THE GOALS OF ASSESSMENT

Mikko VANHATALO[1], **Timo LEHTONEN**[1], **Tero JUUTI**[2], **Jarkko PAKKANEN**[1] **and Asko RIITAHUHTA**[1]
[1] Tampere University of Technology, Finland
[2] Nokia Mobile Phones, Finland

ABSTRACT
In traditional teaching the assessment is seen only as a test of learning. This approach does not consider the assessment as a tool for managing the students learning. Current assessment methods do not motivate students' learning at the beginning of the course which would be the optimal point in time to begin the motivation. One effective way of motivating students during the whole course is learning contracts. These contracts tells who is responsible and for what in the learning process. Meaning e.g. teacher agrees to give enough information and guidance and students agree to do their best to find out correct answers. The assessment should be designed to reinforce this kind of learning contract, hence guiding students to learn essential matters and in correct way. The learning process can be seen as a transformation from one stage to another, so management of this transformation requires good understanding of the two stages and also the transformation process itself. We approach this challenge by modelling the relations between the goals of assessment and the assessment methods. By these relations it is possible to select the assessment method(s) which fulfil best the goals set to the course. We discuss in this paper about the effects of the assessment to the students learning and motivation.

Keywords: Assessment, learning contract, management, situational leadership (learning)

1   INTRODUCTION

At the moment students are taught the same way in university at some courses as they were taught in elementary schools. This leads to situation where students quietly sit in classes, are afraid to answer questions in case of being wrong, do not doubt what the teachers say, and so on. Whereas learning in universities should be the contrary to this. University students are adult individuals and they should have their own opinion which they formulize during their studies based on their life experiences. We believe that university students are able to learn much more compared to the amount of learning at the current situation. The challenge is to get the student into right learning mode. One must have great devotion to fully learn and understand a new matter. Small amount of students have this kind of devotion by nature but the rest of the students need external motivation to become interested to the topic.

Another issues pondered in this paper are the reasons for grading the students in university. In some level the grading can motivate students to seek better performance, but that kind of motivation can already come from the student himself. On the other end the requirements for the lowest grades guides the students at least for the minimum performance. From the university viewpoint grading puts students in order of superiority and this classification gives tools to find out the possible potential researchers for the university and gives conception about the students' performance level also to industry. These matters puts more pressure for the correctness of the assessment as students tends to change their studying methods and focus in to the specific areas of the topic based on the assessment criteria.

It is assumed that the grading of the students learning is just a necessary matter and that it should be done at the end of the course. This is a false assumption as can be seen from the research about the effects of the assessment to the students learning strategies [1], [2]. In worst case the students merely checks the earlier exam question, find out the correct answer to couple of those, and tries to memorise the answers for the exam. This surface learning is something that should be avoided as it does not

support the understanding of the topic at any level. Deep learning requires totally different kind of learning strategy which is on the other hand guided by the assessment methods.

Tim McMahon [3] presents in his article seven maxims for more effective teaching. The aim of these maxims is to enhance the teaching so that students learning changes from surface to deep learning. Two of these maxims are related to students' assessment and hence related to our topic. Firstly: *"Ensure that the students have a clear understanding of what is required from them"*. Younger students at the beginning of their university studies tend to learn exactly and only what is required. Thus it is important to carefully construct the content of the course and based on this the assessment. What is taught and what is assessed should be in line, which is not always the case. Secondly: *"Ensure that assessment regime rewards evidence of higher order thinking and learning"*. This is extremely challenging task as creating the assessment measuring the higher order thinking and indicators to represent this level is not a straight forward process. Measuring only the capabilities of memorising different matters is substantially easier compared to measuring of deep learning and understanding.

We see the students' assessment as a way to manage students in sense of motivation, learning, and learning strategies. Correctly chosen assessment methods give interesting challenges to students and they are rewarded when performing well on the tasks. This can be carried out for example by giving alternative ways of taking the course and by developing the evaluation according to these alternatives. The assessment is not a neutral topic but a strong tool for managing students and their learning.

2   SCIENTIFIC BACKGROUND

Hubka's Theory of technical systems [4] presents technical systems as a transformation from existing stage to desired stage. This model is represented in Figure 1. In teaching this means transformation of students knowledge, abilities, and skills from one stage to another. At the existing stage students have perhaps some knowledge about their studies main subject. At the desired stage the students are experts on certain engineering area and they have all the needed skills to be able to perform the given tasks in industry. The transformation process in learning is influenced by teachers, teaching technology, teaching information, teaching management, and institution. Part of students' management in learning can be done by suitable assessment methods. The assessment and the reasons for it are strongly related in the process. The assessment guides students learning and thus reflects to the outcome of the universities. The competent transformation requires that we understand the existing stage, desired stage, and what the transformation is.
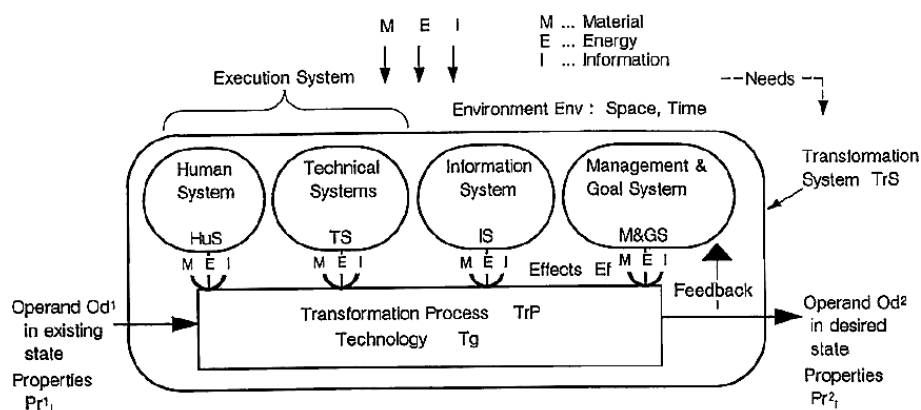

Figure 1. The model of technical system by Hubka [4]

In the transformation there are at least following changes: mental know-how of the students increases and the individual comprehension about the topic develops. This transformation could be achieved by "pushing" or "pulling". The "pushing" means that the students are forced to go thru learning process in which they have to learn. The "pulling" means that the students are invited to explore and learn. When these approaches are spelled out this way, it is evident that latter is the goal of most graduate programs in the universities today. According to this background it is alarming to notice, that traditional exam at the end of the course supports well the former but weakly the latter.

By Leamnson [5] the learning requires that the learned matter is both understood and remembered. The student can know the contents and significance of the matter by heart without understanding the matter. On the other hand, the student can understand the studied matter, but cannot recall it

afterwards. Only when both factors appear together, learning has taken place. So that the understanding could take place, the student must concentrate his attention into the matter to be learned.

The assessment method chosen to each course should support the learning objectives chosen particularly to that course. On some courses it can be necessary that the students rote learn certain matters whereas on the other courses it is important that the topic and its phenomena is truly understood so that it can be utilized afterwards for instance in the working life.

Anderson et al. [6] define learning contract as follows: *A learning contract is a written agreement negotiated between learner and a teacher or faculty or university.* The idea behind the learning contract is that adult learners should be encouraged to take more responsibility of their own learning. Even in the secondary school the teaching is more or less based on the relationship where teachers say how matters are and the students do not question it. In universities the learning and teaching process should be the opposite. Meaning the students should more and more begin to learn how to find out the right answer to the questions by themselves. This balance will naturally develop during the studies as the content and assignments in the course come more complex and larger. The learning contract combined to the mindset of managing students by assessment is a powerful way to enhance probability of students' deep learning.

3 MANAGEMENT IN TEACHING

The Situational leadership theory developed by Hersey and Blanchard [7] is one way to steer the behaviour and relationship between leaders and subordinates. This theory is one management model which is also suitable for the university teaching. It is based on the thought that the leader (a teacher) changes his management according to the maturity degree of the subordinate (in this section a student).

The scale of the maturity has four stages as represented in Figure 2. In the first stage – Directing (Telling in teaching) – the directing behaviour is strong and the supportive behaviour is in minor role. When the student's maturity has increased at the second stage - Coaching (Selling), the students' interest in to the matter has been induced and the teachers' supportive behaviour becomes strong. At this stage the students' activity in learning events, like in the lectures, should be higher and they are involved in discussions about the topic. Also the setting of the goals for the course is discussed with students. The third stage is Supporting (Participating) and then teachers' role changes to facilitator, meaning that the directive behaviour diminishes but the supportive behaviour stays high. The maturity of the students is high enough for learning events, for example seminars, where the teacher is as an equal participant in the discussion. At the fourth stage students are self-directed and the teacher becomes a consultant. Then both directive and supportive behaviour are low and students' tasks are for example thesis or other individual or self-directed study-group works, where their own role in the evaluation of the goodness level is high. This is represented also in Figure 3 that includes also examples of activities in certain stages. [8]
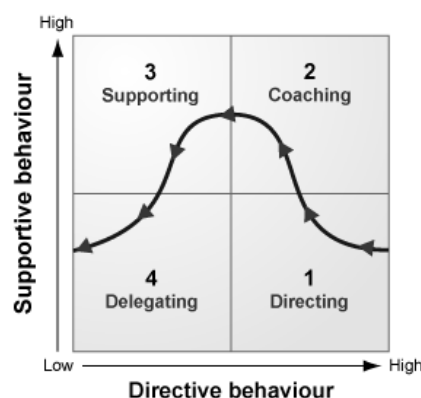

Figure 2. Maturity stages of subordinates and behaviour
changes of leaders in the Situational leadership theory [7]

*Figure 3. Change of roles of the teacher (T1-T4) and the
student (S1-S4) and its effect on activities [8]*

Teachers' role and the used assessment method evolve based on which stage the students' maturity is. At the lowest maturity level assessment measures purely the learning of basic theories of the study area. On the highest level the assessment should value the true understanding of the matter and the knowledge the student has gained. In addition to understanding students should have characteristic and skills (e.g. being independently initiative, capable to search solutions and information, and being able to see the validation of the references).

As the students' maturity grows their own ambitions develop at the same time. In the first stage students work just enough to get an average grade and practically just to get that grade. At the other end students are not interested so much on the grading but what they learn.

4 HOW THE TYPES OF EVALUATION REFLECT TO LEARNING

As said above the assessment methods can guide the students to learn/study wrong matters and in a wrong way. When they are working for instance as engineers in industry they should have the "engineering skills" e.g. the ones determined in the CDIO syllabus [9]. These skills should be learned during the transformation from a novice to an expert. The skills can be taught if the assessment methods are chosen correctly according to the learning goals.

We approach the assessment issues by defining the relations between the assessment goals and the assessment methods. We define the goals (reasons) of the assessment on the higher level as follows: rewarding, motivating, guidance of the students, supporting of the maturation, and quality control. The emphasis of these goals varies depending which stage (of the Situational leadership) the students are.

At the courses students' real reward is the new knowledge they get. The concrete rewarding is the grades and credit units of the courses. These should measure the level of the students' knowledge, but the challenge is to specify the authentic assessment methods and the skills and the knowledge that the students should have after the education from the society and industry point of view.

Motivation is one of the commonly known problems in teaching. Small part of the students finds the topic very interesting but majority can feel that they are forced to participate to the course in question. Sometimes the case is also that the students realize afterwards the need for the certain knowledge and they don't see the need for it while they are actually studying it. These students create great challenges to teachers. Teachers' task is to teach and organize the course in a way that students find it challenging and motivating to devote time and work to study the topic adequately. And as researches show the assessment has great influence on the students when they make study plans for each course.

Students' guidance is more abstract goal for the assessment. It might be difficult to see what the actual content of the course or a study block is and what kind of skills one can learn at the course. The academic freedom in university education (in Finland) leads to a situation where students' might find it very challenging to decide what to study and why. Different assessment methods emphasize

different facilities of the students. Correctly chosen assignments, examinations, etc. and more importantly their assessment criterion tells to students if the course in question is suitable for his skills and motivation.

At the beginning of the university studies most of the students are in the same learning mode as in elementary or secondary school. They are more or less dependent on the teachers as guides of their studies and they believe that everything said to them by teachers is the ultimate truth. The transformation to experts demands also maturation to a self-steering person who is able to solve complex multidisciplinary problems and know from where and how to get the information. Hence the assessment has to evolve to direction where problems to be solved are similar or real cases from the industry and the grading is strongly related to the capabilities of independent working.

The practical side of the assessment is the quality control of the output. First of all the minimum level has to be achieved but on the other hand the grading is the only way to show how well students did on the course which further on tells the level on their knowledge assuming that the assessment is actually measuring the knowledge. The high grades are not particularly interesting but the amount of learning and understanding of new matters is.

The assessment methods include different types of exams (from traditional essay exam to verbal exam and peer assessment), assignments (from personal smaller tasks to multidisciplinary large scale group-works), and seminars as can be seen from table 1. Some of these methods are timed on the end of the course and others more evenly during the whole course.

Table 1. Cropped example of the relation evaluation matrix

Higher level goals	Specified goals	Traditional essay exam	Multiple choice	Online exam	Group work assignment	Personal assignment	Lecture diary	Demonstration exam	Seminar presentations	Peer evaluation
REWARDING	Rote learning	3	3	0	0	0	0	2	1	3
	Diligence	2	1	2	1	3	3	0	2	1
	Realisation	1	0	2	1	3	2	2	1	2
MOTIVATING	Force the student for minimum effort	1	0	3	0	3	2	3	2	0
	Make the students to try their best	0	0	1	1	1	1	3	2	0
STUDENT GUIDANCE	The good students' persuasion to continue the studying of the matter to the subject in question	0	0	2	2	2	0	0	1	0
SUPPORTING MATURATION		0	0	0	0	1	0	2	0	0
QUALITY CONTROL	Dividing the output in grades	3	1	3	0	2	1	3	1	3
	Preventing the passing of faulty ones	2	1	1	0	2	1	3	1	2
	Guidance of own recruiting of future researchers	3	0	3	2	3	1	2	1	0

The relations are rated from 0 to 3 based on how well the assessment method fulfils the decided goals. These values are summed up to find out which of the assessment method correspond best to the situation in hand. Content of the matrix is course dependent and the goals of each course depends on which level the course matter and students are. Our example in the Table 1 is defined based on our experience about the assessment methods, thinking of a non-motivated student, and in the courses of

the study block offered by us. The calculations of the matrix shows in our case alarming results that the assessment methods used by us are not balanced to the goals that we value in our education.

The matrix telling the relations between the goals of the assessment and the assessment methods is filled up keeping in mind a student who is not motivated by the personal basis. The ones who are already very motivated and feel responsible to learn the taught matter are not so critical in sense of management by assessment.

From table 1 it can be seen that for example the traditional paper examination supports the rote learning well whereas lecture diary in turn does not measure this matter at all but concentrates on measuring the understanding of the matter and diligence, because in the lecture diary the aim is that students write about what they have learned at the lecture and what kind of questions arose during it. The lecture diary gives in addition immediate feedback to teacher and he/she can see where the students pay attention at the lectures. The online exam on the other hand creates more realistic problem solving situation because during the examination the students have all the possible material available. This way it is possible to test students' ability to find correct material and how they utilise it. When choosing an evaluation method suitable to the course in hand, it has to be determined what values should be emphasised and decisions are made based on this. If a subject is of such nature that there are a lot of matters to be rote learned, the paper examination is a good alternative. If in turn the internalisation of the matter on the basis of the lecture is important, it is more consistent to use the lecture diary.

5   DISCUSSION

The learning results will improve if it is thoroughly considered what the actual goals on the course are and it is verified that the chosen assessment methods support these objectives. The students are a very heterogeneous group varying in the orientation of the studies and in personalities, thus the analyzing is reasonable to perform considering those individuals whose motivation and/or learning capabilities are unclear and weak. An interesting viewpoint is also to analyze the same course from different student personality's perspective.

The relations between the goals and the assessment methods shown in the table 1 are defined based on our experience. Different methods used in different courses has resulted certain patterns in learning and also feedback about the course from students reveal what and how the students learn. This motives us as teachers to devote in developing the course assessment methods especially to the direction where students gain good understanding of the topic and they realise that they gained useful knowledge from the future working career point of view.

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