Activating and Engaging Large Classes

Dr. Monika Rummler | TU Berlin, ZEWK | TU Delft, Lunch Lecture | 18 April 2018

About the Lecture

Find out how TU Berlin engages large classes!

At TU Berlin bachelor studies include lectures with a massive number of
students between 500 and 1500 students attending.
In what way is it possible to keep these masses engaged, on task and making
the most of their studies?

In this presentation, I will share how we prepare our teaching staff and of
course share the insights into the most frequently encountered problems
during these classes and what one can do to deal with those problems.

Programme Topics

Our Centre and Continuing Education Programme   Courses for all Phases of a Teaching Career
                                                                                    The « Teaching and Learning » Curriculum
                                                                                    9 Competence Areas
                                                                                    Some Outlines of Innovative Studies
                                                                                    Academic Teachers' Concerns

Questions
Motivating Students   The Retention-Attention Curve
                                                                                    The Sandwich-Principle
                                                                                    Needs of Students in the Beginning
                                                                                    Learning Styles and Strategies
                                                                                    Famous Difficulties and Misunderstandings
                                                                                    Assessment Techniques

Creating a Learning Activity
Learning Processes   Active Learning Formats
                                                                                    Activating Methods – Examples I: Humanities
                                                                                    Activating Methods – Examples II: Nature Sciences
                                                                                    Good Practice – Examples III: Electrical Engineering
                                                                                    Peer Instruction
                                                                                    Interactive Lecture with Clicker/Smartphone

Final Reflection

Our Centre and Continuing Education Programme

4 Areas:

Koop, BANA, Kubus, WWB

4 Programme Foci:

Teaching and Learning
Research Management
Science Communication
Working and Management Techniques

Courses for all Phases of a Teaching Career

▪ Student tutors: "Train the Tutor"

▪ Scientific assistants: Introductory Course "Teaching for University's Best"*
Training Programme "Teaching and Learning in Higher Education"*
including e-learning courses

▪ (Newly appointed) Professors Programme
Parallel Course Offerings, Coaching

*accredited in 2006, 2012 and 2018 by the Accreditation Commission of the German Society for Academic Development (dghd) and according to European "Standards and Guidelines for Quality Assurance in the European Association for Quality Assurance in Higher Education (ESG)" and the "European Association for Quality Assurance in Higher Education (ENQA)".

The „Teaching and Learning" Curriculum

Introductory Course

for Beginners „Teaching for University's Best" (German and English)

20 Basic and Advanced Teaching Modules

in 9 Competence Areas (partly in Englisch)

Documentation and Reflection

Coaching, Teaching portfolio or Teaching project

Networking

Lunch for good Teaching (with international workshops)

Frame

eg. Intercultural Challenge for Visiting Scholars

ZEWK

9 Competence Areas

- Planning and Performance
- Learning
- Classic and New Media
- Quality
- Communication
- Diversity Culture
- Methods
- Subject-related Didactics
- Background

Some Outlines of Innovative Studies

- A combination of different forms of electronic learning with traditional learning and continuing education methods and direct practical application

- International studies with high foreign language parts

- A link of practical and theoretical education

- Sensitivity for problems, articulation of problems, own problem solving capacities at the basis of teaching and learning processes

- Workshops, seminars, projects and phases of self study to transfer the contents of lectures at a high level

- Distance learning, individual study schedules

Academic Teachers' Concerns

- High number of students, anonymity
- Evaluation results, teaching portfolios
- Demand for individual feedback
- Openness of project studies results
- Insecurity with activating methods in classes
- (virtual) communication with students or project teams
- cooperation in intercultural student groups or project teams
- dissemination of teaching or project results
- Knowledge transfer between students, coworkers and colleagues

Different subjects and needs according to career phase
all studies, faculties resp. chairs,
during application procedures, newly-appointed and experienced teaching staff

Questions

Who is teaching in large classes?
Who is teaching traditionally? Who innovative?

Who is planning face-to-face lectures?
Who is planning self study phases for students?

Who is teaching with activating methods?
How many activating methods do you know:
None? Up to 5? Up to 10? More?

Motivating Students

How can we motivate students?
1. Enthusiasm from the lecturer
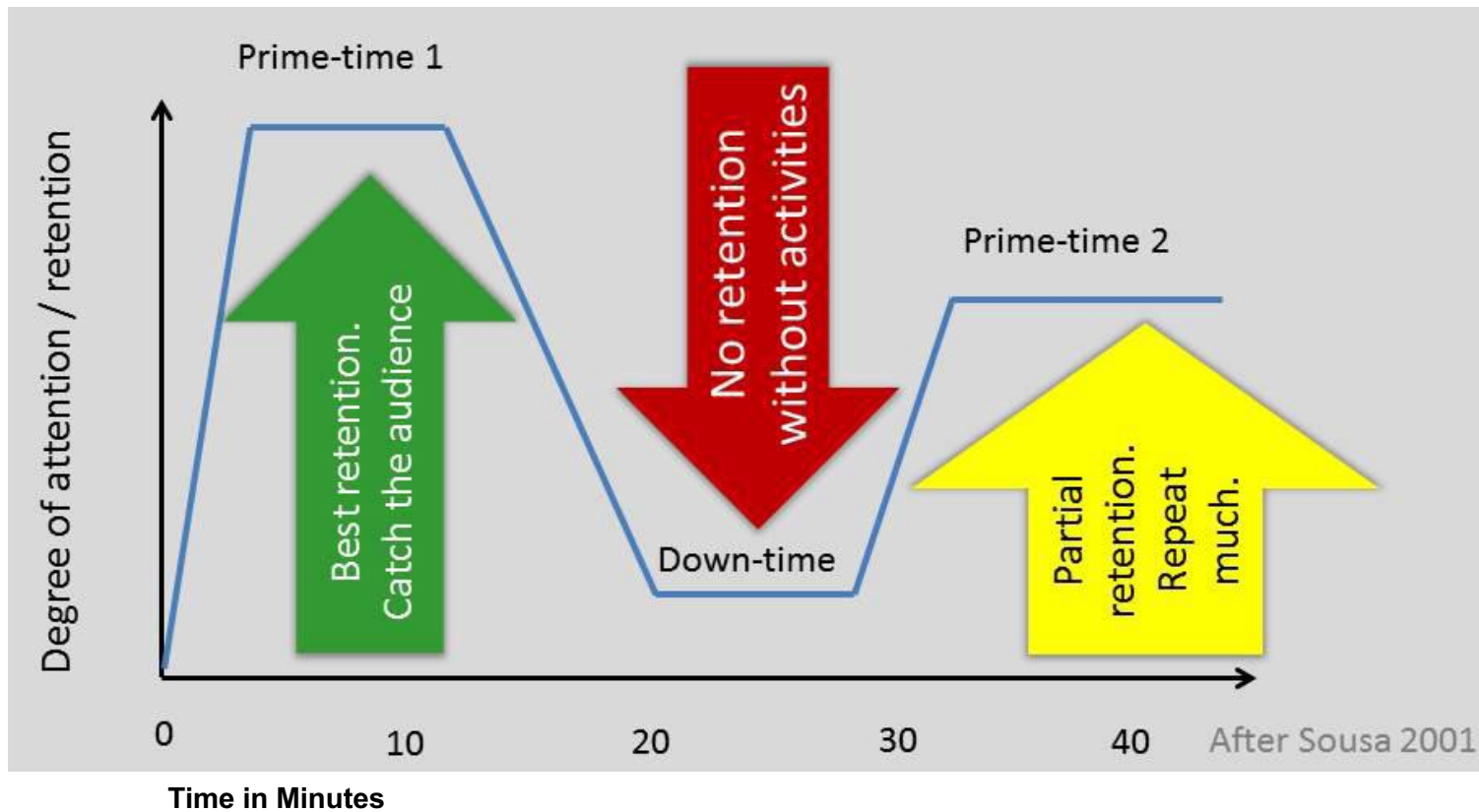2. Calculate existing motives.

Common motives of students:
1. „Deep" and „surface" approaches
2. The desire for relevance
3. Curiosity
4. Achievement and fear
5. Need for social interaction
6. Activity and esteem

Source: Donald A. Bligh: What's the Use of Lectures? New York: The Jossey-Brass higher and adult education series 2000 (1st Ed.), p. 57

The Retention-Attention Curve - Implications

Time in Minutes

The Sandwich-Principle

Introduction

Information reception – passive Learning

Information handling – active Learning

Information reception – passive Learning

Information handling – active Learning

Conclusion
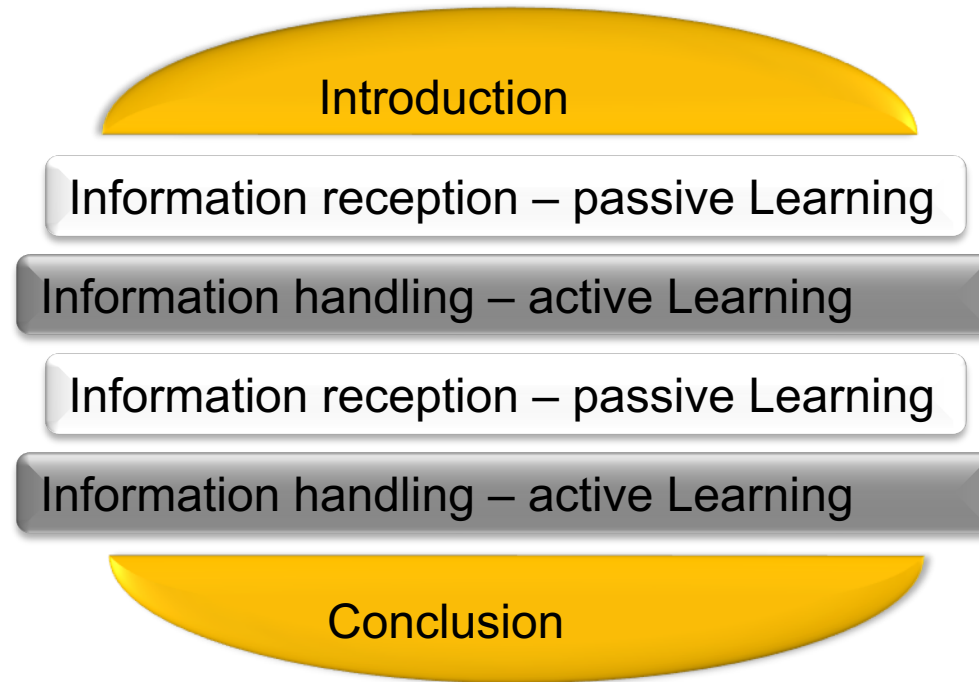
Needs of Students in the Beginníng

- I want to gain security quickly!
  (Approach to someone you know well.)

- I want to gain orientation!
  (What is this about here? Which social norms are applicable?)

- I want to gain a fast survey about the other students!
  (How many? Who is there? Who is missing?
  Which relationship between us?)

Source: Thomas Bartscher: Das Feuer großer Gruppen. In Management & training 6/2002, S. 38

Learning Styles and Strategies

Active and Reflective Learners
    "Let's try it out and see how it works." – "Let's think it through first."

Sensing and Intuitive Learners
    Facts, well-established methods, patience with details, practical –
    innovation, new concepts, abstractions and mathematical formulations

Visual and Verbal Learners
    See: pictures, diagrams, flow charts, time lines, films, demonstrations –
    word: written and spoken explanation

Sequential and Global Learners
    Linear, logical steps in finding solutions – large jumps, suddenly "getting it",
    solve complex problems quickly but cannot explain how

<u>Source:</u> Richard M. Felder/Barbara A. Soloman: Learning Styles and Strategies.

Famous Difficulties and Misunderstandings

Problems of Terminology

Confusing technical meanings and ordinary meanings of words

Using words that have technical meanings and not even realizing it

Getting confused between similar but not identical terms

Other Types of Common Conceptual Difficulties

Finding unlikely and/or complex solutions when ordinary, simple ones will do. Not seeing how the parts relate to each other or to the whole

Problems with Numbers

The overly mathematical or unmathematical students

Most classes have both types of students

Estimate first and calculate later (if necessary)

Source: Richard M. Felder/Barbara A. Soloman: Learning Styles and Strategies.

Assessment Techniques

At the Beginning: Register Expectations and Activate Knowledge
previous knowledge tube, focussed listing

Self screening : Difficulties to Comprehend, Lack of Knowledge
write down the most important points, phrase 2 or 3 exam questions,
voluntary/anonymous tests, questioning hours, discussion during
lecture, ask questions before lesson and answer at the beginning
(repetition effect), answer short questions immediately

At the End: Record Learning Success and Learning Difficulties
muddiest point, one minute paper,
impulse questionaire (most/least interesting today…)

Source: Petra Jordan/Monika Rummler: Lernerfolg und Zufriedenheit, Evaluation. In: Monika Rummler (Ed.):
Vorlesungen innovativ gestalten. Weinheim/Basel: Beltz 2014, p. 59-62 (own translation)

Creating a Learning Activity

Please interview your neighbour and make notes:

1. Which learning activities of your students do you observe?
Time: 2 x 3 Minutes

2. Which needs are obvious?
Time: 3 Minutes

3. What did surprise you?
Time: 3 Minutes

4. Please share your selected examples with the audience!
Time: 10 Minutes

Learning Processes

Receptive processes (passive)	Expressive processes (active)
Influence to Teaching and Learning	
▪low	▪ high
Examples	
▪ see ▪ observe ▪ read ▪ listen ▪ memorize	▪ ask questions ▪ describe with own words ▪ tell someone ▪ discuss with someone ▪ draw own drafts ▪ play ▪ simulate ▪ test ▪ apply practically ▪ transfer

Active Learning Formats

- Buzz groups

- Partner interview, Peer Instruction, group work

- Controlled discussion

- Reading, audiotapes and videotapes

- Brainstorming

- Mind maps, concept maps

- Case-study method, task-solving in a team

- Role plays, planning games

- Project work (poster, wall news sheets, products)

Activating Methods – Examples I: Humanities

Instead of asking a question, teachers can give a task to students that must be solved in a few minutes only, for example

- draft a visualisation (mindmap, concept map, matrix, scheme)
- identify key words of a text
- give a written reply to a key question of a text
- design an outline to a problem
- excerpt a text segment and compare the result with others
- find reasons why a result could be wrong
- outline a problem solution of a methodical approach

Source: Petra Jordan/Monika Rummler: Aktivierende Lehrformen für große Lerngruppen: Techniken und Methoden. In: Monika Rummler (Hrsg.): Vorlesungen innovativ gestalten. Weinheim/Basel: Beltz 2014, S. 64 (own translation MoR)

Activating Methods – Examples II: Nature Sciences

You might pose a problem or describe a system and ask the students, individually or in groups,

- to draw and label a flow chart (schematic, free-body diagram, differential control volume).
- sketch a plot of what the problem solution should look like before they do any calculations.
- give several reasons why the solution might be useful.
- write the next step in a derivation.
- find one or two ways to check a solution.
- brainstorm a list of reasons that a calculated result might be wrong or might not be how a real system would behave.
- list possible safety (environmental, quality control) problems with the process unit just designed
  and give double credit for an answer nobody else thinks of!

<u>Source:</u> Richard M. Felder (1997), http://www4.ncsu.edu/unity/lockers/users/f/felder/public/Papers/Largeclasses.htm (03.04.2018)

Good Practice – Examples III: Electrical Engineering

Concept
- a multi-level analysis is provided, similar to the principles of a construction kit,
- every natural, electrical phenomenon, such as lightning, is named, explained and
- illustrated by the conduction of an appropriate experiment.

Implementation in lectures
- integrating realistic examples, movie clips, live-experiments and 3D-animations,
- ad hoc exercises for calculations in the new script, done during the lecture,
- continuous improvement: expansion of the topics explicable by experiments,
- subsequent adaption of the work-sheets,
- integration of simulation tools,
- recordings of the lecture for self-study,
- **tutorials (up to 30 students)** divided into sub-groups (max. 6),
- exercises for the tutorial are provided in coherence with the lecture

Source: Petra Nikol SEFI Leuven/Belgium 19.09.2013: Innovative Teaching & Learning Projects in Engineering Education: Didactic Approaches for first-year Students (adopted by MoR)

Peer Instruction: effective and sustainable learning

Instead of lecturing topics from prepared and accessible scripts, texts or books, the knowledge transfer (Instruction) is done by students (Peers). The learning performance normally happening as preparation/follow-up is integrated directly into the face-to-face lecture.

The Lecture phases are
1. Preparation of contents by students (with books, texts, or script) at home or in the learning group
2. During the lecture: talk about selected themes
3. Discussion of conceptual problems (high effort for teachers!)
4. Single voting on the solution to first question of theme 1 (clicker or flashcards)
5. Discussion between students on solutions
6. Renewed voting
7. Continuation with theme 2

Interactive Lectures with Clicker/Smartphone

Audience Response Systems (ARS) or Smartphone Application: wireless electronic voting devices to answer a question. The responses of students can be evaluated by a Software (e.g. kahout) without time delay and are directly presented via beamer.

Didactic aspects and success criteria

- Effect: communication situation in the lecture hall is reversed.
- Management: Transparency – Which purpose is intended? How is the procedure?
- Question design: How many questions? Type of question used (Knowledge or estimation question, conclusion question, concept question for incorrect interpretation, Peer Instruction)
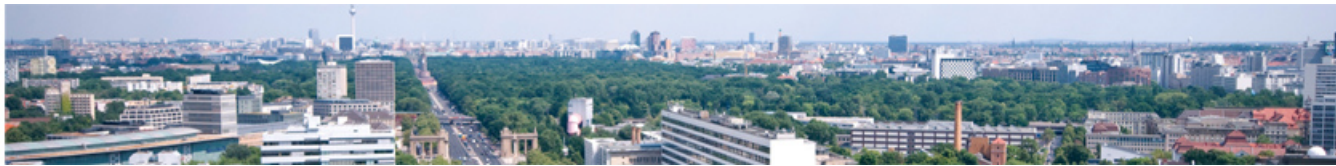- practical aspects (purchase, provision, administration)

Trend: positive attitude of students amd increased attentence of students show enhanced interest in the subject, hints to improved learning results and quality

Source: Timo Lüth/Peter Salen: Interaktive Vorlesungen mit Clickern und Peer Instruction – praktische und didaktische Aspekte, p. 283-289.

Monika Rummler (Hrsg.)

Vorlesungen
innovativ gestalten

Neue Lernformen für
große Lerngruppen

LEHREN AN DER HOCHSCHULE
WEITERBILDUNG · TRAINING

BELTZ

Literature

T.A. de Angelo, /K.P. Cross (1993): Classroom Assessment Techniques: A Handbook for College Teachers. (2 nd Ed.). San Francisco: Jossey-Bass.

Thomas Bartscher (2002): Das Feuer großer Gruppen. In Management & training 6, p. 38

Donald A. Bligh: What's the Use of Lectures? New York: The Jossey-Brass higher and adult education series 2000 (1st Ed.), p. 57

Creating a Learning Activity: Inspired by Dr. Renate Klaassen/Ir. Alexia Luising at Etalee Conference, November 2015 in Copenhagen, adopted and selected by MoR March 2018

Richard M. Felder (1997): Beating the Numbers Game. http://www4.ncsu.edu/unity/lockers/users/f/felder/public/Papers/Largeclasses.htm (03.04.2018)

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Ole Lauridsen/Line Hassall Thomsen: Tips for student-activating teaching. https://medium.com/cultivate-grow-your-teaching/tips-for-student-activating-teaching-fe72ae0c8de9 (03.04.2018) (Article originally published in Cultivate magazine ed. 05, June 2014)

Timo Lüth/Peter Salen (2014): Interaktive Vorlesungen mit Clickern und Peer Instruction – praktische und didaktische Aspekte, S. 283-289; Vgl. auch: Timo Lüth/Alexander Tscheuling/Peter Salden (Ed.): Die Masse in Bewegung bringen. Aktives Lernen in Großveranstaltungen. Hamburg (2. überarb. Aufl.). www.tuhh.de/zll (30.12.2015)

Thank you!

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Final Reflection

Which experiences or insights are important for you today?

How can you apply it to your teaching?

«Teaching without Learning is just Talking!» (de Angelo/Cross 1993)

Design a Learning Activity II

Create and develop as many ideas as possible!

Time: 5 Minutes

Inspired by Etalee Conference, November 2015 in Copenhagen (Dr. Renate Klaassen/Ir. Alexia Luising),
Adopted and selected by MoR March 2018

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