

ELECTRONIC ADMISSION AND ENROLMENT PROCESSING - NO QUEUES ANYMORE?

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1. EXECUTIVE SUMMARY

1.1. Background

In 2000 the Technische Universität München (TUM) introduced as one of Germany's first universities aptitude tests for the selection of its students in some degree programs. One of the major reasons for this initiative was the reduction of student drop-out rates. Hence, applicants were exclusively admitted evaluating their personal level of qualification for the respective program.

By now, aptitude tests have proven their value and were introduced for nearly all TUM study programs. However the selection process is time consuming and requires an intensive cooperation between centralized and decentralized organizational units. In the past, some faculties developed isolated solutions for an IT-technical support, but a holistic solution had been missing so far.

In addition, student application numbers rose steadily throughout the past years. However, staffing in admission, enrolment, and student administration remained constant. This has led to long queues and prolonged response times.

Furthermore, due to a change of most German federal states from a 13-year school system to 12-years, there will be a double graduation class in 2011. In correspondence a sharp increase in the numbers of applicants from the winter term 2011/2012 on is expected. To manage this rush, it is necessary to improve the operational and organizational structure as well as the IT support in the affected areas with the goal to establish an electronic administration.

1.2. Conclusion

In May 2008, TUM launched successfully a completely new developed electronic application process. The procedure is characterized by its flexibility to handle even complex degree-specific selections (aptitude tests and numerous clauses/enrolment limits) semi-automatically. In an ideal case, applicants will receive immediately after submitting their online enrolment the study admission.

The introduction of the new online application was the first concrete result of a cooperation with the Technische Universität Graz (Austria). In a 18-months joint venture project a for Austrian universities developed, highly efficient campus management system (CAMPUSonline), is adjusted and enhanced to the extensive requirements of the German TUM and stepwise put into service.

Therefore, there are no admission queues anymore. The new online application and enrolment process, organizational changes, as well as improved front and back office structures and the redesign of administrative procedures will be described and discussed in detail in this paper.

2. INTRODUCTION

2.1. Technische Universität München

The Technische Universität München (TUM) is among Europe's leading universities - approximately 22,000 students, 400 professors, 4,400 academic, and 2,800 non-academic staff members belong to it. TUM comprises of twelve faculties which can be found on three main campuses in and around Munich.

In 2000 TUM introduced as one of Germany's first universities aptitude tests for the selection of its students in some degree programs. One of the major reasons for this initiative was the reduction of student drop-out rates. Henceforth, applicants were exclusively admitted evaluating their personal level of qualification for the respective degree program. Herein, final high school grades still play a crucial role, not only taking the averages, but also specific course grades relevant for the chosen degree program into account for admission. Further elements of the aptitude tests, called "Eignungsfeststellungsverfahren" (EFV) in German, are a letter of motivation, essays and personal interviews.

By now, aptitude tests have proven their value and were introduced for nearly all TUM degree courses. However, the selection process is time consuming and requires an intensive cooperation between centralized and decentralized organizational units. In the past, some faculties developed isolated services to support the EFV, but a university-wide system had been missing so far.

Fortunately, student application numbers rose steadily throughout the past years. However staffing in admission, enrolment, and student administration remained constant. This has led to long queues and prolonged response times. In addition, due to a change of most German federal states from a 13-year school system to 12-years, there will be a double graduation class in 2011. In correspondence, a sharp increase in the numbers of applicants from the winter term 2011/2012 on is expected. To manage this rush, it is necessary to improve the operational and organizational structure as well as the IT support in the affected areas with the goal to establish an electronic administration.

2.2. Vision of a Digital Campus

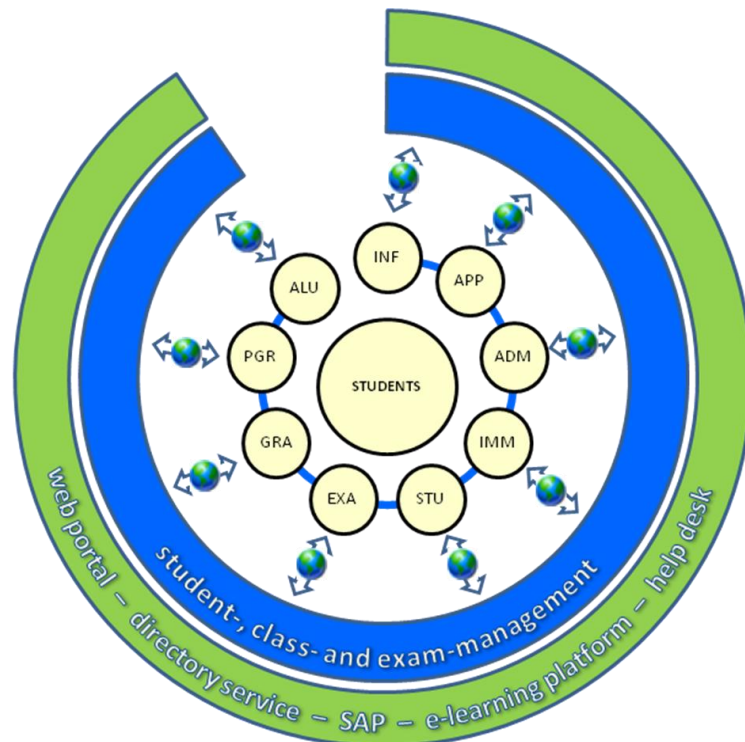


Figure 1: Vision of a digital campus

Based on the mentioned organizational aspects, the vision of a digital campus was developed (see figure 1). Subsumed under the name “Campus Management” all processes, organizational features as well as the IT infrastructure dealing with studies and teaching are to be optimized and digitally modeled. In the future, a core system will manage the areas student-, class- and exam-management. Thus, a complete IT-based processing of all planning, coordination and administration of the entire student life cycle - from information and application up to alumni management - will be possible. The condition sine qua non for the project is a 100% interoperability with all other used components of the second level (e.g. portal, SAP, directory service (LDAP), e-learning platform). If possible, all services should be made available to the students online. Furthermore, all faculties as well as courses of study have their own specific and heterogenic requirements to the system, which has to be adaptable flexibly to it.

This paper focuses on the electronic admission and enrolment processing of TUM, taking specifically the vision of a digital campus as well as the introduction of the new campus management system TUMonline into account.

2.3. Cooperation agreement “Campus Management”

At the beginning of 2008 TUM’s Executive Board of Management decided in favor of a re-organization of study related processes and signed the cooperation agreement “Campus Management” with the Technische Universität Graz (TUG), Austria. Within 18 months the campus management system called CAMPUSonline [3], which was developed at TUG, will be adjusted within the project CM@TUM [4] to TUM specific needs and introduced as TUMonline at TUM. Thus, TUMonline becomes an important, further component on TUM’s way to provide a customer-friendly and smoothly integrated information and communication technology infrastructure for research, teaching and administration, which had been started in 2003 with the project IntegraTUM [5]. For further details see [2].

3. GOALS OF THE ELECTRONIC ADMISSION AND ENROLMENT PROCESSING

The implementation of the Bologna Process at TUM brought fundamental changes with it. For example, the change from the former diploma to the two-tier bachelor and master degree system, a new examination culture and the modularization of degree programs affected the central administration and the faculties quite heavily. Business processes and regulations had to be standardized and optimized, responsibilities and competencies redefined, and the organizational structure checked and redesigned. The adjustments concern the entire field of study and teaching of the whole university. [1]

The following goals were pursued during the conception and implementation of the online admission and enrolment processing:

- **Recentralization of the application data acquisition and evaluation:** The gradual introduction of EFV at TUM led to the fact that applicant data were gathered and evaluated both central by the admissions office, and local by the respective faculties for the application processing. Thus, a primary goal of the introduction of the new online application based on TUMonline was the central data acquisition, check and as far as possible also evaluation.
- **Prompt feedback to the applicants:** In the past applicants often got their application results just a few weeks before beginning of term. This is however straight in the competition for the best students and in connection with e.g. short housing space in Munich of large disadvantage.
- **IT-driven organization and process optimization:** The entire admission and enrolment process was critically analyzed and optimized in co-operation with the TUG, before it was implemented in TUMonline.
- **Generation of ad hoc statistics:** Before TUMonline was introduced valid and reliable statistic material was not available during an ongoing application process.
- **Improvement of customer care:** Thanks to the automation of processes with the help of TUMonline staff gets more time for individual customer care.

In the context of the project CM@TUM numerous workshops with specialists, staff, coworkers of the student service center (SSZ), faculty representatives and consultants of the TUG were organized to find solution approaches for the enumerated goals, which are described in detail within the next section.

4. SOLUTION APPROACHES

As a unique feature compared to other online application systems the so called “fast track” was implemented. This means the complete automated handling of the 1st stage of the aptitude test procedure. Applicants with a general German higher education entrance qualification (final secondary-school examination), called “Abitur”, receive immediately after submitting their application for an EFV degree program feedback from TUMonline whether they are rejected, approved, or invited to a personal selection interview. In case of approval the applicant is able to accept his study place directly online. Upon receipt, a specialist verifies all documents and recalls, if necessary, the approval/study place acceptance. All applicants without a German “Abitur” are handled via the “slow track”, i.e. a specialist checks all documents which are received by mail before the EFV calculation process starts.

Also the implementation of the complex numerus clausus (NC) procedure with automated clearing process was very efficiently done. Thanks to the new algorithm applicants received immediately after the application period (NC-deadline) a feedback about their application success and the overall process can be completed much faster. The different admission modes and the application process are described in section 5 in detail.

Particular attention was paid to a user-friendly software system, while planning the new online admission. An intuitively operable web wizard leads the applicants through the application process. Tooltips and help buttons with additional explanations assist in case of ambiguity. Inline checks of the received application documents and detailed status information in TUMonline increase the transparency of the admission process for the applicant substantially. At any time the applicant can reconstruct whether his documents arrived and were verified or e.g. if his payment was received.

In order to arrange the recentralization process for the faculties as smoothly as possible, interfaces for existing faculty systems were defined. Faculties can furthermore - now on the basis of via TUMonline entered and verified data - implement local EFV processes and transfer the results to TUMonline.

A flexible document management per degree program takes heterogeneous requirements into account. The faculties can configure, whether applicants e.g. should upload a motivation letter or their curriculum vitae as document or paste the data into a web form. A so-called dossier, which TUMonline aggregates out of an application data, bundles all application-relevant data in a single document and provides a fast and comprehensive overview of the application of a candidate.

The study papers (Leporello) are sent now via mail, a personal registration on-site is not necessary anymore. The identity of the applicant is verified during the application process on the basis of a paper copy of an identification document and after registration at the personal collection of the StudentCard. The StudentCard replaces the former student identity document.

5. IMPLEMENTATION OF THE ELECTRONIC ADMISSION AND ENROLMENT PROCESSING

Already in 2007 the working group „application/admission/enrolment” of the SSZ was founded to shrink the enrolment queues at TUM. An extensive actual/target analysis of the application process was done and formed the basis of the implementation of the electronic admission and enrolment processing with TUMonline. In the following some key aspects are presented.

At TUM three modes of admission are in use:

- Unrestricted admissions: Each applicant applying for a degree program with unrestricted admissions is admitted if application deadlines are met and qualification prerequisites are fulfilled.
- Local numerus clauses (NC): Allocation criteria are grade point average of final secondary-school examinations (“Abiturdurchschnittsnote“), waiting time and number of study places.

A clearing process distributes spare places. The calculation basis changes each admissions process depending on the number of university places to be allocated, the number of applicants and their allocation criteria (grade point average of final secondary-school examinations and waiting time).

- Aptitude tests: At TUM aptitude tests are two-tier based and required for the majority of degree programs. Several criteria are used for the evaluation process: grade point average of final secondary-school examinations (“Abitur“), weighted subject grades, motivational letters and possibly hands-on experience in connection with the planned degree program as well as, in some cases, a personal interview. During the first stage the applicant’s data is evaluated with the help of a transparent point system. Dependent on the reached number of points, the applicants are directly approved, rejected or invited to a personal interview.

The idea of a “fast/slow track” as outlined in section 4 was modeled for all three modes of admission: Applicants of a degree program with unrestricted admission receive directly after submitting their online application the approval and thus the possibility to accept a study place. Local NC-candidates are automatically handled as “slow track”, since computation must wait till application deadline. Figure 2 visualizes the admission and enrolment processing from the point of view of an applicant.

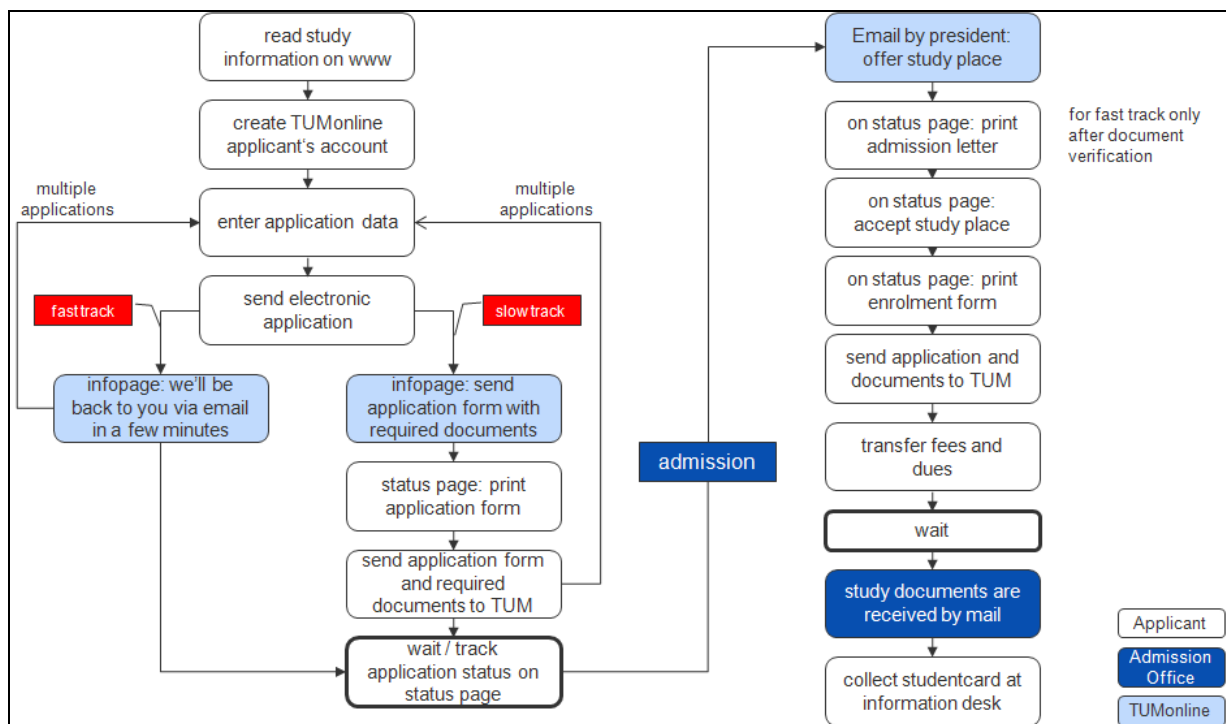


Figure 2: Admission and enrolment processing - applicant view

The definition of clear competencies between SSZ and the faculties on the basis of a uniform admission und enrolment process, adjustments to the organizational structure and an EFV-test case were accompanying measures. A central coordination office was founded to control and manage the admission process for the whole TUM. The enrolment office verifies all by applicants sent-in documents on completeness and correctness. In order to be able to master the high application rate towards the end of the application period, a temporary administrative unit was created, which consists mostly of temporary workers.

Each study course of TUM is configured in TUMonline before a new application phase starts. Faculties choose between unrestricted admissions, local NC or aptitude tests for each provided program. Furthermore, document lists for each degree program configure the needed data of the applications. For example outline and input type (upload, text input, mail) of documents depending on higher

education entrance qualification, professional qualification or citizenship. TUMonline creates study documents automatically. Students can access them online. SSZ takes care of the content and design of all study documents.

Faculty specialists get dedicated, roll-specific access to application data and statistics via TUMonline. A right and role model regulates the access control - faculty specialists may only view applicant data of associated courses of studies. The use of a data export interface via web service is regulated via access tokens.

The electronic admission and enrolment application within TUMonline was developed via rapid prototyping. After a joint conception and planning phase, the developers of the TUG provided first web forms, which were discussed, improved and refined together with TUM specialists, faculty staff, users, and developers. Altogether, the application was done in record time - from conception till going live in less than five months. The issue-tracking system jtrac¹ was used as central coordination tool during the implementation phase. Error messages, feature requests and questions were exchanged and tracked between the developers at TUG and TUM easily.

All requests concerning the electronic admission and enrolment process are answered via a central IT service support [4]. Issues which can't be solved within 1st level support are forwarded to specialists at the 2nd level, who help prompt and comprehensive on expert and detail questions. Trivial issues are solved within 1st level support by student assistants; thereby disburdening the specialists on the 2nd level.

6. CONCLUSION AND OUTLOOK

The electronic admission and enrolment processing was successfully put into service in May 2008. Over 16,000 applications of nearly 13,000 applicants were submitted for the winter term 2008/2009.

Figure 3 shows cumulated values for submitted applications, approvals, refusals, taken study places, enrolments, admission requests, enrolment requests.

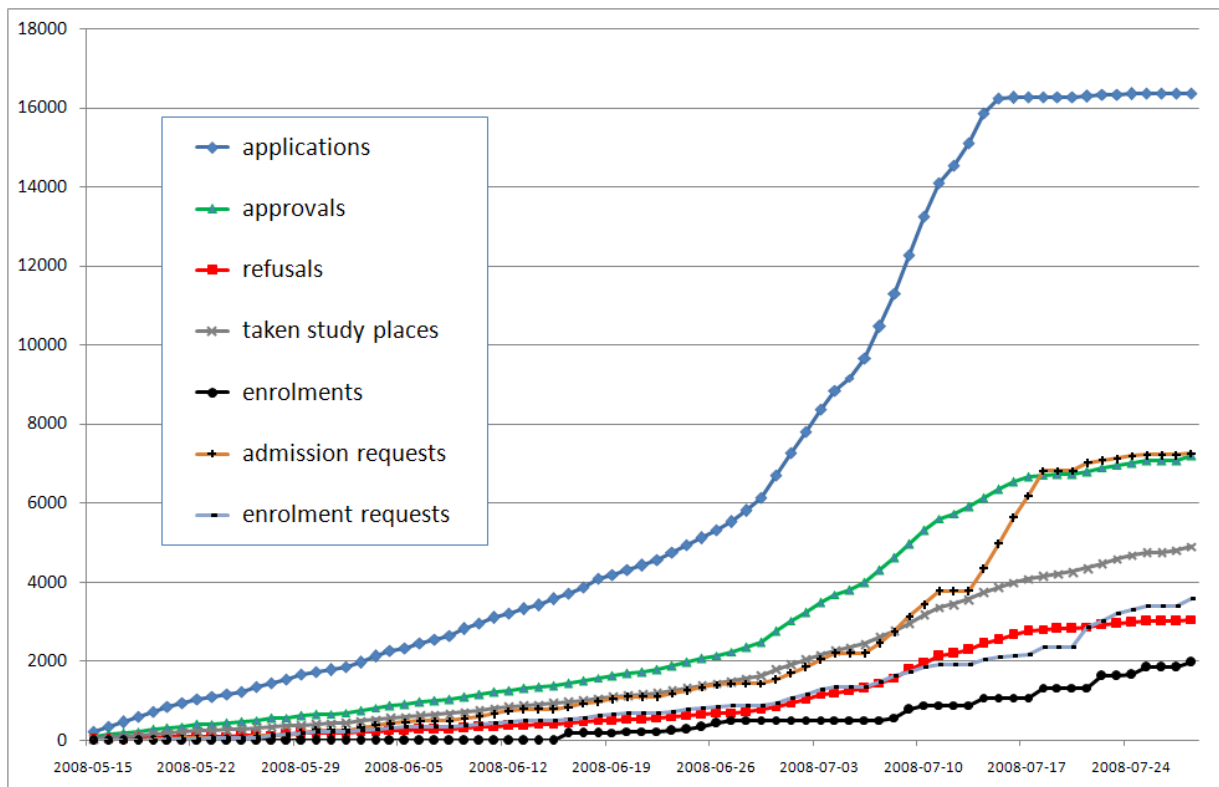


Figure 3: Bachelor admission and enrolment statistic winter term 2008/2009 (cumulated values)

¹ see <http://www.jtrac.info/>

In the past, there was no considerable experience in the field of the electronic admission and enrolment processing at TUM. Therefore we assumed that up to 1,000 applicants would use the system at the same time. In the follow up we realize that up to 1,000 applications were sent on a single day, but hardly more than 150 users were logged in at the same time.

Figure 4 shows numbers per day of submitted applications, received admission and enrolment requests, and enrolments. On June, 27th 2008 at most secondary schools in Bavaria the “Abitur” certificate was conferred. The figure shows a clear rise of applications in the following days. A further significant rise can be observed in the second week of July. Interestingly no peak was monitored at the end of the application period (July, 15th 2008).

The feedback of the applicants and the faculties concerning the new system was very positive. Many applicants were pleased about the new “fast track”-procedure and the resulting quick reply of TUMonline. Furthermore, the new transparency concerning the document reception, the processing status and the receipt of payment were mentioned affirmatively.

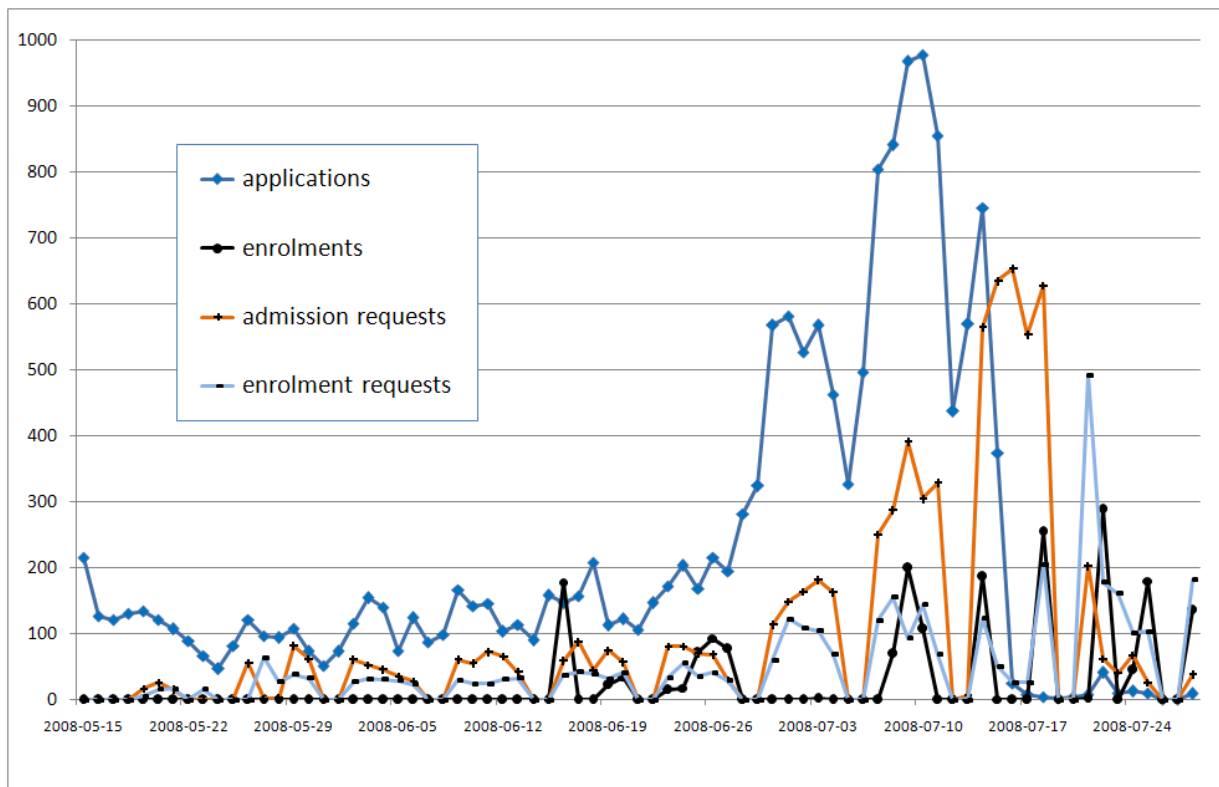


Figure 4: Bachelor admission and enrolment statistic winter term 2008/2009 (numbers per day)

The use of up to 15 temporary workers for the real time status update of the mailed application documents was very successful. Within the admissions office a front and back office structure got installed. Document processing was done in separated rooms. Public access was limited to special office hours. Thus a noticeable improvement of the working conditions within the admission office could be achieved.

Also the critical review of the existing processes proved as very valuable. Thanks to the rearrangement of the data acquisition process - from staff to the applicants themselves, the quality of data of the applications could be significantly increased. It can be stated that the applicants e.g. are very concerned about the correctness of their address. The new process contains, as already pointed out in section 5, a verification of the entered data on basis of the mailed certified copies by a trained specialist.

High process transparency created by TUMonline was and is very valuable for the control and coordination of the overall process. The number of self-registered users in TUMonline is a good basis

to estimate the potential incoming applications. Likewise estimations for staff requirements for status updating and checking of mailed application documents were possible.

Within the project CM@TUM the stepwise rollout of functionalities of TUMonline, like identity, examination, room or course management, is planned, prepared and realized. IT-systems like HISSOS, HISPOS, FlexNow and UnivIS are redeemed already or will be in the near future. Students and staff are going to find all course relevant information and services via TUMonline at a glance.

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