversity
14. Standards and assessment

In the paper:

• For each principle — how we addressed it

Today:

• 3 core building blocks — illustrate principles
Building Block 1: Well-integrated team project
Building Block 1: Well-integrated team project

- Teams of 3-4 students
- Goal: iteratively design and test a mobile application
- 4 milestones
  - Milestones carefully synced with lectures’ content
- Constant feedback and discussion
  - Every week: In-class presentations & feedback groups
  - Quick turnaround of Milestone submission
Principles addressed

1. Nature of the learning process
2. Goals of the learning process
3. Construction of knowledge
4. Strategic thinking
5. Thinking about thinking
6. Context of learning
7. Motivational and emotional influences on learning
8. Intrinsic motivation to learn
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Principles addressed

1. Nature of the learning process
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3. **Construction of knowledge**
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**Principle:** Construction of knowledge

**APA:** “The successful learner can link new information with existing knowledge in meaningful ways” [1].
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“In the student presentations, it was clearly visible that they had learned from previous mistakes to further improve their own tool.”

Excerpt from reaction sheet
Building Block 2: Rich communication channels
**Building Block 2: Rich communication channels**

- Reaction sheets
  - always discussed at beginning of class
  - mutual discussion to inform course of action
- project consulting
- online forum
- Facebook groups
- ...
- *on par communication* between students and instructors
Principles addressed

1. Nature of the learning process
2. Goals of the learning process
3. Construction of knowledge
4. Strategic thinking
5. Thinking about thinking
6. Context of learning
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**Principle:** Social influences on learning

**APA:** “Learning is influenced by social interactions, interpersonal relations, and communication with others” [1].

“At the beginning the audience was not very active. Then we were offered to discuss the questions with our neighbors. For me it is easier to think out loud. I believe it is a splendid method to get the students more involved.”
Building Block 3: Multi-faceted layout
Multi-facetted team
Multi-facetted assessment

- 40% — Project
- 25% — Individual homework
  - design & evaluation
  - programming
- 20% — Literature tests
- 15% — Participation
  - presentation
  - feedback groups
  - reaction sheets
Principles addressed

1. Nature of the learning process
2. Goals of the learning process
3. Construction of knowledge
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**Principle:** Individual differences in learning

**APA:** “Learners have different strategies, approaches, and capabilities for learning that are a function of prior experience and heredity ” [1].

“I like the fact that the professors will change, as this is a good way to get different perspectives and ideas. I am also looking forward to meeting people who work in the domain (guests) and can share their practical experiences with us..”
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Discussion & Limitations

• Very good summative evaluation
• “Only” one case study
• HCI nicely lends itself to a learner-centered approach
• Still testing out new things every year
Summary

• Case study
  - of putting 14 APA’s learner-centered principles into practice in a large course (~200 students) on Human-Computer Interaction

• 3 core building blocks
  - Well-integrated team project
  - Rich communication channels
  - Multi-faceted layout

• More information in the paper
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Thank you!

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