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Acceptance and Benefits of Web-based Self-Assessments at Universities

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ABSTRACT

Self-assessments are getting more and more popular regarding improved study advisory. By offering a more extensive assessment comprising multiple information modules the benefits of such applications can be upgraded enormously by offering more benefits not only for user, but also for providers (the universities). The precondition for use is that the self-assessment is accepted by the users. Thus, in order to evaluate the prototype of our self-assessment, an acceptance analysis based on the existing UTAUT-model was conducted. The results both confirmed our assumed benefits and led to short term and long term improvements.

Keywords

Self-assessment, user acceptance, course guidance

1 Introduction

Higher education in Europe is in a state of substantial restructuring towards a common standard like in the United States. Due to a fundamental reform, also known as Bologna process, Bachelor's and Master's gradually replace traditional degrees across a range of more than 40 signatory countries. As a consequence, foreign and domestic universities compete on the same terrain now and cause an enormous rise of need for information from customers (i.e. freshmen). Further reasons for the increasing competition among universities are decreasing funds and more freedom of choice regarding university selection in several study programs through the possibility of applying directly to universities instead of central, study related applications, which challenge the quality of education. Accordingly, there is few staff and money to advise students an to give course guidance.

In addition, many young people do not know their strengths and weaknesses, even though this is very important both to know for choosing the right study program and for further success in working life.

Often the awareness for study requirements is missing. We will point out how it is possible to support students to choose the right subject for their personal skills and aptitude in a virtual environment. Knowledge and competence is not easy to recognise in virtual environments, but it has many advantages for students and universities. Web-based self-assessments, as part of a web-based information platform, can serve a large number of users to test their competence, knowledge and competence by means of standardized testing methods. They enrich traditional course guidance while being more cost-efficient compared to other advisory opportunities like face-to-face guidance.

In addition, web-based self-assessments correspond to the life style of the target group mainly consisting of young people aged between 18 and 25 – the so-called “net-generation”. Technology, and especially the internet, has become a part of their life (Roberts, 2005). They are used to communicate, shop, play and work by applying the online medium. They are not only most interested in new communication technologies. Hence, the internet is the perfect medium to provide the current generation of young people with essential data about studies and career.

In this context the following core questions arise:

- What are fundamental elements of web-based self-assessments?
- Which benefits can be achieved by applying web-based self-assessments?

In order to find an answer we describe the web-based self-assessment at our faculty. The structure and content of the final self-assessment consists of information sites, test modules and analysis modules for every of the three topics:

- Are you ready for the university?
- Are you ready for studies?
- Which course program fits you best?

The users are provided with clearly structured and interesting information related to the studies as well as with appropriate sites for every topic. The analysis modules evaluate and represent the results determined by the test modules. Both graphical visualizations and text elements are used.

In order to evaluate the success of the implementation of the self-assessment at our faculty, we conducted both a paper- and web-based survey among a range of users the self-assessment. The purpose was to analyze the benefits of the system from the university’s point of view (the provider perspective) as well as from an applicants’ point of view (user/client perspective). As a central finding, the evaluation confirmed that web-based self-assessments cause benefits both for the provider (the university) and for users (study applicants).

2 Competence Definition and Classification for web-based Selfassessment tests

The basis for almost every self-assessment test is a set of required competences. Competence is a motivational construct, referring to capabilities of people for formulating goals and producing effortful, continual, goal-directed activity. Humans possess the need to feel competent. Therefore, they seek optimal challenges (Deci, 1975).

Competence is often used to refer to a person's behavioural "inventory". In this usage, a competent person is a person, who possesses certain specified skills or abilities. These skills or abilities represent a person's behavioural potential. However, this potential may not always be utilised. Furthermore, even when someone seems to be competent, this may not necessarily lead to successful outcomes. Therefore, skills differ with regard to competences and performance (Ford, 1985, p. 5). According to Erpenbeck and Rosenstiel (2003) motivation for a special task or topic is the basis for competence. This leads to the desire to get qualifications, which are the basis for skilful behaviour. Finally, competence is the ability to use skills within the right situation to achieve high performance.

Linked to the education at universities, competence can be defined as the ability of graduates to act in a particular situation, to learn, and to be creative as a result of their learning experience. Their competence is the output of the education system and the key knowledge input for employing organisations. The total sum of competent graduates is the contribution of the educational system to the intellectual capital of a society (Sallis et al., 2002, p. 57). On the basis of the individual competences, authority and rights are stated. This could serve as a starting point for further examinations. During their education at university – and also after their graduation – students are in competition.

This brief description shows that the various meanings of competence should be regarded as complementary rather than competing perspectives. Competences are often arranged according to categories. The number of categories differs. Practical approaches can show a high number of categories (e.g. Volvo, Guide, Sparkasse) filled with specialised competences, whereas the academic literature aggregates competences often in two up to four categories. According to (Kauffeld et al., 2002, p. 199, Sonntag, 2002, p. 59, Bergmann, 2003, p. 229), we chose a concept with 4 categories. We distinguish among personal, social, methodological, and professional competence.

Personal competence includes personality traits, which cannot be classified within the other categories. It consists of personal participation and the motivation to create one's working place and environment constructively. Self-activity when learning during work and the acceptance of responsibility are also important factors of personal competence. There is no assured index of these criteria. The list depends on the special situation for which the competences will be analysed, e. g., flexibility is a pre-requisite for social competences but has also further connotation and can be used in the context of personal competence (Kauffeld et al., 2002, Hösch, 1995, Bergmann, 2003).

Generally speaking, **social competence** can be viewed as more than good communication. Social skills allow a person to interact and communicate in nature with others. Social competences are the cognitive, behavioural, and communication skills necessary to have successful interpersonal interactions. Many researchers view social competence as a combination of different factors, including positive relations with others, absence of non-adaptive behaviour, exhibition of specific behaviours that maximize the probability of reinforcement, as well as employment of behaviours that focus on group-related acceptance, and effective social skills (Coleman and Lindsay, 1992, Gresham and Elliott, 1987, Vaughn and Haager, 1994).

Methodological competence is the ability to act in different situations, describe problems in a flexible and structured manner. Furthermore, this category stands for the ability to identify autonomously faults and transfer these insights to other situations. The willingness to use personal mental abilities and knowledge and the willingness to learn are important factors too (Bergmann, 2003, Faix et al., 1991, Kauffeld et al., 2002, Muellerbuchhof and Zehrt, 2004).

The concept of **professional competence** has evolved over the last 20 years from a one-dimensional construct representing "specialised occupational knowledge" to a more general one, which includes the application of this knowledge. Competence represents the entirety of combining knowledge, skills, and abilities required for professional practice with the special focus on the application context. Professional competence implies a minimum level of proficiency and performance. Certification is the mechanism that represents to the public that someone has completed his or her professional education and possesses a minimum level of knowledge (Education Council of the American Academy of Physician Assistants, 1996).

Many web-based Self-Assessment tests can be arranged according to these competence categories. Some of them inquire predominantly professional skills and methodological skills. Others have more complex questions in regard to the different aspects of the field of study; e.g. required skills, interests, content of a study, abilities, or potentials.

3 Web-Based Self-Assessment for Information Systems and (international) Business Administration

The use of Self-Assessment is a relatively new application field. Information about the success of these tests and the acceptance do not exist at a sufficient rate. We are developing an information system for student guidance with Self-Assessment tests. It will be a voluntary offer of guidance to young people interested in studying at our faculty. A live-demo can be tested here: <http://www.advisor.wiso.uni-erlangen.de>. The system fulfils thereby several goals:

- Course guidance: With the help of a multi-perspective competences analysis the prospective student gets detailed feedback about his/her abilities and courses of studies which can be recommended for him or her.

- Information support: The study applicant gets information about the university, the faculty, the study place Nuremberg and the different kinds of studies.
- University marketing: The information system communicates a positive picture and the advantages of the WiSo faculty to prospective students. Multimedia elements, like 360 degree images, photos and podcasts support this. The test functionality motivates the applicant to go further into the subject of study requirements and offers than by just reading information brochures, no matter if those are paper- or web-based.

Thereby, a high number of study applicants get personal university advisory service. Later on, they can speak about special questions with their student advisor personally. With this two phase system of student guidance possibly even the ratio of the university drop-outs can be reduced.

Based on a state-of-the-art analysis of web-based self-assessments the prototype of a competence based information system for the future freshmen of our faculty has the following structure (Table 1).

Part	Information sites and tests	Content
A) Ready for university?	Ready for our university? Ready for our faculty? Ready for the location/city? Ready for the student's life?	Knowledge about the university and the city shows the interest and motivation of the future freshmen for their university.
B) Ready for studies?	Qualifications Methodical competence Personal competence Social competence	The tests in this part check the competences, which are relevant for studies at our faculty, e.g. ability for teamwork, ability to communicate.
C) Which study program fits you?	Your interests Your knowledge Your career perspectives	Interests, knowledge and career perspectives are useful to choose the right course program.

Table 1: Structure and content of the web-based self-assessment

Each part consists of four (A and B) or three (C) sub-parts containing an information site with internal and external links and a web-based Self-Assessment test. Furthermore, we used in part A multimedia-content (panorama pictures, photos and podcasts) to support the information needs of the future freshmen.

Part A ("Ready for university?") consists of information about the university, the faculty, the city and the students' life. The purpose of part A lies mostly in university marketing, since in the associated test modules information is obtained in a motivating way. Block B ("Ready for studies?") serves the competence analysis. The test modules examine four competence classes with questions developed according to current literature in self assessment. In this way the general studying ability of the user (regarding the business administration area) is evaluated. After conducting the test, which is assigned to part C ("Which study program fits you?") the offered course programs are brought into a sequence according to the user's personal preference.

- The information sites

Information modules appear as HTML-sites and fulfil above all the aspect of information. Interesting information and suitable (external) pages are presented to the users in a clear form for every topic. Although the information pages appear static, they are generated from the application database. Due to the separation from structure (system) and content (database) the information can be easily changed and updated, see an example in figure 1. As additional motivation factor the information modules contain also multimedia elements, like 360°-photos and movie sequences about the university and the city.



Figure 1: Part of an information site

- The tests modules

The self-assessment modules represent the most complex components of the system. Different types of questions are supported e.g. multiple choice or single choice questions with given answer list, free input mode with evaluated answer (correct or wrong), free input mode without automated evaluation. In addition, each question can be marked as facultative (no answer must be indicated) or mandatory (at least one answer must be indicated). Internally, the answers must be linked with evaluations (ratings) and characteristics and/or competences, so that after the execution of a test a result can be given. During the execution of the test a help function is available to explain the sense of the current question in detail. The test modules offer a free navigation (arbitrarily forward and/or back), so that the possibility of error corrections before conclusion of a questionnaire remains. Every test can be interrupted without the inputs given so far being lost. In order to intensify the aspect of information in the test modules underneath the question blocks thematically fitting quotations by well-known personalities, professors and students are indicated.

For the competence tests we chose a concept comprising 4 categories of competences. According to (Fank, 2004, Erpenbeck and Rosenstiel, 2003) we distinguish among personal, social, methodological, and professional competence. Based on a literature research for existing competence profiles and

student guidance literature we identified a list of competences for every category. With a survey of students and faculty staff, we identified those competences which are important for a successful study at our department. For every competence we developed about five test questions and choose a suitable scale to measure it (Fig. 1).

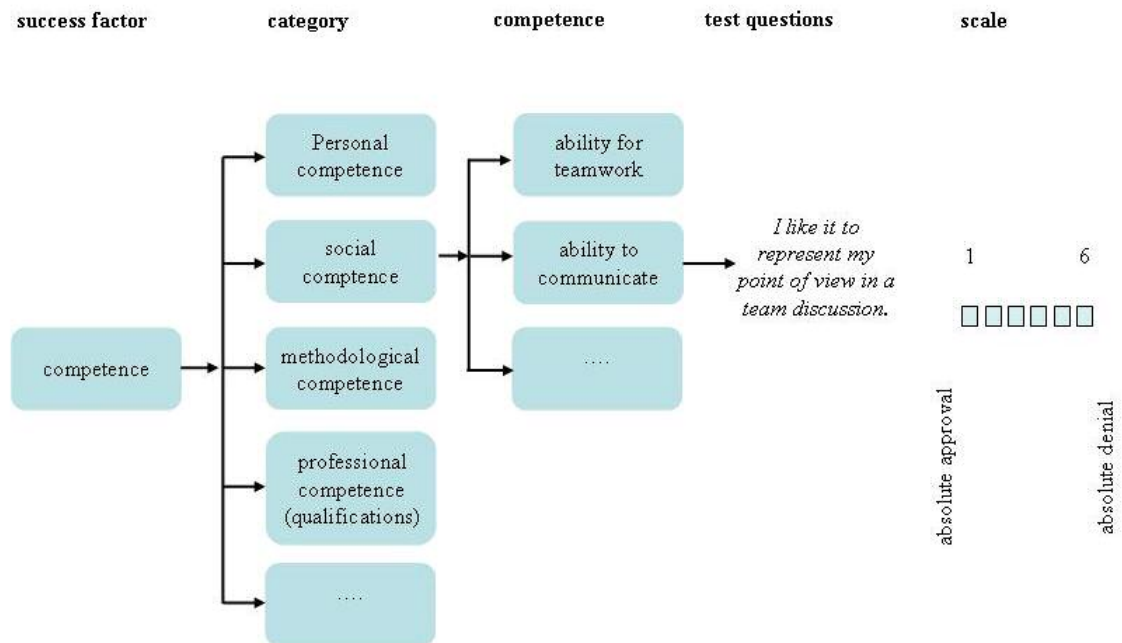


Figure 2: Development of the Self-Assessment test modules

- The analysis modules

The analysis modules evaluate and represent the results determined by the test modules. Both, graphical visualizations and text modules are used. The result overview shows a summary of the results of all test modules completed, see figure 3. The detailed results are linked to this overview. Furthermore, the user has the possibility to request all results in a detailed report (about thirty pages containing all single results with text and graphical visualization) in pdf-format by e-mail. If the user is logged in, he or she can obtain an automatically generated detailed report sent by e-mail.



Figure 3: Part of an overview of the test results with bar charts and iconographic faces

4 Acceptance and Benefits of Web-Based Self-Assessments

A web-based self-assessment offers benefits not only for the user of the system, a prospective student, but also for the university representing the service providers for this study and course guidance. In contrast to other self-assessments and study advisories, however, this ours intends to give a broad view of all aspects and benefits which the study period should offer from a student's point of view. Therefore, the information offers were extended from an only studies-related advisory to an overall view comprising all aspects of student life. In concrete, benefits shall not be based only on the analysis of relevant competencies regarding studies (part B) and career perspectives and their fit to a person. In fact, the study environment like the location, leisure-time offers as well as living expenses are further import criteria that are supposed to have an immense influence on the choice of studies and university of a prospective student in most cases. Therefore, such criteria are integrated into the self-assessment of our faculty as an essential part of module A (Fig. 2) in contrast to most of the other self-assessments offered from institutes for higher education.

4.1 **Intended benefits from developing voluntary web-based self-assessments**

Thereby, internet-based self-assessments and information systems are useful contributions to an advisory system regarding study and university choice and generate multiple benefits from a two-fold perspective:

- From a student's/ applicant's perspective

Three main benefits emerge from a user's- point of view:

Firstly, an extensive information platform enriches the traditional personal study guidance and brings to mind even aspects like living costs and local spare time offers which are often neglected by personal study guidance. In reality, most universities are hard-pressed for money and human resources. As a consequence, study guidance is often limited to advisory in context with the university or faculty, courses and study programs.

Secondly, the user is forced to engage more in the information offers as the most relevant topics are integrated in the self-assessment by means of test elements. As a consequence, the user is encouraged to read up information where required to complete the test or at least to get the right answers afterwards. This is a more active form of information absorption. According to (Kroeber-Riel and Weinberg, 1999) the form of communication and information transfer has a significant influence on the internal learning process. The voluntary and anonymous participation in the test modules furthermore motivates to answer even questions about the own personality instead of trying to hide personal weaknesses in order to reach better results.

Finally, the web-application facilitates the efforts to collect relevant information for prospective students. It offers a study guidance which is independent from time and location, as it can be used at any place, at any time and as long as necessary or desired.

- From a university's – the provider's – perspective

The faculty as provider of a self-assessment benefits in several ways, too:

Firstly, the web-based self-assessment is quite a cost-efficient way of study guidance once it is developed. Apart from some few administration tasks like updating information contents there are no running costs for the provider by serving a multitude of users at the same time compared to personal advisory with restricted manpower. Thereby, the traditional study advisory facilities represented by human advisors or information offered on homepages is extended and enriched.

Secondly, the online-medium can easily be administered as for example updated and thus offers always the most current information. In this context, even new interactive elements related to Web 2.0 can be integrated into such web-based assessment and information applications. This raises motivation and engagement to gather information about study requirements and is supposed to contribute to a reduction of university drop outs in the end.

Finally, the specifications like important facts and amenities of a university or a faculty and its environment shall be highlighted by means of a structured, attractive information presentation through test modules, additional information sites and suitable links for further research. This is intended to sharpen the image of the university on the one hand and to communicate a certain quality approach on the other hand.

4.2 Acceptance as precondition for reaching benefits with web-based self-assessments

However, the precondition for use and for achieving the perceived benefits both for prospective students (improvement of study advisory) and for the university (sharpening of image by improved study advisory and information flow) is that our self-assessment is accepted by the users. Thus, an acceptance analysis was conducted.

This was conducted by means of a paper- and web-based survey.

As stated in the beginning, the target group mainly consists of a precisely defined group of young people with suitable educational background, aged between 18 and 25 years and hence belonging to the so-called net-generation, as stated in section 1.

This implied the hypothesis shown below in figure 4 that the intended users of our self-assessment possess a sufficient knowledge and interest in internet-applications in general and therefore have neither problems with using the system (both regarding content and usability) nor with the access to

use it (to the required hard- and software). This is pointed out by the influence of the independent variable “effort expectancy” on the “behavioral intention” on the one hand and “facilitating conditions” on “behavioral intention” and “use behavior” on the other hand (figure 4). Apart from that, the expected and perceived performance of the system (“performance expectancy”) was supposed to have an impact on the “use behavior” through an influence on the “behavioral intention”.

The intention to use the system (“behavioral intention”) and finally its actual application (“use behavior”) determine the success of the system. Success, in this context, means an improved study advisory and information platform concerning student life at our university as well as offers of the city as study location in general. Regarding the successful implementation, we furthermore assumed a positive influence of the social environment (“social influence”) as well as a regulatory impact of an applicant’s “gender” on the “behavioral intention” and consequently on the “use behavior” and the user acceptance of the system.

Recapitulating the hypotheses, we noticed that the variables influencing the acceptance of our web-based self-assessment turned out to be very similar to those already affirmed by the so-called Unified Theory of Acceptance and Use of Technology (UTAUT) –model (figure 4 including some changes) developed by Venkatesh, Morris, Davis & Davis (2003). It is supposed to evaluate the acceptance of new technologies as the precondition for the innovation to be used. Hence, such an acceptance analysis can serve as control construct to estimate the use intention, behavioral use and benefits of the web-based self-assessment (see figure 4). Due to this correspondence and the fact that the model is already acknowledged by a range of researchers, it should serve as basic construct to our analysis of acceptance and benefits of the web-based self-assessment and study advisory system.

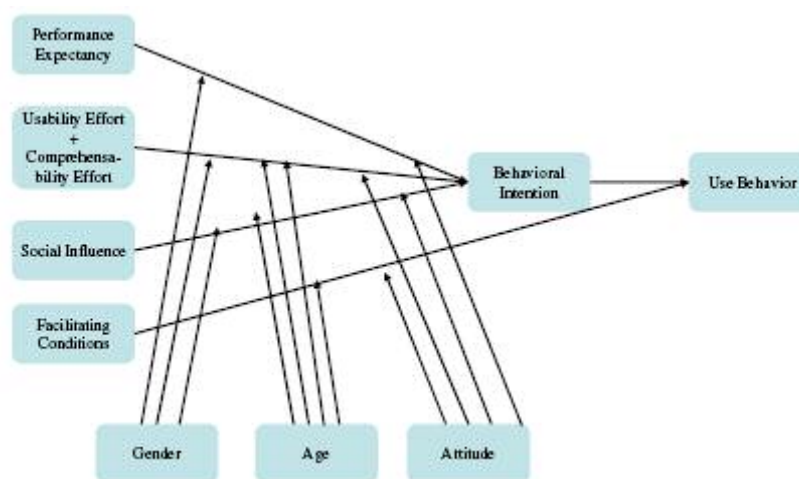


Figure 4: Adjusted UTAUT- Model

However, we adjusted the original model by neglecting the factors “voluntariness of use”, as the non-compulsory use of the system is one basic characteristic of our concept of the self-assessment and advisory system. In addition, “experience” which is a regulatory variable in the UTAUT-model, was supposed to be not relevant in our context as the target groups were likely to have no experience neither regarding study related self-assessment nor with studying in general. Instead, in our hypothesis

the influence of “experience” on “behavioral intention” was replaced by the “attitude” towards self-assessments, study guidance facilities and the university. Finally, we adjusted the variable “effort expectancy” by dividing it up into two separate factors “usability effort” and “comprehensibility effort” in order to get more concrete information and hints regarding potential strengths, weaknesses and improvements of the system (figure 4).

In a next step, these acceptance indicators are the basis to develop a standardized questionnaire. Each acceptance indicator was used to identify suitable questions. In contrast to the UTAUT questionnaire, we chose a 5-point Likert scale as measures as that one was supposed to create more definite results than 7-scale measures. 94 users aged between 17 and 27 took part in this survey. 9 used the online-questionnaire, the others were pupils from regional high schools and upper vocational school being in their final years. The sample size seems appropriate as it refers exactly to the target group of the system.

The evaluation was supported by means of statistical software (Statistical Product and Service Solution). The evaluation provided us with following central findings:

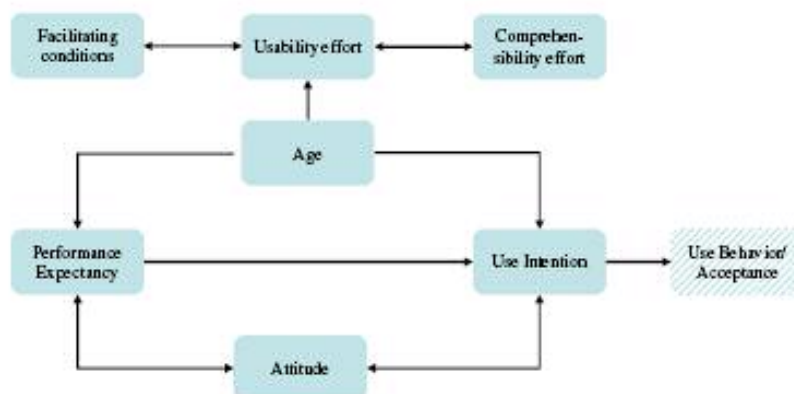


Figure 5: Effectiveness/ Capability of the WiSo@visor from a student's point of view

After having analysed all items, only those items with a sufficient Cronbach's Alpha were considered for evaluation. In addition, the variables were reorganized after a factor analysis in order to provide a valid survey instrument. After that we would like to present our final results as follows:

First, we found a significant correlation between the variables “social influence” – representing an over-directed own will – and the “behavioral intention” – covering the own will. Due to the results of the factor analysis we compressed those two variables to one single variable called “use intention” (figure 5).

Second, we found a correlation between our newly arranged effort variables “usability effort” with “comprehensibility effort” on the one hand, and with the original UTAUT-variable “facilitating conditions” on the other hand. Furthermore, the results showed that both effort regarding comprehensibility and regarding the access to the application (facilitating conditions) determines the “usability”. In addition, this usability factor is determined by the “age” of a user (figure 5). In short,

these correlations affirm our basic hypothesis (section 1) about the net-generation and their affinity regarding the internet and web-based applications.

This hypothesis is additionally supported by the fact that this “age” factor showed a positive impact on the “performance expectancy” and “use intention” of the respondents. That confirms our assumption that the more the user corresponds to the net-generation regarding age, the less the handling of a web-based application is regarded as a problem at all.

Third, we found that the factor attitude is a significant determinant of “use intention” and furthermore turned out to be independent from the age factor. This suggests that the social influence from i.e. friends, teachers etc. should be used to influence potential students’ attitude towards using our system. As the former separate social influence variable is integrated in the factor “use intention” (through joining “social influence” and “behavioral intention” (our first result)), such persons should be used to influence prospective students’ attitude towards using the system (figure 5). This is especially important as the attitude additionally has an indirect impact on the use intention through its second direct determinant with performance expectancy (figure 5).

Generally speaking, the dependent variable “use behavior/acceptance” and thus the “acceptance” of our web-based self-assessment is directly influenced, according to the results of the sample, by the “age”, the “attitude” and the “performance expectancy” variables, apart from the indirect impacts mentioned before through the first three findings.

The results of the acceptance survey altogether evaluated our web-based self-assessment prototype as an appropriate system both for information and for self-assessment purposes. The results of the acceptance and the derived benefits regarding the competence test in part B (section 3) were slightly more positive than the acceptance and the perceived use concerning the information function of the system. Through open questions we found out that an improvement of the information modules of the self-assessment could be achieved by providing the user with the correct answers to the knowledge tests of part A (section 3) in line with the presentation of the user’s final test results (section 3).

5 Outlook

The results of the survey showed that the concept of a combination between test and information modules offered as web-application were accepted by the sample. This is especially valuable as the sample represents the target group regarding age, attitude and use behavior. Also the intended benefits - sharpening the profile of a university and providing users with significant information regarding their study choice - turned out to be recognized by the sample.

However, the survey referred to the prototype only. The results of the questionnaire as well as further developments that took place in the meantime show that the full potential of the web-application has not been tapped by now. Promising implications to raise acceptance could be

The documentation of clickstreams could help to identify key interests and behavior patterns of users. This supports a tighter development of our information platform.

In addition, the self-assessment should be extended to a course guidance platform for the whole university instead of focusing one faculty only in order to reach a broader target group (users with other study preferences) and to supply the information demands to a higher degree. In addition, the application could reach internal users by providing the services in English language. In order to raise the motivation to concern oneself with information about our university, the platform should provide more interactive and attracting elements like bots or fun modules.

On the whole, the acceptance study approves that our prototype version of a web-based self-assessment and information system is accepted and can generate perceived benefits for users as well as for providers. At the same time, there are multiple possibilities for further development of the system. This indicates the potential of our internet-based self-assessment for the future. However, for such a system to be competitive and attractive in the long run, the study guidance services have to be part of a continuous improvement process due to a rising competition between European universities in line with the Bologna process (section 1).

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