Leveraging Collaborative Mobile Learning for Sustained Software Development Competencies

TECHNIK

Dr. Sigrid Schefer-Wenzl
Dr. Igor Miladinovic
Agenda

> Introduction
> Course concept
> Evaluation results
> Conclusions
Introduction

> Increased industry need for highly skilled software engineers

> Lack of programming skills among Computer Science students

> Lots of challenges for teaching and learning of programming

> Traditional-style lectures still more common

> Goal: sustained mobile learning approach combining different teaching methods
Constraints and Preconditions

> Different entry levels in programming skills from beginners to professionals

> Low motivation for software development tasks

> Limited self-organizing skills
Main goal:
Leverage advantages of mobile learning in an inverted classroom setting with Just-in-Time teaching elements.
Just-in-Time Teaching

> Students
  > prepare via online material and web-based assignments for the subsequent lecture
  > reflect each self-study phase in a learning diary

> Instructor
  > reads and evaluates the student submissions just-in-time, i.e. shortly before the next in-class lesson
  > adjusts the lecture according to the students’ needs
Mobile App Development Course Module

> Overall effort: 300 hours (12 ECTS)
> 4th and 5th semester
> Lecture, tutorial and project
> Previous related courses effort: 625 hours (25 ECTS)
Learning Outcomes (Selection)

> Explain and apply an effective software engineering process
> Gather, document and analyze requirements
> Translate a requirements specification into an implementable design
> Employ team working skills
> Make effective use of UML and apply software design strategies
> Design a testing strategy
> Evaluate the final projects by checking compliance with the requirements
Addressed knowledge levels

>Based on knowledge levels according to Bloom’s Taxonomy
Evaluation Results – Average Knowledge

Evaluation before/after the course

Number of students

SW Development
SW Engineering
Evaluation Results – Programming Skills
Evaluation Results – Software Engineering

- **High**: After > Before
- **Advanced**: After < Before
- **Basic**: After > Before
- **Poor**: After < Before

Legend: Red = After, Blue = Before
Sustainability Evaluation

> Three different indicators:
  > the number of students that elected subsequent projects and bachelor theses in the area of mobile app development
  > the results of an unannounced, repeated examination six months after the end of the tutorial
  > the number of students who applied for a subsequent Master study in the area of software development
Sustainability Results

> More than 90% of students stayed in the software development area with subsequent projects and bachelor theses

> Results of the unannounced, repeated examination even better than of the original one

> 80% of students started with our Master study in the area of software development
Conclusions

> Complex topics of software engineering usually taught with traditional concepts

> Learner-centered, competence-based approach for “Mobile App Development”

> Addressing all knowledge levels contributed to sustained learning

> Evaluation results of students’ progress, satisfaction and sustained learning effects confirm our approach