Effective Capacity Building by Empowerment Teaching

Prof. Dr. Jürgen Kretschmann, President, TH Georg Agricola University, Bochum, Germany
5 key messages of the university

1. Quality
We offer an outstanding and practical education in engineering.

2. Openness
We are open for all kinds of talents, irrespective of their social background.

3. Flexibility
We encourage and attend the exchange, university and employers as regards contents and organisation through flexible courses, which are intelligently interlocked.

4. Humaneness
We are friendly, family-like community.

5. Tradition
Almost 200 years of experience not only developed a lot of moments, but also principles of success. Our history is knowledge which obliges us to innovation.
TH Georg Agricola University
Future since 1816

1816 Foundation of the THGA

2500 Students in 2019
• 52.3 % in Part time
• 13 % Women
• 19 % international Students

Professors lectures teach at our University

160 Departments
• Geo-Resources and Process Engineering
• Mechanical Engineering and Material Sciences
• Electrical Engineering, Information Technology and Industrial Engineering

3
# Programs offered

<table>
<thead>
<tr>
<th>Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>D1</strong> Geo-Resources and Process Engineering</td>
</tr>
<tr>
<td>Mineral Resources Engineering B.Eng.</td>
</tr>
<tr>
<td>Process Engineering B.Eng.</td>
</tr>
<tr>
<td>Surveying B.Eng.</td>
</tr>
<tr>
<td>Geo-Engineering and Post-Mining M.Eng.</td>
</tr>
<tr>
<td>Mineral Resources and Process Engineering M.Eng.</td>
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<tr>
<td><strong>D2</strong> Mechanical Engineering and Material Sciences</td>
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<tr>
<td>Mechanical Engineering B.Eng.</td>
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<tr>
<td>Applied Material Sciences B.Eng.</td>
</tr>
<tr>
<td>Mechanical Engineering M.Eng.</td>
</tr>
<tr>
<td><strong>D3</strong> Electrical Engineering, Information Technology and Business Engineering</td>
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<tr>
<td>Electrical Engineering and Information Technology B.Eng.</td>
</tr>
<tr>
<td>Technical Business Management B.Sc.</td>
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<tr>
<td>Electrical Engineering and Information Technology M.Eng.</td>
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<tr>
<td>Business Engineering M.Eng.</td>
</tr>
<tr>
<td>Operational Safety Management* M.Sc.</td>
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Knowledge can be the basis for a better world!

90% of all scientists who have ever lived are living today, but …
... quantity in knowledge does not necessarily imply quality
Knowledge has to be diffused
Engineering disciplines like mining are applied sciences!

- Mining is an engineering discipline with an impact on the society and its members: companies, organizations, administrations, individuals.

- Because mining leads to results that can change parts of the world forever.

- Students and young researchers should be able to apply their knowledge in a responsible way to find the best solutions.

- Therefore universities should empower them.

- To create a better world!
How can we educate our students effectively?
Technically learning is based on communication

Shannon-Weaver’s Model of Communication
Conventional lectures from sender to receiver

- Teacher-centered
- Teacher defines contents and method.
- „Lecturer knows everything, students know nothing“
Fundamental assumption for an effective knowledge transfer

• The success of communication (teaching) depends on the receiver...
… not on the sender!
Empowerment teaching

Main aim: empower the learner to meet challenges of the future.
The role of the lecturer as a team leader

• The main role of the lecturer is to secure that the students are able to learn effectively.
• The lecturer’s emotional and social intelligence is crucial.
• The lecturer should promote positive thinking and avoid negative comments (lose-face).
• The lecturer should motivate the students to talk and listen. The lecturer himself should aim to be the best listener in class.
• The lecturer should thank the students for their contributions in the classroom. This will improve the relationship between him and the class.
• The lecturer should acknowledge the learning progress of the students and make them feel optimistic about their abilities to learn, enhance creativity and decision-making skills.
The 7 phases are

1. Start-up Phase
2. Warm-up Phase
3. Learning and Experiencing Phase
4. Practical Phase
5. Wellness Phase
6. Exam Phase
7. Final Phase
1. Start-up Phase

• Give an introduction
• Memorize names
• Set rules for everybody (no phones, no internet, etc.)
• Take care of perfect time-management
• Take a photo of the class
• Appropriate Classroom language
The Introduction

Participants should be asked to introduce themselves, share experiences and expectations.

Aims:
• Overcome learners’ hesitancy to speak
• Make learners talk (first step to empowerment)
• Get to know each other (team building measure)
• Facilitate learning by creating a friendly, cooperative atmosphere.
2. Warm-up Phase

• Aim: Break the ice between lecturer and students!

• Change the seating position (no group-building)

• Always welcome questions

• Explain the “big picture” of the lecture

• Speak in simple comprehensive language

• Start to build an emotional bond based on trust and sympathy

• Assess cultural barriers (shyness, restraint, language)
Two levels of teaching

Content

• Objective information
• Things, objects, projects, appointments, deadlines, problems etc.

Process/Relationship

• The way people speak to each other
• Sympathies, emotions, expectations, fears etc.

Communicative relationships (like the ones between lecturer and student) are influenced predominantly by emotional feelings and only to a much lesser extent by rationality. Lecturers and students should understand each other on the content level and on the relationship level.
3. Learning and Experiencing Phase

- Explain your teaching methods
- Plan distributed learning in intervals (no cramming)
- Give enough time for discussions, repetitions
- Give the students opportunities to make their own experiences (guess, try, speculate)
- Encourage the students to actively use English language
Theoretical input

- Lecturer is leader of the learning process and moderator
- Participants should share own ideas based on the theoretical input
- Activated Learning!
Increasing self esteem

• Due to participatory teaching methods

• SEA students were eager to come to class and learn

• they were open for new ideas and learning processes and

• willing to contribute to class in a two-way-learning-process (which increased their acting competence)

• they trusted and believed in themselves more and more (increased self-efficacy, self esteem)
Inspiration for Junior Lecturers and Undergraduates

Seminars based on participatory training methods for junior lecturers and undergraduates at the Hanoi University of Mining and Geology
4. Practical Phase

- People remember about:
  - 10% of what they read
  - 20% of what they hear
  - 30% of what they see, BUT
  - 50% of what they see and hear
  - 80% of what they say or write
  - 90% of what they compile and execute themselves
Mining is an applied science!

Aim of the practical phase:
Learning works best using all senses!

• Verify the theoretical input in practice
• Empower students to perform and meet challenges of their future jobs
• Let them execute, support their progress
• Vary circumstances in which students learn
Practical training

Aim: Realization of self-effectiveness and competence

- The lecturer acts as a motivator and mentor to foster acting competence
- He should encourage teamwork
- Students contribute, ask questions, share experiences and observations, reflect implications and consequences, discuss with people in practice
- Let students test themselves.
Practical training for safety experts in RAG Coal Mining Company, Germany

Practical training with risk management tools from RAG for staff of Coal Company 86 - Vietnam
5. Wellness Phase

- Planned distraction can be helpful for the learning process!
- Enjoy free time with the students
- Overcome cultural barriers between lecturer and students
- Create an international student network
6. Exam Phase

- Let your students APPLY their knowledge and be successful!
- Create a positive atmosphere!
- BE FAIR! NO SUPRISES!
- Allow their own handwritten papers (compilations)!
7. Final Phase

• Encourage students to be proud of themselves
• Take a lot of photos (good memories)
• Invite the class (and staff) for dinner (strengthen the emotional bond)
Roles of the Professors

- Empowerment
- Coach
- Teach
- Teamwork
- Lead by example
- Inspire
- Vision
- Motivate
- Mentor
Empowerment formula

\[ a + 2h = c \]

\( a = \text{I am (a valuable person, lovely, nice, competent, individual, someone special, human)} \)

\( 2h = \text{I have (knowledge, aims, competencies)} \)
\( \quad \text{I have (friends, a team who will help, people who are like me)} \)

\( c = \text{I can (apply my knowledge, take action, solve problems, meet challenges, undertake responsibilities) create a better world.} \)
Empowerment teaching matters

- Boosts confidence of learners which impacts on motivation of learners (Graham et al. 2013)
- Freeman et al. (2014: 8410) summarize impact on student performance through empowerment teaching/ active learning: average exam scores improved by 6%, and students were less likely to fail
- Strategy most effective in smaller classes (under 50 students) (Freeman et al. 2014: 8410)
- Also important: Teachers’ open mind about learners’ (growing) abilities (e.g. Canning et al. 2019; Rattan et al. 2012), as “Professors’ beliefs about the nature of intelligence are likely to shape the motivation and achievement of students in their classes […]” (Canning et al. 2019: 4)

Source: Graham et al. 2013: Increasing Persistence of College Students in STEM, p. 1455
Conclusion

• Participatory teaching methods can improve the effectiveness of knowledge transfer
• They can overcome cultural barriers and create win-win situations for both, lectures and students
Thank you for your kind attention! Glückauf!