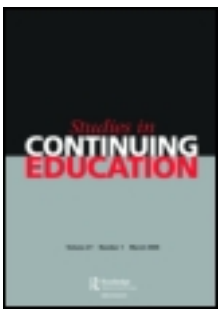

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Matching Student Assessment to Problem-based Learning: lessons from experience in a law faculty

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ABSTRACT *Congruence between instruction and assessment is an essential condition for realising such innovations in education as problem-based and life-long learning. Schools employing problem-based learning have always struggled to achieve congruence between their objectives and student achievement assessment. Reality has taught us that the ideals of problem-based and life-long learning are difficult to translate into an assessment system. This paper is a case study of the development of an assessment program in a problem-based learning curriculum, its pitfalls, the compromises between the ideal and the attainable, and the way in which a number of solutions were eventually found. It demonstrates the power of student assessment. Our law faculty developed a new assessment system based on a range of assessment methods, such as block tests, portfolios and formative computer-based tests, whereby the assessment program was continuously monitored and evaluated. The assessment program enhanced skills and changed attitudes that had been opposed to the ideals of life-long and problem-based learning. Empirical data on the quality of the new assessment system reveals that we went a step forward in matching problem-based learning with student assessment.*

Introduction

Higher education seems to be preparing for a major move in instructional strategy. Although educationalists use different terms, emphasize different elements and claim the uniqueness of their approach, the similarities of the strategies suggested are more impressive than their differences. Terms used are life-long learning, situated learning, authentic learning, open-discovery learning, collaborative learning, self-directed learning, to name but a few. These educational models propose a more constructivist approach to teaching and learning, in which the emphasis shifts from the rather absolute knowledge offered by the teacher to the learner's active participation in the construction of knowledge (Savery & Duffy, 1995). The common feature of these educational approaches is a moving away from the classical

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teaching model towards a learning model, for which self-directed learning, the ability to apply knowledge and skills in more authentic problem-oriented situations, and group and teamwork are essential components. It constitutes a move away from the existing teacher-centred models towards an emerging student-centred and life-long learning approach.

Problem-based learning is such a student-centred model. Problem-based learning focuses on skills which are important for life-long learning, such as professional conduct, reflectiveness and self-evaluation. It is characterized by problem-orientation, interdisciplinary work and self-directed learning and focuses on inter-personal and professional skills. The point of departure is that study activities centre on authentic problems. Students work in small tutorial groups under the guidance of a member of staff, who serves as the tutor. They discuss the problem, activate and discuss their prior knowledge, identify points that need clarification and formulate learning objectives. The role of the tutor is not to teach, but to guide and facilitate the group process. The learning objectives formulated are pursued individually through self-study and the result is reported to the group in the subsequent student group meeting. The cycle repeats itself with each new problem assigned. There are two tutorial groups per week as a rule. In addition to tutorial groups, skills training programs are followed, usually in small groups as well. A number of lectures are scheduled, but compared to traditional teaching, their number is quite small. There is ample time and there are ample facilities for self-study (Van der Vleuten *et al.*, 1996; Moust, 1997).

Schools using problem-based learning have always struggled with the assessment of student achievement. We know there is a strong relationship between student learning behaviour and assessment programs (Frederikson, 1984; Messick, 1994). As the students' academic success is defined by the examination program, this is at the top of their agenda. To students, the examination program *is* the actual curriculum. No problem exists if the educational objectives as defined in the curriculum are matched by the objectives of the assessment program. However, in the event of a mismatch, the student assessment system will prevail over the actual learning, irrespective of the loftiness of the curriculum objectives. This is the friction in problem-based learning. There is no lack of noble ideas in pursuit of educational objectives, but it is difficult to adhere to and attain these objectives in student assessment programs. This article is a description of such a struggle. It is a case study of the development of an assessment program in a problem-based learning curriculum, of its pitfalls, of the compromises between the ideal and the attainable and the way in which a number of solutions were eventually found. It is a description of and a reflection on a probably never-ending process of struggle and we are fully aware that we are still far removed from the ideal. The case in hand is assessment at the Maastricht University Faculty of Law in the Netherlands. The paper begins with a description of the Law Faculty's curriculum and its original assessment system. The major developments are sketched in the assessment history from 1982 until 1999. The Faculty has learned a number of tough lessons from these developments, especially from the consequences of assessment for student learning. The answer to the problems are given in the last section but one in the form of a

remodelled assessment strategy and the experience gained with this new strategy. The paper ends with the conclusions that may be made from this case study.

The Maastricht Faculty of Law

Since its inception in 1982, the educational programme of the Faculty of Law was organised according to the principles of problem-based learning. Undergraduate legal studies comprise a four-year curriculum. Each year is divided into four units of 9 weeks, during which students are required to study topics around a particular theme. Interdisciplinary courses contain materials from at least two legal areas, e.g. criminal law and private law. Teachers of various disciplines, organised in "planning groups", collaborate in the production of a course book, called "block book". The book contains the problems to be tackled by the students and provides a schedule for all other teaching activities during the block, such as lectures and skills training. Parallel to the courses, weekly skills-training sessions are offered, dealing with legal writing, legislative drafting, negotiating, moot court skills and legal professional training (Cohen *et al.*, 1987). The emphasis on practical training is not common in law schools, in any case in the Netherlands. Most law schools focus on acquiring detailed information on the common core of traditional law subjects and the legal system.

The Assessment System in 1982

The predominant principle in defining assessment strategy has invariably been that the assessment must do justice to the problem-based learning philosophy on which our training program is based. For this reason, such assessment systems should satisfy the following requirements (Cohen, 1989):

- Problem-based learning emphasises the ability to apply knowledge in concrete situations, the ability to reflect and to resolve problems. Consequently, not just knowledge, but also comprehension and (problem-solving) skills should be assessed;
- Students should have pleasure studying. Problem-based learning aspires to give students a stimulating and "pleasant" learning environment in which students feel free to express ideas and suppositions, even when they are not sure about their correctness. Tests and assessment are often associated with stress and distrust on the part of the student.
- Test-directed studying should be avoided. In problem-based learning, ideally, the problems and the discussions in the tutorial groups guide the students' learning process. The assessment methods should not interfere with this by steering the learning process towards the expected test content or level.

A very clear and uncomplicated assessment system was developed in 1982 for the Faculty of Law: practical training, essay tests and progress testing (Mols & Crombag, 1989).

Progress testing

The Maastricht University Faculty of Medicine developed the concept of progress testing (Van der Vleuten *et al.*, 1996). It is basically a conventional knowledge assessment using multiple-choice questions of the true/false type, being formatted and used in such a way that it prevents test-directed studying and reinforces longitudinal functional knowledge. A progress test can best be conceived of as a final examination. It is a comprehensive examination representing the ultimate objectives of a curriculum. It is made up of questions from all the disciplines involved. The test was given at intervals, i.e. three times a year. It was administered to all the students enrolled in the curriculum. The questions could also either be answered or may be completed with a "don't know option".

First-year students scored well on a limited number of questions, second-year students significantly better, and progressively so. In the course of the curriculum, the student would "progress" towards a final level of knowledge. The major advantage of the Progress Test was that it was not possible to study for the test; anything could be tested and students were unaware of what exactly was going to be tested. Eventually, if a student studied regularly, essentially following his own or the group's learning objectives, he would find the content reflected in the test and would show progress.

Writing assignments and block tests

The end-of-course assessment consisted of either a writing assignment or a block test. The block test consisted of four to six questions, usually with a case vignette, some with sub-questions. Most tests allowed students to choose four questions out of six. The basic idea was that individual students may have studied different objectives, depending on the (group) learning goals identified. The tests focused mainly on insight and application of legal knowledge. Recall of knowledge was not a primary objective of the block test. In a number of courses, students were required to complete a writing assignment instead of a block test. The ability to express oneself in writing as a future lawyer was seen as essential. The length of the essay was 5–10 pages. The most important criteria for the evaluation of the assignments was the correctness of the (legal) content, the form of the papers played a less important role.

Practical training

Skills training is an important component of the programme. Parallel to the courses, many skills training sessions were organised. The staff proposed not to assess the skills training with the (convenient) argument that this could introduce stress and competition.

The next section offers a picture of the way in which this assessment strategy functioned in educational reality. It shows that the impact of assessment on student learning and assessment organization dominated our assessment history.

Confrontation between Assessment Strategy and Educational Practice

Assessment organisation and progress testing

From the start, the progress test divided the staff into two opposing factions. The proponents stressed that the progress test did not interfere with student learning, emphasised its focus on functional knowledge and the rich feedback for both students and faculty (Mols & Crombag, 1989). These were the factors that contributed to the success of this format in the study of medicine (Van der Vleuten *et al.,* 1996). There was also substantial opposition against progress testing within the context of the Faculty of Law. In 1989, Crombag listed the major problems of progress testing as applied at the Faculty of Law (Mols & Crombag, 1989):

- *Identification of core content:*. Due to the missing link between course and test content, the content validity of a progress test was problematic. The ultimate objectives of the curriculum were not specific enough to generate a test blueprint. The staff never agreed on the core content for the test. This led to a practical approach of using course-bound detailed knowledge questions, which did not do justice to the functional knowledge objective of progress testing;
- *Question quality:* The nature of the progress test called for a central test-development organisation in the form of a test-review committee (Van der Vleuten *et al.,* 1996). The Faculty of Law failed to organise proper central screening of test questions prior to the administration of the tests. Therefore, questions of poor quality could enter into the progress test.
- *Test-difficulty variation:* Progress curves spanning the entire curriculum were seriously hindered by substantial variations in the degree of difficulty of the tests. Due to these variations, it happened, for example, that a student scored remarkably lower in a progress test in his fourth year than he had done in his second or third year. Experiencing a decline in knowledge instead of an increase is frustrating for students (Wolleswinkel, 1989). Due to the lack of a central test-development body, the Faculty was not able to control these variations in test difficulty.

These disadvantages of progress testing were also recognised by Van der Vleuten *et al.*, in their review of progress testing at the Faculty of Medicine (Van der Vleuten *et al.,* 1996). Whereas the Faculty of Medicine came up with solutions to counteract them, the Faculty of Law failed to overcome the drawbacks of progress testing. Finally, in 1991, the opponents gained the upper hand and the Faculty decided to abolish progress testing for the law curriculum.

Efficiency

The marking of writing assignments implied a heavy workload for the staff. After just one year, it was decided to replace the writing assignments by regular block tests.

The marking of the block test was less labour-intensive. However, during subsequent years, growing student numbers placed a heavy marking burden on faculty members. The Faculty started out with 100 students, the annual intake gradually increasing to approximately 600 students. A study of the efficiency of the tests used showed that the marking of one block tests required approx. 350 hours, i.e. about 0.2 full-time equivalent staff (Driessen *et al.*, 1999).

Reliability and construct validity of the block tests

The large number of teachers involved in marking, often more than 15 teachers for one test, and their very different backgrounds resulted in substantial marking variations. It also became clear that marking was actually based on the naming and occurrence of relevant legal concepts and that the quality of reasoning was disregarded (Fonteijn, 1995). In reality, the block tests which intended to assess legal problem solving skills measured to a large extent the ability of students to list relevant concepts. It was learnt from discussions with the staff that they recognised this phenomenon and blamed it on the substantial workload involved in marking the tests. Assessing the quality of reasoning or judging the correctness of conclusions would take more time than just assigning marks for naming crucial concepts.

The impact of the block tests

The strongest trend in our assessment programme was the increasing importance of course-bound testing, due to the absence of most of the writing assignments and progress testing. This led to an assessment system that strongly relied on block tests. The block test proved to have a strong impact on student learning in the tutorial groups, individual study and the skills training sessions. The assessment system had quite negative consequences, which nobody had foreseen when the assessment system was planned. The test format chosen and the programming of the assessment in particular provoked undesirable study strategies. We will discuss these elements in more detail below.

The test format—all-essay tests—allowed for a limited number of questions per test only. Its content coverage was therefore limited. This stimulated undesirable study strategies. Students were able to pass their test after studying only part of the subject matter. Students avoided in particular technical and difficult topics, such as alimony calculation. Potential gaps in their knowledge failed to show (VSNU, 1991). The limited content coverage of the test also adversely affected the discussions in the tutorial groups. Students tended to ignore topics which they thought they would not be questioned on in the test (Wolleswinkel, 1989).

The programming of weekly skills-training sessions, which were not formally assessed, running parallel to the courses which were evaluated with high-stake block tests, had a strong impact on the course of the skills-training. In the perception of both staff and students the relative importance of the skills-training lessened with the growing importance of the block tests. Not passing block tests not only had

consequences for study progress, but also carried the risk of losing government grant money. The impact of this was a sharp drop in student attendance at the training sessions. They preferred to invest in individual-study time for the course, instead of preparing for and attending the skills training. The other effect of the programming was that staff planned learning activities in the training sessions which had little to do with skills training. In the perception of the staff, the skills training sessions suffered in importance. The staff preferred to use the scarce instruction time within the training sessions for other teaching topics that could not be discussed during the tutorial groups.

It was clear that no one was happy. The Faculty suffered a crisis of sorts. It was often alleged that the problem-based learning model was not appropriate for legal studies and some teachers and students called for the abolishment of "the system" and a return to the familiar lecture-based approach. What, in fact, happened was that the assessment program drove the students towards (undesirable) study strategies, in which the problem-based learning program was not helpful or effective. As usual, the assessment program gained the upper hand and slowly, but progressively, undermined the problem-based learning approach. A revision of the assessment program was imperative, if the problem-based learning approach was to survive.

Assessment Strategy in 1999

In 1995, we began work on remodelling our assessment strategy, wishing to use the strengths and challenges faced in our own assessment history. This assessment history taught us first and foremost that test-directed studying cannot be stopped. Any evaluative action triggered a reaction on the part of the students. Even the absence of an assessment method (i.e. for skills training) influenced study behaviour, which was contrary to the educational goals. The aim therefore was not to stamp out test-directed studying, but to use it strategically to steer the learning process towards a more desirable—or at least less harmful—approach. We viewed assessment as an educational design problem and aimed at provoking effects that squared with the educational strategy (Wiggins, 1989). Our experience shows that the actual effect cannot always be predicted. A careful and continuous monitoring of the educational side-effects is required (Crooks, 1988; Shepard, 1991). A good assessment program is characterised by continuous evaluation and continuous modification based on such information. For this reason, we opted for a continuous quality-control system to facilitate and monitor the assessment program.

Problem-based learning claims some specific objectives regarding the learning process; objectives which are essential for life long learning. Students are expected to be self-responsible for their learning process, to formulate learning goals, to gather information to reach these goals and to reflect on the learning process. In our original assessment system there was hardly explicit attention for the skills and attitude related to life-long learning. In our new assessment strategy we incorporated the life-long learning concept by: (a) strengthening the self-monitoring skills of students by formative assessment instruments and; (b) stimulating reflectiveness by implementing the portfolio concept in our skills training.

Quality Control

If assessment instruments are used to motivate and influence students, it is essential that these instruments be of the highest quality. Often, however, tests actually measure and reward something quite different than their developers had intended and in most cases this means that the tests in reality measure more trivial, fragmented knowledge instead of the targeted problem-solving skills or insight (Crooks, 1988; Frederiksen, 1984). It is essential, therefore, to create a path of quality assurance around the construction of assessment instruments (Feletti & Smith, 1986).

Our original assessment system almost completely lacked quality control. The first measure we took in our new assessment approach was to set up a quality-control program to facilitate and monitor the new assessment program. The objective was to review the assessment instruments conceived by others and to use statistical means to bring about improvements. Project teams, made up of experienced teachers from different legal areas and an educationalist, now carry the responsibility for these instruments. In the period preceding the test administration, the project teams screen the assessment material on the basis of several criteria; for example relevance, content and objectivity. With the aid of test blueprints, the instruments are put together in such a way that they represent a balanced and relevant reflection of the courses. The last step prior to test administration is a pilot administration by two reviewers. These are tutors who did not write or screen the questions themselves. They screen the test and assess its correspondence with the course and its degree of difficulty. After the exam, the questions and test scores are analysed as to the degree of difficulty, their discriminating power and marking consistency.

Upon completion of the test, the students may take the questions home and comment upon them. This has proved very useful and has added significantly to the quality of the test. The comments by the students and the statistical results are examined by the project group and may result in the elimination of a question or in modifying the model answer. Thus, tutors and students can receive information on performance and test quality. Furthermore, the assessment methods are regularly evaluated with the aid of questionnaires and interviews for the purpose of monitoring the effects of the assessment on students and the curriculum.

Block Tests

The new organisational framework should offer a solution to the problems in the block tests that arise when large student populations are to be tested in a problem-based learning context. The new block tests should be efficient and reliable. To accommodate the problem-based learning principles, they should also be multi-disciplinary, assess higher cognitive skills and above all stimulate processes in the tutorial groups and individual study. The solution proved to be as simple as it was efficient. A high-quality test form was introduced that combined multiple-choice questions and essay questions, the "combination test". It had the following features:

Broad content coverage: a major problem of the all-essay block tests was the small content coverage resulting in a negative impact on study behaviour and problem discussion. A test of both open and closed question formats may contain more questions, therefore allowing better coverage of the subject matter. It no longer pays to study only part of the course content;

Efficiency: Another problem with the all-essay block tests was the huge amount of time staff spent on marking. The use of multiple-choice questions yielded considerable savings in faculty input;

Multidisciplinary: Project teams were set up consisting of members from the different legal disciplines and an educationalist, these teams which were responsible for test construction;

Broad cognitive domain: To guarantee a proper fit with learning practices, both open and closed questions must assess a comprehensive range of cognitive levels. The focus of most block tests is on insight and application of (legal) knowledge. Both types of formats may do this by using problem vignettes. The use of essay questions makes it possible to measure skills that are not readily measurable otherwise, such as creativity, writing skills or evaluative skills;

Transparency: Transparent and sound assessment procedures are conducive to student learning (Stiggins, 1997). In consequence, the marking procedure is criteria-based, with a possibility to compensate for unexpected test difficulties (Wiggins, 1993). Questions that were previously used are available in the Electronic Study Environment. They can be downloaded and printed by students.

Skills assessment

The programming of skills training without any form of assessment frustrated the skills training process. The skills training sessions were badly attended and students hardly prepared for them. The solution to this problem was to incorporate student assessment into the skills training program. The idea of a portfolio provided us with a method which integrated learning and skills assessment. It offered students the opportunity to be involved (Johnson & Rose 1997). For each eight-week period of skills training, a set of assignments were developed. Depending on the aim of the skills training sessions, various forms of assignments were offered, such as legal writing assignments, computer-based case solving, legislative drafting and contract drafting. For each assignment form a set of assessment criteria was developed.

Example of a Legal Skills Assignment

Throw No More!
Pete Talldrink is a dwarf. He is 25 years of age and works in a club, named Whap! in the

Municipality of Throwstown. As a game, visitors to the club may throw him as far as possible. He, who throws him the farthest, is the winner.

The City Council of Throwstown wishes to prohibit dwarf throwing, because it deems dwarf throwing contrary to human dignity as laid down in various treaties and the Constitution. Pete fears for his job, if the prohibition is adopted.

Is dwarf throwing contrary to human dignity? And, if so, is such inhumanity not undone by the dwarf's consent?

1. *Take a position in the case. Approximately one half of the group defends Pete Talldrink, while the other half defends the position of the City Council of Throwstown;*
   The remainder of the assignment is completed at home as preparation for the next session.
2. *Formulate the standpoint of the party you are to defend (proposition);*
3. *Make clear which right(s) and argument(s) can be invoked by the party and state your reasons;*
4. *Make up a number of false reasonings and slip these into your letter to the other party.*

Every two weeks an assignment is scheduled. Most assignments can be done at home. Some, like the computer-based assignments, have to be completed at the Faculty. The products often serve as the materials for the next training session. In the latter, students are asked to assess each other's products. This peer review is combined with the tutor's assessment of the student's work. The products, peer and tutor feedback and the results are kept by the student in a file. We call this way of assessment "file testing". The tutor keeps an electronic file of each student.

Formative assessment

The "Electronic Study Environment" supports learning in the tutorial groups. It serves as a student discussion forum. The staff may provide relevant information on a course, such as changes in schedule or background information on subject matter. Another important function of the Electronic Study Environment is that it operates as a medium for self-assessment: computer-based self-assessment modules with which students can monitor their knowledge of the problems discussed in the tutorial groups. A module consists of a set of questions that assess the students' knowledge on the subject matter related to the assignment. This way, a student is able to monitor his newly acquired knowledge using the computer before he joins the tutorial group in the reporting phase in the tutorial group. This leaves more room for synthesising and testing the newly acquired information at a higher cognitive level during the tutorial group discussions. Furthermore, this monitoring of knowledge offers students the opportunity to adjust their study strategy. The Electronic Study Environment also contains test questions previously used. This allows the student to get an idea of the required level of comprehension.

Experiences

So far, we have found the combination test effective as a block test. The broad content coverage combined with the (high) cognitive level of the tests resulted in higher study input on the part of the students and a high acceptance by both students and faculty (Driessen *et al.*, 1999). In a study of the impact of the combination test, students indicated that they studied in both a detailed and a global way. This may explain the increase in individual-study time. The majority of our students report that test preparation does not interfere with the preparation for and the attendance of the tutorial group meetings. By combining multiple-choice and essay questions, higher cognitive skills are assessed in an efficient way. The time needed in drafting the questions for a combination test and marking the answers amounted to two thirds or less the time required for drafting and marking an all-essay test.

The combination test has gained faculty-wide acceptance. It has improved the quality of our student assessment system and has contributed considerably to the reduction of faculty workload. This assessment form will therefore remain an important component of our future assessment program.

Students are free to use the self-assessment modules in the Electronic Study Environment. It is not mandatory. Two years of experience with the Electronic Study Environment show that most students take advantage of the opportunity to monitor their knowledge (Span & Heldeweg, 1998). A comparison between performance on the block test and self-assessment shows that students who monitor their knowledge from the start of a course perform better on the block test than those who do not use the self-assessment instruments or do so only just before test administration (Spearman's correlation 0.35, $p < 0.01$, $N = 231$). The role of formative use of assessment and self-assessment will become more important in our assessment strategy. We wish to integrate the self-assessment modules in the courses in such a way that students are stimulated to use them from the beginning of a course.

The idea for the new form of skills assessment through portfolio assessment was worked out in 1997. The development process was complex and required careful planning. Software programmes had to be written, assignments had to be constructed and staff had to be informed. It entailed a complete re-programming of our skills training. The implementation of the portfolio assessment only took place in the beginning of 1999. Consequently, portfolio assessment could not as yet be comprehensibly evaluated. However, the first evaluation data are quite promising. The introduction of portfolio assessment resulted in more than a doubling of study hours for preparation of the skills sessions: 2.9 hours per week in 1998 as opposed to 7.4 hours per week in 1999. Stimulation of study effort was one of the main reasons to introduce the new test form. By and large, the first reactions of students and tutors have been positive: both students and staff indicate that the atmosphere in the training sessions is pleasant and that the portfolio assessment offer students a strong learning opportunity. There is also criticism, however, on the organisation of the training sessions. The organisation of the skills training programme has been

somewhat unclear to students and staff. At this moment in time, several staff members are involved in organising the skills training programme. In future, we will overhaul the portfolio assessment organisation in such a way that central co-ordination will be enhanced. However, the criticism is proof that the skills training program is taken more seriously by both students and staff.

Conclusion

This case report shows the power of student assessment. It shows how careful one needs to be in designing and monitoring an assessment program. As in most educational reforms, our assessment program was not well-conceived. It reinforced learning strategies that were antithetical to the endeavours of problem-based learning. The system nearly crashed as a result of that and the problem-based learning model received the blame. The assessment in fact undermined the system slowly but systematically. We learned a few hard lessons:

1. You will get as much out of assessment as you are prepared to put into it. Assessment is usually considered last in curriculum programming and curriculum innovation; limited resources are available. Our case report shows that a mismatch between educational objectives and assessment easily occurs and may have dramatic consequences. Assessment will always come out on top; there is no escape. In our view, this proves that assessment requires careful planning, effort and resources. It cannot be done on a shoe-string, but requires substantial investment. Given the correlation between assessment and learning, we believe that such investment will pay off. Inasmuch as assessment is part of the curriculum, assessment should be considered an integral component of the curriculum and, consequently, of the curriculum budget. Compared to what is spent on the curriculum itself, the balance will not be tipped by additional financial input for the assessment program.

   Proper assessment requires quality control and continuous monitoring. Essential to quality control is the use of peer review in test construction. Good test materials are difficult to create and unscreened test material is usually flawed as to format, content or relevance. The key to quality improvement is an assessment of each other's products. Peer review is a procedure with which we are quite familiar in research, but it occurs only rarely in education. Continuous monitoring and evaluation of the assessment program is in order. The effects of the assessment program are difficult to predict and may change over time. An evaluation of the evaluation is imperative in a good assessment program.
2. Assessment is an educational design problem. Since assessment and learning go hand in hand, assessment is also a curriculum-design problem. The challenge is to reinforce desirable learning behaviour. This supersedes the responsibility of the individual teacher in the individual course and the individual form or method of assessment. Not individual assessment, but the program as a whole will dictate what will happen in the curriculum. For this reason, there should be an integral approach towards assessment program design.

This article makes clear that the major move in instructional strategy in higher education towards student-centred and life-long learning will not stand a chance without appropriate assessment technology. Our program is just the first step. Concepts such as professional conduct, reflectiveness and self-evaluation are only assessed marginally if at all. There is still a long way to go. If we fail to address these issues, however, we will know the outcome of this move.

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