

# Team-based learning

## Group work

Academy for Industrial Management  
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# Team Based Learning

1. A micro-TBL session - start
  - a. (usually 240 min, now 12 min)
2. Experiences of our group in 5 years of TBL sessions
3. Micro TBL - finalization

## **A micro-TBL**

1. Individually answer 3 brief questions
  - a. copy your answers on the card
- 2.
- 3.

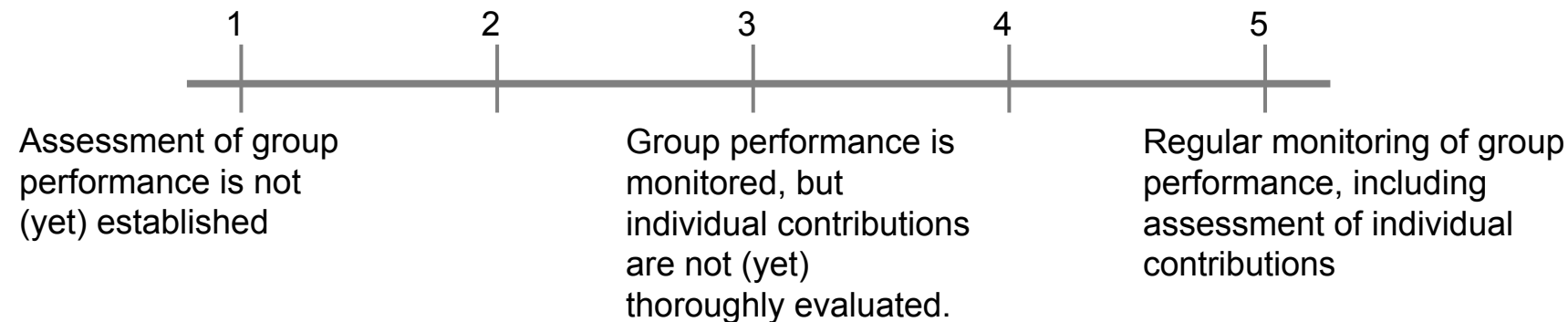
## Group work

*For your curriculum, please indicate*

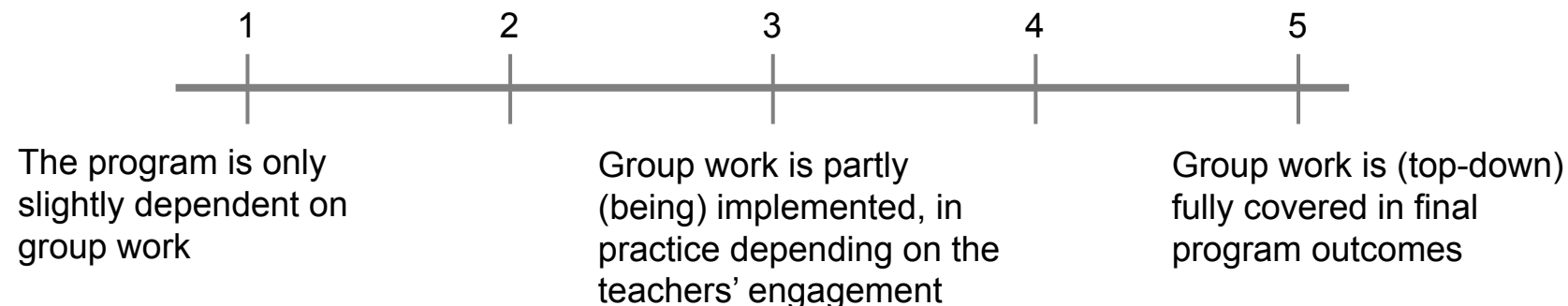
### 1. Your country *(encircle)*

Austria - Belgium - France - Germany -  
Hungary - Netherlands - Iceland - Ireland -  
Italy - Poland - Serbia - Spain - Sweden -  
Switzerland - USA

### 2. Assessment *(encircle number)*



### 3. Embedding *(encircle number)*



# Copy answers to card

**1. Your country** (*encircle*)

Austria - Belgium - France -  
Germany - Hungary -  
Netherlands - Iceland - Ireland -  
Italy - Poland - Serbia - Spain -  
Sweden - Switzerland - USA

**2. Assessment** number:

**3. Embedding** number:

*We collect  
the cards*

## **A micro-TBL**

1. Individually answer 3 brief questions
  - a. copy your answers on a second sheet
2. Discuss your answers in the group
- 3.

# Discuss your answers

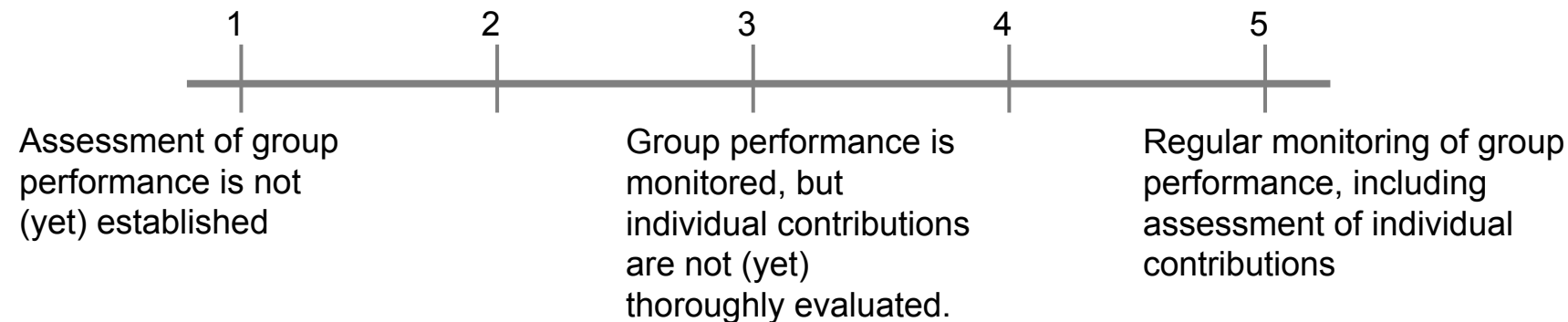
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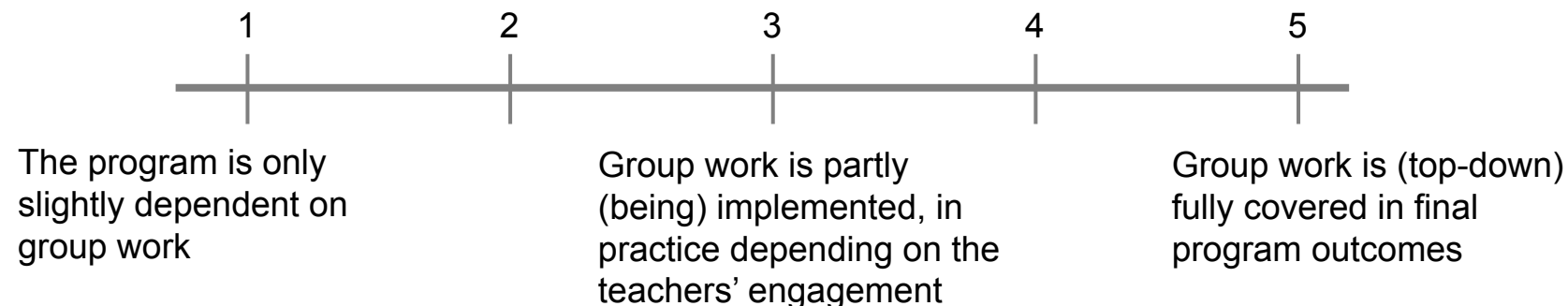
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# Team Based Learning

Application in Industrial Engineering and Management  
Gerald Jonker, Engineering Systems & Design (ESD) Group





# Purpose and Objective

*Definition: Team-Based Learning (TBL) is an evidence based collaborative learning teaching strategy designed around units of instruction, known as “modules,” that are taught in a three-step cycle:*

- 1) preparation*
- 2) in-class readiness assurance testing*
- 3) application-focused exercise*

*A class typically includes one module.*



- › The purpose of TBL: develop maturity, goal-seeking behavior, group work and knowledge/skills



# TBL (IEM) *Set-up*



## > General

### ▪ **Teacher preparation**

- Teacher prepares TBL with MC questions & group assignment
- Group formation (remains similar for all TBL) - CATME

## > Each TBL ( $\pm 3$ per course unit)

### ▪ **Student preparation:**

- *Preparation* Substantial reading materials for self-study *High level*

### ▪ **Session (3-4 hours)**

- *Readiness Assurance Test* Individual Multiple Choice (0.5 h. , 20 questions)
  - Evaluation of MC group by scratch cards (0.5 h.) *Fun, group forming*
- *Application-focused exercise* Group work (2 h.) with in-depth assignment  
*Usually poster*

### ▪ **Afterwards**

- CATME group evaluation

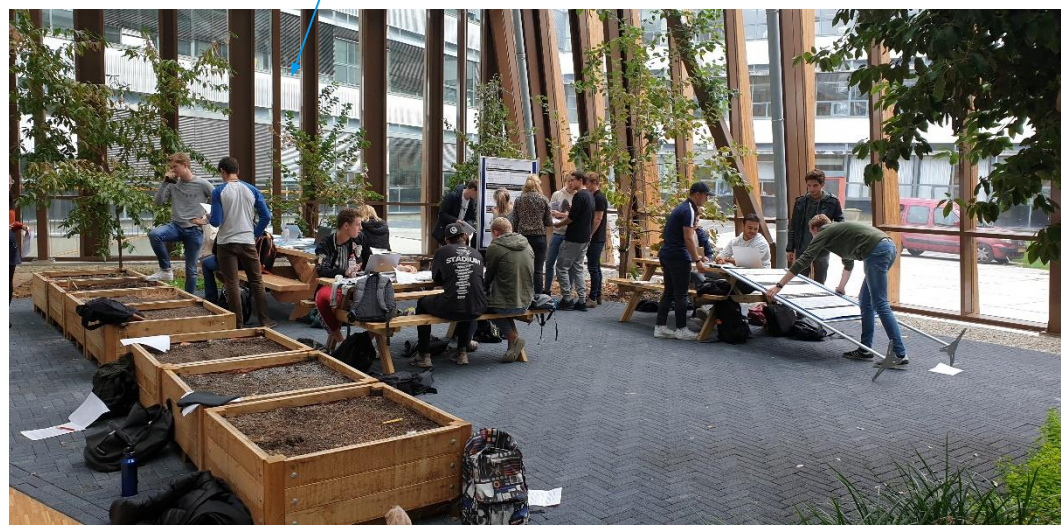
# Impressions

1. *Readiness Assurance Test*
  - Individual MC in exam set-up
  - Group MC with scratch cards
2. *Application-focused exercise*
  - Continue with group assignment

**IMMEDIATE FEEDBACK ASSESSMENT TECHNIQUE (IF AT®)**  
 Name \_\_\_\_\_ Test # \_\_\_\_\_  
 Subject \_\_\_\_\_ Total \_\_\_\_\_  
**SCRATCH OFF COVERING TO EXPOSE ANSWER**

	A	B	C	D	Score
1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3
2.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2
3.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3
4.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3
5.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
6.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2
7.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3
8.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1

Eric Mazur's approach



# IEM (RUG) TBL experiences

# Design Group (FSE, RUG) courses in IEM

## > Bachelor Year 1 (150 students)

- S1a (Global Supply Chain):
  - Mandatory
  - Close reviewing of posters
- S1b (System Dynamics)
  - Formative TBL

## > Bachelor Year 2 (120 students)

- S1b (Production Planning and Control)
  - Exploring specific subjects
- S1b (Research and Design Methodology)
  - Practice method selection

## In general four phases

- > I-RAT - 30 min
- > G-RAT - 30 min
- > Group extensive assignment - 90 min
  - Works best with posters
- > Debriefing - 20 min

Usually elements are graded

# Experiences Design Group

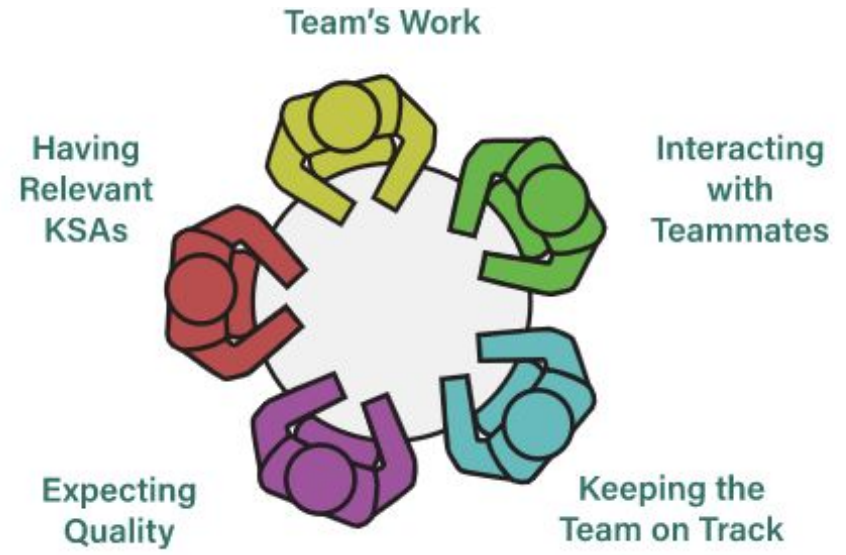
- > Group sizes matters:
  - groups of six perform better compared to three
- > Online version is possible
  - MC via LMS tool, including group MC
  - Poster via Jamboard, in Google Classroom
- > About 1 teacher and 2 teaching assistants per 150 students.
- > CATME is key to facilitate group work
- > Challenging MC questions are key
- > Student appreciate intensive way of tutorials
- > Scale up/down easily possible  
Room size
- > Lecturers experiences additional work, but definitely worthwhile

MC = multiple choice





### What CATME Can Do For You



Make More Effective Custom Teams  
[CATME Team-Maker](#)



Allow Students to Confidentially Evaluate Their Teammates  
[CATME Peer Evaluations](#)



Provide Teamwork Behavioral Training for Students  
[CATME Rater Practice](#)



CATME Tools are Backed by Extensive Research  
[CATME Research](#)

# Motivation aspects

*(Additional info regarding experiences ESD Group 1/4)*

**Intrinsic:** Students actively work with the course material and engage with each other. The cases for the group assignment allow the students to apply their theoretical knowledge.

**Social:** With regular assignments, there are (some/many?) groups that split the workload and never discuss the overall picture. At the TBL, they are forced to meet physically and usually discuss the T-RAT and assignment enthusiastically.



# Foster social motivation (Additional info regarding experiences ESD Group 2/4)

1. Groups should be properly formed (e.g. Intellectual talent should be equally distributed among the groups). These teams are fixed for the whole course.
2. Students are accountable for their pre-learning and for working in teams.
3. Team assignments must promote both learning and team development.
4. Students must receive frequent and immediate feedback.

# Knowledge effect

*(Additional info regarding experiences ESD Group 3/4)*

We bring the "theory of the book" with the case-oriented type of questions during the first two activities of the TBL. Furthermore, we design cases for the poster elaboration activity inspired by real complex problems faced by researchers or companies we collaborate with. It looks like the students can connect theory with reality.

The major knowledge effect for me as teacher is that students always prepare before going to the TBL. Otherwise, they would postpone studying the articles/book. So during the TBL they are supposed to already have the knowledge, and they can test their understanding by applying it to a case.

# Experiences workload (Additional info regarding experiences ESD Group 4/4)

The teacher should know that preparation and coordination take 95% of the resources while execution takes only 5%.

When two courses are using this strategy, then two TBLs should not be executed during the same week. It represents such a workload that having two TBLs sessions during the same week kills the fun factor (bringing a sense of small lecture and learning in a social environment). Also, the interesting peer-review system that fosters team cohesiveness is replaced by frustration and CATME fatigue.

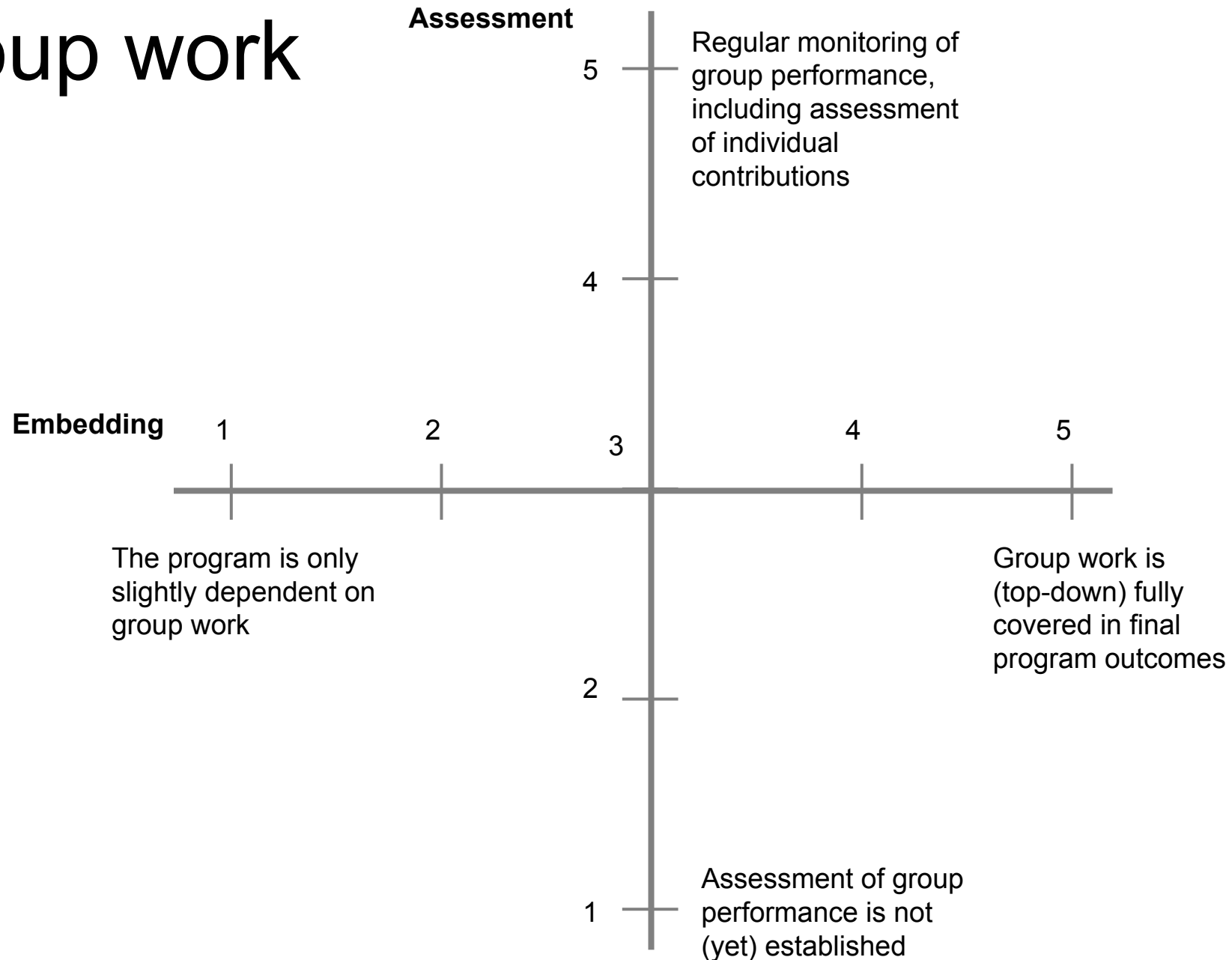
I-RAT - G-RAT - Group Assignment

# Group assignment

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# Group work



# Group assignment (plenary)

Would TBL a suitable method for your program?

Consider

- › Motivation of students (intrinsic, extrinsic, social)
- › Understanding complex knowledge areas
- › Rehearse skills sets (methods)
- › Position in the curriculum (organisation)



# In summary: key features of TBL

- › The purpose of TBL: develop maturity, goal-seeking behavior, group work and knowledge/skills
  - Rather than 'force' students to master a skill or pass a course
  - Avoid summative grading
  
- › Keep the scope limited: helps to set-up the MC and assignment
  - A more complex deliverable transfers TBL to regular group work with a time/grade filter and a preceding MC test.
  
- › TBL should be designed as much as possible around a closed learning loop within a session
  - Needs time for facilitating simultaneous reporting and discussion
  
- › Therefore: debriefing is a (the) key element of TBL
  - Emphasizes the main messages of TBL

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**Thank you**