Online self-assessment as a quality assurance tool in higher professional education

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Theme: Quality Assurance in Higher Education

Abstract

An online tool was developed for (potential) students to assess the congruence between the characteristics of an educational program and student preferences (Butter & Van Raalten, 2010). It supports student choices and vocational guidance. The research design was mixed-method and combined a contextualized design approach with a quantitative validation study. Learning team coaches were asked to assess students' behavior. Reliability, validity and user experiences were satisfactory. The platform is freely accessible and offers maximum privacy. Along similar lines, a self-assessment tool will be developed aimed at the applied research related skills of lecturer / researchers, ranging from expertise building, research design, writing skills to contract activities. The tool will raise awareness of what is needed to contribute successfully to applied research projects at several levels. Thus, it has a strong developmental orientation. It can also facilitate selection by enhancing structured behavioral interviewing. Thus, it optimizes the allocation of specific human resources to specific research projects and enables to shed more light on the learning effects for lecturers and research groups of participating in research projects.

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Assessment Tool Master Pedagogics

Since 2005, HU University of Applied Sciences offers the Master Pedagogics. This program is intended for students who already have a bachelors level. Mostly they are professionals who are already working in practice in a pedagogical setting, for example in education. The program offers students a considerable amount of freedom in adjusting their education to their own specific developmental needs. This makes it necessary to support students' study and career orientation in an adequate way. Given the ambulant character of the program, a web-based self-assessment format was chosen. This is not meant for the summative judgment of students, but for formative support during choice processes and consultation (e.g. Van de Mosselaar, Dochy & Heylen, 2002). Accordingly, the angle of student-environment fit or person-environment fit was chosen. From this perspective, the question is whether an education program or an organization fits in with the preferences or interests of a person. The level of congruence is supposed to be an important determinant of a person's well-being and/or success in education and in working life (e.g. Harms et al., 2006; Westerman, Nowicki & Plante, 2002). More specific, we were interested in the question to which extent a student recognizes himself in and identifies himself with the values or principles of an educational program (see also Knippenberg et al., 2001). Such identification is important for educational success, especially in an adult and working population as in this study (e.g. Donaldson & Graham, 1999).

In line with the above, the Assessment Tool Master Pedagogics was developed. The development process was first described in Dutch in Butter and Van Raalten (2010). The purpose of the tool is threefold. First, it helps potential students to make a deliberate choice for or "against" the program. We stress here that it is not meant as a selection tool. If there is any selection function at all, it will only be self-selection. Next, it enables existing students to make explicit their tacit assumptions with respect to the program, such that they identify with the program characteristics more consciously en progress through the learning landscape in a more purposeful and effective manner. As students can develop on the value domains of the program, it is finally also a developmental assessment which focuses on sense making and identity formation (e.g. Kaplan, 1998; Silzer & Jeanneret, 1998; Kok & De Jong, 2004).

This paper describes the development of the Assessment Tool Master Pedagogics (AMP) and discusses the potential of a similar online assessment approach to shed more light on the practice-based research competencies of lecturers. The AMP is a contextualized

measuring instrument that was tailor-made for and takes into account as much as possible the context for which it was developed (see also Butter, 2012). The general research question was as follows. Is it feasible to measure the value domains of the Master Pedagogics in a reliable, valid and for the user valuable manner?

The following specific questions were addressed.

- Are the scales of the AMP sufficiently reliable (internally consistent)?
- Is the construct validity sufficient?
  - What is de factorial validity: to what extent are value domains of the AMP empirically founded?
  - How do the AMP dimensions relate to personality factors?
- Is the external validity sufficient: how are the (potential) students' self-report scores related to the way in which they are individually assessed by their coaches as for student-program fit?
- How are the first user experiences of students?

Method

Three adaptive group sessions with researchers and program representatives took place. During the first session the educational values were discussed. Based on these, the researchers came with a proposition for measurable dimensions. During the next two sessions, the final dimensions were chosen in an interactive process. These were partly inspired by the educational concept Levend Leren (Living Learning) (Jansen, 2005; 2007) and partly by educational practice and are represented in Table 1.

Table 1 Educational values of the Master Pedagogics

Educational values[2]	Description
Self-directed vs. teacher directed learning	The student progresses as autonomously as possible through the learning landscape and provides his own content instead of the content being supplied by the educational program.
Active processing learning vs. knowledge collecting learning	The focus is more on the student's active search and application of contextually relevant knowledge that on transferring a central knowledge base.
Co-directed vs. self-directed learning	The student learns together with and from other students in a learning team context.
Ecological vs. specialist perspective	The focus is more on the broader context in which pedagogical questions arise and the resources available there than on applying specialist remedial knowledge.
Understanding vs. explaining research	The focus is more on trying to understand phenomena from within than on general, external explanations
Coach as tutor vs. coach as content expert	The learning team coach is steering the learning process rather than transferring knowledge

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[2] The bold pole characterizes the education program

Table 2 Example questions for the Assessment Tool Master Pedagogics

Educational	Example question
Self-directed learning	I take responsibility for my own learning process vs. the education program determines my learning process
Co-directed learning	I am open to advice, opinions and feedback from fellow students vs. Discussing each other's work and study activities only breaks my own study pace
Active processing learning	Knowledge is only interesting to me when I can apply it somehow vs. To me knowledge is valuable in itself, independent of its usefulness
Ecological perspective	I like to work according to a method vs. I try to do justice to a situation
Understanding research	To me researching means getting as close as possible to what I study vs. To me researching means keeping a certain distance from what I study
Coach as tutor	I expect my coach to steer mainly on the learning content vs. I expect my coach to steer mainly on the learning process

Design of the quantitative validation study

About 300 existing students were invited to participate in a digital survey. The survey consisted of the AMP questions and a short version of a Big Five personality inventory, the BFI-10 (Rammstedt & John, 2006) in order to investigate the correlations between the scores on the AMP scales and personality factors. The intention was to get more grip on the substantial meaning of the AMP scales. The English personality questionnaire was translated into Dutch using a back translation procedure. This short scale was chosen in order to minimize the task load of respondents. The final sample consisted of 89 students who completed both questionnaires. The distribution across the three study years was as follows: 1st year 20, 2nd year 36, 3rd year 27, rest unknown. One of the reasons behind the high non-response was probably that the survey was mailed to the students via the program's intranet . This was not used frequently by all students and has been replaced in the meantime. It will be clear that our sample is a convenience sample which is not representative. Our aim, however, was not to generalize to the entire population of students, but to investigate the correlation of the students' self-reports with the program fit assessments made by their coaches.

Results

Reliability study

According to the founders of the education program, all of the educational values resulting from the qualitative pre-study were intrinsically important in their own right. Thus, these values were taken as a starting point in the further development process in order to increase ecological validity (e.g. McAuley, 2004; Butter, 2011). First, a reliability study was conducted on the items that were intended to measure the various educational values. Internal consistency measures (Cronbach's alpha) are given below. Also, Kolmogorov-Smirnow tests (Siegel & Castellan, 1988) for normality were performed for each sum score distribution. Cronbach's alpha is given in parentheses after the scale name. *Self-directed learning* (.78, 6 items). *Co-directed learning* (.81, 6 items), *Active processing learning* (.71, 6 items), *Ecological perspective* (.72, 7 items), *Understanding research* (.75, 8 items), *Coach as tutor* (.79, 9 items). All scores turned out to be normally distributed except for co-directed learning which is skewed to the right meaning that high scores are overrepresented in the sample.

Validity study

In the validity study, the construct validity and the criterion validity were studied. In the construct validity study, the factor structure of the AMP and the correlations between the AMP scales and personality scales were taken into account. In the criterion validity study, the correlations between the AMP scales and coach assessments were investigated.

Construct validity

Factor structure

First, a principal component analysis with oblique rotation was conducted to verify whether the qualitative educational values that are measured by the AMP are empirically distinguishable. Six components explain 49% of the variance. The AMP scales are meaningfully related to the empirical components. Each of the scales is clearly related to one component with which it shows the highest correlation. Besides, for each component, the correlation with one scale is highest. The fourth component, with which Understanding Research correlates most highly, seems to be negatively defined. Almost all AMP scales are negatively correlated with it. This could be seen as an indication that Understanding research and Ecological perspective are to a lesser empirically distinguishable. This can also be deduced form the relatively high inter correlation of .54 (p < .01) between these two scales.

Correlation with personality factors.

 To shed more light on the meaning of the AMP scales its correlation with the BFI-10 was inspected. The following significant correlations were found.

Co-directed learning positively correlates with *extraversion* ($r = .27$, $p < .05$), *agreeableness* ($r = .28$, $p < .01$) and *conscientiousness* ($r = .26$, $p < .05$). The intention to learn together with others in a learning team is related to an outward-directed, constructive attitude towards others and to a thorough working attitude.

Ecological perspective correlates positively with *agreeableness* ($r = .28$, $p < .01$) en *openness* ($r = .22$, $p < .05$). Engaging an open pedagogical orientation and willingness to take into account the context is related to an understanding and constructive attitude towards others and to a curious and investigating attitude.

External validity

 Table 3 shows the significant correlations between the scores of the students on the AMP and the individual assessments of their "program fit" which were made independently of the student's self-reports by their coaches. Coach assessments were available for 67 students. Five point Likert scales were used ranging from 1 *not at all*, 2 *hardly*, 3 *reasonable*, 4 *rather well* to 5 *excellent*. The coach assessments on the various dimensions show positive manifold. One dominant factor explains 56% of the variance. The eight single scores were therefore combined into a composite score that can be interpreted as the global fit between the student and the program. (Cronbach's alpha = .89). This score is distributed normally (*K-S Z* = 1.11, $p = .17$).

Tabel 3 Correlations between the AMP self-report scores and the coach assessments

Coach assessments: extent to which	AMP SCALES					
	Self-directed learning	Co-directed learning	Active process learning	Ecological perspective	Understanding research	Coach as tutor
the program fits the student	.34**	.44**				.26*
the student contributes actively to the learning team		.37**				
the student uses an ecological perspective on learning		.38**	.32**	.32**	.26*	
the student learns in an active practice-based manner		.28*				
The student feels at ease in a qualitative research approach		.40**		.24*		.34**
Global student-program fit		.41**		.30*		

**p < .001 (2-sided)
*p<.05 (2-sided)

Table 3 shows that the students' AMP scales correlate significantly with the individual assessments by their learning team coaches. Especially *co-directed learning* seems to be an important aspect of student-program fit. In order to flourish in the program, it is important that a student is open to cooperation with peers in a learning team setting. Next, an ecological perspective is important. This means an approach that is more based on the broader context of knowledge development and the available resources available there than on applying specialist remedial knowledge.

User reactions

The students participating in the validation study were later invited to complete the final online version of the AMP. After completing the instrument, they were requested to leave their user reactions in an open format. Eighteen user participated. Their reactions are generally positive. They experience the tool as approachable and useful. The form of the instrument and the report style were appreciated. People recognized themselves in the descriptions. Also they indicated that their self-reflection was stimulated.

Conclusion and discussion

Our mixed-method study shows that the qualitative educational values can be measured in an adequate manner. The AMP scales are reliable, can be largely empirically distinguished and correlate with personality factors in a meaningful way. Also, the external validity is reasonable and the AMP self-report scores are significantly related to independent coach assessments. Finally, the user reactions are positive.

This study shows that the AMP supports the self-reflections and choices of students at a distance, but in a sound and scientific manner. We believe therefore that a good compromise between efficiency and measurement quality was found. The instrument also gives learning team coaches concrete suggestions for counseling their students, which further enhances its practical relevance. It is important to note here that such support can only take place of the student's own volition as only he/she has access to the test results.

Based on the above results, we think that a similar type of online support could also be interesting to other educational programs and other target groups, for example to assess the practice-based research skills of lecturers.

Within a University of Applied Sciences research and education should be tightly connected. Accordingly, lecturers should be supported in developing their practice-based research, consultancy and development skills. To participate effectively in research projects,

it is important that a lecturer has a clear picture of the research competencies that are needed in a specific project and the extent to which he possesses these. Examples of relevant competencies are expertise building, research design, writing skills and consultancy activities. A developmental online self-assessment can raise lecturers' awareness of their research related development points and can also be used to allocate lecturers to research projects in an efficient, effective and low-cost way. It will be clear that this can only be done using strict ethical guidelines. Finally, we expect that such a work floor human resource management tool will enhance the applied research competencies of lecturers in higher professional education.

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