The purpose of this presentation

- Summary of our past and present activities concerning the joint course
- Summary of the contributions to the course
- Proposals of future work
The Background

Stability pact for South-Eastern Europe

DAAD
(German Academic Exchange Service)

Humboldt University Berlin
University of Novi Sad

University of Skopje
University of Plovdiv
University of Belgrade

University of Kragujevac
University of Nis

2000

Project: JCSE / SETT-Net

Goal:
Development of shared training and teaching resources for a software engineering course

2001

Essential tasks of the joint course

- Introduction of a software engineering course in South Eastern Europe
- Creation of a joint software engineering course
- Development of training and teaching materials: slides, case studies, assignments, examinations, literature …
- Providing a basis of future research cooperation
Workshops

Sep. 2001: 1st Workshop Software Engineering Education and Reverse Engineering, Novi Sad

Sep. 2002: 2nd Workshop Software Engineering Education and Reverse Engineering, Plovdiv

Aug. 2003: 3rd Workshop Software Engineering Education and Reverse Engineering, Ohrid

Past and present:

The general development process of our course materials
Milestones of the joint course on SE

1995: HU starts with a web-based SE course (with the exception of slides)

Sep. 2001: 1st Workshop on SEE and RE, Novi Sad

Feb 2002: first German and English ppt-slides

Summer 2002: first SE lecture with ppt-slides at HU (1400 slides)

Sep. 2002: 2nd Workshop on SEE and RE, Plovdiv

Winter 2002: first SE lecture in Novi Sad based on English slides

Aug. 2003 3rd Workshop on SEE and RE, Ohrid

Z. Budimac: "Let's take the HU course as a basis of a joint course."

Presentations of several topics

Project environment: style guides, update management, copyright, ...

The origins of the course materials

German language software engineering course
(at Humboldt University Berlin)

Covers 85% of the core lectures in software engineering of CC 2001

IEEE-CS

ACM

CC 2001

"Curricular guidelines for undergraduate programs in computing"
SE: 31 out of 280 core lectures
The development process: as planned in 2001

- rather straightforward and simple ...

plan (2001) and reality (2003) ?

The development process – plan and reality in 2003

2002: Lecture in Novi Sad
- English slides
- Serbian spoken language

feedback

enrichment

not yet in June 2003
The development process: English version vs. national versions

Do we need national versions?

The case for the English version:
- Less maintenance effort
- Students cope with English
- Enforce higher quality of English slides
- More attractive in international cooperations

The case for national versions:
- National educational laws
- Ability of the students
- Ease of presentation for the lecturer

An outlook concerning national versions

Translation should be done after stabilisation of the course

new participants
Past and present:

Overview of involved course materials

The joint course website
Overview of the project materials
(adapted from the course website)

Project materials are much more than a pool of slides

Project materials: extentions

Duration of the lectures
Slide version management
Lecture notes
Copyright policy

Review reports
Structure of the course

Slide usage guides
Slide style guides

Participants
Topics
Syllabus
Assignments
Documents
Case studies
Discussion
Literature

Basic Principles
F.A.Q.

Participants
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Participants
Topics
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Case studies
Discussion
Literature
The Joint Course on Software Engineering: Past, Present, and Future

Project materials: location of the extentsions

Duration of the lectures
Slide version management

Lecture notes
Copyright policy

Participants
Topics
Syllabus
Assignments
Case studies
Literature

Review reports
Structure of the course

Slides (ppt, pdf)
Documents
Discussion

Katerina Zdravkova
Dragan Bojic
Zoran Budimac
Natasa Ibrajter
Asya Stoyanova-Doycheva
Mirjana Ivanovic
Zoran Putnik
Boro Jakimovski
Kay Schützler

Klaus Bothe
Zoran Budimac
Copyright policy

Katerina Zdravkova

Slide usage guides
Slide style guides

Klaus Bothe

Natasa Ibrajter
Mihajlo Kresojevic
Ivan Pribela

Klaus Bothe
Klaus Bothe

The Joint Course on Software Engineering: Past, Present, and Future
Lecturers need additional information about the slides

The classical waterfall model (1970)

Analysis and Definition

Design

Implementation

Test

Usage and Maintenance

Problems?

1. Topic 3: Lecture Notes
   (instructions for the lecturer)
   - Author of the topic: 
   - English version: 
   - Author of the lecture notes: 
   - About the subject of this topic: 
   - To do: 
   - Slides that could be improved and replaced: 
   - Duration of the lecture: 
   - History of changes: 

2. Contents:
   - Methodology:
   - Remarks:
   - Answer to the question „Problems?“:

Lecture notes: Slides and instructions for the lecturers
Project materials: current and planned extentions

- Students review sheets *
- Examinations *
- Review reports
- Tool information *
- Course adaptation guidelines *
- Lecture notes
- Publications
- Duration of the lectures
- Slide version management
- Structure of the course

Possible future project website structure

- Project management
  - Participants
  - Project schedule
  - Basic Principles *
  - Discussion & Review reports
  - F.A.Q.
  - Documents
  - Responsibilities (roles)
  - Slide style guides
  - Slide usage guides
  - Publications
  - Slide version management
  - Copyright policy

- Course materials
  - Contents
  - Literature
  - Syllabus
  - Examinations
  - Slides (ppt, pdf)
  - Lecture notes (doc)
  - Structure of the course
  - Assignments
  - Case studies
  - Course adaptation guides

*) Requirements specification
Past:

Contributions to the course materials

Contributions to the joint course on SE: mainly sorted by history

- Novi Sad: Z. Budinać, N. Brijger, M. Ivanovic, Z. Putnik, M. Kresojevic, I. Pršelj
- Skopje: V. Ajanovski, A. Misev, K. Zdravkova
- Belgrade: D. Bojic, D. Tosic
- Plovdiv: E. Doytchev, M. Georgieva, A. Stoyanova-Doytcheva, S. Stoyanov, B. Botev, R. Gospodinov
- Kragujevac: N. Grujović, R. Slavkovic
- Nis: M. Ćirić

- Design of original slides
- Translation to English
- Additions of new slides
- New topics
- Lecture Notes
- Review reports
- Slide style guides
- Use of slides in lectures
- Website design
- Website administration
- Assignments
- Copyright
- Case study 'Seminar organisation': translation, implementation
- Translation to national languages
- Topic presentation at a workshop
### The joint course on SE: contributions (1)

<table>
<thead>
<tr>
<th>Design of original slides</th>
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<tbody>
<tr>
<td>K. Bothe</td>
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<td>U. Sacklowski</td>
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<td>S. Joachim</td>
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<th>Additions of new slides</th>
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### The joint course on SE: contributions (2)

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Present:

Project publications and related work
Publications

- K. Zdravkova, K. Bothe, Z. Budimac:
  SETT-Net: A Network for Software Engineering Training and Teaching,
  ITI, Information Technology Interfaces, Cavtat, Croatia, June 16 - 19, 2003

- K. Zdravkova, K. Bothe, Z. Budimac:

- K. Bothe, K. Schuetzler, Z. Budimac, K. Zdravkova, D. Bojic, S. Stoyanov:
  Technical and Managerial Principles of a Distributed Cooperative Development
  of a Multi-Lingual Educational Course,
  1st Balkan Conference in Informatics, Thessaloniki, Nov. 21 - 23 2003

Related projects

Fields:
- SE course export
- Joint SE course material
- Offer for distance education in SE
Related projects: SE course export – presented at ITI 2003 (Cavtat)

- Saunders, B.: „Delivering an undergraduate course to a cross-cultural market using the world wide web“

  London Metropolitan University  pool of modules (courses)  University of Hong Kong

- Crnkovic, I. et all: „On the teaching of distributed software development“

  Mälardalen University, Sweden  course „Distributed SW development“  University of Zagreb

Related projects: Joint SE course material

**SWENET project:**
- CSEET 2003, Madrid:
  - Software Engineering Course Materials Workshop
- Participants:
  - Rochester Institute of Technology
  - Georgia Institute of Technology
  - Texas Tech University
  - Milwaukee School of Engineering
  - Drexel University Philadelphia
  - Embry-Riddle Aeronautical University
- Goals:
  - Create, collect, and share SE course materials
- Supported by NSF Grand EEC-0080502

„As software engineering educators, we are all too aware of how difficult it is to start from scratch. In particular, the lack of examples, teaching materials, and exercises can significantly impede the inclusion of software engineering concepts into undergraduate courses.“
Module description in SWENET
Related projects: Offer for distance education in SE

ISEUC project:
- CSEET 2002, Kentucky (K. Modesitt)
- International Software Engineering University Consortium
- 35 members from Australia, Canada, U.K., USA
- Online courses for distance learning
- Primary market:
  - Corporations that employ software professionals
The future

Established groups:
- HU Berlin
- Plovdiv
- Skopje
- Novi Sad
- Belgrade
- Kragujevac

New groups:
- Nis
- Sarajevo
- Zagreb
- Banja Luka
- Timisoara
- Tirana

Are there open problems?

What has to be done?

Joint Course on Software Engineering in 2003
Contributions – the near future: enrich the course

The best way to become familiar with the project and to contribute to the project is to offer a SE lecture.

Usage of the course: usage reports

Extend topics / add new topics:
- Design patterns
- Extreme programming
- Rational Unified Process
- PSP (Personal Software Process)
- Component based SW development
- Architectures of embedded systems
- Architectures of distributed web applications

Add new case studies

Review reports

Translation to national languages

Extend topics to a new course: *)

*) Extended material:
- the lecturer can select slides
- more flexibility to offer courses

Plovdiv: SE as part of Bachelor and Master

Software engineering in special courses

Part I: Introduction to SE
1. Basic concepts of state-oriented view
2. Basic concepts of scenario-based view
3. Object-oriented analysis
4. Formal specification and program verification

Part II: Requirements engineering
11. Basic concepts of state-oriented view
12. Basic concepts of scenario-based view
13. Object-oriented analysis
14. Formal specification and program verification

Part III: Design
17. Object-oriented design

Part IV: Implementation and testing
19. Systematic testing

Part V: Advanced problems
21. Software metrics
22. Reverse engineering
23. Quality of software development process and its standardization
24. Software ergonomics
25. Project management

Requirements Engineering (SEI, Pittsburgh, USA)
Petri nets (Reisig, HU)
Objectoriented SW development (with UML) (Fischer, HU)
Formal methods of SW development (SEI, Pittsburgh, USA)
Software architecture (SEI)
Software test methods (Spillner, Bremen)
CAME-Tools (Dumke, Magdeburg)
Software reengineering (Koschke, Stuttgart)
PSP (SEI)
CMM (SEI)
Software ergonomics (Wandtke, Inst. of psychology, HU)
Project Management (SEI, Pittsburgh, USA)
Contributions – the middle future: new courses

Build up a pool of computer science courses

- Software Engineering
- Multi-agent systems
- Functional Programming
- ...

Only in case of sufficient capacity!

New courses: two offers

Build up a pool of computer science courses

- Introduction to object-oriented programming using Java
  (K. Bothe, HU)
- Compiler Construction
  (K. Bothe, HU)

- 800 slides (xdiv, latex, pdf)
- Pool of sample Java programs
- Pool of exercises

- slides (xdiv, latex, pdf)
- case study:
  - sample compiler for a Pascal sublanguage
  - target language: virtual P-code
  - implementations in C and in Java
  - visualising compiler: visualisation of the work of the compiler
  - visualising interpreter for P-code
Extend the SE course in all of its parts: Topics become modules

<table>
<thead>
<tr>
<th>Build up a pool of Software Engineering modules</th>
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<tr>
<td>Software testing</td>
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<td>OO analysis and design</td>
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<td>Software architecture</td>
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<td>Configuration management</td>
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<td>Project management</td>
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Extend our topics

Module in SWENET: a unit from 1-8 lecture hours

What belongs to the knowledge of SE?

- SEI SE curriculum modules
- CC 2001 from IEEE-CS & ACM
- SWEBOK Software Engineering Body of Knowledge
  - from IEEE-CS & ACM
  - [http://www.swebok.org](http://www.swebok.org)
Contributions – the future vision

The Joint Course on Software Engineering: Past, Present, and Future

The future: an alternative summary (1)

Joint Course on Software Engineering

- e-Learning
- Distance Learning
- Multi-lingual support
- Semantic web
- e-Learning process models

Usage

Project management for distributed course material development

Enrichment:
- extended and new topics
- new case studies

Integrate own SE research into the course material

Incorporate XCTL as a case study

Experiments with alternative didactic principles

Include other media

Support multilinguality

Support adaptability to university-dependent needs

JCSE: a case study for distance learning and e-learning principles and tools (e.g. DeLC)
The future: an alternative summary (2)

Collection of SE course materials

Experiments with SE course materials: didactics, new media ...

Include own SE research into the course materials

Research in distance learning and e-learning

- SWENET
- ISEUC
- MuSoft (11 people for 3 years)
- JCSE / SETT-Net (we 😊)

Advantage to have own copyright-free materials!