PROBLEMS
OF EDUCATION
IN THE 21st CENTURY
Vol. 75, No. 3, 2017
270

LEARNING ASSESSMENT VIEWS AND PERCEPTIONS OF FINNISH TEACHERS AND INTERNATIONAL STUDENTS IN POSTGRADUATE PHYSICS STUDIES

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Abstract

The way teachers view assessment has a considerable impact on their practice of assessment. Student perceptions of assessment, in turn, affect the ways in which they take advantage of its potential to direct their learning processes and to develop metacognitive skills. In this research, physics teachers and international postgraduate students at a Finnish university were surveyed for their views of assessment. The teachers were found to use assessment in a restricted fashion, which indicates that their conceptions of assessment are also limited in scope. The international students appeared to have a loose grasp of the concepts pertaining to assessment. Furthermore, clear differences were found in the purposes ascribed to assessment by the teachers and students. The implications of the findings are discussed and suggestions are made for the development of assessment practices to ensure a better use of its potential as a tool for achieving learning objectives.
Keywords: *educational programmes, higher education, international students, postgraduate studies, views of assessment*.

Introduction

Assessment is one of the primary means at teachers' disposal to either foster or impede student learning (Evans, 2013; Yorke, 2003). The extent to which assessment will support learning depends on the efficiency and suitability of the assessment methods used (Nicol & Macfarlane-Dick, 2006). The conventions to which teachers adhere undoubtedly affect their views of assessment and the practices that they implement (Brown, 2004). Although student-centred approaches of teaching and learning have gained ground in higher education, assessment is still often seen as a teacher-centred activity (Nicol & Macfarlane-Dick, 2006). The long tradition of using written exams as a means to assess student performance has prevailed to the present day in physics lecture halls and classrooms across Finland and beyond.

However, little seems to have been done in the field with respect to the Master's level of higher education, especially within the domain of physics teaching. As universities seek to constantly develop the education they provide, the policy makers and academic staff should acknowledge the need to implement assessment practices that are based on solid educational theories. However, the success of the implementation depends on the degree to which teachers recognise the role of assessment as a means to facilitate and direct learning.

Students constitute the target population for whose benefit assessment is primarily intended. Looking into students' perceptions of assessment provides insight into their views and experiences of the matter. Contrasting the two sets of data—from teachers and students—will disclose possible contradictions or inconsistencies between their conceptions. The two groups

PROBLEMS
OF EDUCATION
IN THE 21st CENTURY
Vol. 75, No. 3, 2017

holding very different or constricted ideas about the purpose and practice of assessment may inhibit the use of its potential in both teaching and learning.

Considering previous research (*e.g.*, those referred to in this article), two features stand out in the literature on the assessment of learning at tertiary level. Firstly, the bulk of research into assessment seems to be done in the fields of law, medical sciences, and humanities. Only a few of the studies at the authors' disposal (*e.g.,* Scott, Stelzer, & Gladding, 2006; Goubeaud, 2010; Wilcox & Pollock, 2014) include the context of physics. Secondly, a small number of publications appear to address assessment of learning at postgraduate level. A more discipline-specific approach needs to be, therefore, applied to student assessment at the Master's level of education.

Generally, teachers in the physics education sector seem to hold a somewhat constricted view of assessment. Such a conclusion can be drawn from the review article authored by Docktor and Mestre (2014), in which they present a comprehensive synthesis of the main topical areas in the field, including assessment. Despite the significance of assessment as a tool for directing student learning, the assessment practices in the physics education context seem to be almost entirely limited to the summative mode. Docktor and Mestre (2014) devote a large portion of their assessment section to concept inventories, leaving the reader with the impression that the inventories are the primary assessment method currently used in university physics education. Although the inventories employ elements and ideas from formative/continuous assessment, turning the tide is a lengthy process, as traditional end-of-the-course assessment practices have for long been predominant in science and physics education (*e.g.* Dickie, 1994).

The aforementioned issues form into the following research problem: How to help fill the gap that appears to exist in the discipline-specific studies of assessment regardless of the massive amount of research into the manifold aspects of education. To be more particular, this research seeks to obtain information about the teachers' and students' ideas on assessment in order to provide the basis for the advancement of pedagogical practices. In order to address the research problem, assessment views and perceptions of both the teachers and students are studied in the context of an international Master's degree programme in physics at a Finnish university. The following research questions are posed:

RQ1: What kinds of views and perceptions of assessment do university physics teachers hold?

RQ2: What kinds of views and perceptions of assessment do the international postgraduate students of physics hold?

Theoretical Framework

Assessment has been one of the foci of interest in educational research for several decades (*e.g.* Black & Wiliam, 2003). As a result, it is widely recognised as an efficient tool for orienting and enhancing students' learning (Broadfoot & Black, 2004; Gibbs, 2006). On the one hand, assessment determines the requirements according to which students are able to set aims for their learning. On the other hand, learning outcomes are measured through assessment. The learning process, during which students make decisions that help them advance to the desired learning outcome, acts as a link between the two ends.

Definitions of Assessment

Educational researchers have proposed various definitions of the concept of assessment. Sadler (1989) uses the term to signify *'appraisal (or judgment, or evaluation) of student's work or performance'*. Benson (2014) defines assessment as an activity comprising the

PROBLEMS
OF EDUCATION
IN THE 21st CENTURY
Vol. 75, No. 3, 2017

> measurement of learning or the demonstration of achievement to make educational decisions about students and to provide feedback to teachers and parents on the individual progress, strengths, and weaknesses of student performance.

Benson's description includes various aspects of assessment–the agents involved, and the advances and needs of a learner. In brief, assessment could be defined as an activity with the purpose of determining a student's current or recent stage of learning (Biggs & Tang, 2007).

Types of Assessment

The above definition refers to the two common *types* of assessment. *'Current'* indicates an ongoing evaluation of learning, mostly referred to as *formative assessment*, aka *assessment for learning*. *'Recent'*, in turn, points to a summarizing end-of-module measurement of student achievement in their studies–hence termed *summative assessment* (Sadler, 1989; Dodridge, 1999). According to Angelo (1995), formative assessment deals with improving students' competence based on the level of their performance.

Black and Wiliam (1998) characterise formative assessment as a sequence of interactive behaviour in which the teacher assists the learner in identifying the gap between his/her present state and the learning aims. The student's responsibility is to close the gap in the light of the information acquired through self-assessment and from the teacher. In their more recent work, Black and Wiliam (2009) formulate a more comprehensive framework of the practices often collected under the umbrella of formative assessment. Various methods, such as self-regulated learning (*e.g.* Zimmerman, 2001), classroom discourse (Christie, 2002), cognitive acceleration (Adey, 2005), and dynamic assessment (Haywood & Lidz, 2007), are included to achieve a more complete concept of formative assessment.

In education, assessment serves a number of purposes. For example, in the task of keeping students' accountable and motivated, *feedback* and *grading* stand out as the primary means of assessment (Biggs & Tang, 2007). Feedback is often associated with formative assessment, whereas grating primarily carries a reference to the summative aspect of assessment.

Representing various aims in assessment practice, summative and formative assessment are often seen as the opposite ends of the intent axis (Fig.1). *Benchmarking* is yet another type of assessment, falling between the two extremes. Essentially, in benchmark assessment student progress in a given subject is tested through measures, such as grading and ranking, distributed to students periodically throughout the study unit. On the other hand, students are provided with feedback on their progress in learning, which reflects the formative nature of the method (*cf.* Benson, 2014).

Modes of Assessment

Another classification pertains to carrying out assessment tasks. Maclellan (2004) refers to three groups of *assessment modes*. The most extensively used are various *written* modes, such as short-answer questions, essays, and multiple choice questions. *Oral assessment* is employed, for example, when a learner is required to produce proof of his/her skills *viva voce*. The third group, *functional assessment*, is justified by the need to evaluate the practical skills, such as performing measurements in a laboratory.

ISSN 1822-7864 (Print) ISSN 2538-7111 (Online)

PROBLEMS
OF EDUCATION
IN THE 21st CENTURY
Vol. 75, No. 3, 2017

Models of Assessment

The essence of evaluating learning can be described in terms of comparing student performance against a given set of references. In selecting such references, two main approaches have been adopted. First, the *measurement model*, a type of *norm-referenced assessment* (NRA), is concerned with comparing individuals–a model originally developed by psychologists and later adopted by educationalists (Taylor, 1994; Biggs & Tang, 2007). Ranking, marking (*i.e.*, counting up points), and *'grading on the curve'* (Biggs & Tang, 2007) are a few examples of procedures used extensively in the NRA.

The second approach to evaluating educational outcomes is *criterion-referenced assessment* (CRA), which is the basis of the *standards model*. In contrast to the measurement model, in the standards model evaluation is focused on student performance–the level that the individual has succeeded in achieving the learning objectives (Taylor, 1994). According to Biggs and Tang (2007), the primary difference between the NRA and CRA is that the former *'makes judgments about* people*'*, whereas the latter *'makes judgments about* performance*'*. A common assessment strategy in the CRA category is referred to as competency-based grading.

Unfortunately, not all assessment practices serve their intended purpose. Assessment yields valid results only if it corresponds to the real-life settings in which the knowledge is actually meant to be applied (*cf.* Newmann, 1997). The point of validity has been emphasised by using specific terms for evaluation. Elliott (1991) and Torrance (1994), for example, refer to *'authentic assessment'*. Arguably, this implies that other types of assessment are inauthentic, as a result of which some researchers (*e.g.* Moss, 1992) prefer the term *'performance assessment'* to avoid unnecessary labelling.

At the other end of the authenticity scale lies *decontextualised assessment*, in which assessment tasks are not suited to the context of application of a particular domain. This type of assessment can be applicable if the intent is to measure declarative knowledge instead of functioning knowledge in its appropriate context (Biggs & Tang, 2007).

The formats of assessment mentioned above could be summarised in a diagram with three dimensions–intent, basis, and linkage to real life (Fig.1). The diagram displays the trends that have emerged in the course of research during the past decades, with the conventional types of assessment on the left and the more recent ones on the right hand side of the scale. Although the diagram in Figure 1 roughly divides assessment formats into two groups, conventional and modern, the former are still widely used in education.

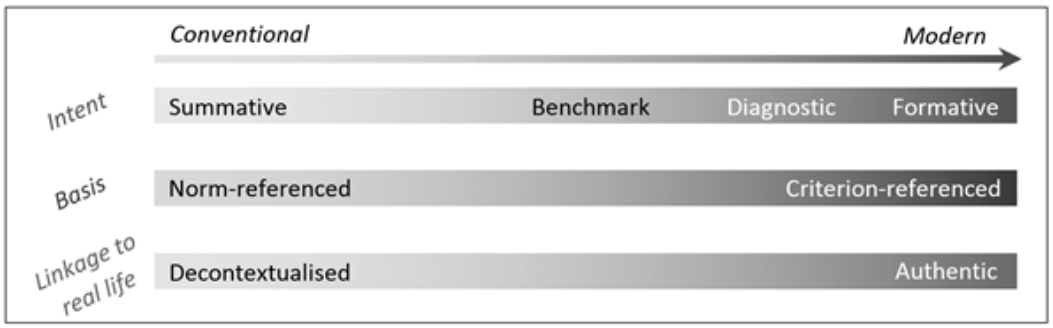

Figure 1: Dimensions of assessment.

PROBLEMS
OF EDUCATION
IN THE 21st CENTURY
Vol. 75, No. 3, 2017

Overview of Research into Views of Assessment

Teachers' ideas about assessment determine the types of assessment used in evaluating student performance, and the modes of assessment employed. Moreover, faculty staff views typically dictate the form to which assessment is reshaped. Assessment views of teachers, allegedly in favour of developmental and formative function of assessment, are not always consistent with their assessment practices (Maclellan, 2001). Furthermore, teachers' beliefs about assessment–and consequently the practices implemented−often contradict those advocated by educational researchers and developers (Samuelowicz & Bain, 2002). Even the academics inclined to favour real world problems in measuring students' learning achievements seem to lack a holistic view of the authenticity of assessment (Maclellan, 2004).

In pursuit of understanding teachers' conceptions of assessment, Brown (2004) has devised a model that describes these conceptions in terms of four assessment purposes. Brown's model, originally designed for primary schools, has been revised by Fletcher, Meyer, Anderson, Johnston, & Rees (2012) for higher education contexts. The model depicts teachers' views in terms of (a) improvement of teaching and learning, (b) institutional accountability, (c) student accountability, and (d) treating assessment as irrelevant. Fletcher *et al.* (2012) report that faculty staff primarily see assessment as a tool for advancing as well as for understanding student learning. Their results also reveal that teachers considered assessment reliable while recognizing the possibility of error.

Goubeaud (2010) has found statistical differences in teachers' uses of various assessment types, in particular between the disciplines of biology, chemistry, and physics. She argues that the differences may be due to the teachers' perceptions of the subjects that they teach. Her conclusion finds support in Maclellan's research (2001), which is based on the premise of faculty staff implementing assessment practices that are dependent on their views of assessment. According to Goubeaud (2010), there has been a shift in educators' views of assessment over the last few decades toward a greater variety of assessment practices. However, she reports only a range of written assessment tasks, disregarding various other methods such as oral presentations.

The connecting thread in all of the aforementioned studies appears to be an objective to provide a framework within which the assessment practices and−in a broader perspective−tertiary education as a whole can be advanced (*cf.* Samuelowicz & Bain, 2002). Evidently, any progress in the field of assessment will also have a positive impact on physics education.

Research Methodology

This research was conducted in the Department of Physics and Mathematics at a Finnish university. The target population consisted of the teachers and students of Department's international Master's degree programme in physics that has been underway since 2010. A great majority of the students studying in the programme come mainly from South Asia and a few from African countries. The data was collected through an interview and a survey questionnaire. The group of interviewees comprised of professors, university lecturers, senior and postdoctoral researchers, an associate professor, a senior engineer, and a doctoral student, all of which are referred to as 'teachers' in this article.

Instruments and Target Groups

The semi-structured interview protocol targeting the teachers was based on the research literature. The discussion with the interviewees relevant to this research centred on the impact of assessment on both learning and teaching. The teachers were also queried about the current

PROBLEMS
OF EDUCATION
IN THE 21st CENTURY
Vol. 75, No. 3, 2017

assessment practices and their views on the purpose of assessment. The duration of the interviews ranged from 30 to 75 minutes.

Fourteen of the fifteen (93.3%) physics teachers of the Department acceded to an in-person interview in 2013. In order to complement the interview data, the survey questionnaire was administered in 2015 to the target groups of 15 teachers and 29 international students of the Department. Survey responses were received from 11 teachers (73.3%) and 22 students (75.9%), resulting in the overall response rate of 75.0 per cent. Eight of the 11 teachers had taken part in the interview in 2013.

Since assessment was not the only topic discussed in the interview, the data were constricted in the variety of aspects related to assessment. Thus, complementary data were collected utilizing Maclellan's (2001) survey questionnaire as it broadly covers the central aspects of assessment, such as its purpose, content, and mode (Appendix). The questionnaire consists of 40 items that are grouped into 8 clusters. Each item reflects an issue relevant to the practice and theory of assessment, and is discussed in the literature. The four-point Likert scale is sufficiently informative to convey the prevalence with which perceptions of various aspects of assessment occur. The clusters depict primary aspects of assessments, for which reason the results are discussed in terms of these facets.

To suit the context and needs of this research, the original questionnaire was modified by adding open-ended questions about the respondents' views of the purpose, current modes, and functionality of the currently practiced assessment. Also, questions concerning the respondents' position at the Department, their teaching experience, and their use of various teaching modes, such as lectures and seminars were added. A few original items were omitted as irrelevant in the present context of physics.

Analysis

The interview data were transcribed and elements of directed content analysis (Hsieh & Shannon, 2005) were applied to identify respondents' key perceptions regarding assessment. The concepts and ideas discussed in the reviewed literature, as well as those used in the survey questionnaire, formed the conceptual framework for the interview data analysis. The framework was used in order to elicit views of assessment, either supportive or contradictory to those found by means of the questionnaire. The same strategy was also applied to the open-ended questions of the survey.

Since assessment plays a significant role in driving student learning, the aim is to examine the views and perceptions that physics teachers and as well as students hold of assessment. This research seeks to depict these perceptions in terms of frequencies with which the practice stated in each item were experienced. The percentages of the responses to each multiple choice item on the rating scale of *'frequently'*, *'sometimes'*, *'never'*, and *'don't know'* (Maclellan 2001) are tabulated in the following section; the modal values are summarised in the Appendix.

In contrast to Maclellan's (2001) analysis, teachers and students were treated as two separate groups. While recognizing the various usage of different modes of instruction, assessment was scrutinised within the entire degree programme, without drawing distinctions between individual teachers, although they use these instructional modes variably.

Results of Research

Open-Ended Questions

Among the teachers, the most endorsed view of the purpose of assessment in the Master's degree programme in physics was the evaluation of students or their performance (see

PROBLEMS
OF EDUCATION
IN THE 21st CENTURY
Vol. 75, No. 3, 2017

Table 1). Of those who brought up the evaluation of student performance as a principal function of assessment, 60% regarded student ranking as an equally important purpose. A minority expressed the idea that assessment provides feedback for students in order to facilitate their learning. Also, one of the teachers considered that assessment offers feedback for staff on their methods of instruction, although this was noted as a function that was nevertheless secondary to measuring student performance.

In the interviews, however, 64% of the teachers shared the idea of assessment working as a guide to student learning, whereas 21% were uncertain whether exams, in fact, affect learning strategies and outcomes.

Table 1. Teachers' conceptions of the purpose of assessment as investigated through the open-ended questions.

Purpose of assessment	%
Performance evaluation	45
Student evaluation	36
Student ranking	27
Feedback for learning	18
Feedback on teaching	9
Not specified	9

Percentages (rounded to the nearest whole number) of the respondents who associated each particular function with assessment.

With respect to a question about whether and how assessment affects learning, one of the respondents noted:

> Certainly. Rote learning occurs because … students memorise [their lecture notes when preparing] for the exams. I have noticed that they are reluctant to take exams on successive days, because they would like to cram for a few days before each exam.

Apparently, the teachers recognised the guiding effect of assessment when it was explicitly mentioned by the interviewer, but did not state it in the open-ended questions. Indeed, only 18% of the teachers said that assessment provides feedback for learning (Table 1). This suggests that the idea of using assessment as a tool to direct student learning has not been adopted.

Students were said to adjust their learning strategies to various types of exam question. Once students become familiar with the style of the examiner, they opt for learning strategies that will help them prepare in order to be better able to answer exam questions of this particular style.

> [Students] usually try to acquire old exams to see what type of questions [have been posed previously]… They specifically prepare for the type of exam that they know the teacher will give them.

It was noted that students occasionally skip the questions that require a thorough answer. On the other hand, assessment that requires elaboration on various topics is claimed to drive students toward greater efforts to understand the subject.

> I've seen it happen [i.e., students have not really understood the contents] when … I require students to focus on something particular and elaborate on the underlying physics, then they would ignore that [guideline] and still write the contents of their lecture notes [reproducing all they can recall that even remotely relates to the subject].

PROBLEMS
OF EDUCATION
IN THE 21st CENTURY
Vol. 75, No. 3, 2017

As expected, the methods most frequently used in the degree programme were written exams (82%) and problem-solving sessions (64%). Some of the teachers (27%) said that they evaluated laboratory work reports, whereas students' presentations were assessed by one of the interviewees. In addition, 27 per cent of the teachers mentioned *"subjective evaluation"* of students' performance in a laboratory setting.

One of the open-ended questions inquired the teachers' opinion about the functionality of the current assessment methods. Five of the respondents (45%) deemed the assessment appropriate, while according to two of them (18%) assessment was limited, giving a constricted picture of students' skills. Most students who excel in the exams were said to *"also succeed later in doing their doctorate."* Yet, for some students, receiving high grades at postgraduate level does not mean that they will be *"independent enough"* in their doctoral studies. Over a quarter (27%) of the respondents noted that there is room for development in the assessment practices. As the selection of students for postgraduate studies is based on performance–measured generally by written exams–the method is at times inefficient in *'identifying the most talented students'*.

Some teachers expressed concerns about rote learning. Since it is virtually unfeasible to produce new questions for each exam, the old ones are often recycled. This encourages rote learning because the exam questions from the previous years are readily available to students.

Multiple Choice Questions

In the following paragraphs, the results obtained through the multiple choice questions are clustered according to the 8 different aspects addressed. The tables present all percentage values for both the teachers and students.

Purpose of Assessment

It is worth noticing that, in comparison to the teachers, a very small proportion of the students regarded assessment as being used for grading/ranking (Table 2). Moreover, nearly one fifth of the students (18%) could not say whether grading/ranking was the purpose of assessment at all.

Table 2. Purpose of assessment as viewed by both the teachers (T) and the students (S) working within the Master's degree programme in physics.

Assessment is used to	Frequently		Sometimes		Never		Don't know	
	T	*S*	*T*	*S*	*T*	*S*	*T*	*S*
Motivate learning	55	36	27	59	0	0	18	5
Grade/rank students	91	27	0	45	0	9	9	18
Diagnose strengths/ weaknesses	18	18	73	68	0	0	9	14
Evaluate teaching	36	32	18	55	9	5	36	9

The numbers in all following tables are the percentages for a given group of respondents.

Interestingly, 36% of teachers noted that they did not know whether assessment could serve as a tool to evaluate teaching. Equally many stated that assessment was frequently used for this purpose. In the interviews, the same percentage of teachers maintained that assessment not only helped evaluate teaching but, in fact, affected teaching practices.

PROBLEMS
OF EDUCATION
IN THE 21st CENTURY
Vol. 75, No. 3, 2017

> If it [assessment] were something else [than written exams], then perhaps other kinds of things would be emphasised [in teaching]… or things would be done [or taught] differently.

A smaller number of teachers were of the opinion that assessment has an impact on teaching practices. Also, there were those (21%) who thought that assessment directs teaching only to a limited extent.

> Yes, [assessment does direct learning] to some extent. …one of the assessment criteria is how much the students ponder the topic themselves and present their own ideas. So, when teaching, one tries to avoid providing too many [answers]…

Content of Assessment

Application of knowledge was the content most commonly ascribed to assessment among the teachers. A total of 91% of them regarded it as being realised either frequently or sometimes (Table 3). In comparison, only 18% of students stated that assessment often measures application of knowledge, while considerably more of them claimed this to be the case occasionally.

Table 3. Respondents' answers (%) regarding the focus of assessment.

Focus of assessment	Frequently		Sometimes		Never		Don't know	
	T	*S*	*T*	*S*	*T*	*S*	*T*	*S*
Development of knowledge	36	45	45	41	9	5	9	9
Application of knowledge	45	18	45	68	0	5	9	9
Presentation of knowledge	27	14	55	64	0	5	18	18
Analysis of information	27	9	55	77	0	5	18	9
Synthesis of information	27	14	55	50	0	9	18	27
Evaluation of information	27	23	36	64	0	0	36	14

T = teachers, *S* = students.

As for the presentation, analysis, synthesis, and evaluation of knowledge, relatively few students (9–23 %) perceived these as frequently the core of assessment. For teachers, the respective percentages were uniform and slightly higher (27%). In general, both teachers and students seem to be equally inclined to think that assessment, at least once in a while, evaluates a variety of aspects of information-processing. The results show that 81–90 per cent of the teachers regarded assessment as a tool for evaluating higher cognitive tasks, as described by, *e.g.*, Krathwohl (2002), at least sometimes.

This notion is in line with the interview data indicating that the teachers seek to compile assessment tasks that require elaborate processing, such as application and analysis of knowledge.

> Sometimes… I've altered [the exam contents] toward the kind that will test whether they really know the subject.

Indeed, the teachers acknowledge the need to appraise reasoning skills rather than to solely measure the ability to reproduce information from lecture notes.

PROBLEMS
OF EDUCATION
IN THE 21st CENTURY
Vol. 75, No. 3, 2017

> …at least I feel that [the assessment] is nowadays more focused on evaluating whether or not students really know how to apply their knowledge. Whereas earlier it was perhaps more concerned with how well they could memorise things.

A few teachers remarked, however, that at least some of the exam questions evaluate how much is learnt by rote. Most interviewees endorsed the idea that the current assessment be improved so that it would measure the evaluation and application of information instead of requiring a mere reproduction of memorised course material.

Assessor

There is a discrepancy between the teachers' and the students' views on the matter of the agent carrying out assessment. More than one third (36%) of the students claimed that self-assessment was practiced frequently, and a few responses (14%) indicated that it was regularly performed by their peers (Table 4). By contrast, in none of the teachers view, either of the two types was used frequently. Instead, roughly half of them said that students never practice self-assessment, nor are they assessed by peers.

Table 4. Respondents' views (%) of the assessors.

Assessment is carried out by	Frequently		Sometimes		Never		Don't know	
	T	*S*	*T*	*S*	*T*	*S*	*T*	*S*
Self	0	36	36	41	45	14	18	9
Peers	0	14	9	68	55	9	36	9

T = teachers, *S* = students.

A plausible explanation for the differences between the teacher and student responses can be found in the students' background, particularly in the culture of education pertaining in their countries of origin. Most physics students of the Department come from South Asia where the educational systems have largely been authoritative (*e.g.* Hasan, 2001) implying that students are assessed by teachers, not by themselves. Most of the students involved in the present research are, therefore, likely unfamiliar with the western concept of self-assessment. When assessed by teachers through, for example, written exams, the students may feel that the mark given by the teacher provides a reference on their level of performance, enabling them, in a sense, to assess their own learning. Even if this conjecture were erroneous, it is clear that the students lack a clear understanding of self-assessment.

Interpreting the results on peer assessment (Table 4) poses an equal challenge. A significant number of teachers (apart from the 36% claiming unawareness) say that peer assessment is never practiced, and yet, most students (68%) maintain that they are being peer-assessed sometimes. Moreover, according to 14% of the students, peer assessment is undertaken frequently. Judging by the responses, the students and teachers hold divergent conceptions of both self- and peer assessments.

Timing of Assessment

Assessment predominantly takes place at the end of a study module (91% of teachers, 73% of students, see Table 5). Indeed, many of the teachers as well as students assert that it is never carried out at the start of a module. Yet some of the assessment is said to be performed during the module at least sometimes (in total, 73% of teachers and 72% of students).

PROBLEMS
OF EDUCATION
IN THE 21st CENTURY
Vol. 75, No. 3, 2017

Table 5. Responses (%) concerning the timing of assessment.

Assessment is carried out	Frequently		Sometimes		Never		Don't know	
	T	*S*	*T*	*S*	*T*	*S*	*T*	*S*
At the start of the module	18	18	18	32	64	45	0	5
During the module	18	27	55	45	18	27	9	0
At the end of the module	91	73	9	23	0	5	0	0
When student feels ready	18	32	9	55	27	0	45	14

T = teachers, *S* = students.

The item concerning students' readiness for assessment (Appendix) could be understood in two different ways. First, assessment (*e.g.*, a written exam) is carried out when students feel ready, in other words,

- timing of assessment is (intentionally) matched with student readiness.

This, however, is hardly the reality since establishing students' readiness for assessment is quite unfeasible. Another interpretation, also likely to be the actual experience of the students, is that they feel ready to be assessed regardless of the time set for assessment by the teacher. Briefly,

- student readiness matches the timing of assessment.

Comparing the responses of the two groups, it appears that students feel much more ready to be assessed than the teachers would assume. The result of 87% of students saying they are–sometimes or frequently–assessed when they feel ready, and only 27% of teachers stating the same level of student readiness, can be given at least two explanations. First, the difference could be due to faculty staff interpreting the survey item in accordance with the option (*a*) presented above. However, assessors rarely–if ever–wait for the students to prepare for exams, hence the chiefly negative views on this item. The students, on the other hand, may think that their readiness matches the timing of assessment (option *b*), since they would know the exam dates in advance and could thus prepare accordingly.

Another explanation for the small proportion of teachers thinking that students are assessed when they feel ready may be found in the rightmost column of Table 5–nearly half of the teachers (45%) cannot say whether students feel ready for assessment.

Mode of Assessment

According to the teachers, short answer questions and standard quantitative problems (similar to those found in traditional textbooks) are by far the most common modes of assessment. Over 90% of the teachers said that these two modes are used frequently (Table 6). At the other end of the scale lie the audio or video products–approximately half of both groups stated that these means are never used for student assessment. Tutorials seem to be fairly unfamiliar to the teachers at this educational level, since 55% of them could not say whether they are utilised. As expected, multiple choice questions are not used frequently–none of the teachers and 18% of the students reported frequent use, yet according to 82% of the teachers and 50% of the students, multiple choice questions are used occasionally.

PROBLEMS
OF EDUCATION
IN THE 21st CENTURY
Vol. 75, No. 3, 2017

Table 6. Respondents' views (in percentages) of assessment modes in the international Master's degree programme in physics.

Assessment takes place through	Frequently		Sometimes		Never		Don't know	
	T	*S*	*T*	*S*	*T*	*S*	*T*	*S*
Presentations to peers	27	14	45	36	18	32	9	18
Essay	18	18	55	45	18	32	9	5
Multiple choice questions	0	18	82	50	9	32	9	0
Short answer questions	91	45	9	45	0	5	0	5
Standard quantitative problems	91	50	9	36	0	9	0	5
Labs/Workshops	55	45	27	45	0	9	18	0
Audio/video products	0	0	18	32	45	55	36	14
Tutorials	0	32	36	32	9	38	55	9

T = teachers, *S* = students

These results are consistent with the teachers' statements given during the interviews–assessment was said to be primarily summative, carried out in the form of written exams.

> Considering [assessment in] all the courses in general…, there is perhaps too great an emphasis on the [final] exam, on what is produced in writing…

Marking

In this category, there seems to be the highest uncertainty amongst both the teachers and the students. Surprisingly, 23% of the students claimed that they did not know whether their work was given a summative grade. Moreover, nearly half of the teachers and 32% of the students said they were not aware of whether second marking was used (Table 7). Still more respondents said that they were uninformed about second marking being used in the case of a fail (teachers: 55%, students: 50%).

Table 7. Respondents' perceptions (%) of the practices and purposes of marking.

Marking is	Frequently		Sometimes		Never		Don't know	
	T	*S*	*T*	*S*	T	S	T	S
Against implicit criteria	0	14	55	41	9	27	36	18
Against explicit criteria	27	23	36	23	0	23	36	32
To strengthen knowledge	36	59	55	36	0	0	9	5
To develop thinking	18	45	73	32	0	9	9	14
To improve presentation	45	41	45	45	9	9	0	5
To give a summative grade	45	45	45	27	0	5	9	23
Second marking	9	5	9	27	36	36	45	32
Performed anew if a fail	9	14	0	14	36	23	55	50
Moderated	27	9	9	32	27	18	36	41
Anonymous	0	14	9	23	55	36	36	27

T = teachers, *S* = students

PROBLEMS
OF EDUCATION
IN THE 21st CENTURY
Vol. 75, No. 3, 2017

Marking appeared to have a more positive impact according to the students than according to the teachers–the highest percentage of students said that it often strengthens knowledge and develops thinking. As expected, second marking turned out to be a procedure rather unknown to both respondent groups, likely because it is not practiced at the Department.

Feedback

Feedback given in the course of assessment was largely seen as beneficial by faculty staff as well as the students. More than half of both respondent groups said that feedback was often helpful in its detail and that it enhanced learning (Table 8). Most staff (64%) and 45% of the students thought that feedback often increased students' understanding of assessment. All teachers noted that, at least sometimes, feedback stimulated discussion. For the students, the corresponding percentage was only slightly lower, 86% in total.

Table 8. Respondents' views (%) on feedback as part of assessment.

Feedback	Frequently		Sometimes		Never		Don't know	
	T	*S*	*T*	*S*	*T*	*S*	*T*	*S*
Is helpful when detailed	55	64	45	32	0	0	0	5
Prompts discussion with teacher	45	45	55	41	0	5	0	9
Helps understanding of assessment	64	45	36	45	0	0	0	9
Improves learning	64	55	36	32	0	0	0	14

T = teachers, *S* = students

One of the interviewees admitted that assessment *'definitely directs learning'* but noted that the mode of assessment has little or no effect because, for any student population, the means of assessment can be *'tuned'* to limit the best grades to, for instance, three on a scale of one to five.

Discussion

In this research it was found that even though the teachers acknowledged the need for moving assessment closer to its more authentic modes, the current practices remained traditional in terms of mode, timing, and content of assessment. The assessment currently used still emphasises traditional ways of measuring student performance. This result finds support in Maclellan's work (2001). Regarding the content of assessment, application of knowledge stands out as the sole higher order cognitive activity that is frequently being assessed according to nearly half of the teachers.

The teachers' conceptions of assessment seem to remain constricted, which is in line with previous findings (Docktor & Mestre, 2014). A large majority of the teachers perceive assessment as consisting of marking exams or ranking student performances. It has been noted that teachers' conceptions of different facets of teaching affect their pedagogical decisions, including, in regard to assessment (*e.g.* Brown, 2004). Hence, the results presented here, in part, explain why assessment of learning in the international degree programme is mostly limited to its summative format. The results also indicated that the four purposes laid out in the questionnaire do not match with the students' idea of what assessment primarily is and the students do not see assessment predominantly fulfilling any of the four functions that educationalists deem central.

PROBLEMS
OF EDUCATION
IN THE 21st CENTURY
Vol. 75, No. 3, 2017

One of the main findings is that the students display a low mastery in assessment-related terminology, which is evident in their responses pertaining to the content and purpose of assessment (in part, teachers and students had significant differences in their opinions regarding, for instance, modes of assessment). Furthermore, the differences in views on several aspects of assessment, such as self-assessment, second marking, assessment criteria, and marking moderation, reveal, on one hand, students' insufficient grasp of the concepts related to assessment. The differences may also occur due to a language issue, as nearly 67% of the target population were not native English speakers. On the other hand, these results indicate the students' poor knowledge of the criteria that they are being assessed against. The fact that the students seem to feel relatively ill-informed about the assessment criteria also suggests that they have been inadequately apprised of the standards of assessment. Interestingly, however, a majority of the teachers stated that explicit criteria are used in assessment either sometimes or frequently.

Regarding feedback, the teacher and student views are rather convergent. The two differences worth pointing out are related to feedback (i) leading to discussion with a teacher, and (ii) helping understand assessment. As for the former, less than half of the students felt that they would frequently engage in a discussion with teachers on the basis of marking, while a slim majority of the teachers stated that this was less frequently the case. On the other hand, the teachers were more optimistic about feedback as an aid to making sense of assessment.

The teachers and students understand the role of assessment differently. For instance, the students maintain that there are activities such as self-assessment being practiced as part of assessment, and yet the teachers claim the opposite. The discrepancy raises a few questions. To what extent do the teachers and the students share similar views about the purpose and means of assessment? More importantly: how do these differences affect teaching and learning?

The findings of this research indicate that the teachers do not perceive themselves as ones who guide students' study practices and learning processes through assessment. Such limited views of assessment could be expanded by means of professional training held by education experts. Mere changes in assessment policy, practice, or tools may turn out to be ineffective if teachers' conceptions remain unaddressed (Brown, 2004).

Conclusions

The present research contributes to the field of assessment by providing new theoretical as well as practical insights of problems that may occur at the tertiary level of education. Using a method similar to the one employed in this research, targeting both teachers and students at once, could elicit possible contradictions in their views. Bringing such research results to teachers' attention could help them acquire practices that better support student learning.

Applying new assessment practices can redirect students' learning orientations. More specifically, students' awareness of assessment could be increased, for instance, through a specific study module introducing (a) the general objectives of the degree programme, (b) the learning objectives of courses, and (c) the assessment practices employed in the programme. The objectives pertaining to the learning process and the skills to be acquired should be made explicit to the students at the very start of the educational programme. An understanding of the educational goals shared both by staff and students will facilitate the achievement of those objectives. However, merely articulating the standards and expectations does not suffice to make students internalise them. In order to advance student understanding and improve their learning, students also need to be engaged in the practice of assessment by socializing them into the communities of practice (O'Donovan, Price, & Rust, 2008).

Implementing formative assessment of learning carries a potential of making instruction more learner-friendly. Therein lies an opportunity to direct students' learning routines to produce a better outcome with regard to the objectives set for the programme, since imparting

PROBLEMS
OF EDUCATION
IN THE 21st CENTURY
Vol. 75, No. 3, 2017

those objectives is integral to formative assessment (Pryor & Crossouard, 2008). When employed alongside the aforementioned assessment modes, summative assessment can be used to test the acquisition of the desired knowledge and skills, *i.e.*, to measure the extent to which the learning objectives have been achieved.

Considering the small target population of this research and the consequent limitations in its generalisability, conducting similar research in a larger scale and including data about student performance (*e.g.*, course grades) would be worthwhile in finding out how their views and perceptions are linked to their academic performance. Furthermore, university teachers' views and potential changes in assessment practices could be of interest before and after intervention, such as suggested above.

References

Adey, P. (2005). Issues arising from the long-term evaluation of cognitive acceleration programmes. *Research in Science Education, 35*, 3–22.

Angelo, T. A. (1995). Reassessing (and Defining) Assessment. *The AAHE Bulletin, 48*, 7–9.

Benson, T. L. (2014). *Sixth through eighth grade teachers' conceptions (beliefs) about assessment and practices.* A Doctoral Dissertation. Matthews, NC: Wingate University.

Biggs, J., & Tang, C. (2007). *Teaching for quality learning at university,* 3rd ed. (pp. 163–194). Berkshire, UK: McGraw-Hill Education.

Black, P., & Wiliam, D. (1998). Assessment and Classroom Learning. *Assessment in Education: Principles, Policy & Practice, 5*, 7–74.

Black, P., & Wiliam, D. (2003). 'In praise of educational research': formative assessment. *British Educational Research Journal, 29* (5), 623-637.

Black, P., & Wiliam, D. (2009). Developing the theory of formative assessment. *Educational Assessment, Evaluation and Accountability, 21*, 5–31.

Broadfoot, P., & Black, P. (2004). Redefining assessment? The first ten years of Assessment in Education. *Assessment in Education: Principles, Policy & Practice, 11* (1), 7–27.

Brown, G. T. L. (2004). Teachers' conceptions of assessment: implications for policy and professional development. *Assessment in Education: Principles, Policy & Practice, 11*, 301–318.

Christie, F. (2002). *Classroom discourse analysis: A functional perspective* (pp. 1–27). London: Continuum.

Dickie, L. (1994). Approach to learning and assessment in physics. (Distribution number 15320521.) Report presented to Ministry of Higher Education and Science. Quebec, Canada: John Abbott College.

Docktor, J. L., & Mestre, J. P. (2014). Synthesis of discipline-based education research in physics. *Physical Review Special Topics – Physics Education Research, 10* (020119), 1–58.

Dodridge, M. (1999). Learning outcomes and their assessment in higher education. *Engineering Science and Education Journal, 8*, 161–168.

Elliott, S. N. (1991). Authentic assessment: An introduction to a neobehavioral approach to classroom assessment. *School Psychology Quarterly*, *6*, 273–278.

Evans, C. (2013). Making sense of assessment feedback in higher education. *Review of Educational Research, 83* (1), 70–120.

Fletcher, R. B., Meyer, L. H., Anderson, H., Johnston, P., & Rees, M. (2012). Faculty and students conceptions of assessment in higher education. *Higher Education, 64*, 119–133.

Gibbs, G. (2006). How assessment frames student learning. In C. Bryan, & K. Clegg (Eds.), *Innovative assessment in higher education* (pp. 23–36). London: Routledge.

Goubeaud, K. (2010). How is science learning assessed at the postsecondary level? Assessment and Grading Practices in College Biology, Chemistry and Physics. *Journal of Science Education and Technology, 19*, 237–245.

Hasan, S. (2001). Let the people prevail! The authoritarian system of education in Pakistan. *Human Rights Education in Asian Schools, 4*. Retrieved from http://www.hurights.or.jp/archives/human_rights_education_in_asian_schools/section1/2001/03/volume.html.

PROBLEMS
OF EDUCATION
IN THE 21st CENTURY
Vol. 75, No. 3, 2017

Haywood, C. H., & Lidz, C. S. (2007). *Dynamic assessment in practice: Clinical and educational applications*. New York: Cambridge University Press.

Hsieh, H. -F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research, 15* (9), 1277–1288.

Krathwohl, D. R. (2002). A revision of Bloom's Taxonomy: An overview. *Theory into Practice, 41* (4), 212–218.

Maclellan, E. (2001). Assessment for learning: The differing perceptions of tutors and students. *Assessment & Evaluation in Higher Education, 26*, 307–318.

Maclellan, E. (2004). Authenticity in assessment tasks: a heuristic exploration of academics' perceptions. *Higher Education Research & Development, 23*, 19–33.

Moss, P. A. (1992). Shifting conceptions of validity in educational measurement: Implications for performance assessment. *Review of Educational Research, 62*, 229–258.

Newmann, F. M. (1997). Authentic assessment in social studies. In G. D. Phye (Ed.), *Handbook of classroom assessment* (pp. 359–380). London, UK: Academic Press.

O'Donovan, B., Price, M., & Rust, C. (2008). Developing student understanding of assessment standards: a nested hierarchy of approaches. *Teaching in Higher Education, 1 3* (2), 205–217.

Pryor, J., & Crossouard, B. (2008). A socio□cultural theorisation of formative assessment. *Oxford Review of Education, 34*, 1–20.

Sadler, D. R. (1989). Formative assessment and the design of instructional systems. *Instructional Science, 18*, 119–144.

Samuelowicz, K., & Bain, J. D. (2002). Identifying academics' orientations to assessment practice. *Higher Education, 43*, 173–201.

Scott, M., Stelzer, T., & Gladding, G. (2006). Evaluating multiple-choice exams in large introductory physics courses. *Physical Review Special Topics – Physics Education Research, 2* (020102), 1–14.

Taylor, C. (1994). Assessment for measurement or standards: the peril and promise of large-scale assessment reform. *American Educational Research Journal, 31*, 231–262.

Torrance, H. (Ed.), (1994). *Evaluating authentic assessment: Problems and possibilities in new approaches to assessment.* Buckingham, UK: Open University Press.

Wilcox, B. R., & Pollock, S. J. (2014). Coupled multiple-response versus free-response conceptual assessment: An example from upper-division physics. *Physical Review Special Topics – Physics Education Research, 10* (020124), 1–11.

Yorke, M. (2003). Formative assessment in higher education: Moves towards theory and the enhancement of pedagogic practice. *Higher Education, 45*, 477–501.

Zimmerman, B. J. (2001). Theories of self-regulated learning and academic achievement: An overview and analysis. In B. J. Zimmerman, & D. H. Schunk (Eds.), *Self-regulated learning and academic achievement: Theoretical perspectives, 2nd ed*. (pp. 1–37). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Appendix

Modal values of the teachers' and students' responses. Percentages (rounded to the nearest whole number) are given in parentheses.

Item		*Teachers*	*Students*
Purpose			
1.	Assessment motivates learning	Frequently (55)	Sometimes (59)
2.	Assessment is used to grade/rank	Frequently (91)	Sometimes (45)
3.	Assessment is used for diagnosis	Sometimes (73)	Sometimes (68)
4.	Assessment is used to evaluate teaching	Frequently (36)	Sometimes (55)
Content			
5.	Development of knowledge is assessed	Sometimes (45)	Frequently (45)
6.	Application of knowledge is assessed	Frequently (45)	Sometimes (68)

PROBLEMS
OF EDUCATION
IN THE 21st CENTURY
Vol. 75, No. 3, 2017

7.	Presentation of information is assessed	Sometimes (55)	Sometimes (64)
8.	Analysis of information is assessed	Sometimes (55)	Sometimes (77)
9.	Synthesis of information is assessed	Sometimes (55)	Sometimes (50)
10.	Evaluation of information is assessed	Sometimes (36)	Sometimes (64)
Assessor			
11.	Self-assessment is used	Never (45)	Sometimes (41)
12.	Peer assessment is used	Never (55)	Sometimes (68)
Timing			
13.	Assessed at the start of a module	Never (64)	Never (45)
14.	Assessed during a module	Sometimes (55)	Sometimes (45)
15.	Assessed at the end of a module	Frequently (91)	Frequently (73)
16.	Assessed when students feel ready	Don't know (45)	Sometimes (55)
Mode			
17.	Assessed through presentations	Sometimes (45)	Sometimes (36)
18.	Assessed by essay	Sometimes (55)	Sometimes (45)
19.	Assessed by multiple choice questions	Sometimes (82)	Sometimes (50)
20.	Assessed by short answer questions	Frequently (91)	Frequently (55)
21.	Assessed through standard quantitative problems	Frequently (91)	Frequently (50)
22.	Assessed in labs/workshops	Frequently (55)	Frequently (45)
23.	Assessed through audio/video products	Never (45)	Never (55)
24.	Assessed in tutorials	Don't know (55)	Frequently (32)
Marking			
25.	Assessed against implicit criteria	Sometimes (55)	Sometimes (41)
26.	Assessed against explicit criteria	Sometimes (36)	Don't know (32)
27.	Marking strengthens knowledge	Sometimes (55)	Frequently (59)
28.	Marking develops thinking	Sometimes (73)	Frequently (45)
29.	Marking improves presentation	Frequently (45)	Sometimes (45)
30.	Work is given a summative grade	Frequently (45)	Frequently (45)
31.	Work is routinely second marked	Don't know (45)	Never (36)
32.	Work is second marked if a fail	Don't know (55)	Don't know (50)
33.	Marking is moderated	Don't know (45)	Don't know (41)
34.	Marking is anonymous	Never (55)	Never (36)
Feedback			
35.	Feedback is helpful in detail	Frequently (55)	Frequently (64)
36.	Feedback prompts discussion with teacher	Sometimes (55)	Frequently (45)
37.	Feedback helps understand assessment	Frequently (64)	Frequently (45)
38.	Feedback improves learning	Frequently (64)	Frequently (55)

PROBLEMS
OF EDUCATION
IN THE 21st CENTURY
Vol. 75, No. 3, 2017

Received: *April 13, 2017* Accepted: *June 22, 2017*

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ISSN 1822-7864 (Print) ISSN 2538-7111 (Online)