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Using Evaluation Data to Initiate Change in the Study Entry Phase

Abstract

Improving the study entry supports students in a decisive phase of their university education. Implementing improvements is a change process and can only be successful if the relevant stakeholders are addressed and convinced. In the described Teaching Quality Pact project evaluation data is used as a mean to discuss in the university the situation of the study programs. As these discussions were based on empirical data rather than on opinion, it was possible to achieve an open discussion about measures that are implemented. The open discussion is maintained during the project when results of the measures taken are analyzed.

Keywords

Evaluation, change process, evaluation as a mean to communication, Teaching Quality Pact

Nutzung von Evaluationsergebnissen als Impuls zur Verbesserung der Studieneingangsphase

Zusammenfassung

Eine Verbesserung des Studieneinstiegs unterstützt Studierende in einer entscheidenden Phase ihres Studium. Jegliche Veränderungen müssen jedoch als Change-Prozess angesehen werden und können nur gelingen, wenn alle Hochschulbeteiligten einbezogen und für die Verbesserungen gewonnen werden. In dem hier beschriebenen Qualitätspakt-Lehre-Projekt wurden Evaluationsdaten als Kommunikationsanlass zur Studiensituation verwendet. Dadurch konnte eine offene Gesprächskultur über Maßnahmen zur Verbesserung der Lehre hergestellt werden, die sich auch in der Projektumsetzung fortsetzt.

Schlüsselwörter

Evaluation, Change-Prozess, Evaluation als Kommunikationsanlass, Qualitätspakt Lehre

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1 Introduction

The study entry phase is considered to be decisive for students' success in their university study (IN DER SMITTEN & HEUBLEIN, 2011). Students' reasons for failing to complete a study program and time of drop-out during their studies were analyzed in a higher education research project by surveying dropouts nationwide. In bachelor programs most dropouts leave university earlier compared to study programs leading to traditional degrees. Most of the dropouts leave university during their first year of study (HEUBLEIN et al., 2010). Specific to engineering education, similar results were found and led to a release of recommendations for engineering education to prevent dropouts (VDMA, 2009).

These studies look specifically at Germany but it is reasonable to expect that findings are similar to the situations in other countries, at least in Europe. The studies identify the following main reasons that students do not complete a study program:

- insufficient academic performance
- lack of academic integration
- lack of motivation
- financial problems (which will not be looked at in this article)

Universities want to improve the study entry phase and by undertaking a problem analysis they have to determine, what exactly shall be improved and which resources for implementing measures are needed. Critical for success is involving a variety of stakeholders in the transformation process, namely, professors, teaching staff, students and university management. It is difficult to pursue a change process top-down by university leaders or administrators alone, not least because of the strong position and self-conception of professors (ASH, 2006). A broad agreement to changes has to be achieved bottom-up as well (LUKAS, 2010). Support from the afore mentioned stakeholders helps to strengthen buy-in at all levels, implement changes and maintain successful approaches beyond the scope of a funded project initiative.

Evaluation findings can provide the required fundament for such a change process. They serve as a starting point for communication (BOENTERT, 2013), give empirical data for university planning and arguments for the implementation phase. Furthermore, evaluation findings help in transferring knowledge and learning for ongoing changes. This contribution reports about Pro-MINT-us[2], a Teaching Quality Pact project at the Hochschule Bonn-Rhein-Sieg. In Pro-MINT-us evaluation data is used as the basis for improving the study entry phase.

2 Quality Development as a Change Process

General factors for successful change processes have been discussed in KOTTER (2005) and eight stages to obtain lasting change are named:

[2] The project name refers to the supported teaching measures: project-based learning and support of STEM modules, where MINT is the German language equivalent to STEM[5]

1. Establish a sense of urgency
2. Form a powerful guiding coalition
3. Create a vision
4. Communicate the vision
5. Empower others to act on the vision
6. Plan for and create short-term wins
7. Consolidate improvements and produce more change
8. Institutionalize new approaches

Improving the quality of students' entry phase is such a change process and in order to make it successful, lessons of previous change processes are taken into account. In 2011 the German government initiated the nationwide funding program Teaching Quality Pact (Qualitätspakt Lehre) to improve university education. This program`s objectives and allocated resources serve as an external trigger for the change process. However, resources alone are not sufficient to initiate change. Evaluation findings are used to establish a sense of urgency for improved teaching, but also show the potential for improvement and thus create a vision and a coalition for change. Furthermore, empirical data is considered as neutral and provides the required transparency.

During the change process evaluations will focus on project's monitoring data but can also identify positive examples, i. e. "wins" (KOTTER, 2005) to further drive the change. The Teaching Quality Pact project is ongoing but consolidating and institutionalizing new approaches beyond the project duration is intended. To what extent this goal can be reached will determine the success of the change process.

3 Evaluation Data

The project Pro-MINT-us is based on two sets of evaluation data, a first semester evaluation and an analysis of exam results.

3.1 First Semester Evaluation

First semester students at the Hochschule Bonn-Rhein-Sieg have been surveyed about their school background and their experiences during the first weeks of study. The results are used for several purposes, e. g. to determine which schools students come from and which offers of the university they use, e. g. study advisor, preparation courses, or the library.

For our project we mainly focused on the question whether students noticed a lack of certain knowledge or skill expected in their studies and the specifications of their lack of knowledge. Our university is a University of Applied Sciences, which had been compared to a polytechnic type of university. Students may enter bachelor study programs with different educational backgrounds. The two largest groups are students who have completed 13 years of school (here named as "a-HZB"[3]) and students who combine a 10- to 12-year school education with a vocational educa-

[3] allgemeine Hochschulzugangsberechtigung

tion (here named as "FHR"[4]). The university offers STEM[5] and non-STEM study programs and data were collected to distinguish between educational background and type of study program in order to acknowledge the diversity of students and study programs. The first semester survey showed that about 60 % to 75 % of students responded that they miss competencies required for their study (Figure 1).[6]

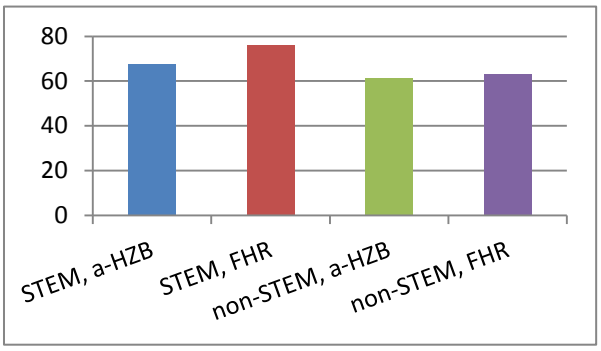

Figure 1: Students self-assessment: "Yes, I feel I miss competencies." (in %)

Most students miss competencies in mathematics, FHR more than a-HZB. But also lack of practical knowledge and work experience is stated, FHR less than a-HZB (Figure 2). Missing competencies in mathematics und practical knowledge are inverse when comparing both groups. It must be noted, that a self-assessment of students might not be identical to the lecturers views. However, the self-assessment is very important, because it represents the attitude of students towards their study skills and abilities.

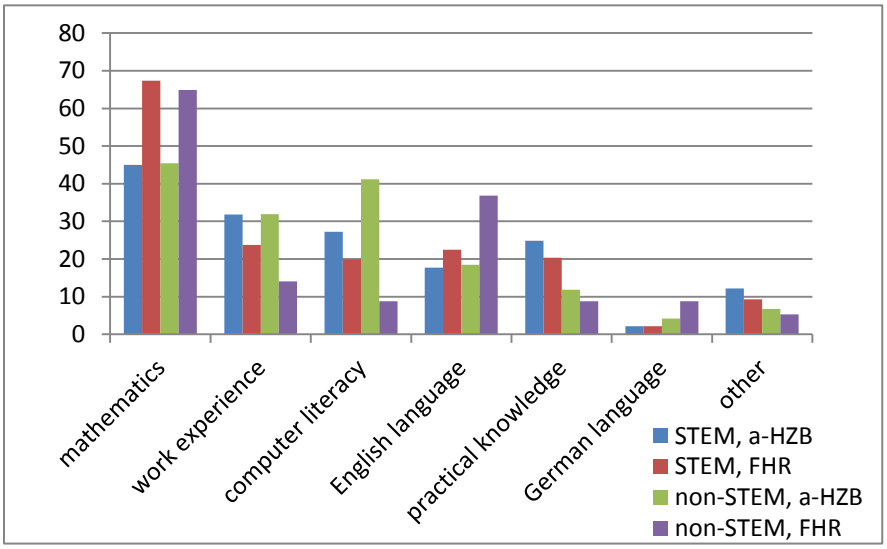

Figure 2: Students self-assessment: "If yes, competencies missed." (in %)

[4] Fachhochschulreife

[5] STEM = Science, Technology, Engineering, Mathematics

[6] Aggregated data from 2007 to 2009 with 1008 responses

3.2 Analysis of Exam Results

Exam results are analysed as a possibility to have a view inside the individual study programs. As a practical approach, for all active[7] bachelor study programs all first year exams of the calendar year 2009 were considered. Only a distinction between pass and fail was made and it was not analysed whether students took an exam for the first or a repeated time.

During the internal discussion of the analysis and in writing this contribution, the problem of data protection and denouncing of departments and individuals needs consideration. In the university, it was made clear, that data is not collected in order to put pressure on someone to lower requirements and let students pass more easily. It was critical to assure that data is used to identify possibilities to support students. Still, exam results always correspond to individual lecturers. In order to treat departments and lecturers with respect, study programs and exams are anonymised here.

As a first result of data analysis, significant differences between the eleven bachelor study programs of our university can be seen (Fig. 3). Most study programs have 20 % to 30 % failed exams, but one program has 43 % fail rate while two others only have 11 % and 1 %.

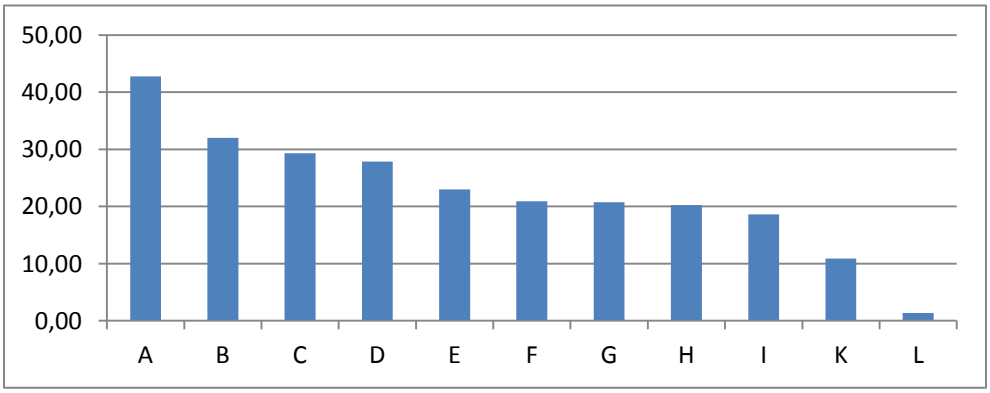

Figure 3: Percentage of failed exams for first year bachelor study programs

The failed exams of Fig. 3 are used to discuss with the departments about their study programs, but as said earlier, there is no expectation for a university wide uniformity. Study program A with 43 % failed exams is a demanding STEM subject that gets good feedback in ratings. Study program K and L have strong entry restrictions, leading to a significant selection of students.

The second look on the exams goes towards the individual exams of a study program.[8] Fig. 4 looks at study program A (43 % fail rate). It can be seen that most modules have a fail rate between 40 % and 50 %. Thus, all modules put similar requirements on the students.

[7] in total 13 704 exams, excluding study programs replaced by a new curriculum

[8] number of exams in study program A: 1877 and in study program C: 1236

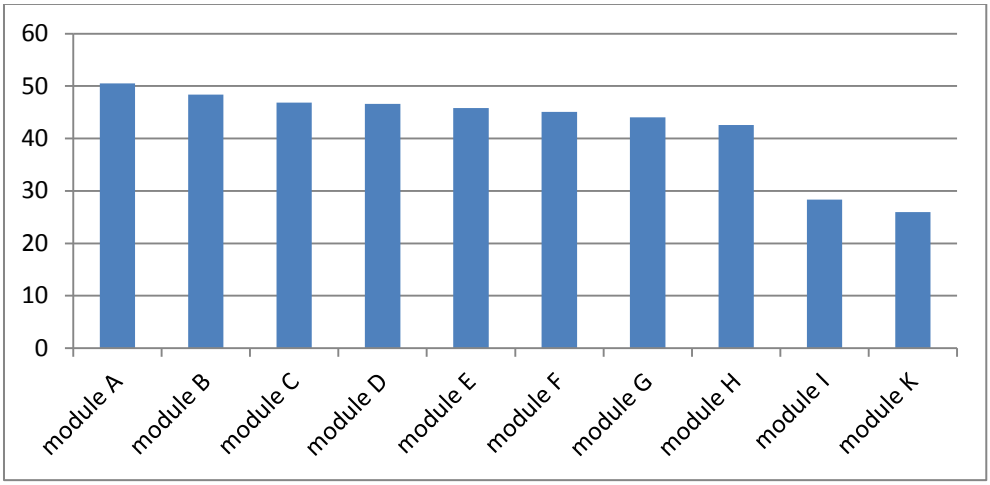

Figure 4: Percentage of failed exams in modules of study program A

The percentage of failed exams in study program C (29 % overall fail rate) is depicted in Fig. 5. For this study program some modules have considerably higher fail rates than others. Especially mathematics (module A) and another STEM topic (module B) are critical modules with about 50 % failed exams.

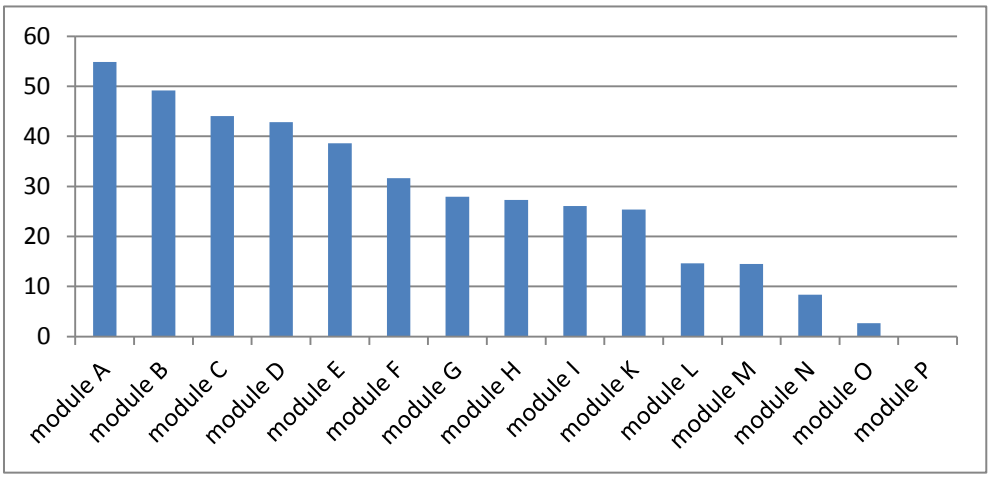

Figure 5: Percentage of failed exams in modules of study program C

This analysis of failed exams gives opportunity for discussion with university leaders, departments and heads of study programs. University governance has included periodical negotiations between university, department and study program leaders providing a regular platform for cause studies, action agreements and resource allocation. However, no automatic reaction forcing identical pass rates is intended. A simple analysis would also fail due to different characteristics of the study projects, e. g. different numbers of exams and exams that cover one or two semester courses. Instead, an open discussion for finding new solutions to existing or upcoming problems is fostered. E. g. for study program C in Fig. 5, it could be agreed upon that the most critical modules should be supported by additional measures, actions and resources.

4 Improvement of Study Programs

Based on the evaluation data two main approaches plus supporting measures were identified and funding was granted in the Teaching Quality Pact (Grant 01 PL 11067). A detailed discussion of the described teaching formats is beyond the scope of this contribution but can be found in literature.

4.1 Project-based learning

The self-assessment of students reported missing practical knowledge and work experience. During discussion of this evaluation finding, a lack of academic integration and of motivation by some students was confirmed by persons in charge of study affairs. To address these difficulties, project-based learning elements are promoted. They connect theoretical knowledge to practical problems and provide additional approaches to learning (JUNGE, 2010).

4.2 Support of STEM modules

For all study programs, the exam analysis showed that STEM modules have the highest fail rates and thus are most critical for study success. This does not only apply for STEM study programs but also for non-STEM study programs which also contain at least mathematical content. Measures to support these modules include additional lectures for a smaller number of students, additional courses outside the regular schedule and consulting for students (MARTSCHINK, 2013).

4.3 Supporting measures

Further measures to improve teaching and learning are introduced. These are training courses for lecturers, eLearning courses addressing the study entry phase and additional study advisory for students in their entry phase.

5 First Results

The Teaching Quality Pact project is funded for five years and about half of this time has passed. The five year funding allows a long-term perspective which is beneficial to foster sustainable change of university teaching.

Project management acknowledges that introducing new teaching formats requires time. Meetings are held at least every semester with all departments. A university-wide “day of teaching” is installed to be held every other year. At the same time, university, department and study program leaders reflect outcomes and incorporate action programs and resources into the university development plan which is revised and formally approved every five years. During all feedback cycles, departments discuss their situation in teaching, research and budgets.

So far, all departments have implemented new lecture formats. Examples for project-based learning are first semester projects and an assembly line for model cars to illustrate logistics. Examples for support of STEM-modules are parallel groups for math teaching and courses target to students who have failed a first exam.

Students' feedback praise these new lecture formats and ask for an extension beyond the study entry phase. The first semester projects have been included in curricula of two engineering programs and thus are expected to be sustained beyond being funded. Also training courses for lectures are sought after. Since the start of Pro-MINT-us participation in training courses has more than doubled.

All these early improvements are communicated in the project in order to consolidate the taken measures and motivate for further change.

6 Conclusion

Improving the study entry phase is an important change process for a university. To succeed in change, all relevant stakeholders need to be addressed and measures for improvement need to be agreed on. In the Teaching Quality Pact project Pro-MINT-us, evaluation data is used primarily as a mean to discuss the situation in the university`s study programs. A balance was found to base the discussions on empirical data while not requesting certain levels of pass rates. Instead, open discussions about the current situation and measures to improve students' learning were achieved.

The open discussion atmosphere is maintained during the project and evaluation data will be used to analyze the measures taken in the different study formats. It is intended to further promote a culture of departments learning from own and others` experiences as well as university governance incorporating these outcomes into their development plans.

7 References

Ash, M. (2006). Bachelor of What, Master of Whom? The Humboldt Myth and Historical Transformations of Higher Education in German-Speaking Europe and the US. *European Journal of Education, 41*(2), 245-267.

Boentert, A. (2013). Qualitätskultur durch Kommunikation – Das Beispiel der Fachhochschule Münster. *Zeitschrift für Hochschulentwicklung, 8*(2), 125-137.

Heublein, U., Hutzsch, C., Schreiber, J., Sommer, D., & Besuch, G. (2010). *Ursachen des Studienabbruchs in Bachelor- und in herkömmlichen Studiengängen – Ergebnisse einer bundesweiten Befragung von Exmatrikulierten des Studienjahres 2007/08*. Hannover: HIS Hochschul-Informations-System.

In der Smitten, S., & Heublein, U. (2013). Qualitätsmanagement zur Vorbeugung von Studienabbrüchen. *Zeitschrift für Hochschulentwicklung, 8*(2), 98-109.

Junge, H. (2010). Projektarbeit. In Ruhr-Universität Bochum: *Wissen was zählt – Ideen für die Lehre* (pp. 58-63). Bochum.

Kotter, J. P. (2005). *Why transformation efforts fail*. Harvard Business Review, March-April.

Lukas, W. (2010). *GUUGLE – A bottom up approach to develop the learning culture at the university.* 3rd International Conference of Education, Research and Innovation, ICERI, pp. 6133-6140.

Martschink, B. (2013). *Besser lehren und lernen: Einführungsveranstaltungen in der Mathematik.* Neues Handbuch Hochschullehre (61).

VDMA – Verband Deutscher Maschinen- und Anlagenbau. (2009). *VDMA-Handlungsempfehlungen zum Studienabbruch im Maschinenbaustudium*. http://www.vdma.org.

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