



Team Based Learning

A new didactic concept

The first results



November 17, 2016

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Content

Topic:

Team-based learning

- Learning aspects
- Some small questions
- What is Team-Based Learning
 - Structure
 - Implementation
- First results in TBL
 - Concept test over the first 6 modules of EE
 - Introduction to Communication Systems in module 8, EE
 - Creative technology module 5 – Smart Tech
- Q&A

Learning aspects

- We all heard about the terms:
 - Flipping the classroom
 - Engage student participation,
 - Increase passing rates
 - ...



- Interesting topics, but the question is, how to do this?
- A possible method is - Team based learning - TBL

Why TBL?

- I was part of the 'Leergang Onderwijskundig Leiderschap (LOL)' (Educational leadership)
- 10 meeting of 2 days about education
- And a Study tour to the UK
- TBL at Bradford school



Question 1

What percentage of today's schoolchildren will eventually be employed in jobs that have yet to be created (according to this U.S. Department of Labor report, 2016)?

- A. 25%
- B. 40%
- C. 65%
- D. 80%



Question 2

Myth or fact: “Teachers are the most important influence on a child’s education”

- A. It is a fact. Good teacher are the most important aspects of learning.
- B. Less than 30 percent of a student's academic success is attributable to schools and teachers.
- C. Most significant variable of student’s learning is the didactic concept of teaching.
- D. Good teachers have almost no influence on the learning process. Bad teachers do a little bit.

Question 3

If individuals make a test and later on teams make the same test again, what percentage of teams outperform their own best member?

- A. 85%-95%
- B. 95%-99%
- C. Over 99%
- D. Less than 85%

Question 4

Who said “Books will soon be obsolete in schools”

- A. Eric Mazur in 2005
- B. Peter Apers in 2015
- C. Thomas Edison in 1913
- D. Steve Jobs in 2007

Question 5

The main aims of self and peer assessment are to:

- A. increase student responsibility and autonomy
- B. strive for a more advanced and deeper understanding of the subject matter, skills and processes
- C. lift the role and status of the student from passive learner to active learner and assessor (this also encourages a deeper approach to learning)
- D. involve students in critical reflection

Next step : work in teams

- Now we will repeat the questions, but now you can discuss it in teams. For now : don't care about the size of the team.
- And : use the scratch card

IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF AT®)

Name GROUP 7 Test # _____

Subject _____ Total _____

SCRATCH OFF COVERING TO EXPOSE ANSWER

	A	B	C	D	Score
1.				☆	20
2.	☆				20
3.				☆	20
4.		☆			10
5.	☆				20
6.		☆			20
7.			☆		20
8.	☆				20
9.				☆	20
10.	☆				20
11.					
12.					
13.					
14.					
15.					
16.					
17.					

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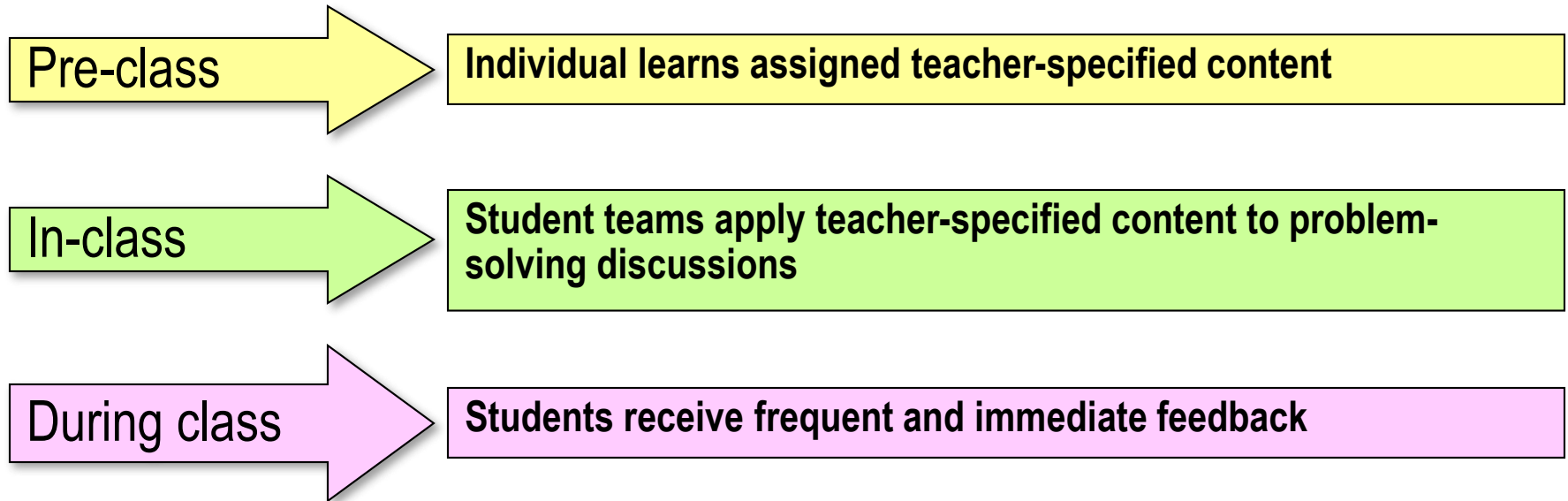
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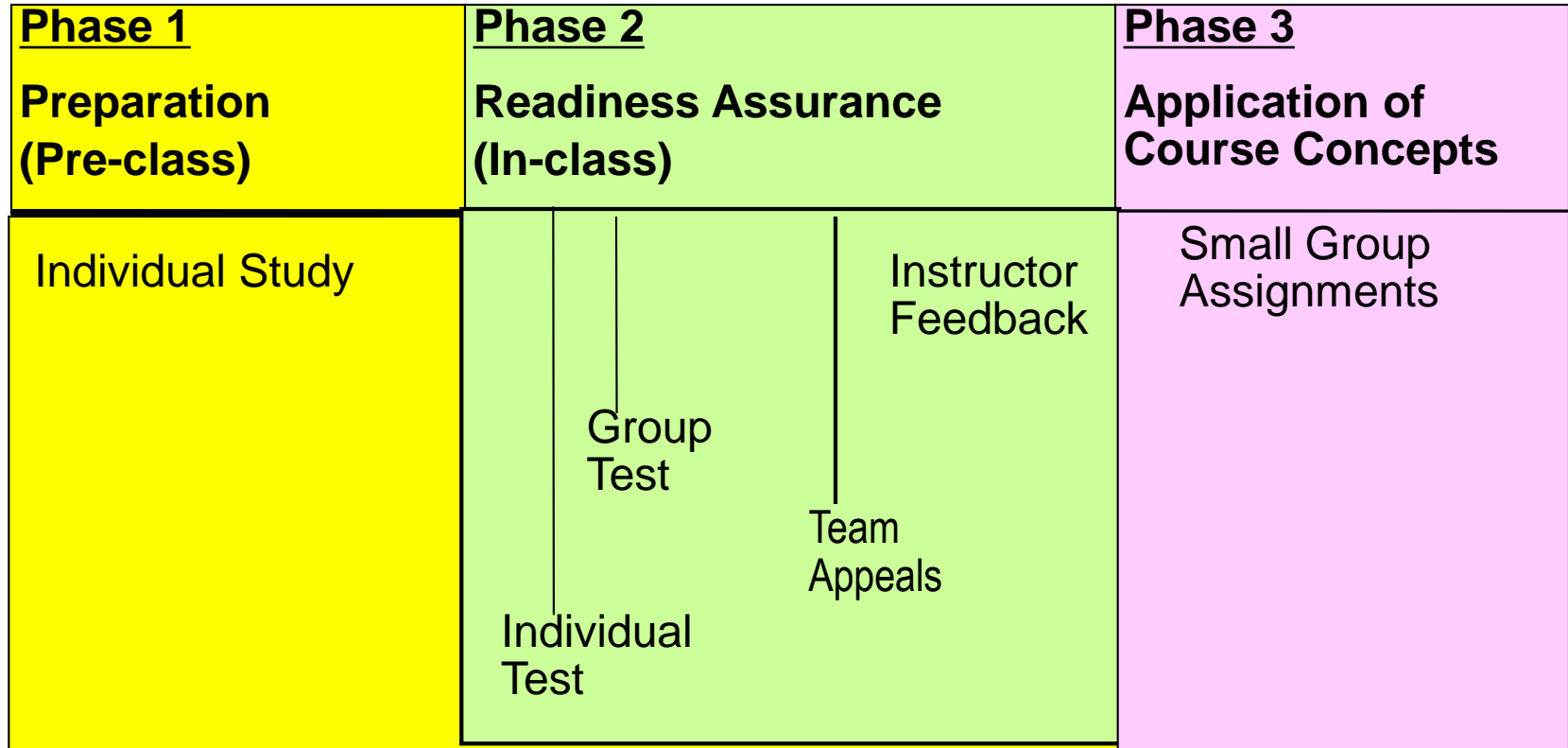
TBL

Small groups of students interact as in-class teams to apply content to simple and complex problems with the feedback of the instructor as the content expert.



Team Based Learning was developed in the 1970's by Dr. Larry K. Michaelsen, a Professor of Management at the University of Oklahoma, who wanted to change the passive learning in his lectures into active learning by testing and assigning students to teams.

Concept



Comparison

	Lecture	Problem-Based Learning	Team-Based Learning
Key points	Instructor provides content for student note-taking in a hall	Student-directed learning in solving real world problems in small groups	Instructor-directed content applied to real world problems by student teams in a lecture hall
Teaching Methods	Lecturer didactically provides content	Facilitators give cases and students analyze facts to solve case	Students prepare content before class. In class, they apply it in teams to solve problems
Outcomes	Content acquisition and conceptual understanding	Problem-solving abilities, critical reasoning, content acquisition, understanding, effective communication and small group interaction	Content acquisition, understanding, content application to solve problems, critical reasoning, effective communication, collaborative team work
Instructor's role	Identifies learning objectives, prepares presentations and answers student questions	Facilitates small group discussions and gives students feedback and guidance as needed	Identifies learning objectives and content, prepares readiness tests, answers student questions and prepares application assignments for team work
Student's role	Attend lecture, study notes, prepare for exam	Identify learning issues, do independent out of class research, join group discussions	Do independent out-of-class study, join team discussions, defend team solutions to class

*Table excerpted from Baylor College of Medicine, Team Learning in Medical Education, September 2002

Implementation ..

- A couple of pilots have been carried out:
 - Module 8 ‘Signal Processing and Communication’ in EE
 - Introduction to Communication part (Mark)
 - Module 5 ‘Smart Technology’ in Creative Technology.
 - Complete Introduction to Communication part (Mark)
 - Two TBL lectures of the Electronics part (Erik)
 - A concept test of the first 6 modules in the EE curriculum

- And several TBL introduction workshops

Example : M5 Creative Technology

- Last year 6 lectures and 3 tutorial sessions were scheduled
- This year:
 - Introduction lecture
 - 4 TBL sessions, with 2 team tutorial sessions
 - A concluding lecture
- A written exam, more or less at the end of the module.

Flipping the classroom

- On Blackboard I put the following material:
 - Movies for each of the TBL lectures. In total about 5 hours of new material has been made.
 - Slides
 - I used 'ScreenFlow' on a MAC
 - Slides I used in the movie
 - Extra written material about the topics
 - Example problems (also an example exam) with solutions
 - Links to related YouTube videos

In class

- First thing : iRAT (Individual Readiness Assurance Test)
 - 15 questions
 - Separate sheet --- 60% for the grade of the day
 - Individually
 - Closed book
- Then: tRAT (Team Readiness Assurance Test)
 - Scratch forms
 - Immediate feedback
 - 40% for the grade of the day
- Appeal – very important
- Explanation by the teacher / additional questions etc...

- After that: group assignments: the tutorials

Bonus points

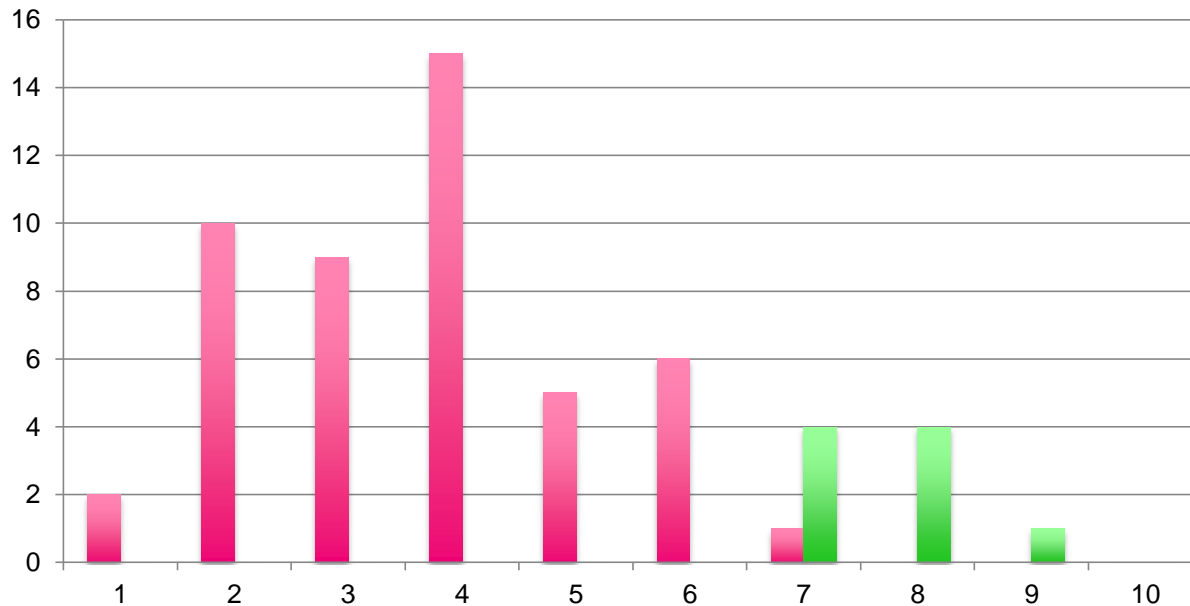
- To motivate people to learn and come to class:
 - 1 bonus point (on top of the results)
 - Divided over 4 tests (0.25 each)
 - 60% iRAT result
 - 40% tRAT result

During the EE sessions – 100% attendance

In the Create sessions this was lower (about 60-70%)

Some results

- First test I did: concept test EE
 - I ask the module coordinators of the first 6 modules of EE to give me 5 questions.
 - I also ask the math OLD to do this
 - I selected 25 questions (5 possible answers / question)



Individual average = 3.8
Team average = 7.8

Results

- EE module 8
 - Four themes
 - In Theme 3, I used TBL (5 sessions)
 - In Theme 4, 'traditional' lectures were given
 - Looked at 2015 (traditional) and 2016 (partly TBL)

- Theme 3:

- 2015
 - average score: 25.6/60 points
 - 41% scored > 5.5
- 2016
 - **average score: 36.8/60 points**
 - **75% scored > 5.5**

- Theme 4:

- average score: 26.3/45
- 71% scored > 5.5
- average score: 24.0/45
- 64% scored > 5.5

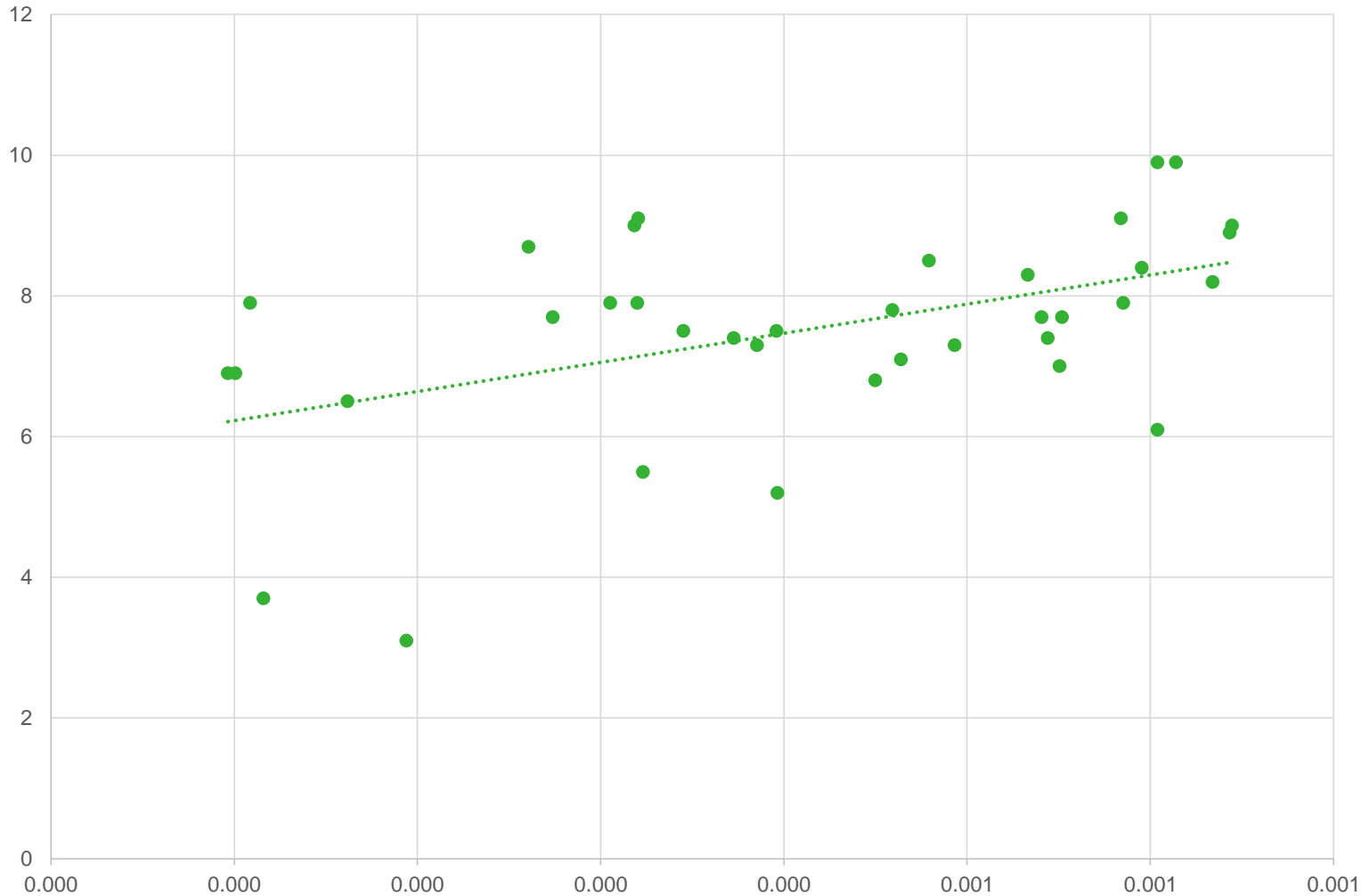
Results

- Creative technology Module 5
 - 2016 used TBL completely in the Telecom part
 - Same level of test (I even think the test in 2016 was more difficult)
- 2015: Average grade exam = 5.54 (before the resit)
- 2016: Average grade exam = 6,54 (before the resit)

- TBL bonus : maximum 1 point
 - For 2 of the 46 people an insufficient grade changed in a pass.

Results

Grade Telecom as function of TBL points



Results Electronics part (Erik)

- Two TBL session (OpAmps & Superpos + Thevenin)
- Average grade of test was 6.47 ± 1.85
- If we make the distinction between participation in the TBL sessions, we find the following average values:
 - Average Grade of people doing 2 TBL sessions: 7.09 ± 1.99
 - Average Grade of people doing 1 TBL session: 6.86 ± 1.26
 - Average Grade of people doing 0 TBL sessions: 4.71 ± 1.04

Results Electronics part (Erik)

- TBL Opamp session
 - Average grade from TBL = 4.84.
 - Students participating in the TBL session - 6.74
 - Students not participating in this TBL - 4.94
- Superpos + Thevening TBL session:
 - Average grade from TBL = 6.13.
 - Students participating in this TBL session - 7.61
 - Students not participating in this TBL - 4.28

Conclusions

- TBL forces the students to start working from the beginning of the module.
- TBL will help to study in teams
- In the experiments we did, the results are significant higher.
- Students like TBL, but Not for the complete curriculum
-

And:

- Publish results – I will give a talk at the TBL annual conference in March 2017 in Orlando
- More to come....

Questions ??

