

## LEARNING BY TUTORIALS

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Tutorials play a major role in technical education. Teachers spend a lot of time to make up exercises that include important aspects of the subject. They encourage students to work with the exercises seriously, to practise, in order to learn and understand the matters fully. We will not discuss here, the quality or the quantity of these exercises. We will however, discuss how seriously the students take their assignments and what parameters influence the process of learning by tutorials.

According to our experience, students believe they can prepare themselves for examination on a few days at the end of semester, so they tend to not do the exercises properly. Most of them only do what is necessary to be admitted to the final examination.

In this study we tried to find a constitutive model to motivate the students to take their assignment seriously. The students were second and third year civil engineering students, and the subjects were “structural mechanics” and “concrete structures”. The proposed model, were applied autumn 2000 for both subjects. Student participation in testing the model, were optional. The students had a choice to accept and participate in the model and score points from the beginning of the semester, or they could, as earlier just do the required exercises to be admitted to the examination. Even though it was optional, almost all of the students took this choice.

The model includes some factors that are intended to motivate the students to work with exercises both before and after a solution to the problem has been handed out.. They grade their own paper and compare it with the corresponding hand out. To new parameters are included in this model:

1. Evaluation of exercises at the end of the semester. The problem in this evaluation is almost the same that is included in the exercises.
2. The correction parameter.

Tutorials have maximum of **45** point  
Points scored by each student via tutorials.

$$\frac{A+B}{2} * 0,45$$

Students take an examination of the tutorials and score point **B**. The problems of the examination are precisely some of those that are included in the exercises.

**A** is average points scored by the student in doing twelve exercises, and is calculated as follows.

$$A = (X + \frac{Y}{5}) * 0,90 + Z$$

**X:**

1. Each student does the exercises and gives the paper to the teacher. The teacher, grade the paper and record the score ( $X_t$ ) and return the paper to the student without any comments.
2. Each student grade his/her own paper and set a score ( $X_s$ ) and return the scored paper to the teacher. The students are also allowed to correct mistakes before returning the paper.
3. The teacher, compare  $X_t$  by  $X_s$  and decide **X**.

**Y:**

The teacher, justify the correction and set point **Y** based on the corrections (correction of mistakes) the student made after studying the teacher handout with a suggested solution to the problem.

**Z:** ( $0 \leq Z \leq 10$ )

**Z** is based on the quality of the correction work done by the student.

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