

# Two Stage Business and IT-Alignment: Initial Experiences from Portal Implementation for Non-Traditional Study Formats of a University

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**Abstract:** Business and IT-alignment (BITA) is a continuous process aiming at aligning strategic and operational objectives and ways to implement them between the business divisions of an organization and its information technology. The work presented in this paper focuses on a specific aspect of BITA: the process of creating an alignment between stakeholders in an organization and the IT. In a project aiming at the implementation of lifelong learning services, experiences were collected supporting a two stage BITA process. The organizational objective of the project was to offer tailor-made learning possibilities at university level to new, non-traditional target groups. New study formats allow to start studying at any stage of life and offer appropriate IT support for new target groups and study formats. The central technological idea consists in a context-oriented, information technology portal for e-learning, the MyKOSMOS portal, with an individualized and demand-based supply of information for the learners.

## 1 Introduction

Business and IT-alignment (BITA) in general is a continuous process aiming at aligning strategic and operational objectives and ways to implement them between the business divisions of an organization and the organization's information technology division. BITA is not limited to commercial enterprises but also required in public authorities and non-profit organizations. Many challenges are linked to BITA since the business environment continuously changes and so does the IT in an enterprise, but the pace of change and the time frame needed to implement changes are different. The reasons for changes are quite diverse [21] and include, e.g., changes legal aspects and regulations, new business requirements, or economic developments. Technological trends such as business as a service, virtualization, cloud computing or digital enterprise architectures are influencing the way in which IT-functionality can be provided [22]. Model-based approaches and IT governance are potential candidates

to support capturing of business context, organizational needs and required IT support [23].

One of the challenges in business and IT-alignment frequently experienced is how to integrate different organisational stakeholders and their demands into the alignment process. In this context, this paper will focus on a two stage alignment approach observed in a case from higher education (cf. section 2). In this case, a university made a number of strategic changes which also affected the traditional education programs and aimed at a more prominent support of life-long learning services. When analysing requirements for the support of the new university strategy in life-long learning (cf. section 3), we realized that an IT-support aligned to the changed organisational needs would not only have to support strategic aspects, but also the demands on operational level, e.g. of the different study format managers and even of individual teachers. We also realized that the adjustment demand is not a mere configuration of functionality but a composition of different functional modules to reflect teaching models and distribution strategies beyond the university level.

From a business and IT-alignment perspective, we consider this as an alignment process divided into several phases:

- The strategic alignment on university level: starting from a decision to invite new target groups and to create new study formats, the IT support and functionality had to be designed for the need
- The operational alignment, upper level: for every specific study format, the second alignment stage addressed organisational and didactic needs, based on various factors, like, e.g., the geographical distribution of participants, their distribution in different time zones, and required software bundles and combinations of IT
- The organisational alignment, refined level, addresses the needs of module teachers for individual classes or cohorts and mostly can be implemented by configuration of functionality.

The purpose of this paper primarily is to describe the different alignment stages based on a case from higher education and to share experiences about the alignment process. A clear limitation of the work is that we only have one case to report on, i.e. our findings are meant to inspire future research work and kick-off further activities into the direction of “staged alignment processes” but are not generalizable.

The core instrument from a method perspective is the definition of guidelines packaged in a 6-step process for performing the upper level of operational alignment (cf. section 4). These guidelines were a result of the prior alignment on strategic level.

## **2 Background**

This section provides background information on the works presented in this paper including the project in which the results were achieved (2.1.), the field of teaching and learning systems (2.2) and IT-supported portals (2.3).

## 2.1 Project Context: KOSMOS

The work presented in this paper was realized in the project „Konstruktion und Organisation eines Studiums in offenen Systemen (construction and organization of studies in open systems) KOSMOS<sup>1</sup>“, funded by the BMBF and the EU at the University of Rostock. The University of Rostock is aiming to implement a concept of Life Long Learning (LLL) offering tailor-made possibilities to study at University level to traditional and non-traditional target groups. New study formats allow to start studying at any stage of life. They offer follow-up opportunities after vocational training and professional activity. However, the integration of Life Long Learning cannot be achieved unless the University as institution is reorganized. Accordingly, organization development is part of the project and connected with the objective of implementing a content-related, structural and organizational framework for Life Long Learning.

The implementation of the above-mentioned objectives does not only require new study models and study formats, it is also necessary to take into account the technical and organizational preconditions and tools provided for the learners and the teachers. That is why, in the KOSMOS project, one work package focuses especially on the “medial infrastructure”, since new target groups, study formats and learning culture can also imply new challenges for the supporting IT systems (e.g., so-called learning management systems or learning systems) and for the relevant contents. This paper presents results from this work package.

## 2.2 Learning Management Systems and Infrastructures

Technical, organisational and didactic support for life-long learning has been subject of research since many years with a lot of focus on how to bridge the dimensions time and space, i.e. to support co-located and distributed e-learning scenarios as well as synchronous and asynchronous settings. Many different systems, services and standard proposals were developed. Integration of different functionalities and services into a single user interface is a feature of contemporary learning management systems [5] (e.g. Ilias, Stud.IP, Moodle, Sakai, OLAT, Clix etc.) which provide a platform for co-located and distributed teaching.

New teaching and learning styles [4], for example with alternating co-located and distributed phases (for example based on content recorded with Lecturnity, Opencast Matterhorn or synchronous communication with Adobe Connect or Open Meeting) and completely digital and virtualized study modules are more and more common practice in universities. This leads to a high demand regarding service quality and availability of IT infrastructures. Already in 2003, the Atkins-report of the US National Science Foundation (NSF) [6] developed a vision of a reliable cyber-infrastructure for this purpose. Many development in Europe (e.g. e-science in UK or d-grid in Germany) extend this idea towards implementing a middleware also suitable for scientific demands.

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<sup>1</sup> <http://www.kosmos.uni-rostock.de/>

## 2.3 Portals

Information technology portals generally unify the access to different applications and information sources under one single interface [17] adapted to the actual user and concealing different applications behind it [16]. Portals are a technology used in enterprise IT and especially in knowledge management [3]. For its usage in a University context, it is crucial to think of a portal in the sense of a „Single Point of Entry“[1] for all applications to be used online for continuing education or to support them.

A market analysis of portals and portal platforms [9] showed a prevalence of Liferay<sup>2</sup>. It is characteristic for Liferay to function on the basis of the model-view-controller principle allowing to separate the presentation of the contents from the processing logic. Thus, it is possible to shape the processing logic in software modules and to present it to the user in an aggregated form without any clashes with existing functionalities. Extensions in Liferay can be integrated in two different ways. First, they can be simply embedded without any further adaptation as additional pages. The second option is to work with portlets which is more complicated in technical terms but they alone enable the presentation adapted to the user. Among other things, they allow for data exchange with other application.

## 3 Alignment on Strategic Level

In the KOSMOS project (see section 2.1), the first stage of business and IT alignment consisted of defining new strategic requirement for lifelong-learning and implementing an IT support aligned to these requirements. Section 3.1 will discuss the strategic context, section 3.2 the MyKosmos portal as implementation of the IT support for the strategic aspects.

### 3.1 Strategic Direction and Requirements

Care staff, landscape architects, physicians and psychologists in one and the same course of study? Kindergarten teachers, school teachers and special education teachers with common study interests? – These situations are rather unusual for traditional courses of study at Universities. However, in the new strategic objectives at Rostock University such situations are seen as commonplace. The goal is to open up the University to non-traditional target groups by offering new study formats, such as “horticultural therapy” or “gifted education”, and to support the overall process of teaching and studying in a lifelong learning context.

The central infrastructure idea to support the above strategic aim consists in a context-oriented, information technology portal for e-learning with an individualized and demand-based supply of information for the students. Within the frame of the portal design, a central aspect had to be the context orientation, i.e., the testing and evaluation of context-based learning systems and teaching contents for the university

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<sup>2</sup> Siehe <http://www.liferay.com>

continuing education. Many investigations from the field of knowledge management and information logistics point to the fact that understanding and support of the user context has a significant influence on the acceptance and the quality of IT systems and contents as perceived by the user. In this respect, the user context comprises not only the actual role or task of a user, but also his educational background, experiences and personal preferences.

### **3.2 Requirements to IT support**

With the background of the strategic aspects (see 3.1) aiming at opening up for new target groups and study formats in the frame of university education, a stronger individualization for the single learner and their actual context was identified as a core requirement to the IT support. In this respect, the “context” implies all information describing the situation of the learner and which should thus be taken into account for the individualization. The focus on a stronger individualization is explained by the following background:

- Learning is a process which any person needs to integrate individually in their routines and backgrounds. Learning occurs in different speeds, with different associations and with different previous experiences.
- The specific teaching-learning experiences in different university disciplines (engineering, social sciences, humanities, natural sciences) vary significantly. Therefore, we can speak of a culture of disciplines which has to be taken into account in the teaching-learning process of the continuing education.
- The learners in the new study formats differ in their age, their background knowledge, their learning objectives, their time availability, their sex etc. Thus, they claim a much stronger individualization of the learning process, the study offers and the teaching-learning organization compared to the common university practice.

Investigations in the field of knowledge management [18] point to the fact that understanding and support of the user context has a significant influence on the acceptance and the quality of learning systems and teaching contents as perceived by the user. In this regard, the user context comprises not only the actual role or task of a user, but also his educational background, experiences and personal preferences. Therefore, the objective is to guide the learners with their different prior knowledge more individually and to offer them further electronic support possibilities.

### **3.3 IT support for the requirements**

In order to support new study formats and target groups, the portal system MyKosmos was designed and developed. Portal design followed the requirements identified and outlined in section 3.2 by translating them into appropriate functionality. The current implementation of the MyKosmos portal integrates different functionalities and applications into a single user interface. Examples are:

- Meta-search engine: one element of the integration is to provide a single user interface to searching several literature database and research information

systems. Based on the student profile (i.e. the study format, current integration into working groups and personal background), the meta.search is configured to search with priority in those database assumed to be the most important ones for the task at hand.

- Integration of learning management systems: Rostock University has a learning management system for supporting teaching in different courses (stud.ip), for interactive content and learning objects (ILIAS) and for scheduling education and providing individual information (LSF). These systems are integrated into the MyKosmos portal provided a joint view on relevant data.
- Collaborative work of distributed student groups is supported by integrating synchronous (Skype) and asynchronous communication, document sharing, joint editing of documents and awareness functions for group work. This functionality is required, as group work is considered increasingly important in education in general [12] and considered as valuable support by the learners [7] [13].
- Program managers and course responsible persons (teachers) may integrate additional functionality into the portal by using the “portlet” concept of the Liferay platform which forms the basis for MyKosmos.

The above summary shows that MyKosmos is contributing to the integration of various applications. Furthermore, the portal also contributed to more synchronized work flows as the portal development was accompanied by business process integration activities. More concrete, we modelled all future usage scenarios for the portal and derived integration needs on process and application level from the scenario models. For this purpose we used an approach from enterprise modelling based on Troux Architect as a tool and Troux Semantics as notation. We modelled the different planned ways how myKOSMOS would be used by the future users.

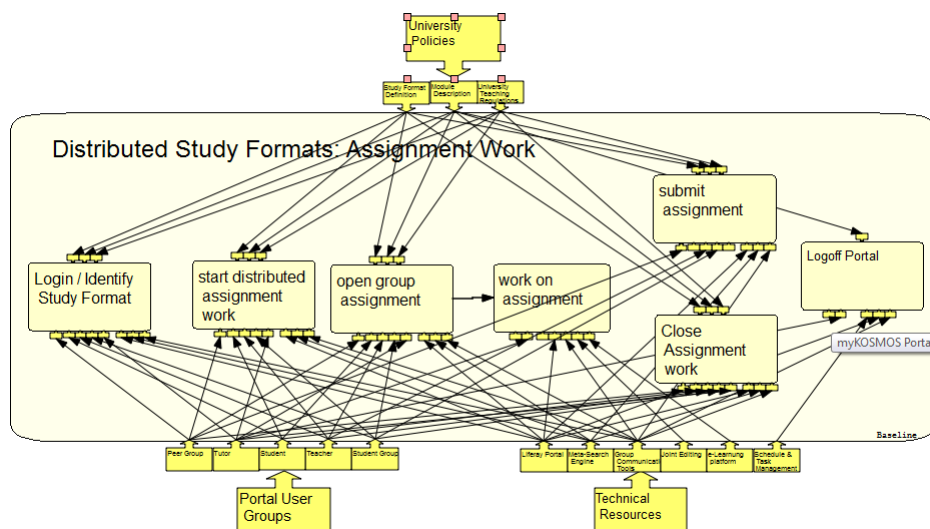


Fig. 1: Process model (excerpt) for new study format

This resulted in process model-like scenarios, as depicted in Figure 1 showing the example “distributed study formats: assignment work”. The scenario starts with the student logging in. According to his profile he is provided with an individually configured entry page, making offers for his learning process. Following his course of study, completing different modules within the study format, the student chooses to open or proceed with his assignment work for a certain module, which is loaded presenting the recent state of his work in progress. Once having caught up with his recent results, the student is confronted with different tasks to be fulfilled in order to fulfil the assignment, however is free to choose which task to pick. A regular assignment the designed study formats includes information research the portal supports providing the appropriate sources for the study format. In addition many assignments also involve the communication with fellow students since they are assigned group work. In the process the work should be documented to be handed in, where the kind of documentation being determined in the assignment description.

#### **4 Alignment on Operational Level**

While the previous section addressed the strategic alignment on university level, this section focuses on operational alignment. This alignment stage takes place when a new study format is in the process of implementation and the IT infrastructure created for supporting the strategic decision, i.e. the MyKosmos portal, has to be put in operation. For such a study format, the organisational and didactic needs have to be taken into account. Here, the alignment demand is created by the stakeholder group of study program managers and includes various factors, like, e.g., the geographical distribution of participants, their distribution in different time zones, and required software bundles and combinations of IT.

How the alignment on operational has to be performed is defined in a methodical guideline. The aim of this guideline [8] is to describe a systematic approach on how to decide whether the MyKOSMOS portal is suitable for a study format and how to adapt the portal for this study format. The guide has been prepared with a view to the professional responsibilities for a study format. Thus, no special knowledge is required in the field of information technology. The guideline consists of 6 steps described in the following.

##### *Step 1: Evaluate the suitability of the portal*

The use of the portal does not make sense if the content and didactic concept of the study format does not provide or even explicitly excludes the use of IT-supported media or teaching and learning platforms. The use of the portal is particularly useful when there is an added value compared to the "standard" e-learning platform Stud.IP. Stud.IP is integrated into MyKOSMOS, so its functions are already available. In order to facilitate the evaluation, a questionnaire was developed as an aid. If a clear picture does not arise by answering the questions, a discussion with the professional responsibilities for the portal is recommended for a joint decision-making.

*Step 2: Specify the scope of the portal use*

Since, in principle, it is not possible to provide a portal usage for the entire course of the study format, but only for selected content, the scope of portal use must be determined in this step. The scope is most easily defined by the modules of the study format, which are to be supported in the portal. On the basis of the module list, the relevant teachers and students can be specified (in the case that not all participants in the study format have to participate in the modules).

*Step 3: Analyze the need for information*

One of the main goals of portals is to provide students with access to information that is important to the organization of tasks or topics within their study format. On the one hand, this ease is achieved by the fact that, in the search for information or literature, it is already preset which sources of information have the highest relevance for the study format. If the student does not change this default, the search functionality built into the portal will first search in these sources. On the other hand, applications can also be integrated into the portal interface that provide the required information. These could be special information services or systems that are not accessible with general search.

In order to determine the information requirements, a method for analyzing the need for information is available, which investigates the information requirements in detail from tasks and responsibilities. This method is documented in [20]. Since the full execution of such an analysis can be quite complex, it is recommended to use a "simplified" method. On the basis of the study format and the tasks performed in the individual modules, this method determines which information sources are relevant, the importance of the information from these sources for the task, and the consequences of the lack of information. Based on this assessment of the information sources, priority information sources are identified, which are included in the profile of the study format and are used in step 6 to configure the meta-search.

*Step 4: Determine the need for portal functionality*

This step defines how the initial or "default" configuration of the portal should be set. This includes, among other things, which portlets to integrate and which layout is to be realized. Furthermore, it is determined whether there should be adjustments for individual subgroups of the students in order to support e.g. collaborative learning. For each developed portal functionality (see section 3), it will be determined whether this is needed and how the basic configuration should be.

*Step 5: Compile the required portal customization*

Since the determination of the information requirements and the determination of the required functionality of the portal may be carried out with the cooperation of different parties and at different times, this work step was integrated into the sequence in order to compile a total view from the partial results. In the simplest case, this step consists only of combining the results documents of the previous activities into one overall document. The consistency of the overall picture should be examined. In a few cases, it will become clear that there is a need for additional information or additional



portal functions, which can only be seen in the overall view. In this case it is recommended to resume the work in the corresponding step.

*Step 6: Launch portal customization*

The central goal of this activity is to initiate the implementation of the required portal adaptations in order to ensure a soon provision of the portal. Part of this work step is also to examine the feasibility of all requirements and, if necessary, to specify them. In many cases, the actual portal customization will not require any programming tasks, but will only include the configuration of the portal and therefore be performed quickly. This usually involves setting up a so-called "profile" for the study format in the portal search function, whereby the relevant information sources with priority are searched for the system. In rare cases, the technical access interface to the information sources must also be set up, which may require a programming interface. Furthermore, to configure the portal, you must make the basic settings for the functions that should be available in the study format. If functional extensions are required, such as the integration of additional applications or portlets, the procedure must also be clarified.

## **5 Summary and Outlook**

In the context of strategic changes within a university regarding lifelong learning services, the paper investigated the process of business and IT alignment. When analysing requirements for the support of the new university strategy in life-long learning we realized that the alignment process should be divided into several phases. The paper reports on the strategic alignment stage on university level and the operational alignment (upper level) for every specific study format. A clear limitation of the work is that we only have one case to report on, i.e. our findings are meant to inspire future research work and kick-off further activities into the direction of "staged alignment processes" but are not generalizable.

Furthermore, the paper presents, in the context of the KOSMOS project, the basic idea, the concept and experiences of the realization of the MyKOSMOS portal with its central approach of a demand-based information supply and user-specific provision of functionality in e-learning. The future extension of the portal will be to set up, record and maintain the portfolios of the learners which is partly a compilation of systemic data, but which will be extended by personal data. Thus, it would be conceivable to retain the training level in relation to the basic subjects (e.g., mathematics) or the professional status in order to provide additional material. This information would have to be uploaded by the participants themselves. According to the data provided, additional material can be identified and recommendations can be formulated and represented.

**Acknowledgement:** The work within the frame of the KOSMOS project presented in this contribution was funded by the BMBF and the ESF Programme of the EU.

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