

# Learning with Digital Media - Experiences from Computer Science -

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International Seminar  
Developing International Teaching and Research  
through University Cooperation Projects

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# Initial Commitment

**E-learning is not my  
favourite**

Nevertheless, together with my Cameroonian colleague David Békollé we have applied for an e-learning project with BMBF

**“Qualifying for an occupational perspective as software engineer.  
A contribution to the improvement of the teaching situation in  
Computer Science in Cameroon”**

## Why?

# Initial Situation

## in computer science at the University of Ngaoundere and in Cameroon at all (2010)

Lack of

- professors\* & lecturers
- assistants
- lecture rooms
- infrastructure (laptops, beamers)
- internet (low cost & reliable connectivity)
- good professional perspectives for graduates

\*8 for the whole country  
22 for CS in Bremen

# Project Concept

- e-learning as compensation for the lack of professors
- education of graduates to become lecturers
- start with courses on software engineering and mobile applications at the University of Ngaoundéré
- dissemination of the courses for Buéa, Douala, Dschang, Maroua, Yaoundé
- experiments with video recording and dissemination of lectures

later on: extending the e-learning idea on security, cryptography, ...

# Didactical Concept

- **Traditional course on software engineering**  
2 semesters with 13 lessons each
- **1 course on mobile applications**
- **One lesson per week**  
+ about 2 hours of reading and exercises
- **Work with tutors**  
+ 4 hours per week, discussions on the lesson, exercises

# Didactical Concept

- **Learning in groups**
  - + small projects for mobile applications as exercises
- **3 to 5 different student projects parallel**
  - + 5 to 7 students per project, effective solutions to local problems
- **Projects scheduled for three semesters**
  - + Delivery of an interim solution each semester

# Objectives

Empowering graduates

- to start their PhD thesis
- to become lecturers
  
- to work as software engineers for mobile applications
- to establish their own start-up business

# BMBF has financed

Mai 1, 2011 until July 31, 2013

## Bremen

- 1 Computer scientist
- 1 Student worker

## Ngaoundere

- 2 Computer scientists
- 2 Student worker
- 1 Server with RAID system (Moodle)
- 20 Personal computer incl. screens
- 20 Smartphones with Android, Windows ...
- 1 Video camera
- 1 Beamer
- Internet connectivity for 8 months



## BMBF has financed

7 days training for the entire project staff in

- university didactics
- e-learning

Given by

Kompetenzzentrum Hochschuldidaktik für Niedersachsen  
Technische Universität Braunschweig

**Result:** Flop, break-off after 3 days

# What did we do with the money?

## We introduced

- E-learning courses in software engineering & applications
- Project-based learning

## We realised

- Three courses each with 13 lessons
  - Software engineering I and II
  - Development of mobile application
  - Student projects

# Implementation

**Blended Learning:** Reading, discussions, exercises with support of tutors

**Projects:** Effective solutions for local problems

Tourism portal

Car sharing agency

Train & bus timetables

Online ticketing

Payment via Internet

Campus plan, Room management system

E-market places

E-health services

# Course Content

## Software Engineering I

Introduction to Software Engineering  
Project Management  
Object-oriented Modelling with UML  
Models in Software Development  
Quality Management 1  
Requirements Engineering  
Enquiry Techniques and  
Requirements Definition

Prototyping  
Requirements Specification  
Formal Specification  
Usability  
Cost Estimation  
Legal Framework  
Project Presentation

# Course Content

## Software Engineering II

Architecture & Design  
Influence Factors & Global  
Analysis concerning Architecture  
Architecture Views and Viewpoint  
Modularisation

Architecture Styles  
Software Product Lines  
Design Patterns

Version control  
Implementation  
  
Maintenance  
Maintenance Processes and  
Techniques  
Quality Management 2  
Documentation  
Project Presentation

# Course Content

## Mobile Applications Development

The Mobile Ecosystem

Mobile Network

Mobile User Interface

Mobile Design Patterns

Platforms, Frameworks, Applications

Developing for Android: A Showcase

Platform-independent Frameworks

Developing Web Applications

Developing Hybrid Applications

Developing Web and Hybrid  
apps: A Showcase

Testing and Evaluation

Publishing in Application Stores

The African Mobile Market

Project Presentation

# First Experiences

## August 2013

- Workload is high, courses are very challenging
  - Content
  - English language
- ➔ Learning and exercising the lessons takes more time than originally planned
- The role of assistants and tutors is central
- ➔ They themselves must be trained and prepared for each lesson

# First Experiences

## August 2013

- Students are highly motivated
- ➔ But motivation is depending on their understanding
- Project-based work and the projects themselves are successful
- ➔ Students experience directly that they can improve the situation at their university and in the country with what they just have learned



# Further Experiences

## April 2014

- Part of the project concept has been:  
“dissemination of the courses for Buéa, Douala, Dschang, Maroua, Yaoundé“  
→ We failed: No interest? No infrastructure?
- Part of the project concept has also been:  
“experiments with video recording and dissemination of lectures”  
→ We also failed: No interest? Camera-shy? Not fit enough?

# Further Experiences

April 2014 (End of BMBF funding May 31, 2013)

## Student complaints

- Not enough staff for supervision
- No electricity in the lecture room
- No Internet connection
- Moodle server not accessible
- Condition of labs & servers disastrous

**Letter to the rector** (April 16, 2014)

## Result

- The rector was not amused
- No improvements

# Further Experiences

## April 2014

- Part of the project concept has also been:  
“extending the e-learning idea on security, cryptography, ...”
- ➔ We also failed with an application within the framework of the BMBF program “Partnerships for sustainable solutions with Subsaharan Africa“

**Blended learning as a sustainable solution**  
in the education of masters in computer science:  
A new generation of lecturers and software engineers  
developing mobile applications for Cameroonian problems  
2013 – 2015

# Further Experiences

## April 2014

### Rejection by BMBF

“Follow-up project, therefore not fundable”

### Question

How to achieve sustainability without follow-up projects?

# Further Experiences

## September 2016

These experiences will be presented  
by

Jean Michel Nlong