

'Learning lasting for life' and 'assessment': How far did we progress?

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Presidential address, EARLI 2005

at the 20th anniversary of the European Association for Research
on Learning and Instruction, Nicosia, Cyprus, August 23.

SUMMARY

Changes in learning and instruction over the past decades, have pointed at the growing importance of assessment as an integral part of the learning process. The current contribution will highlight the most relevant developments in this area and underpin these developments with recent research into 'learning lasting for life'.

In this presentation, we first discuss some important issues in the so called 'assessment culture'. We refer to the results of a recent meta-analysis looking at the effects of the new learning environments from the angle of assessment, to show that there remains a lot to be done in order to fully align today's educational goals, instructional practices and students' assessment. Next, different effects of assessment on students' learning, such as pre-, post-, and true assessment effects are

explained. I will refer to recent investigations, offering empirical evidence for the relationship between assessment and the motivation of students, the impact of assessment on students' approaches to learning, and the role of students' assessment preferences and perceptions of the learning environment. Finally, I will summarise our current research findings on what we know about fostering deep learning, I conducted together with colleagues and staff members.

In the conclusion, I will give some comments and final recommendations.

Introduction: Learning lasting for life

In recent years, education has frequently been blamed because graduates are not sufficiently able to apply their knowledge to solve complex problems in a working context. The development and implementation of instructional practices that will foster students' skills to communicate, think and reason effectively, make judgements about the accuracy of masses of information, solve complex problems and work collaboratively in diverse teams, remains an important challenge for today's higher education (Pellegrino, Chudowsky & Glaser, 2001).

Moreover, because of the continuous change in today's society, the concept of "learning lasting for life" has gained considerable importance.

Learning lasting for life outcomes do refer to outcomes that are durable, flexible, functional, generalisable and application-oriented. Moreover, such learning is characterised by increasing self-directedness and self-assessment and is more discovery-oriented using authentic problems or cases. As such it profits from contextualisation and increased motivation. Nevertheless, a balance between contextualisation and decontextualisation is a necessity. Sometimes, learning is not constructive because there is no decontextualisation; learning remains bounded to a specific context, practice or a framework.

As a level of learning, the meaning of deep learning is an integration of knowledge, development, and action. 'Learning lasting for life' aims at a self-constructed well structured knowledge base, integrated with skills, attitudes and contextual

knowledge of professional key situations, and knowledge creation and productivity for lifetime. Deep learning in a particular domain entails being able to think and act intentionally, reflectively, at a level commensurate with one's standing in the community of practice according to standards and criteria set by the community of practice. Deep learning as 'learning lasting for life' is situated, transformative, self-assessed and self-regulated, integrative and authentic.

Overall, it is claimed that 'powerful' learning environments have the potential to improve educational outcomes for students (De Corte, 2000; Lea, Stephenson & Troy, 2003).

The new teaching and assessment conception stresses the importance of the acquisition of specific cognitive, meta-cognitive and social competencies (Dochy & Moerkerke, 1997). Feltovich, Spiro and Coulson (1993) use the concept of understanding to describe the main focus of the current instructional and assessment approach. They define understanding as "acquiring and retaining a network of concepts and principles about some domain that accurately represents key phenomena and their interrelationships and that can be engaged flexibly when pertinent to accomplish diverse, sometimes novel objectives" (p. 181). In order to reach this goal of deep understanding new instructional methods were needed. A vast amount of research in cognitive psychology has influenced the instructional process (Segers, Dochy & De Corte, 1999). As Mislevy (1996) has stated: "The cognitive revolution is a *fait accompli* in psychology, and it has begun to influence the ways

in which the educators seek to characterize, monitor and advance students' learning." (p. 411).

Robert Glaser (1990) and David Lohman (1993) argued that the changing goals, the new methods of instruction as well as the new findings and insights about new learning environments point to the necessity of reconceptualising current tests and assessments and critically examining their underlying theory. It is generally believed and shown that assessment has an important impact on instruction and learning (Gibbs, 1999; Scouller, 1998). The alignment between the learning environments' objectives and the assessment is a 'magic bullet' in improving learning (Cohen, 1987). The direct and indirect impacts of assessment may be either positive or negative (Crooks, 1988). The main purpose is to make the assessment congruent with the instruction and align the assessment to what students should be learning (Biggs, 2003). The traditional view that the assessment of students' achievement is separate from instruction and only comes at the end of the learning process, is no longer tenable. As assessment, learning and instruction become more and more integrated, there is a strong support for representing assessment as a tool for learning (Dochy & McDowell, 1997; Sambell, McDowell & Brown, 1997). Whereas in the past, we have seen assessment primarily as a means to determine measures and thus for certification (referred to as the 'testing culture'), there is now evidence that the potential benefits of assessing are much wider and impinge on in all stages of the learning process (referred to as the 'assessment culture').

The 'assessment culture'

Reflecting on our test culture, which has a long tradition in many European countries, several problems may be discerned. First, because of their static and product-oriented nature and their distance from daily learning practice, traditional achievement tests fail to provide relevant diagnostic information that is needed to adapt instruction appropriately to the needs of the learner. Second, tests are diagnostic aids only when they identify the extent to which the goals are attained. This means that, with the aforementioned changing goals, tests must be sensitive to how well students are able to use knowledge in an interrelated way when analyzing and solving authentic problems.

In short, tests that are inadequately linked to instruction have led to undesirable consequences such as inappropriate information about learning progress and learning difficulties, reduction of student motivation for learning, and incorrect evaluation of the effectiveness of instruction.

Stemming from the massive attention for these problems (mainly in high stakes testing), new modes of assessment such as observations, text- and curriculum-embedded questions, interviews, over-all tests, simulations, performance assessments, writing samples, exhibitions, portfolio assessment, product assessments, and modes of peer-and co-assessment have been widely investigated in recent years. A set of criteria for new assessment practices has been formulated by Birenbaum, Glaser, Shavelson, and others. Generally speaking, the current assessment culture can be characterized as follows. There is a

strong emphasis on the integration of assessment and instruction. Many assessment specialists take the position that appropriately used educational assessments can be seen as tools that *enhance the instructional process*. Additionally, there is a strong support for representing assessment as *a tool for learning*. The position of the student is that of an active participant who shares responsibility in the process, practices self evaluation, reflection and collaboration, and conducts a continuous dialogue with the teacher. Students participate in the development of the criteria and the standards for evaluating their performance. Next, both the product and process are being assessed. The assessment takes many forms, all of which are generally referred to as "unstandardised assessments embedded in instruction" and more often there is no time pressure, and a variety of tools that are used in real life for performing similar tasks are permitted. The assessment tasks are often interesting, meaningful, authentic, challenging and engaging, involving investigations of various kinds. Also students sometimes document their reflections in a journal and use portfolios to keep track of their academic/vocational growth. Finally, reporting practices shift from a single score to a profile, i.e. from quantification to a portrayal (Birenbaum, 1996).

Important issues in the assessment culture

In this paragraph some important issues in the so called 'assessment culture' are discussed. We refer to the results of a recent meta-analysis looking to the effects of the new learning environments from the angle of assessment, to show that there

remains a lot to be done in order to fully align today's educational goals, instructional practices and students' assessment

1. New learning environments and alignment

Bridging the gap between new developments in the assessment culture and the daily educational and assessment practice faces a number of difficulties (Black & William, 1998). For example, many scholars and teachers still have to be convinced that they cannot implement a new form of constructivist oriented learning without adapting the mode of assessment. Problem-based learning (PBL) is an example of a learning environment, that received a lot of interest in the 90's, partly because of the alignment with our current goals of education and with the constructivist learning principles, which aims to educate students that are able to solve complex problems. However, it is clear that assessment is not always fully congruent with the learning environments' objectives. Our recent meta analysis (Gijbels, Dochy, Van den Bossche & Segers, 2005) on the effects of LE from the angle of assessment included 3 levels of assessment: (1) understanding of concepts, (2) understanding of the principles that link concepts, and (3) linking of concepts and principles to conditions and procedures for application. In order to be congruent with its educational goals and resulting instructional principles and practices, the third level should be at the heart of the matter: the assessment of the application of knowledge when solving problems. Therefore, one could expect students in NLE to perform better at this third level when

compared to students in more traditional learning environments. The results of the meta-analysis showed a difference in the reported effects of NLE between each of the three levels. Different from expectations that the effects of NLE are larger when the method of assessment is more capable of evaluating complex levels, the effect size for the third level of the knowledge structure was smaller compared to the effect size of the second level and not statistically significant. Moreover, in only 8 of the 40 studies included in the meta-analysis the assessment focused at the third level. Most studies (N= 31) assessed at the level of understanding of concepts. These results imply a challenge for learning environments to pay more attention to this third level of the knowledge structure, both during the learning activities that take place and students' assessment. Problem-based learning is not like a pill you can take in order to cure the diseases in education; it has proven not to be a general medicine, but rather a good method that adds under certain circumstances and in certain conditions if we implement it in a balanced way.

As the alignment of learning objectives, educational practice and assessment is a cornerstone for educational innovation, a situation where learning based on constructivist principles goes hand in hand with traditional examinations (often directed towards reproduction of knowledge) can easily lead to what we called the *auto-dissolving prophecy* (Dochy & Dierick, 2001). This hypothesis states that the educational innovation will resolve itself when assessment is not congruent with the teaching.

2. *Effects of assessment*

An underestimated area in educational research is certainly what we call 'effects of assessment' referring to the learning effects and the consequential validity of assessment.

The influence of summative assessment on learning behaviour is mainly pro-active. The question "do we have to know this for the examination" will be recognizable for nearly every teacher and illustrates that students tend to adjust their learning behaviour to what they expect to be assessed. These effects can be described as *pre-assessment effects*, since the effects occur before assessment takes place. When assessment is formative and integrated within the learning process, it can influence learning because students, after finishing their tasks, reflect on their learning outcomes and learning processes. This is referred to as *post-assessment effects*. Feedback is the most important vehicle for these post-assessment-effects.

An important difference between the pre- and post assessment effect is that the latter is intentional, whereas the first is rather a kind of side-effect, since the main purpose of summative assessment is not support for learning (but rather selection and certification of students). A third kind of learning effect from assessment is called the '*true assessment effect*' (Nevo, 1995). Students also learn during assessment itself, because they need to reorganise their required knowledge, use it to tackle new problems and to think about relations between related aspects they didn't discover yet during studying. When assessment

stimulates them to thinking processes of a higher cognitive level, it is possible that assessment itself becomes a rich learning experience for students.

Faced with such powerful effects, assessment should be used strategically, designed to have educationally sound and positive influences.

3. Recent research findings related to assessment and its effects

I now will overview the research findings related to traditional testing and its effects on the one hand and findings related to similar studies within an assessment culture.

First of all, a focus on small scale classroom assessment is needed instead of a focus on large scale high stakes testing. Gulliksen (1985), after a long career in measurement stated that this differentiation is essential: "I am beginning to believe that the failure to make this distinction is responsible for there having no improvement, and perhaps even a decline, in the quality of teacher-made classroom tests..." (p.4). Many investigations have now pointed at the massive disadvantages of large scale testing (Amrein & Berliner, 2002; Rigsby & DeMulder, 2003): students learn to answer the questions better, but did not learn more; a lot of time goes into preparing such tests; learning experiences are reduced; it leads to deprofessionalisation of teachers; changes in content are not accompanied by change in teaching strategies; teachers do not reflect on their teaching and develop more effective practices; efforts and motivation of teachers are

decreasing; teachers question whether this is a fair assessment for all children; the standards don't make sense to committed teachers or strong practitioners; etc. Such external tests do also influence the teachers' assessments. They often emulate large scale tests in the assumption that this represents good assessment practice. As a consequence, the effect of feedback is to teach the weaker student that he lacks ability, so loses confidence in his own learning (Black & Wiliam, 1998). Such as one of my British colleagues insinuated: "A-levels are made for those who can't reach it, so they realise how stupid they are".

In the past decade, research evidence showed that the use of summative tests squeezes out 'assessment for learning' and has a negative impact on motivation for learning. Moreover, the latter effect is greater for the less successful students and widens the gap between high and low achievers (Harlen & Deakin Crick, 2003; Leonard & Davey, 2001).. Also our research shows convincingly that students perceptions of the causes of success and failure are of central importance in the development of motivation for learning. Moreover, too much summative testing does not only affect the students' motivation, but also teachers and their motivation. High stakes tests do result in educational activities directed towards the content of the tests. As a consequence, the diversity of learning experiences for students is reduced and teachers use a small range of instructional strategies. The latter leads teachers to 'deprofessionalization' (Rigsby & DeMulder, 2003). Firestone and Mayrowitz (2000) state: "What was missing ... was the structures and opportunities to help

teachers reflect on their teaching and develop more effective practices” (p. 745).

Recently , the finding that assessment is steering learning gained a lot of attention within educational research (Segers, Dochy & Cascallar, 2003). But also motivation has been investigated as one of the factors that is in many cases strongly influenced by the assessment or the assessment system applied.

With respect to the effect of **new modes of assessment** on the motivation of students, research is still scarce. Some conclude that students “exhibit a greater motivation to learn and a greater amount of engagement with performance tasks and portfolio assignments than with other types of assignments” (Kane et al., 1997, p.201). These results are in line with the findings of McDowell (1996). Nevertheless, we believe we should not be too enthusiastic and we agree with Nevo (personal communication, EARLI 2003) that students might find new modes of assessment motivating and interesting not certainly because of the characteristics of such new modes, but perhaps because they severely dislike and are demotivated by traditional testing methods. Our research shows that as familiarity with new modes of assessment increases, only then student preferences towards such assessment turn to change positively.

More research, related to new modes of assessment has largely focused at pre-assessment effects. Many studies investigated the relation between assessment and students approaches to learning.

The literature and research on students' approaches to learning, suggest that deep approaches to learning are encouraged by assessment methods and teaching practices which aim at deep learning and conceptual understanding, rather than by trying to discourage surface approaches to learning (Trigwell & Prosser, 1991).

The studies of Marton and Saljo revealed already that the students' perceived assessment requirements tend to have a strong relation with the approach to learning a student adopts when tackling an academic task. Similar findings emerged from the Lancaster investigations (Ramsden, 1981) in relation to a whole series of academic tasks and also to students' general attitudes towards studying. Students often explained surface approaches or negative attitudes in terms of their experiences of excessive workloads or inappropriate forms of assessment. The experience of learning is made less satisfactory by assessment methods which are perceived to be inappropriate ones. High achievement in conventional terms may mask this dissatisfaction and also hide the fact that students have not understood material they have learned as completely as they might appear to have done (Ramsden, 1997). Inappropriate assessment procedures encourage surface approaches, yet varying the assessment questions may not be enough to evoke fully deep approaches as we found in our own studies (Struyven, Dochy & Janssens, 2005).

Studies of Scouller & Tang revealed that students tend to adopt more deep approaches to learning in essay or assignment conditions than in multiple choice test conditions. Segers & Nijhuijs did find the opposite results.

An interesting question in this respect has been the relationship between students' approaches to learning and students' assessment scores. Recently, Watkins (2001) conducted a cross-cultural meta-analysis in which the relationship between students' approaches to learning and their academic performance was one of the central questions. It was hypothesized that surface approaches to learning would be significantly negatively correlated with students' grades, whilst the deep approach would be positively related with academic achievement. The results of his study were rather disappointing, although in the expected direction, with correlations of $-.11$ for surface and $.16$ for deep approaches. Although a deep approach to learning is generally expected to lead to higher achievement (both in terms of higher quality outcomes and grades), the assessment system does not always seem to reward the deep approach (Biggs, 1987; Marton & Saljo, 1997; Scouller, 1998; Scouller & Prosser, 1994).

It is clear that the overall results of these studies are inconclusive. Nevertheless, many of us assume that a deep approach is still more effective in the context of 'Learning Lasting for Life'. How can this be explained? Which variables play a role between 'assessment as designed' and 'the students' study approach'?

4. Students' assessment preferences and perceptions

Hence comes the research taking assessment preferences and perceptions of students into account.

Research on students' assessment preferences and perceptions has focused on the format of assessment and its' relationship with students' approaches to learning. According to the studies of Ben-Chaim & Zoller (1997), Birenbaum and Feldman (1998), Traub & McRury (1990), Van de Watering, Gijbels, Dochy and Van der Rijt (2005) and Zeidner (1987), students prefer the multiple choice format or the simple and decontextualised questions over the essay type of assessment or constructed-response type of questions (complex and authentic). Birenbaum (1994) introduced a questionnaire to determine students' assessment preferences (Assessment Preference Inventory) for various facets of assessment. Using the questionnaire, it was found that differences in assessment preferences correlated with differences in learning strategies. In another study, Birenbaum and Feldman (1998) found that students with good learning skills, who have high confidence in their academic ability, tend to prefer the essay type of assessment over the multiple-choice examinations. And vice versa, students with poor learning skills, who tend to have low confidence in their academic ability, prefer the choice over the constructed- response type of assessment. Also Entwistle & Tait (1990) reported that students describing themselves as surface learners preferred teaching and assessment procedures which supported that approach, whereas students describing themselves as deep learners preferred courses which were intellectually challenging and assessment procedures which allowed them to demonstrate their understanding.

According to Birenbaum and Rosenau (in press), students' perceptions of assessment refer to opinions, attitudes, and

preferences towards the assessment and its properties. Struyven, et al. (2003) interpret perceptions as a constructivist act of creating meaning in which perceptions are seen as beliefs, opinions, interpretations, ideas, preferences, images and conceptions as a result of experience. In both cases, preferences are seen as a factor in determining the students' perceptions. Recently, several researchers have investigated students' perceptions of assessment practices. Scouller (1998) and Scouller & Prosser (1994) found that success in multiple-choice examinations was related to the perception of the questions as assessing lower levels of cognitive processes and the non-employment of deep strategies. Although a recent review on students' perceptions of new modes of assessment indicated that students' perceptions of assessment have considerable influences on students' approaches to learning (Struyven, e al., 2003), Lindblom-Ylänne & Lonka (2001) could find no differences in students' perceptions of the examination procedures between four groups with different approaches to learning-profiles. All students criticised the examination practices as calling too much for memorising in stead of understanding and application of knowledge.

In our own research we did not find this straightforward relationship in all cases. In a recent study, we investigated the consequential validity of new modes of assessment (Segers, Dierick and Dochy, 2001). In this case we assessed the extent to which students are able to define, analyse, solve and evaluate, novel authentic problems based on case materials. This is often implemented in NLE, where working on authentic problems is

the core of the learning process. The results of the survey and semi-structured interviews with students and staff members indicated the importance of students' perceptions of key elements of the learning environment. Although the students as well as the staff members support the importance of such a new mode of assessment, they observe several reasons why this assessment instrument does not steer them towards more deep learning strategies.

One of the main reasons is the mismatch between the instructional approach and their perception of the actual implementation of this approach. In their perception, because of an overload of the program, there is no space for properly tackling authentic problems and for feedback on the problem-solving process. The learning process is merely perceived as surface scanning of information such as articles, chapters, etc. Additionally, the transfer of problem-solving skills from the group learning process to the individual process of handling novel problems, is seen as problematic. Finally, students mentioned that teachers did lack the skills to coach the group's problem-solving process,.

In order to unravel the mechanism through which assessment steers learning, two variables, indicated as relevant in the aforementioned studies, are taken into account: students' intended learning strategies and their perceptions of the assessment demands.

To be short, what we found was the following: assessment preferences seem to be clearly linked to students' learning strategies, but it seems very hard to foster deep level learning.

Recently, we studied again the relationships between students' assessment preferences and their approach to learning. The sample consisted of 298 first year university students. Students approaches to learning were measured by Biggs, Kember and Leung's (2001) Revised two Factor Study Process Questionnaire (R-SPQ-2F), students preferences in assessment were measured with Birenbaum's (1994) Assessment Preference Inventory (API).

In general, the results are in line with previous research, namely that differences in assessment preferences seem to correlate with differences in approaches to learning. The results support the suggestion by Entwistle and Tait (1990) that students adopting a deep approach to learning prefer assessment procedures which allow them to demonstrate their understanding: there are strong and significant correlations between the deep approach to learning and a preference for respectively higher order thinking tasks ($r = 0.327, p < 0.01$), integrated assessment ($r = 0.349, p < 0.01$) and non-conventional assessment ($r = 0.238, p < 0.01$). There is somewhat less statistical support for the suggestion that students adopting a surface approach to learning prefer assessment procedures which support memorizing and reproduction. Nevertheless, there is a significant negative relationship between students having a surface approach to learning and a preference for higher order thinking tasks ($r = -0.154, p < 0.01$) and a significant positive relationship with a preference for teacher guided test preparation ($r = 0.143, p < 0.05$).

In another study (Segers & Nijhuijs, 2005) the change in the students' intended learning strategies, their perceptions of the assessment demands and their actual learning strategies in different NLE were investigated.

An assignment-based format was used for the course, which was attended by 406 students. The next cohort of 312 students, received the same course implemented within a NLE. The study reveals once more what was hypothesised earlier: Changing a learning and assessment environment in order to align it with constructivist principles, did not result directly in more deep learning approaches, on the contrary. This is surprising, certainly since we know that the student perception on the assessment demands did not change although the method of assessment changed.

Our recent studies found comparable results indicating the same direction: a study involving respectively about 100 university students shows comparable results concerning the approaches to learning (Dochy & Gijbels, 2006) and a study with about 1000 students in teacher training in higher education showed similar results when investigating their approaches to teaching (more constructivist teaching to these students led to more transmissive oriented teaching). Hence, the lack of feedback and the perceived study load seemed to play a major role in this study. Here, the concept of 'Teaching for Learning' could be a track to elaborate. As it stands now, teacher training seems not really to aim at 'teaching for learning'.

As a possible explanation for these findings, we refer to the concept of study orchestration as the contextualised study approach adopted by individual students or groups of students.

Orchestrations are affected by the qualitative level of perception of the individual towards certain key elements of the learning environment. This might explain why, in the NLE, students even employ more surface strategies than in the original course, although there are no differences in intentional learning strategies and perceptions of the assessment demands. Moreover, this is an argument for the weak association between students' perceptions of the assessment demands and their actual learning strategies. As we pointed out earlier (Segers et al., 2001): although students perceive the assessment demands as asking for higher level cognitive skills, many students still employ surface learning strategies. The results of the qualitative analysis of data show that students perceive the learning environment as overloaded and therefore offering no room for exercising. The students indicate this forces them to employ surface learning strategies. These results are confirmed by a follow-up study of Nijhuis et al. and a subsequent study of our team. It was found that the students' perception of three elements of the learning environment influence their learning strategies: the clarity of the goals, of the appropriateness of the workload and the usefulness of the literature.

When students perceive these elements as negative, they are inclined to employ surface learning strategies. These results are in line with the findings of Thomson & Falchikov (1998). They refer to high levels of stress among students because of the perception of a lack of time. They state: "Students appear to be aware that, if they manage their time effectively, they will be able to deal with assessments in a way that will help their learning and understanding of the subject, which is consistent

with a deep approach. However, they rarely succeed in managing their time in this way, and end up rushing assignments and feeling that they are approaching the work superficially.” (p. 388).

To conclude: perception of a lack of time, of high levels of stress, of heavy study load, lack of feedback, and lack of clarity of the learning goals might be interesting track to investigate further on within the context of aligning assessment and instruction.

4. New developments towards Learning Lasting for Life

Let me finally share with you some of the emerging developments in higher education and perhaps in education as a whole. I want to touch shortly the issues of “Blended assessment, Assessment engineering, Levels in competence-based learning, and Deep Learning as a level of “Learning Lasting for Life”.

4.1. Blended assessment and the role of expertise in authentic assessment

Blended assessment is usually defined as a combination of a variety of assessment modes, such as paper and pencil tasks, online assessment tasks, peer-assessment, overall assessment, etc. A blended assessment system refers to a combining both norm-referenced tests and standards-based tests in one decision-making system.

It is clear that educational assessment is undergoing a fundamental transformation. Advocates for new authentic assessment do of course recommend that assessment should be designed in such a way that it reflects more complex real-life performance. We agree with Wiggins that authentic assessment should focus at: truly representative performance, learning of the criteria for quality, self-assessment and presenting your own work. Wiggins (1993) ignores the statement that most activities and challenges in professional life involve a structured knowledge base. We cannot agree with that point of view. Many years of research on expertise and our own research on the role of prior knowledge (RER) have clearly resulted in the full proof

that experts greatly differ from novices in the fact that they have a large and well structured domain knowledge base (**Chi, Glaser & Farr, 1988**). Despite the current denigration of 'mere facts', decades of research have shown convincingly that holding the key domain knowledge is a basis for excellence of experts (Chi, Glaser & Farr, 1988). This key domain knowledge certainly refers to a larger extent to key concepts and jargon in a domain than to mere facts. No matter what type of assessment we use, we will have to assess, eventually simultaneously, directly or indirectly, the underlying knowledge base of students, necessary to perform adequately. Still, prior knowledge is the best springboard for future "learning lasting for life" (Glaser & De Corte, in Dochy, 1992). As such, blended assessment might be a wise track to follow and to investigate.

4.2. Assessment engineering

Currently, scientists have given clear arguments that 'assessment engineering' is necessary in multiple senses: Aligning assessment, learning and instruction, blending different modes of assessment, avoiding earlier pitfalls such as concluding that assessments within learning environments are largely comparable with assessment of human intelligence and other psychological phenomena. Continuing along this line involves efforts from different players in the field. First, departmental audits or accreditation audits should not be limited to a screening of external standards in summative tests. They should also include an inventory of the amount and nature of formative assessments and new modes of assessment, and consider the

realisation of the aiming at spreading optimal learning and principles of good teaching practice. Secondly, teacher preservice and professional development programmes should include instruction in how students learn and how learning can be assessed as a major component in most programs. The focus should be on the proper integration of learning and assessment in teachers' educational experience (Hamilton, 2003; Pelegrino, Chudowsky & Glaser, 2001). Finally, teachers should use assessment strategically to support students' learning.

Three issues related to assessment can help teachers in doing this (Gibbs & Simpson, in press): First, assessment can influence the quantity and distribution of student effort. This is the case when the assessed tasks capture sufficient study time and effort and distribute this effort evenly across the topics and weeks. Secondly, assessment can influence the quality and the level of the students' effort. When the tasks engage students in productive learning activities and communicates clear and high expectations to the students, assessment supports student learning. Thirdly, assessment can be accompanied by timely and sufficient feedback (from the teacher or the peers). Feedback should be provided quickly enough to be useful to students and should be given both often enough and in enough detail. The quality of feedback is important. Feedback should focus on learning, be understandable for students and linked to the purpose of the tasks and the criteria. Students' response to feedback should be taken into consideration. Feedback should be received by and attended to the students and students should act upon the feedback in order to improve their tasks or their learning.

It is obvious that the 'assessment' in its current meaning, referring to new modes of assessment, assessment for learning, assessment of competence, is still in an early phase of widespread use in educational practice (Segers, et al., 2003). In educational programmes, assessment will need to be much more systematically engineered: Questions that need to be addressed at the classroom level are: Which modes are in line with my instruction? how to combine different modes in my class? How many assessment tasks can I include in one course? Is it manageable for the teacher and the students? At the programme-level one should create a sound assessment policy, ensuring that all modes of assessment are in line with each other in the complete program and that the edumetric quality is sufficient. The science of 'assessment engineering', trying to fill the gaps we find in aligning learning and assessment, asks for more research within many different fields.

4.4. Current levels in competence-based learning

Competence-based learning has recently appeared in our schools, mostly polytechnics, like ABC (Ability Based Curricula) intruded the UK polytechnics and new universities. Competence-based learning as it appears in some of our countries is an interesting , but risky development since it is primarily practice based and almost no educational research has been done related to this issue. As a consequence, I believe we better stress the potentials that support the idea of Learning Lasting for Life, rather than to focus at all the issues that are not underpinned and

unrealistic to purchase in practice. As a result of a phenomenographic study concerning competence-based learning and assessment (Dochy & Nickmans, 2005), we did formulate categories of competence-based learning and categories of assessment. In the remainder, I want to stress those issues in competence based learning and assessment that may contribute to the goal of "Learning Lasting for Life". I will formulate these within some of the following comments and recommendations.

5. Final comments and recommendations

Comment 1:

Research shows that fostering the performance through assessment is strongly influenced (if not determined) by a few core factors:

- Recognising of the negative influence of traditional testing on motivation and well being of students, and the recognising that these factors influence the learning process;(and to act accordingly)
- Providing effective feedback to students; Alignment of learning & instruction with assessment (a magic bullet in improving learning);
- Supporting the need of students to be able
 - to evaluate themselves,
 - to understand how they can increase their performance and
 - to influence their own development.

Comment 2 :

Competence based learning is too far away from current educational practices. We should strive towards implementing only some of the key educational issues, such as :

- Integration of knowledge, skills, attitudes in authentic professional situations
- Explicit attention for **learning tracks** based on constructivist learning environments and **developmental tracks** based on reflective activities of the student and self- and peer-assessment.
- Teachers as coaches that are fully feedback oriented towards individuals, rather than developers of fixed learning tracks for groups.
- More teamwork, team teaching and learning across disciplines and subjects.
- A clear assessment policy within each training program aiming at balanced assessment and including case-based integrated assessment.
- Striving towards more “**assessment for learning**” instead of a complete curriculum based of “**assessment of learning**”, i.e. summative tests and partly summatively used formative tests.

Recommendation 1: Remind the ‘auto-dissolving prophecy’: any educational innovation in classrooms will resolve itself if assessment is not aligned with teaching and learning.

Recommendation 2: Pre-, post- and true assessment effects need more research in order to analyse their large impact on learning.

Recommendation 3: Summative testing squeezes out 'assessment for learning' and has a negative impact on motivation.

Recommendation 4: Teacher training should aim at "Teaching for learning" (teachers should be trained to focus at learning students to enjoy learning)

Recommendation 5: Assessment preferences seem to be clearly linked to students approaches to learning. Students should experience new modes of assessment provided with enough time and feedback.

Recommendation 6: The students' perceptions of a lack of time, of stress, of heavy study load, of lack of clarity of goals and lack of feedback might be key variables in creating real NLE. They might as well "unpower" the environment and induce surface or scanning strategies.

Recommendation 7 : Blended and balanced assessment is a necessity, taking the results of research related to expertise and key domain knowledge into account. Prior knowledge is still a springboard for future Learning Lasting for Life.

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