Towards Interactive Lecture Material—Increasing student engagement and comprehension

Refresh Teaching, October 17th 2017
What is interactive lecture material?

- learners are encouraged to communicate with peers and teachers in a meaningful way.

- useful learning opportunities in where the learning material is presented in a way that is interactive and therefore meaningful to the learner.
Deep Meaningful learning can be supported as long as one type of these three interactions is present at a high level.
Our Presenters

1. Silvio Lorenzetti
2. Alexander Caspar
3. Manfred Einsiedler
4. Norman Sieroka
5. Christina Spengler
Endeavours with eSkript

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Refresh teaching, 17.10. 2017
Bewegungs- & Sportbiomechanik

W. R. Taylor, R. List & S. Lorenzetti

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Das Skript zur Vorlesung Bewegungs- und Sportbiomechanik am Institut für Biomechanik der ETH Zürich.
- Biomechanics 2 (250, up to 360 Students)
- Bewegungs- und Sportbiomechanik (180 Students)
- eSkript for class
- eSkript for exercises
- Hypothes.is annotation
- Quizzes in Moodle
- Exam in Moodle
eSkript 2.0: Kollaboration und Interaktivität fördern

eSkript (Plattform für Interaktives Vorlesungsmaterial mit vier Ausgabeformaten des Inhalts, privater und öffentlicher Annotation (Peer-Review und Kommunikation zw. Dozierenden und Studierenden), vielen interaktiven Modulen) wird in die kollaborativen Lehr- und Lernaktivitäten implementiert. Dazu werden didaktische Szenarien für Studierende und Dozierende, sowie einige technische Updates benötigt.

Antragsteller/in: Silvio Lorenzetti | Leiter/in: Sarah Frédérickx
Department: D-HEST | Institut: Institut für Biomechanik

Experimente Biomechanik (Videos)


Antragsteller/in: Silvio Lorenzetti | Leiter/in: Silvio Lorenzetti
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Interaktives Vorlesungsmaterial


Antragsteller/in: Sarah Frédérickx | Leiter/in: Sarah Frédérickx
Department: D-HEST | Institut: Institute for Biomechanics (IfB)
Motivation

- Tutors
- Sarah !!!!
- LET

- Only together it is possible....
Motivation

- State of the art
- New department
- Fair exercises
- Same material / information for everybody
- Scaling possible to large groups
Benefits 😊

+ fair exam
+ interaction between students and tutors
+ good inclusion of tutors
+ also for big groups

- Keep it running, dependent on others
- Some students are old school
- As pioneer you hit the head couple of times
Interactive Simulations

Manfred Einsiedler / Menny Akka / Anh Huy Truong D-MATH
Refresh teaching, 17.10. 2017
A Voting Star (D-Math)

Dr. Alexander Caspar
Refresh teaching, 17. 10. 2017
Voting-Star: Objectives

How to

- encourage students to reflect continuously on their understanding?
  - What troubles them?
  - What do they always mix up?
  - …

- collect this information in an easy manner?
- implement a collaborative and motivating process?
- incorporate process and outcome into your course.
In Math exams students usually bring their own summary.
Generating this helps them
- to structure and understand the material;
- to get relations between certain fact.

It relieves them from learning tedious formulae.
It offers examiners to test more advanced skills.

On the other hand
- Examiners have no control on the support during the exam;
- Some students might find the solution on their summary;
- Later is crucial in testing theoretical knowledge. Students tend to neglect this, although it has been a great deal in the exercises.
Voting-Star-Button

- With interactive learning material (e.g. eSkript) student can choose what they want / need in the exam.
  
  ★ 2  Click  ★ 3

- This should take place during the semester.
- Teachers can evaluate the voting results and sum up the most popular propositions (if they make sense).
- It is a democratic and lucid process.

Definition ★ 17

Sei \( f : A \rightarrow B \) eine Abbildung.

1. Für \( N \subseteq B \) definieren wir das Urbild von \( N \) unter \( f \) durch

\[
f^{-1}(N) := \{ a \in A \mid f(a) \in N \}\]

2. Für \( b \in B \) definieren wir das Urbild von \( b \) durch

\[
f^{-1}(b) := f^{-1}(\{b\})\]
Voting-Star: Caveats

- Students tend to vote but not to “unvote”.
- In the beginning most of the stuff seems to scare them although it is not relevant for the exam.
- It makes more sense to fix an item in the end. But that is not what we want.
Annotations on the Web
Using eSkript for «Philosophical Reflections on Physics II»
Why using eSkript?

- Background:
  - Interdisciplinary course exemplifying «critical thinking» (CTETH)
  - Implementation includes
    - Flipped classroom (plenary and group discussions) after reading assigned texts
    - Graded performance assessment: critical protocol (5-6 pages)
  - Obstacle: students (rather poor) reading and writing abilities
  - Idea/attempt: use eSkript as a collaborative means for improving these abilities
    - ensures (more or less) the reading itself
    - allows for more profound discussion
    - creating a «peer environment»
    - facilitating engagement with critical protocol
What was done, and how?

- Three tutorials (in groups of 5-10 people), led by TAs on
  - Close reading I (unfamiliar/odd context)
  - Close reading II (course context)
  - Protocol writing («designed» sample protocol)

- Assignments using eSkript (in groups):
  - Close reading I: Mark at least one passage you disagree with and explain why
  - …
  - Protocol writing: Mark at least one felicitious and one poor passage and explain your opinion

- Additional remarks:
  - you may comment on the comments of your peers … however:
  - as a group, avoid too much «clustering»
What was done, and how?

- Positive feedbacks, positive experiences:
  - Students enjoyed using eSkript (and asked for more)
  - TAs and lecturers happy with fulfilment of assignments

- Effectiveness in enhancing reading and writing abilities:
  - Reading skills seem to improve (indicator: focussed discussion)
  - Writing skills seem not to improve (indicator: quality/grades of critical protocol)
Progress and Badges – PROs and CONs

Christina Spengler and Fabian Ammann
Background

- 3 Lab Courses
  - 2x Physiology (requirement): ca 150 HST + ca 70 Pharma
  - 1x Exercise Physiology (elective): max. 48 HST

- Generate an innovative/appealing script (including lab film material)

- Allow students self-assessment of their knowledge
  - support students’ motivation to prepare before lab courses
  - support students’ motivation to actively reflect lab course contents

- Innovedum project: “Virtual Physiology Lab”
  with Sarah F., Fabian A. and the EPL-Team
Students’ learning and self-assessment check

- **PRE – lab course badge**
  - Background info & instructions read
  - TEST: “Bin ich fit für’s Praktikum?” passed

  ➔ 1 badge / course day

- **FINAL badge**
  - all TESTs (1 / course):
    “Erkenntnisse aus dem Praktikum” passed

  ➔ 1 badge / semester
PROs

- **Students‘ motivation increased**
  - pre-lab preparation „Bin ich fit für‘s Praktikum“?
  - post-lab learning progress „Erkenntnisse aus dem Praktikum“

- **Post-lab quiz „Erkenntnisse aus dem Praktikum“**
  - is frequently answered in teams
  - promotes interaction/discussion between students
Challenges (or Cons?)

Within Quiz:

- **Prerequisites**
  - 80% of test-questions correct = passed
  - 2 trials
  - 20 min duration (max) for post-test, pre = unlimited

- **Handling of student 'failure' (badge missed)**
  - student writes e-mail (no automatic notification)
  - teacher needs to re-open quiz in moodle and remind student of additional task (as defined in instruction)

- **Student feedback for optimal learning**
  - Kprim - no wrong-answer-specific feedback possible (i.e. with link)
Challenges (or Cons?)

- If change/update within lab course is required
  - lab course needs to be copied without students
    → all badges need to be re-generated

- When mistake happens when generating badge criteria ...
  - cannot be repaired while course is running (course can only be switched off)
  - copy course + generate new badges!
  - to avoid:
    the entire course (23 badges) would need to be performed
    by 1 person to check whether no mistake occurred... (meaning 46 quizzes)
Challenges (or Cons?)

- **No group assignement possible** to automatically inform teacher once all students of 1 group have achieved 1 badge

- **No automatic notification** with the number/names of students who achieved badge by deadline (and those who did not)

- **Student list** (with badges achieved) **cannot be exported**
  - copy → paste → adjust to see who did not achieve badge
  - remind student(s) → ...
Thanks to Sarah and Fabian and you!
Go to a Discussion Table!

1. Silvio Lorenzetti
2. Alexander Caspar
3. Manfred Einsiedler
4. Norman Sieroka
5. Christina Spengler
6. eSkript – Hands on!

LET – Lehrentwicklung und -technologie

ETH Zürich

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Refresh Teaching

Upcoming events:

- November 23rd (Hönggerberg) Scientific Writing
- December 5th (Zentrum) Improving student learning with individual feedback

Further information and registration:

www.refreshteaching.ethz.ch