The three years before TEM:
- About 24 percent of the students use compensation and is satisfied with grade 5
- 15 to 20 percent of the students decides not to take Analysis in their first year of study

The first four years in TEM:
- Percentage of students with a pass for this course:
  - 2013: 50%
  - 2014: 71%
  - 2015: 60%
  - 2016: 58%
- About 10% of the students use a compensation rule for Analysis.
Can TBL improve the performance of students in Analysis?

The three phases of Team-Based Learning

- Preparation
  - Individual
  - In Teams
  - Discussion

- Readiness assurance test
- Team activities
  - Writing proofs
  - Peer Feedback
  - Inspect and improve own test
The Principles of Team-Based Learning

- Select the teams yourself. Create teams of students with different talents.
- Give students both grades for their individual work and for their teamwork.
- Regular feedback is important.
- The team assignment is formulated openly so that the student can start a discussion.
- All teams have the same assignments and they deliver their results simultaneously.
- Take time for reflection.
Examples of RAT-questions

• Which of the following is true: from
  a) A sequence of integers that is bounded above has a limit.
  b) A monotone sequence of real numbers has a convergent subsequence.
  c) An increasing sequence of integers that is bounded from above has a convergent subsequence.
  d) A monotone sequence of real numbers that is bounded from above has a limit.

• What is the correct definition of a Cauchy-sequence?
  a) .... b) .... c) ... d)......

• Writing exercise:
  Let E be a subset of R. A point a in R is called a cluster point of E if the intersection of E and the interval \((a-r; a+r)\) contains infinitely many points for every \(r > 0\).
  Prove that every bounded infinite subset of R has at least one cluster point.
Results and Evaluation

74% of the students has grade 6 or higher

From students survey:
- 75% of the students increase reading the textbook
- Students like the discussions
- Half of the group agrees that learning with TBL helps to understand

Analysis

Percentage Pass

<table>
<thead>
<tr>
<th>Year</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>50</td>
<td>71</td>
<td>60</td>
<td>58</td>
<td>74</td>
</tr>
</tbody>
</table>

Results and Evaluation