

Reflection of the Developments since the ICA-Edu Colloquium in Bolzano in 2012

How does technology impact on the teaching and learning process –
positive and negative effects

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FUTURE
1872 - 2022

UNIVERSITY OF NATURAL RESOURCES AND
LIFE SCIENCES, VIENNA

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Barbara Hinterstoisser, ICA-Edu colloquium 2022

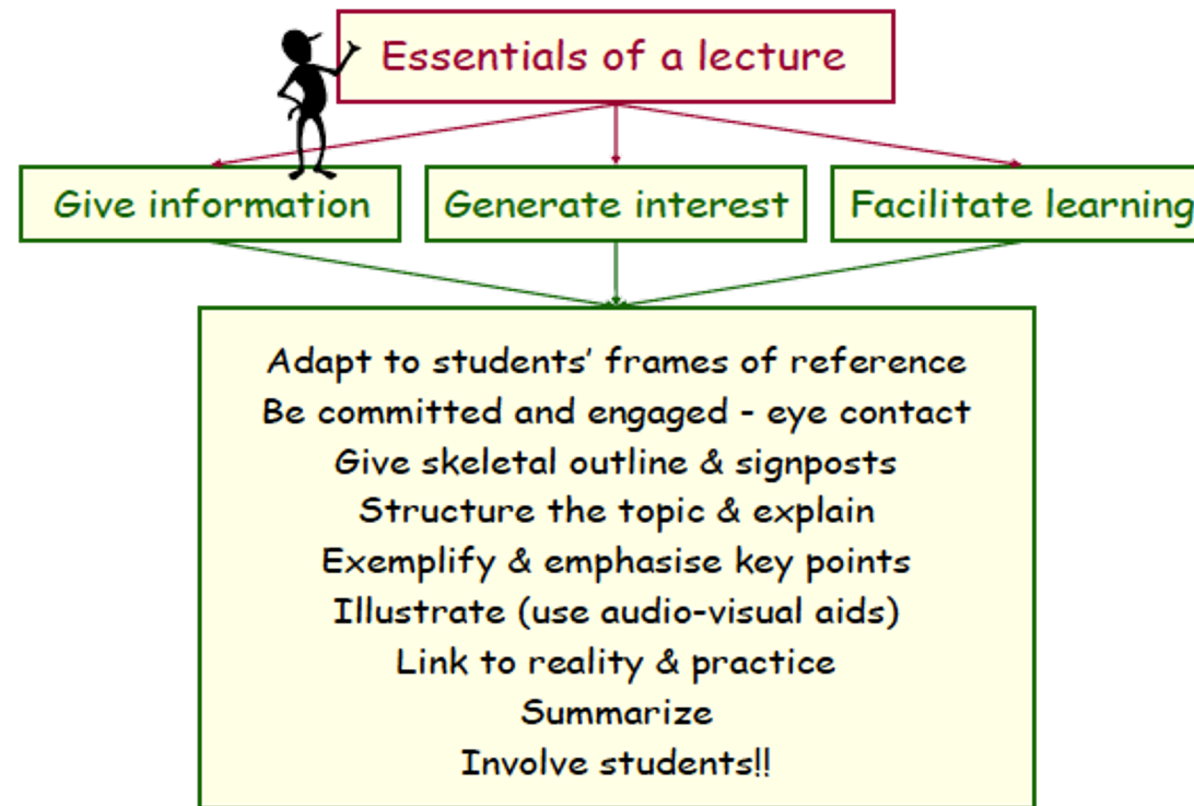


Format and styling has changed / techniques have changed /... / **Life has changed**



What has not changed are the principles of pedagogy

remember:



"Giving a good lecture is an intellectual and emotional challenge that should be worth real effort."

source: Birgitta Malmfors 2006

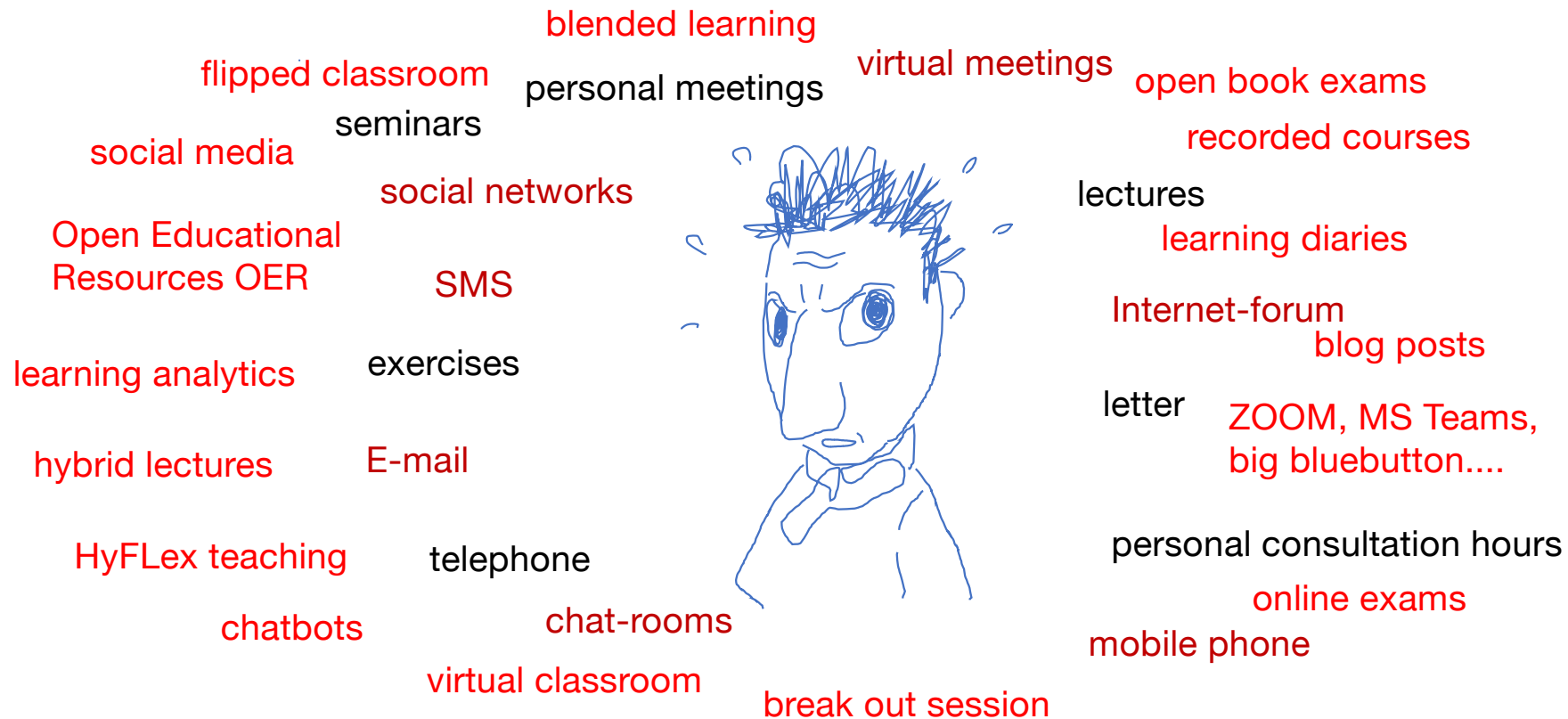
What has not changed are the principles of pedagogy

Pedagogical action is professional action aimed at promoting learning and personal development



What has changed: tools and techniques available for teaching

1992 → 2012 → 2022

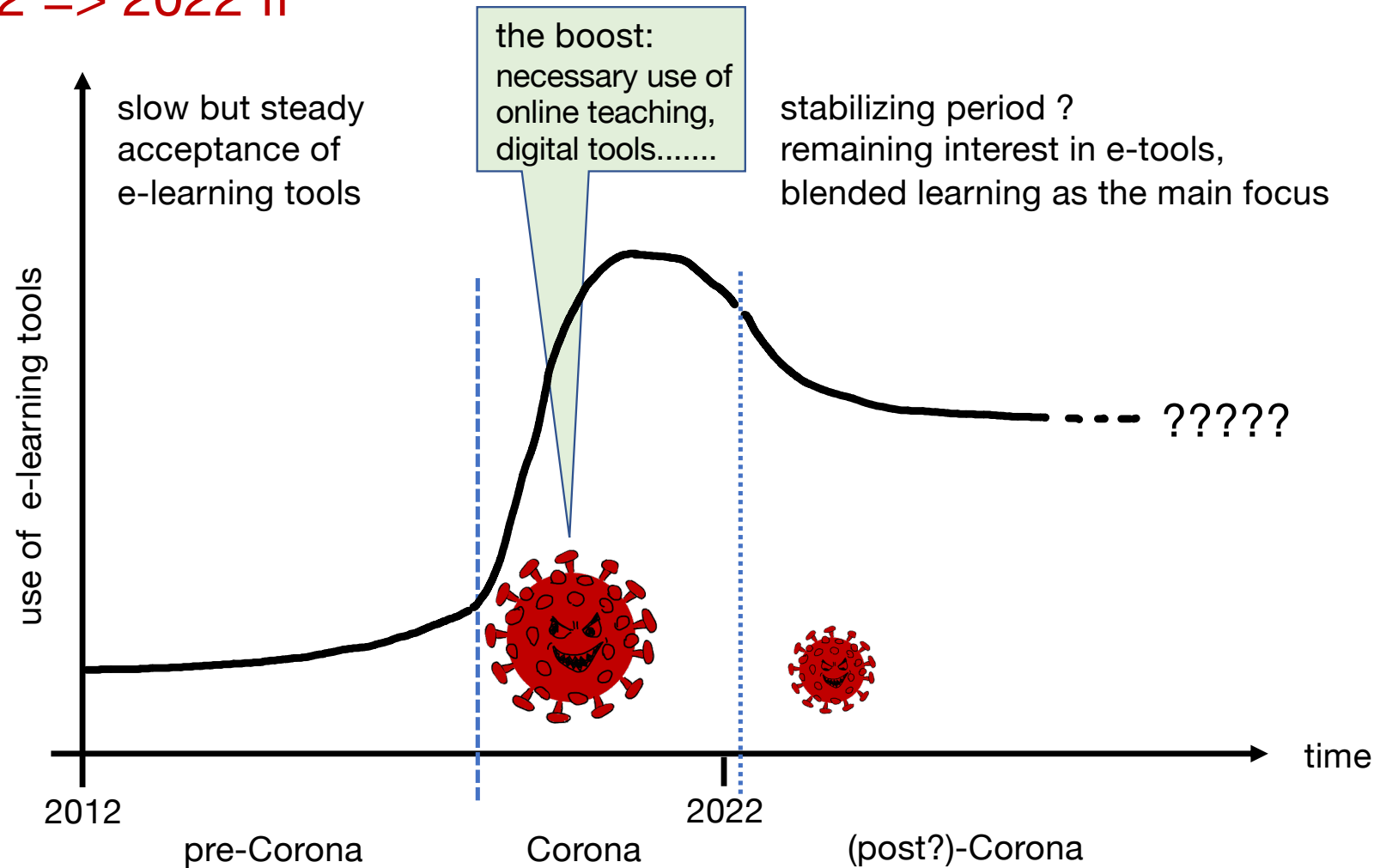


Are we able to manage this diversity in an appropriate way?

2017 at BOKU we stated for further development:

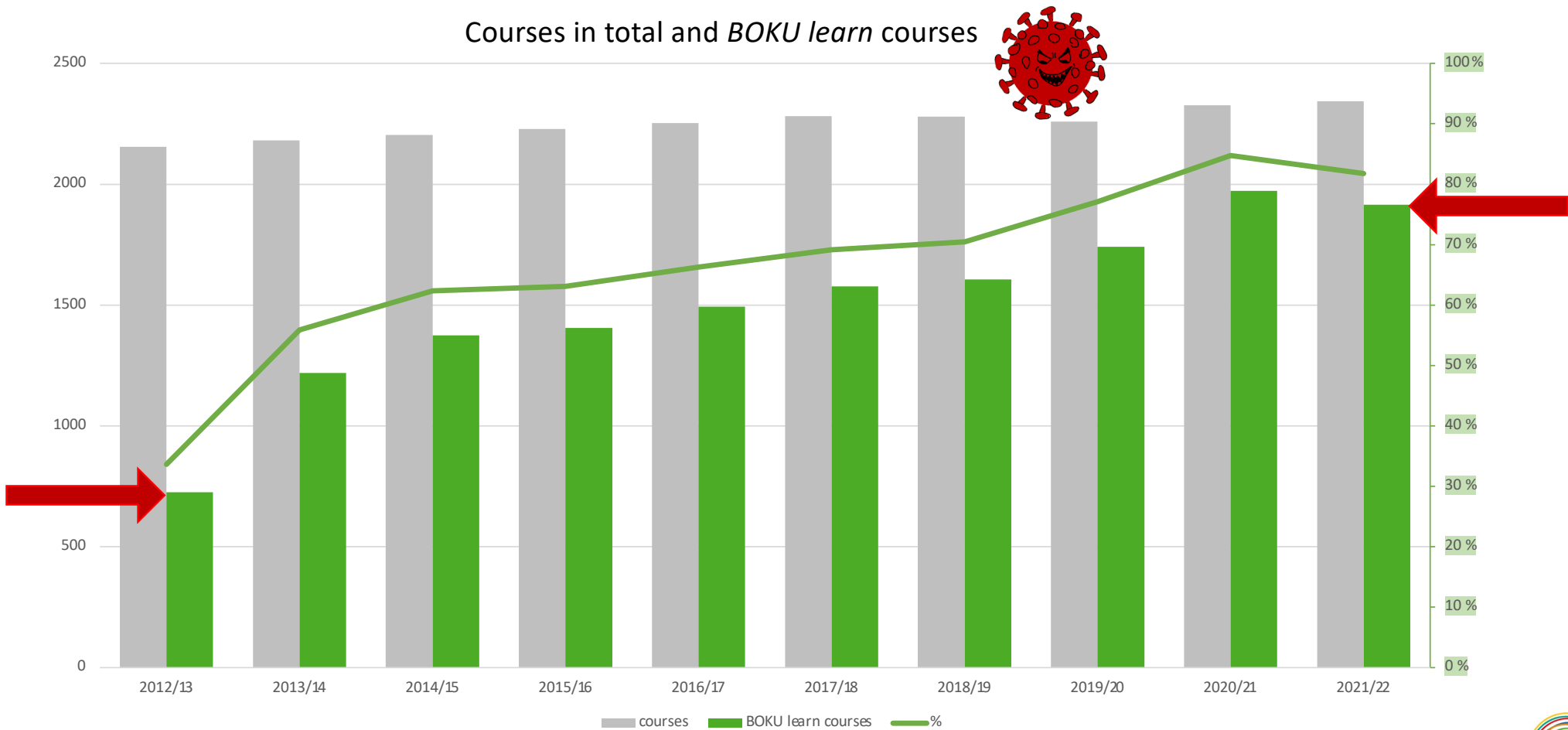
- **Blended Learning**-activities based on BOKU learn e.g. chemical calculations, statics, physics.....
- **Self-learning and self-assessment** options with partially automated individual feedback
- targeted use of **social media**
- **distance learning** for field work
- Webinars for students and teachers
- (teaching) events **live streaming**
- extended use of **BOKU Science TV** (e.g. live reports)
- creation of **wikis**
- **knowledge clips** production for teaching in and from BOKU
- **teaching videos** (BOKUdoku)
- Use of **international networks**
- u.v.a.m.....

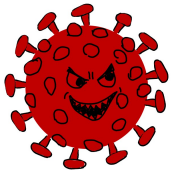
2012 => 2022 ff



measured trend in use of e-media at BOKU

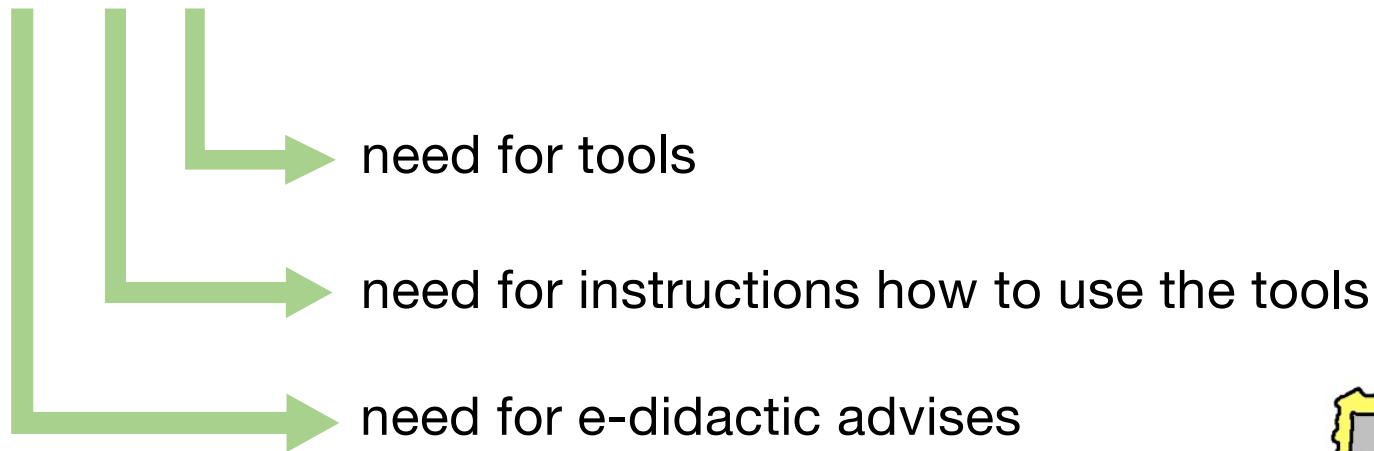
Courses in total and *BOKU learn* courses





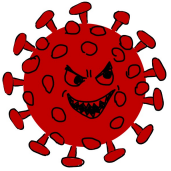
sudden upcoming challenges => demanding quick solutions

didactic interventions



need for a fantastic support by our e-learning team and our IT-services





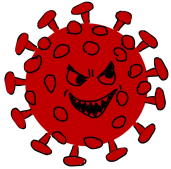
sudden upcoming challenges => demanding quick solutions

University closed => all lectures had to be changed in some way to online teaching

online lectures
lecture recording
active learning
interaction ?
participation ?
flipped classroom
exercise courses ?
excursions virtual ?
assessments
online exams
.....



didactic interventions necessary !



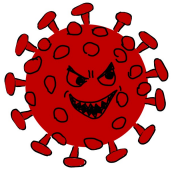
sudden upcoming challenges => demanding quick solutions

didactic interventions

by Claus Rainer Michalek and his team

- adaption of didactic concepts => coaching
- expansion of documentation and instructions
- network platform for teacher
- training programs for lecturers and tutors
- founding of "e-multiplier" group
- expansion of the existing training offers
- specific tailored training offers for departments

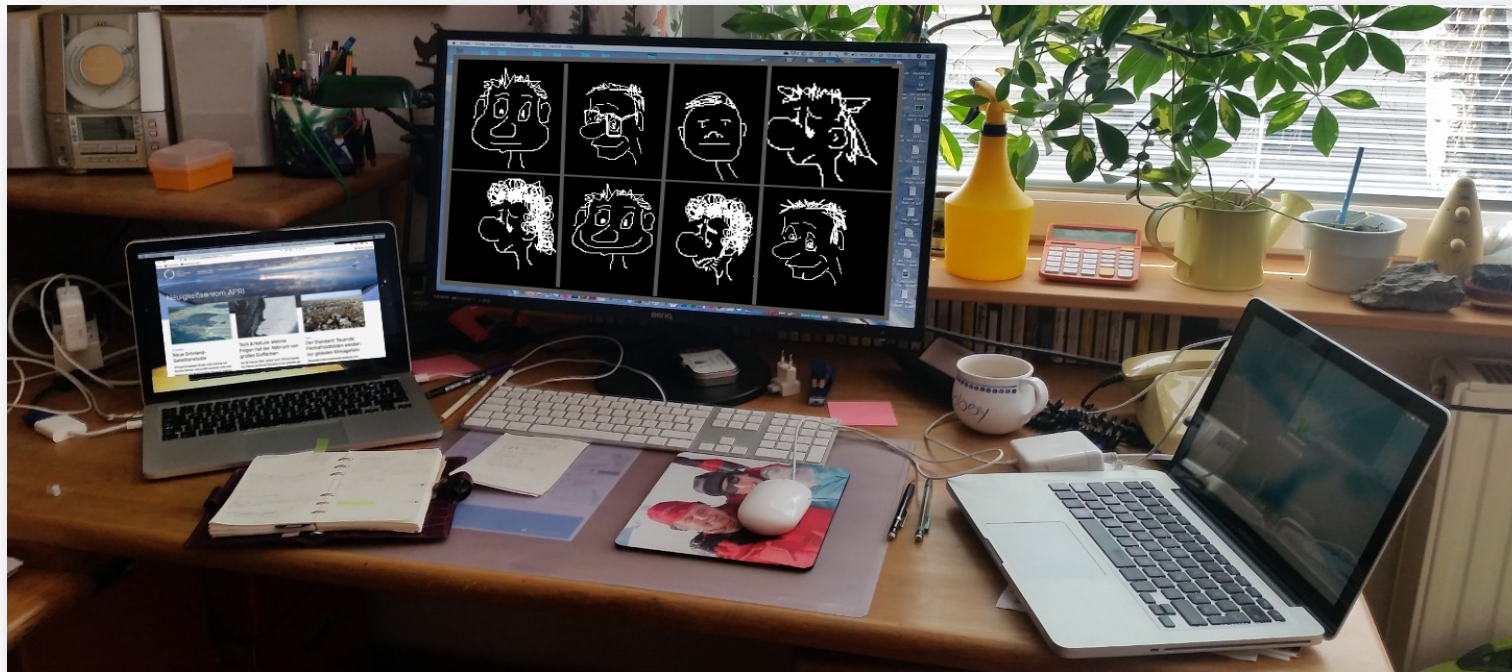


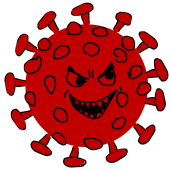


solutions and challenges

online lectures:

- simple, easy to use,
- challenge mostly technical (hardware, software on both sides)
- "revival" of lecture recording which was highly appreciated





solutions and challenges

online lectures:

how to integrate students activities ?

how to keep students motivated to stay ?

- active engagement instead of silent consumption
- simply set questions
- discussion groups / break out sessions
- quizzes (gamefication)
- voting systems (renaissance")
-

a playground for innovations!

BOKU vote

1. vote.boku.ac.at öffnen
2. voting id eingeben:

QNMH

3. antwort anklicken

Ergebnisse anzeigen

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Welche der folgenden Substanzen enthält keinen Sauerstoff?

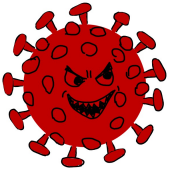
1. Zucker	6
2. Chlorophyll	11
3. DNA	10
4. Fettsäuren	9
5. Polyethylen	50

8 100
vote.boku.ac.at/abstim Google 15:38

Start BOKU vote Hilfe

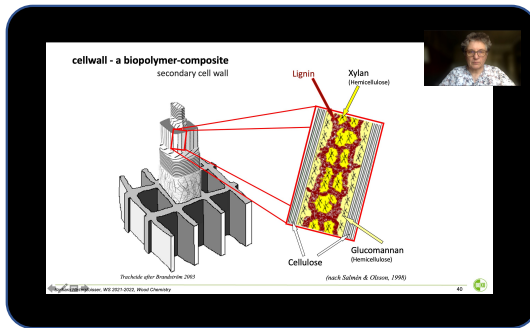
Welches der folgenden Gase ist Hauptbestandteil der Atmosphäre ?

1. Argon	➔
2. Stickstoff	➔
3. Kohlendioxid	➔
4. Wasserstoff	➔
5. Sauerstoff	➔



solutions and challenges

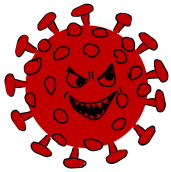
recording of lectures:



- synchronous and asynchronous teaching and learning possible
- Students focus on listening
- Repetition is possible at any time and "anywhere"
- missed lectures can be watched
- Search for key-words possible => specific sequence easy to find
- recorded lecture is an "add on" - not a substitute

but:

- still a type of frontal lecture
- students are tempted to not listen to original lectures
- often new didactic concept required
- Copyright !!!
- Teachers may need technical support
- Initially more time required for teachers and technical staff



solutions and challenges

Flipped classroom (example "Dendrology")

blended learning concept:

- preparation at home and discussion in class (online)
- voluntary introductory unit via video conference
- questions and answer sessions every 1-2- weeks
- short videos (10 min)
- short quizzes

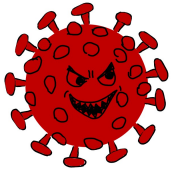


Quizz Onlinevorlesung 03.03.2021

In order to activate the next online lecture, you must have answered all questions correctly.



nach C.R. Michalek 2021



solutions and challenges

Virtual field trips (example "Soil Science and Geology")

preparation:

- 7 excursion sites: short movies (20min) recorded + reflections (short comments in discussion forums)
- e-learning course on learning platform (Moodle)

course: full day, real, time, own speed

- joint start in the morning (ZOOM)
- joint closure and question opportunity in the afternoon (ZOOM)





interactive courses using SCORM

[illegible]

Question 2 of 13

Master horizon designation for Soil 2- Horizon 2
(Single option) - based on given soil characteristics - please select from the list below!

Permanent grassland

Base saturation: >90%

Coarse fragments: 5%

Colour (mott): 10YR 3/3

Base saturation: >90%

pH = 6.0

Texture: silt loam

Coarse fragments: 20%

Colour: 10YR 4/2

Base saturation: 90%

Texture: Sand

Rock fragments: 70%

pH = 6.2

Fragments of sand stone
(silicification material,
lower slope)

Rock fragments: 80%

Carbonate content: 0%

☐ H

☐ O

☐ A

☒ E

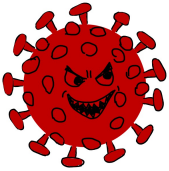
☐ B

Incorrect

Incorrect.

You have 2 attempts

Try Again



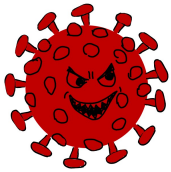
solutions and challenges

Assessments – the most challenging part !!

legal certainty has to be guaranteed !!

various tested and used possibilities:

- online oral exams via videoconference
- online exams written (with back video control)
- open-book exams
- portfolios to be elaborated
- posters presented online
- learning diaries
-



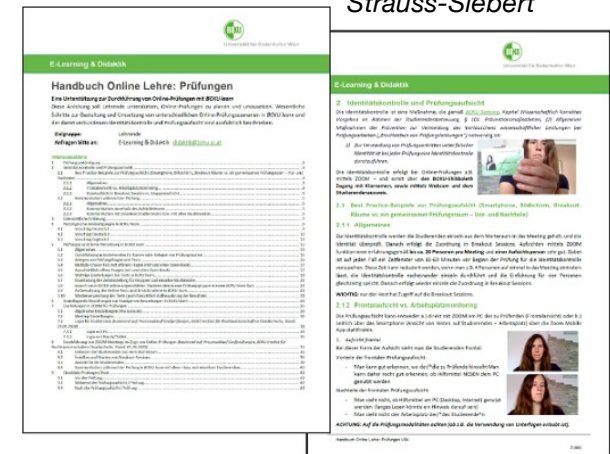
solutions and challenges

Assessments – the most challenging part

e.g. online exams:

- technical handbook was elaborated by the e-learning team
- coaching of the teachers by e-learning team
- proctoring by real persons ("E-Multipliers") via ZOOM up to 2 cameras)

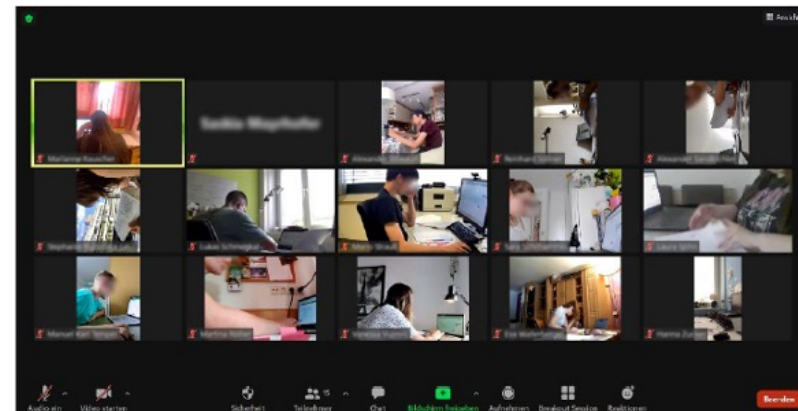
by Michalek, Zitek, Strauss-Siebert



What statement(s) is (are) true regarding nitric acid (HNO_3)









Wählen Sie eine oder mehrere Antworten:

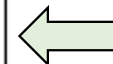
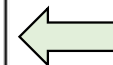
- ☐ a. is facilitating catalytic ozone destruction in the stratosphere by removing NO_x via sedimentation.
- ☐ b. is during night in the troposphere predominantly formed via the reaction of $\text{NO}_2 + \text{OH} + \text{M} \rightarrow \text{HNO}_3 + \text{M}$
- ☐ c. is in the stratosphere recycled to NO_x by reaction on polar stratospheric cloud surfaces.
- ☒ d. is an important NO_x reservoir in the troposphere.
- ☒ e. is water soluble at tropospheric conditions and thus removed by precipitation.



What remains ?

students interview

item	N	not used	not beneficial to learning	beneficial to learning
simple online lecture	1.866	9%		
interactive online lecture	1.862	20%		
live webinar	1.843	55%		
live + asynchronous tasks	1.843	37%		
online lecture + recording	1.857	21%		
self produced videos	1.839	35%		
not self produced videos	1.841	52%		
other digital provided media (e.g. slides)	1.851	9%		



What remains ?

teachers interview

- different **experiences of the teachers**
 - 18 % face-to-face teaching
 - 39 % face-to-face enriched with online elements
 - 36 % blended learning (i. e. Flipped Classroom)
 - 5 % hybrid teaching
 - 2 % online teaching

further options and opportunities:

- inviting guest lecturer via videoconference
- giving lectures from abroad if the researcher is "off-university"
- in general increased flexibility

no goes:

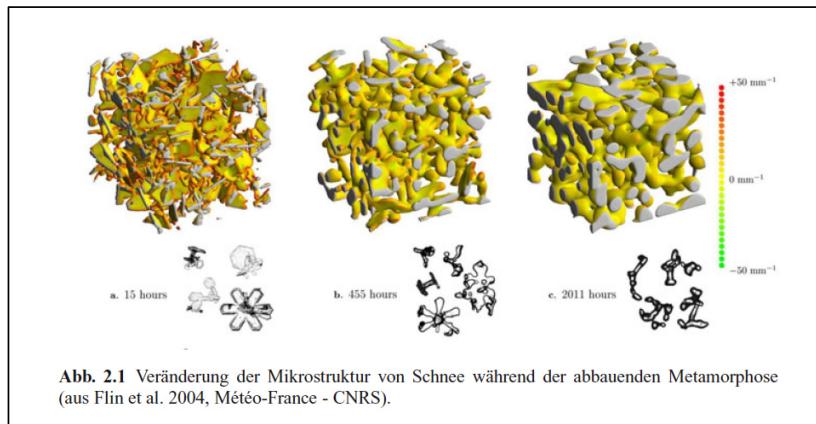
- using the recorded lecture instead giving a new one
- handing over all workload to the students ("lazy teacher")

What remains ?

Exercise Courses: example "Snow and Avalanches"

blended learning concept:

- online and analog teaching with lecture recording
- teachers involved from BOKU Vienna and BFW Innsbruck
- real excursion to ski-area
- from theory to practise



all in all – what remains

- ➡ blended learning in all versions
- ➡ improved individualisation of teaching and learning
- ➡ **personal contact remains an indispensable part of teaching**
- ➡ we have to find a balance between **analog and digital** as learning includes experience with all senses!



Barbara Hinterstoisser, ICA-Edu colloquium 2022



Thanks for Your attention although this
was a traditional frontal speech

