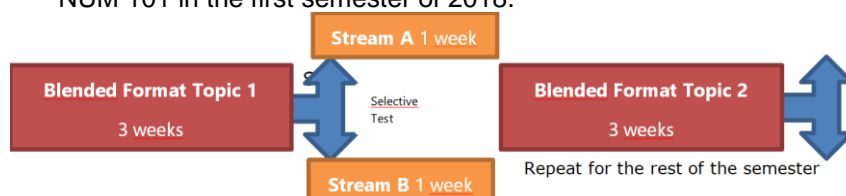


Report after the Assignment at TSiBA

from 10-8-2018 till 2-9-2018
Ernst Elsener B360 education partnerships

Project development so far

- Near the end of 2014 Pearl asked B360 for support to implement blended learning at the TSiBA.
- After discussing different approaches we agreed on starting a pilot project converting NUM101 to a blended learning course. The objective was to adapt the didactics of blended learning to the local circumstances. Pearl explained that the introduction to Mathematics was the bottleneck for many students. Due to the poor level of Maths in many High Schools students often come with a humble foundation in Mathematics. By optimising the effectiveness of this course the high drop-out rate should be reduced.
- The lecturer of the existing bridging course, Tyson Wadley was chosen to cooperate in this change process.
- I visited TSiBA from 11-9-2015 to the 2-10-2015 and developed in collaboration with Tyson a storyboard for NUM101 with a KA – resources and corresponding activities for the tutor sessions.
- I designed a web-site with a coaching section and a week by week list of content referring to Khan Academy resources.
<https://sites.google.com/site/prototype13june2015/>
- The coaching section contained material to be used by the tutor to overcome expected difficulties with self-directed learning.
- The content section consisted of links to Khan Academy tutorials and tests and to Khan Academy video files on the local server, because limited bandwidth was an issue.
- Armin Hollenstein visited TSiBA from 8-2-2016 to the 26-2-2016. He supported the launch of NUM101 and attended some self-directed learning sessions in the computer lab. A survey among students showed that students welcomed this form of learning.
- Unfortunately no tutors could be recruited and Armin and Tyson took care of large groups (50-60 students). After his assignment the tutorial sessions were replaced by lectures. Therefore a relevant element of the blended learning approach could not be implemented.
- During 2016 we developed a storyboard for NUM102 and the corresponding learning path on a web-site on Google sites.
<https://sites.google.com/site/num102tsiba/>
- In 2017 we developed a concept for implement a bridging course at TSiBA for quantitative Mathematics based on the experience with the NUM-courses. The Blended Format phase consisted of 3 lessons self-directed learning, 1 lecture and 1 tutorial session. Stream A and B consisted of 2 tutor session. This concept was planned to be tested with NUM 101 in the first semester of 2018.



- From 26-2-2018 to the 12-3-2018 Armin Hollenstein introduced a self-grading assessment system based on Google forms. About 100 students did this online test with a combination of multiple choice questions and open questions. With this system lecturers can enforce a consistent assessment and grading in a fraction of the time compared with a pen and pencil approach.

Situation in July 2018

- TSiBA has been using Google Classroom for quite a while.
- The IT-infrastructure and the internet access both have been up-graded.
- The two NUM-courses are delivered in the following manner:

Learning Environment



Lecture

2 per week
In 3 groups
Tyson



Tutorial

1 per week
In 4 groups
Tyson, Martin, Ann, Melody



Topic Discussion

1 per week
In 4 groups
Martin



Computer Session

1 per week
In 4 groups
Tyson

Lecturers / Tutors

Lectures on whiteboard

Do exercises
Assignments
Apply knowledge tests

Learn fundamentals
Fill gaps

Specific ICT-skills
Exercise
Do Maths on PC

Students

Listen
Read in textbook
Take notes
Ask for clarification

Do exercises
Assignments
Apply knowledge tests

Learn fundamentals
Fill gaps

Specific ICT-skills
Exercise
Do Maths on PC

There is no self-directed learning with Khan Academy resources however!

- In a similar course (introduction to Mathematics for engineers) at the NUST (Windhoek) self-directed learning is an essential element of the learning environment. In 2017 we have evaluated this course by doing a comprehensive survey. These results can inform us how to improve the effectiveness of NUM102.

Specification for school year 2019

- Pearl sets a deadline for implementing self-directed learning in NUM101 and NUM102 at the start of schoolyear 2019.
- B360 e-Learning team is appointed to support the TSiBA team to make this happen.

Briefing by Pearl 13-8-2018

- After a comprehensive market research a new policy is rectified by the board in June this year with the following key conclusions:
 - Brand change from a NGO to a University
 - Prioritize degrees (94 % of graduates get employment)
 - Jobs will be rather project oriented and not career oriented
 - Our value system is the curriculum
 - We need a new building that supports new pedagogy
 - Focus must shift to on numeric methods
 - Mathematics and Statistics are essential part of curriculum
- Martin Pienaar is the new anchor person in Mathematics. He will be the driving person in the change process

Observation of the four instructional forms

I visited all four lessons to get an insight of the existing learning environment.

Lecture (13-8-2018 Tyson)

- Topic: Introduction to probability after having discussed descriptive statistics.
- The lecturer describes and explains the probability of events and how it is mathematically written. He writes his notes on the whiteboard. With a basic example he explains the compound probability of two events (AND OR).
- Chapter 4 of the textbook covers this topic, too.
- The lecture is given three times for groups of about 26 students. (total 80 students)
- The students follow the lecture and take notes.

Tutorial Session (14-8-2018 Martin)

- Topic: Probability
- The students have to solve a task. They are invited to solve it collaboratively with fellow students. They consult their lecture notes and the textbook.
- Then the lecturer explains, how to solve the task on the whiteboard. He insists on the difference between 'mutually exclusive' and 'independent events'.
- Then the students solve the next task.
- The tutor is attending three tutorial sessions in a row.

Computer Lab Session (16-8-2018 Tyson)





- Topic: Descriptive statistics with Google sheets.
- Students download Excel-files with tasks to be solved. Tyson let's them solve the tasks without any further instructions. He is observing them, asking questions or advising here and there.
- Most students work focused.

Topic discussion (20-8-2018 Martin)

- Topic: Probabilities with VENN-diagrams
- Tutor explains an example of an interview with students who are enrolled for different subjects. Students must solve the problem with a VENN-diagram with three overlapping circles.
- Tutor shows the solution on the whiteboard.
- Students have to calculate probability of students attending a specific subject when picked out by chance.

Integration of self-directed learning

In a discussion with Martin we propose the following changes.

Learning Environment			
Lecture	Tutorial	Topic Discussion	Computer Session
			
Lecturers / Tutors	Lecturers / Tutors	Lecturers / Tutors	Lecturers / Tutors
Lectures on whiteboard With PC/Beamer References to KA	Do exercises Assignments Apply knowledge Tests With PC/Beamer References to KA	Learn fundamentals Fill gaps With PC/Beamer References to KA	Specific ICT-skills Exercise Do Maths on PC References to KA
Students	Students	Students	Students
Listen Read in textbook Take notes Ask for clarification	Do exercises Assignments Apply knowledge Tests Bring their LT / T Learn on KA	Learn fundamentals Fill gaps Bring their LT / T Learn on KA	Specific ICT-skills Exercise Do Maths on PC Bring their LT / T Learn on KA
Self-directed Learning with KA during reserved timeslots in Comp-Lab			

Suggestions how to enhance lessons with digital resources

Lecture

- During preparation lecturer checks for relevant learning resources on KA and on the internet.
- He delivers the lecture with laptop and beamer.
- Example: He shows the KA-video comparing experimental with theoretical probability and shows a learning control on KA. (click on picture to go there)



Tutoring Session

- Tutor addresses the question how to overcome math aversion by showing a personal story. Then he plays live quiz in class about probability.

Topic Discussion

- Tutor shows a video from KA about Descartes, building a bridge between Algebra and Geometry and plays a quiz about probability and Venn-diagrams as homework.

Computerlab Session

- Tutor shows a video tutorial about absolute and relative references in Google sheet.

Income	Percentage	Amount
\$2,900.00	Savings 40%	=G4*\$C\$8
Total Expenses	Emergency 25%	\$0.00
\$1,677.00	Debt Payoff 25%	\$0.00
Total Savings	Other Goals 10%	\$0.00
\$1,223.00	Total	

Self-directed Learning

Time-Slots are reserved for Students to study KA-resources

Students:

- Follow a learning path for guidance
- They check their understanding with learning controls at regular intervals

Tutors and Lecturers:

- They give recommendations
- They can monitor learners activities
 - Who struggles where
 - What is challenging
 - Are groups with similar needs
- This can be motivating for students
- Another incentive to study seriously is:
 - Asking for surprising tests

Further digital resources

Software for recording videos tutorial



Recording Video Tutorials
With Studio Open Broadcaster Software

Open source software for recording and streaming
Download <https://obsproject.com/> and install

Purpose of the software

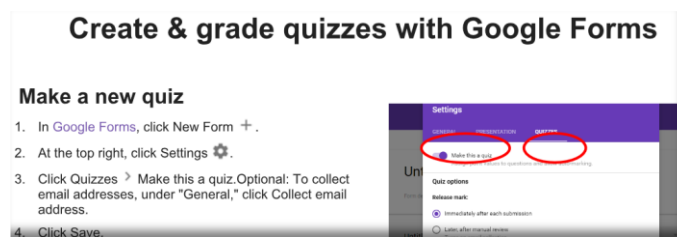
You can record all activities on your screen to a video file and include many media sources such as

- Pictures such as a logo
- Webcam
- Speech recorded with a microphone
- Audio from programs
- Games
- Text
- Video
- etc

Video tutorial to learn how students activities can be monitored by the tutor



Creating self-grading tests

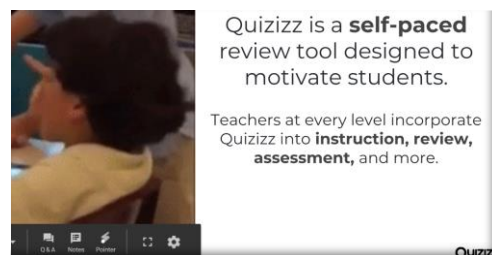


Create & grade quizzes with Google Forms

Make a new quiz

1. In Google Forms, click New Form +.
2. At the top right, click Settings ⚙️.
3. Click Quizzes > Make this a quiz. Optional: To collect email addresses, under "General," click Collect email address.
4. Click Save.

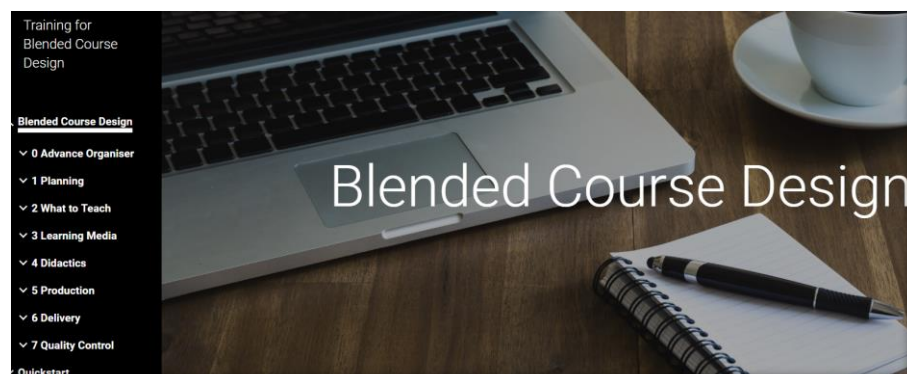
Gamification with Quizizz



Quizizz is a **self-paced** review tool designed to motivate students.

Teachers at every level incorporate Quizizz into **instruction, review, assessment,** and more.

Web-site with resources for teachers who want to introduce Blended Learning



Training for Blended Course Design

Blended Course Design

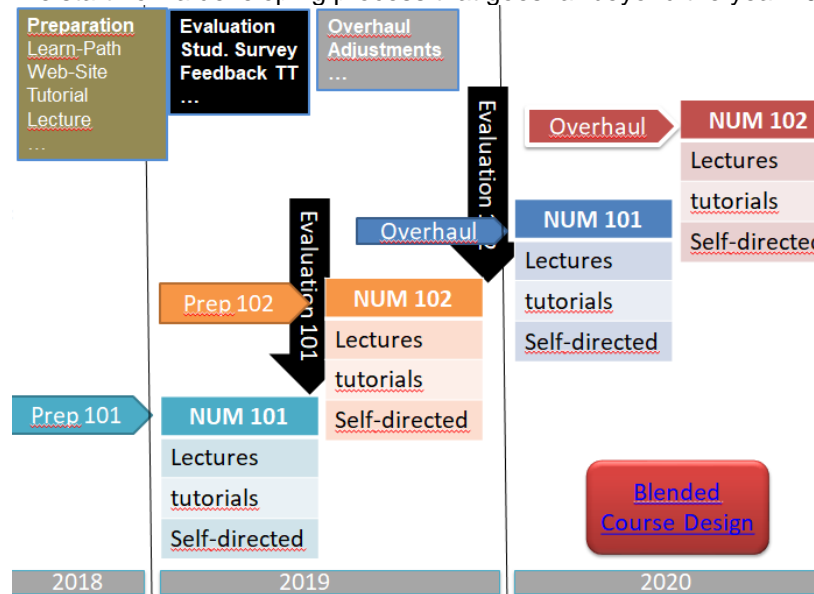
- 0 Advance Organiser
- 1 Planning
- 2 What to Teach
- 3 Learning Media
- 4 Didactics
- 5 Production
- 6 Delivery
- 7 Quality Control

Quickstart

Blended Course Design

Planning the change process

We start now a developing process that goes far beyond the year 2018.



Immediate action:

- Martin and Tyson: Revise the learning path of NUM101 and adapt it to the curriculum of the course
- IT-Department: Maintain the computers in the lab, so that all are reliably functioning, a cable from projector to teacher's desk should be installed
- Integrate time slots for self-study in the computer lab from 1st semester 2019
- Lecturer and Tutors: Bear in mind to consider digital learning resources when preparing for NUM 101
- If more lecturers want to implement blended learning in their courses they need to coordinate their efforts. The students will be confused if access and user face is different for every course. A coordinating task force should work out some standards.

Support by B360:

The e-learning team of B360 educational partnerships is committed to support this process by the following tasks:

- Giving ownership and editing rights for TSiBA NUM - 101 and TSiBA NUM - 102 to the TSiBA team.
- Assistance in the evaluation process. (Propose a questionnaire, number crunching, data analysis...)
- Proposing examples of lectures, tutorials etc.

Feedback for Martin and Tyson

- During the first week I visited lessons held by Martin and Tyson. The purpose of visiting their lessons was not evaluating or even rating their teaching, but to get an idea what the actual learning environment in NUM102 is.
- My observations are meant as an external perspective, which might incite some reflections. Having taught not only in Switzerland but also abroad, I know perfectly well that the climate in a classroom is heavily influenced by the corresponding culture. Therefore my short glimpse into their classroom was very interesting for me.
- The feedback is strictly confidential and remains an exchange between them and me.
- It is important to get both of them on board in our project. They will be the driver of the change process that had just begun.

Presentation of the project for the academic staff of TSiBA

On the 30th of August Pearl invited the academic staff, the volunteer lecturers, the CEO and the IT-staff for a presentation of the project. The purpose of this event was

- Informing all participants about our step by step strategy to implement blended learning in NUM-101 and NUM-102
 - Giving Martin and Tyson a platform to show their role as an owner of the project
 - Announcing the commitment of B360 to support the process
 - Give everybody an opportunity to express their concerns
 - Show other lecturers what it takes to convert a conventional course in a blended learning format and what benefits to expect.
 - 13 participants were present. At the end we had a lively debate, with questions, requests and suggestions.
-

Providing resources for lecturers who want to start with blended learning

After planning, developing, implementing, piloting and evaluating a blended learning course. Teachers should be empowered to multiply the approach and adapt it to other topics. Consequently our role will be limited more and more to assist them in the process. To improve their autonomy schools with experience with pilot projects should in a next phase develop their expertise in this field. To support this process they need a

During the last few weeks I designed a web-site "Blended Course Design" with instructions how to convert a conventional course into a blended learning format.

- Video tutorials, readers, slide-shows, quizzes and assignments explain the most relevant theories of the domain. This material could serve for course with teachers.
 - In the chapter "Quick Start" the change process is summarised in ten steps.
 - There is additional material offered like
 - A manual how to create a video tutorial using an open source software.
 - A manual how to edit a video with open source software.
 - A description how to design a needs analysis
 - Tips how to find and capture learning resources on the internet
 - Criteria for selection effective learning resources
 - A manual how to write a self-grading test with Google forms
 - A guide how to create and use quizzes as formative learning controls
 - A guide how to write challenging multiple choice questions
-

Computer Lesson

- On the 16th of August I discussed a possible collaboration with Anneke
 - We found the following challenges in her computer classes:
 - 120 students but only 80 computers
 - Large differences in prior knowledge of the students
 - Testing and grading is monumental task
 - I showed her the web-site ICT4Students and how I approach similar challenges with large groups of students.
 - I gave her access to the web-site and sent her a manual "How to create self-grading tests" and a manual "How to record video tutorials with open source software.
 - Students at TSiBA use Google apps whereas ICT4students is based on Microsoft Office. If she would like to work with a similar approach we would have to create a new learning path on a web-site. After a quick research on the internet I am confident, that learning resources for Google apps could be found.
 - If TSiBA decides to adapt a blended learning approach for their computer lessons now or in the near future we could assist in creating a learning path that matches the curriculum.
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