DEVELOPMENT AND EVALUATION OF A RESEARCH-BASED TEACHING COURSE AS BLENDED-LEARNING FORMAT IN A MEDICAL INFORMATICS PROGRAM

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INTRODUCTION

Why Research-Based Teaching (RBT)?

Medical Informatics is a scientific discipline with a variety of evolving research topics [1]. Therefore, it is important to educate students to participate in scientific work.
In the Medical Informatics bachelor program at Heidelberg / Heilbronn (Germany) [2] students have an obligatory practical course where all participating students work together as a research team.

Why Blended-Learning?

- RBT requires independent student work and continuous feedback.
- Weekly classroom instruction is not so adequate for a RBT setting.
- Blended-learning formats promise to be a better suited format, but are used rarely in Germany [3].
- A process model how to establish such a course was not available.

➢ We developed a blended-learning concept for a research-based teaching course.

METHODS

Implementation

- Work from Salmon [4,5]: How to implement an active and social Virtual Learning Environment (VLE)
- RBT concepts by Healey and Jenkins [6] and Sonntag et al. [7] to create the VLE design
- Open source learning management system Ilias (version 5.3.7)

Evaluation

- Evaluation at the end of winter term 2018 / 2019 (24.9.2017 - 14.2.2018) with 18 students
- German questionnaire, utilizing the RMRC-K-model from Böttcher and Thiel [8] – measures self-assessment of the personal competence for scientific work
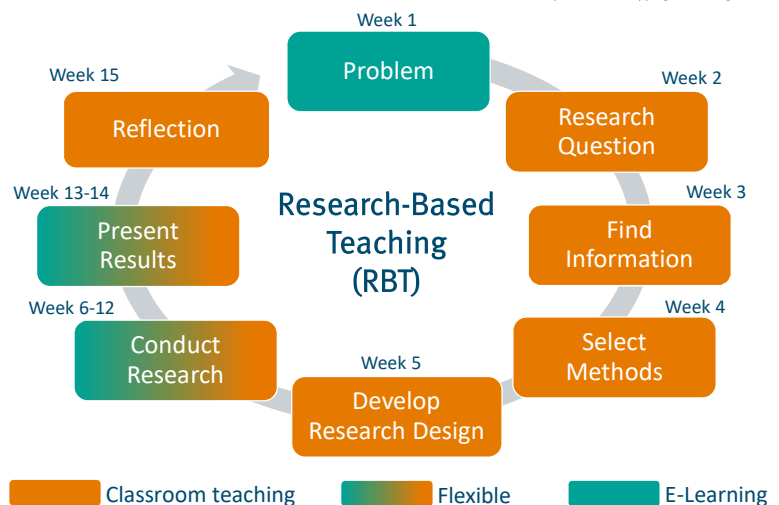
RESULTS

Course Design

The blended-learning concept

- covers 15 course weeks and is suited for a course which grants 6 ECTS credit points.
- motivates students' social learning by 17 E-tivities, which mainly introduce fundamental concepts of scientific work and keep track of the work's progress.

The VLE is structured at several levels:

- Phases from figure 1 are represented at different blocks in the VLE
- Inside each block expandable container objects organize the course weeks
- Each week consists of a textual summary (regarding content and organizational aspects) as well as the content itself (resources, interactive forums etc.)

Course Phases: Research Cycle

Figure 1 – Research Cycle (cf. [9]) phases with mapping to teaching form

Week 1 – Problem
Week 2 – Research Question
Week 3 – Find Information
Week 4 – Select Methods
Week 5 – Develop Research Design
Week 6-12 – Conduct Research
Week 13-14 – Present Results
Week 15 – Reflection

Research-Based Teaching (RBT)

Classroom teaching — Flexible — E-Learning

Evaluation Results

Figure 2 – Average results of the items in the scales of the RMRC-K model, Cronbach's alpha in brackets. 5 is good / high; 1 is poor / low. Negative items were recoded before calculation. n = 15

Content knowledge	3,24 (α = 0,7)
Communication skills	3,60 (α = -0,035)
Skills in reflecting on research findings	3,90 (α = 0,84)
Methodological skills	3,58 (α = 0,67)
Skills in reviewing the state of research	3,82 (α = 0,82)

CONCLUSIONS

- University terms limited to 15 weeks is a challenging constraint for RBT.
- The VLE helped us to closely accompany the students in the crucial first phases of the project.
- Configuration and preparation of the E-learning environment is more demanding than the preparation of material for class-room teaching.
- In return, it is possible to achieve a much closer mentoring of learners.
- The results of the evaluation are satisfactory for a first implementation. We will have the next course in the winter term 2019 / 20 and try to improve the course based on students' feedback.

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