

Identifying a set of relevant input and output factors within a productivity model for educational services

Philipp Bitzer¹, Eva Bittner¹, Jan Marco Leimeister¹

¹Kassel University

Abstract

The study aims to develop a comprehensive set of input and output factors for educational services. In the frame of the study, a set of input, throughput and output factors is presented. These factors were collected in a workshop with lecturers having a long-time experience in teaching, since the authors assume that they have a great amount of implicit knowledge about the productive delivery of educational services.

So far, no further refinement on the different factors was conducted, thus an actual usage of the taxonomy is not possible. Hence, it is necessary, to find a comprehensive set of factors, which helps to operationalize the factors which consequently can be converted into an applicable productivity measurement model.

Based on the workshop results, further details to a beforehand developed productivity model is added, which combines and classifies input and output factors. The advanced productivity model will allow classifying existing learning scenarios and enables scientists to derive appropriate measurement tools to measure the productivity of educational services. Based on the workshop findings an approach for an learning scorecard is presented.

1. Introduction

The advancement of educational services can be considered as one of the most important duties of developed countries worldwide. In 2008, 26.5 billion € were spent for educational services in Germany (Flasdick 2008). Due to demographic change, new technologies and the development of a knowledge-based society, the efficient provision of educational services has to augment (Pfeiffer 2009). According to current research, educational services have a high potential for growth, though still lots of effort and research is necessary to increase productivity in a sustainable manner (Spath 2008). Unfortunately, a universal understanding of productivity in educational services is missing (Baumgärtner 2006).

Educational services are knowledge-intensive and usually delivered face-to-face, which makes it difficult to ensure service success, i.e. increasing and using knowledge for learners at an optimal level of inputs. To capture all parts of educational services a systematization is necessary. This is an important condition for reasonable controlling of educational services, e.g. in considering development of efficiency over several years (Bullinger 2006).

Currently potentials to increase productivity cannot be systematically identified. Thus approaches have to be developed which empower lecturers and designers to provide educational services in a productive manner.

However, the identification of relevant variables, i.e. relevant input- and output factors, turns out to be problematic. A reason for this is the broad variety of input factors such as cognitive characteristics of the students or the quality of learning materials, etc. which have to be combined in the process of service conduction in order to achieve a certain learning output. Identifying learning as an active process, success in learning will only be achieved in interaction between learners, other learners, lecturers and contents (Moore 1989; Hillman 1994). In addition it turns out to be problematic that some factors, e.g. personal motivation and learning outcome, are difficult to quantify which makes it hard to measure causal effects between input and output factors. Hence, individual differences of learners only seldom lead to reproducible research on learning results (Mohr 2005).

Therefore, the goal of this study is to systematically identify input and output factors derived from a workshop with university lecturers with several years of professional experience. By focusing on professionals from academic and educational backgrounds, the intention is to discover factors influencing educational services and what they contribute to the productivity of educational services.

The paper is organized as follows: Chapter 2 provides an overview of existing research in service productivity. Furthermore, the Balanced Scorecard is shortly introduced and connected to educational service productivity. In chapter 3 the methodology is introduced and the final workshop design is presented. In order to present the results of the workshop, chapter 4 describes the various categories. The paper concludes with an integration of the results into a scorecard concept, discussion of the limitations, and an outlook on further research.

2. Related Work

In the following section the research fundament for the study is presented. Therefore, theoretical background is provided and the methodology of the research is presented.

2.1. Service Productivity

The term productivity is a well-known term in business research. It is defined as the ratio between outputs and inputs (Prokopenko 1992). In other words, the productivity is an expression for how effectively input resources in a process are transformed into economic results for the producing firm and value for its customers. This formula has to be modified for services as they imply various characteristics which distinguish them from classical products (Harmon, Hensel et al. 2006). Services are time-perishable, intangible experiences performed for a customer acting in the role of co-producer (Fitzsimmonsund Fitzsimmons 2011). Hence, customers usually influence the process and the result of a service. As their individual perception affects the process and the success of services, a qualitative perspective on services is necessary.

To account for both qualitative and quantitative aspects of productivity, the total productivity perspective was developed, considering the ratio between output quality and quantity as well as input quality and quantity (Jorgenson and Griliches 1967). The evaluation of quantitative inputs and outputs does not seem challenging in most cases, while the evaluation of qualitative aspects often seems to be more complicated. In fact, a comprehensive approach to evaluate the productivity of services seems even more challenging, regarding the special requirements of services. Consequently, productivity measurement procedures of manufacturing industries are inadequate for service companies. Input factors such as labour, knowledge of employees, building a knowledge stock, spill over effects and working capital have to be taken into consideration for a comprehensive productivity measurement (Nachum 1999). Hence, on the contrary to the productivity of manufacturing industries where the tangible assets can be raised and counted easily the integration of qualitative aspects into the measurement of the service's productivity leads to a much more complex procedure. That is because of the influence of the subjective perception of the evaluator which is inevitable during measuring the intangible factors of the services. According to the existing literature this productivity measurement problem is still unsolved.

Additionally the output of services can be categorized in different ways. Gummesson (1978) suggested three different perspectives in categorizing the output of service firms:

1.) Solution

The service product of the service firm leads to a standardized solution of a customer's problem. A clear separation between production and consumption is assumed.

2.) Implemented solution

The producer is involved with the implementation of the solution. The production occurs partly with the consumption and the input of the client is critical.

3.) Impact on the economic situation of the client

The product is produced with support of the customers, which means that the consumption of the product is part of the production.

For the following study, the third perspective is chosen, as productivity measurement for educational services requires the consideration of the economic impact of the client (Kirckpatrick 2006). Therefore, the client all with his attitudes, inputs and outputs is considered in the following study.

The evaluation of qualitative aspects of the creation and conduction of the service is of great importance, even increasing for knowledge intensive services. Knowledge-intensive services are defined as follows: during the service's creation or its delivering process the generation or the use of novel knowledge accounts for a large proportion of the service (Hauknes 1999). Hence knowledge intensive services require a stronger consideration of factors, which cannot be easily expressed in quantitative terms.

2.2. The Balanced Scorecard

A classical performance measurement instrument is the Balanced Scorecard (BSC). The BSC was developed by Kaplan and Norton as a translating mechanism of an organization's strategy into operational terms (Kaplan and Norton 2005). By examining the organization's strategy, it is inevitable to set measures for the organization's performance that lead to the strategy's goals. This performance measurement is performed by using the BSC, which is in fact a list of 18-25 key measures to compare the actual state of the organization's performance to determined targets. By dividing these measures into four groups (financial, customer, internal business processes, learning and growth) the management is able to discern cause-and-effect relationships throughout the strategy. Each category contains a certain amount of factors and ratios, which are to be chosen freely by every user of the scorecard.

Because of the popularity of the BSC model and its high presence in research the BSC is used by the authors as an approach for measuring service performances. According to the already discussed performance measurement problem and the inevitability of including input factors as well as output factors, the original BSC model is not quite sufficient. While the initial BSC lacks of input factors the authors decided to enhance it to a Learning Scorecard, now including input factors. Since Kaplan and Norton stated that "the four perspectives should be considered a template, not a straitjacket. No mathematical theorem exists that four perspectives are both necessary and sufficient" (Kaplan and Norton 2005). Hence the aim of the study at hand is to derive an approach, which helps educational service providers to operationalize productivity measurement, considering the specific requirements of this field.

2.3. Productivity of Educational Services

Knowledge intensive services can be predominantly found in the sectors of communication, financials, research and consulting, health care, education, media and logistics. Additionally, the expression "information-intensive" is used with an almost identical meaning (Apte and Mason 1995). This study focuses on educational services, considering potentials following from (partial) automation through IT.

In this field Bitzer et al. (2010) derived a conceptual draft to systematically assign input and output factors of IT-supported educational services from research results of various disciplines.

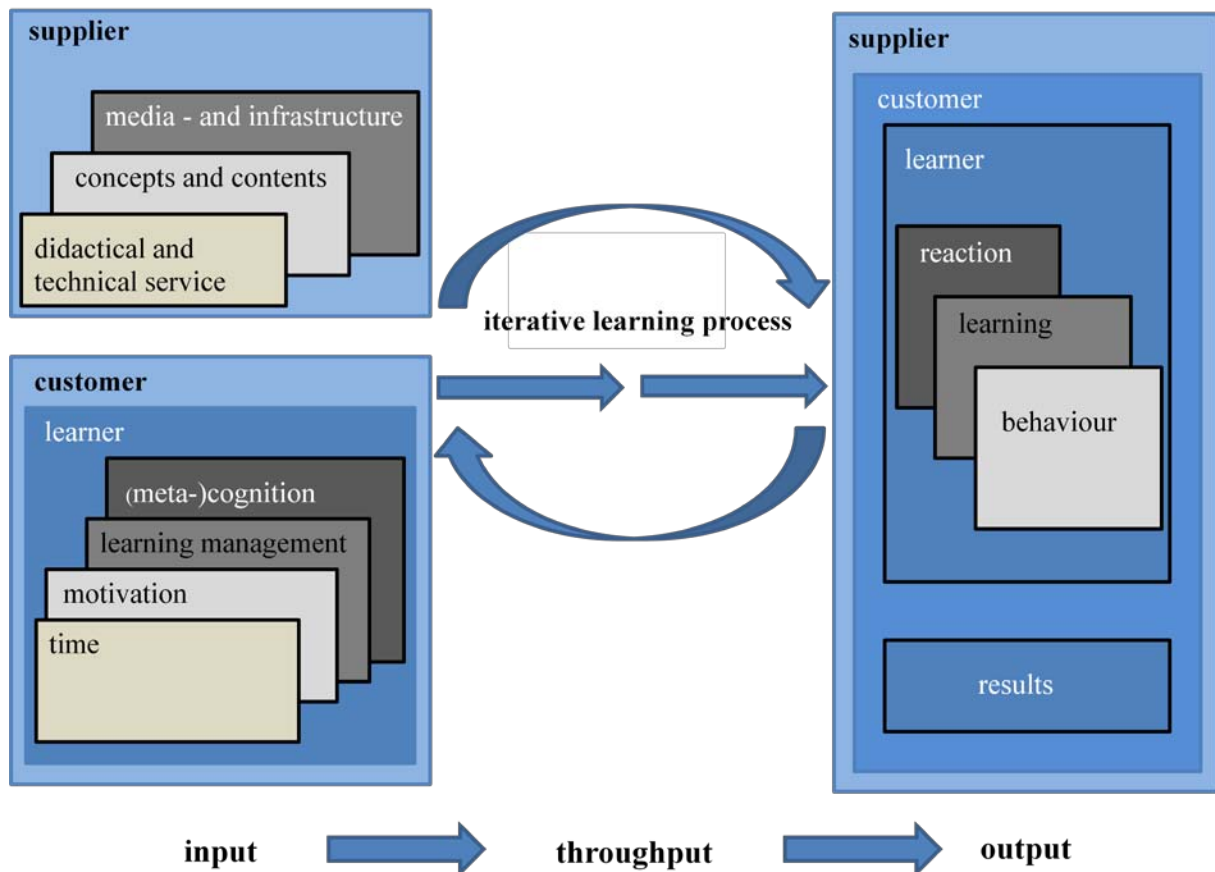


Fig. 1: Productivity scheme for educational services

The authors developed a productivity scheme, derived from theoretical, learning and IT-related models of various disciplines, i.e. pedagogic, information systems, psychology and business. The productivity systematic includes two perspectives, the supplier of the educational service on the one hand and the customer of the educational service on the other hand.

The supplier input perspective consists of three aspects, derived from the widely-known IS-Model (DeLoneund McLean 2003). Analogous to the influence factors of the IS-Model, three influencing factors for educational services were identified. Media- and infrastructure (system quality), concepts and contents (information quality) and didactical and technical service (service quality).

The customer input perspective consists of two elements. The authors differentiate between the customer, i.e. the company who is the buyer of the educational service, and the learner, i.e. the person who is directly consuming the educational service. (Meta-)cognition, learning management, i.e. the ability to develop and realize learning strategies and motivation are derived from the well-known theoretical model of Pintrich and De Groot (1990). Additionally the influencing factor “time” was added, i.e. the amount of time the customer is willing to spend on preparation, conduction and post-processing. Time can be considered as an important input and process related influencing factor on service success.

The output perspective is summed up for suppliers as well as customers respectively learners. Considering the famous research of Kirkpatrick and Phillips (Phillips 1996; Kirkpatrick 2006), four different output-levels were taken into consideration. Reaction

describes direct effects on the learner, mostly affective effects. Learning describes the knowledge which was acquired and behaviour means the transfer of knowledge into working improvements within the company. Results describe the economically measurable influences caused by the training.

The productivity scheme can be considered as a first draft for further research and practical examinations of existing productivity research on educational services. To apply the model in specific situations it is necessary to develop factors which can be transferred into measurable or checkable productivity indicators.

3. Methodology

In order to integrate and involve educational and academic professionals into the development and systematization of a productivity model for educational services, we choose a research design based on focus groups, an approach which is recommended e.g. by (Greenbaum 1998) for idea generation. Focus groups are a way to collect qualitative information from a group of experts. Researchers initiate and learn from discussions on specified topics of interest. Whereas focus groups should allow a group to have its own dynamic and group members should develop their ideas collaboratively, it is crucial for focus group researchers to define the focus and goal of the discussion and guide the group to what they want to learn about (Morgan 1998). In this case, the focus of the qualitative study is to learn from experts in education which relevant influence factors they identify for the productivity of educational services and to collaboratively develop a productivity scheme.

Collaboration aims at solving complex tasks in a joint effort to reach a common goal, where a single individual is unable to cope with the complexity of a task or where a group can perform better. Particularly during the phase of divergent idea generation and collection, collaboration benefits from heterogeneous groups, who bring in different perspectives on a subject from their area of expertise. In our case, experts in undergraduate as well as professional education from different universities and with different backgrounds have been invited to collaborate. As input factors for advanced training services are likely to differ in some points from those in undergraduate teaching, knowledge and ideas from different settings are incorporated in the collaborative process. Jackson (1992) states "heterogeneous groups are more likely than homogeneous groups to be creative and to reach high-quality decisions". The results of collaborative settings, where a group consisting of various stakeholders work together, are more likely to be accepted (Hoffman and Maier 1961). To support effective collaboration and ensure goal attainment, a structured process needs to be designed (Briggs et al. 2003; Kolfschoten et al. 2009). The aim of collaboration engineering is to create practices that evoke recurring collaboration patterns and can be used to support recurring processes (Briggs et al. 2006). A collaboration engineering approach has been applied to structure the generation, collection and systemizing of input and output factors for a productivity model for educational services. We follow a five step approach developed by Kolfschoten et al. (2009) to derive a collaboration process design:

Step 1 - Task Diagnosis: The collaboration goals, requirements and constraints are discussed with the stakeholders. In this step the task, stakeholders, resources and the characteristics of facilitators and practitioners involved are analyzed.

Step 2 - Task Decomposition: The task needs to be decomposed into activities corresponding to the general patterns of collaboration, either based on the results of each activity or the pattern of collaboration that it evokes.

Step 3 – Task-thinkLet Choice: Activities will be matched to thinkLets. A thinkLet design pattern is - „a named, packaged facilitation technique that creates a predictable and repeatable pattern of collaboration among people working towards a goal“ (Kolfschoten, Briggs et al. 2006). ThinkLets are used to give advice on how to implement common activities and to facilitate reusable patterns of collaboration (Briggsund De Vreede 2009).

Step 4 - Agenda Building: The agenda comprises the sequence of thinkLets and activities, instructions and questions for the participants. It should include all required details to execute the collaborative process such as the name and description of the thinkLet, the time and resources needed for each activity and the specific behavior required by the facilitator or participants.

Step 5 - Validation: Before the process is implemented in practice, it can be tested in various ways (i.e. pilot testing, walk-through, act it out, expert evaluation) to identify problems and make adaptations to the design before it is finally executed.

We implement the workshop design in a group support software. Group support systems (GSS) are applicable to render many collaborative settings more efficient and effective than workshop designs without technological support. Prior research has shown the advantages of GSS, which tend to reduce costs and facilitate participants to perform activities faster (Grohowski, McGoff et al. 1990; Boehm, Grunbacker et al. 2001). Furthermore, Zigurs and Buckland (1998) point out that GSS technology can foster communication, structure processes and support information processing. All activities performed throughout GSS can be carried out anonymously, which leads to various advantages. On the one hand, anonymity in collaborative settings mitigates status differences and thus frees participants from fear of contribution; on the other hand, group pressure on individuals can be reduced (Flanagin, Tiyaamornwong, O'Connor, & Seibold, 2002; Nunamaker, Briggs, Mittleman, Vogel, & Balthazard, 1996).

3.1. Workshop development

Following the collaboration process design approach by Kolfschoten et al. (2009) described above, we identified collecting a set of relevant input and output factors for educational services as the collaboration goal for the workshop (Step 1). In a discussion with the workshop designers as well as the main stakeholders involved, we defined that the factors need to be structured in a way all participants can agree on and in a form that is suitable for using them for advancing a productivity model for educational services. Thus, the workshop`s product has to be a reasonable number of input and output factor categories of which each contains related factors. The categories as well as the factors need to be unique and concrete. In particular, it has to be ensured that all participants develop a shared understanding of each category and factor and that the factors are a suitable basis for the development of measures at a later stage.

In the second step, we decomposed the task that was defined before into a sequence of activities (Step 2). The requirements specified in the task diagnosis step led to the conclusion that divergent as well as convergent phases were necessary in the workshop design. To collect a broad variety of input and output factors without the restrictions of a predefined scheme, a convergent brainstorming activity was chosen to start the collaborative process, which represents a “generate” pattern of collaboration (de Vreede et al. 2009). A follow-up activity is needed to clarify the factors that were collected and build a shared understanding. The “clarify” phase can be combined with the development of categories, which help to group the factors in a next activity. The activity to “organize” the factors into categories can be executed individually, however the results should be discussed within the group to build consensus on the allocation of factors to categories. Due to the time limitations of the workshop, we decided to end the workshop at this stage. The raw results were discussed, refined and processed in a small group of three education researchers to match a format that is suitable for the use in a productivity model.

For each activity in the workshop, thinkLets have been chosen to structure the work where available or new facilitation techniques are developed in case there is no suitable thinkLet (Step 3). A workshop agenda has been developed based on the sequence of activities and the time and resource constraints (Step 4), which will be discussed in the following section. As the workshop described in this paper is the first execution of the workshop design, it was validated by a walk-through with three education and collaboration engineering researchers to check whether the questions specified in the activities are likely to guide the group towards the expected results.

3.2. Description of workshop design

The collaboration process design activities described above result in an agenda for a three hour collaboration workshop that follows the group goal of identifying input and output factors for educational services. Table 1 shows the workshop agenda, including starting time of each activity, the thinkLets used and the patterns of collaboration evoked and a description of the activity. For each of the collaborative activities a predefined thinkLet from Briggs and de Vreede's (2010) catalogue of established thinkLets could be applied with only minor adaptations. As the preconditions for applying those thinkLets concerning e.g. recommended group size, inputs and outputs of the activity were met, they were considered as useful design patterns for our context. One adaptation is made in activity two and three, where a FastFocus and Theme-Seeker thinkLet are mixed and executed in parallel. This choice was made due to the similar approach of both thinkLets which allowed synergies in the process. Thus, it was only necessary to discuss the list of input and output factors once.

	<i>Starting Time</i>	<i>Activity (thinkLet)</i>	<i>Pattern of Collaboration</i>	<i>Description</i>
0	10:15	Introduction		Moderator introduces participants to the workshop goal and GSS
1	10:25	Brainstorming (OnePage)	Generate	Team members contribute input and output factors to a shared electronic page in GSS
2	10:45	Clear factor list (FastFocus)	Clarify/Reduce	Team discusses the meaning and wording of factors and removes duplicates
3		Develop Categories (Theme-Seeker)	Organize	Team members point out common themes of factors. Framing is discussed and categories are added as buckets for following PopcornSort
	11:30	Break		
4	11:45	Organize Factors (Popcorn-Sort)	Organize	Team members drag and drop factors into category-buckets
5	12:15	Validation of factor assignment (BucketWalk)	Evaluate	Moderator shows each categories` factors, assignment of factors to categories is checked and refined jointly
6	13:00	Wrap-up	Build Consensus	Summary of the workshop results, discussion of next steps and end of workshop

Table 1 Workshop Agenda

The workshop is executed with 10 professionals in education and academic teaching in a conference facility. Each participant has access to a GSS session through individual notebooks. The session is led by an experienced moderator and supported by a facilitator, taking care of the IT processes.

The results of the group workshop and their implications for a productivity model for educational services will be discussed in the following sections.

4. Results

In this section the results of the workshop are presented in detail. Factors for all three service productivity dimensions were identified, i.e. input, throughput and output factors. In the following the factors are explained in order of the productivity systematic.

4.1. Input Factors

Environment, infrastructure, customer

The first section of input factors is summarized under *environment, infrastructure and customer*. The section describes various moderating factors which potentially influence results of educational services. It contains the following categories:

a.) Customer

This category contains influencing factors determined by the customer of an educational service. The customer is not necessarily identical with the learner. In practice companies often hire educational service providers, which deliver the service for their employees. Nevertheless, the customer can have significant influence on the result of an educational service. First of all, several customer activities were named that influence learners' motivation through the customers' training strategy, i.e. support of learner directly through customer, the match of customer demands with expectations of learners, incentives for learners, prestige of advanced training, preparation of learners and communication measures of practical use and benefits. These factors can have a significant influence on the learners' training motivation, which is an important determinant of training results (Mathieu, Tannenbaum et al. 1992; Colquitt, LePine et al. 2000).

Second of all, factors which influence the customers / companies' perception of costs came up, i.e. monetary expenses (direct costs), absences due to the training (indirect costs).

Third of all, agreement upon selected objectives between customers and learners was named as an influencing factor on service success. This result was examined several studies as well. It was shown that an agreement between customer and learners on the training objectives can have a positive influence on the educational services' results (Tannenbaum, Mathieu et al. 1991).

b.) Group

It is widely known in literature, that the composition of groups has significant influence on learning results (Webb 1982; Springer, Stanne et al. 1999). The workshop participants named various moderating group effects on learning success, which were group size, heterogeneity of the group of learners, interaction and motivation within the group, diverging goals within the group, incompetent learners and group dynamics.

c.) Learning environment

The category *learning environment* contains influencing factors, which are mainly under the control of the service provider and should be prepared before the actual service starts. Factors like attractive learning environment, equipment of accommodation, background noise and spatial situation have been mentioned in this

category. There is evidence in literature, that environmental conditions can have an influence on the perception of service quality and on learning results.

d.) Tools / IT

The effectiveness of the already discussed (partial) automation of learning services is among others affected by the robustness of the IT-infrastructure, the online availability of materials and the presentation which specifically should address different manners of perception. Thus, strictly online, respectively digital, presentation is not always seen as the best way but, in some cases, paper bound communication could be more appropriate. The so-called blended learning system leads to higher learning success and effectiveness, which is also proven in comparison based research (López-Pérez, Pérez-López et al. 2010; Stricker, Weibel et al. 2010). Though, the measurement of the improvement through the use of IT is a highly discussed field of research. The internationally respected IS Success Model introduced by DeLone and McLean (2003) displays a solution and confirms the already mentioned success factors. The model consists of three quality input factors which are the information quality, the service quality and the system quality which includes e.g. the robustness of the IT-infrastructure. Additionally, the application of IT has to be concerted to support the teaching materials and not just for sake of usage. Therefore also the selection of fitting IT instruments out of various possibilities is of essential importance. Last but not least, the usability of the implemented IT is a greatly weighted factor. To explain this more detailed it seems obvious to mention the technology acceptance model (TAM) developed by Davis. In the TAM, the use of IT is determined by two key aspects, first, the usefulness which is expected by the possible user of the IT and second, the perceived ease of use which reflects the before mentioned usability of IT (Davis 1989). So IT-use increases when the effort required to use the instrument is minimized and the IT-system is made easy to get used to. Referring to the IS Success Model, the usage of and the user satisfaction with an IT-System is also influenced by the use itself (DeLone und McLean 2003). This again proves the correlation between earlier research and the findings within the workshop.

Lecturer

The following group of input factors falls under the label *Lecturer*. They display characteristics and possible influences of the lecturer on the success of the learning process. *Lecturer* consists of the following categories:

a.) Moderating conditions

The lecturer and especially his selection are of high importance for the learning framework. He/she should be available for the learners in case of them wishing for contact outside the lectures. The workshop's participants furthermore mentioned that the learning objective and the characteristics of the lecturer should be matching and he should also adequately be prepared for his specific teaching task e.g. provided with necessary material, previous knowledge of the learners etc. Another preparation responsibility on the educational service provider's part is to ensure motivation of the lecturer.

b.) Didactical competences

The lecturer's didactical competences are identified to have a major effect on the quality of the transfer of knowledge. This area of qualities contains the presentation of the learning contents, the selection of goals and the style of the lecture, i.e. cooperative, collegial or commanding. In addition, the lecturer's preparation of the learners for each teaching lesson seems to be important as well as the selected learning targets being redeemable or testable etc.

c.) Professional competence

Besides the didactical qualification of the lecturer he should furthermore be an expert in the taught subject. In addition, he should be able to adapt the learning program to the demands of the learners even during the teaching performance.

d.) Social competence

Adding to these traits of character, the lecturer's social competence must not be disregarded. Hence, he should show that he is willing to communicate with the learners and should even try to address the individual persons he is teaching. That includes an adequate grade of enthusiasm which should be shown by the lecturer.

Learning Content

In this category, characteristics of the learning content and the preparation of contents are described. It contains the following categories:

a.) Characteristics

It is not only important how one teaches and who is teaching but also what is to be taught. Thus the amount and the demand of the learning content have an effect on the teaching success. Additionally, the preparation of the content matters. So it is necessary to create a clear and obvious structure with the result that the learners get a picture of the teaching's goals and the way to get there. The "what" includes also the often mentioned keyword of practical relevance. So it is claimed that subjects with a high amount of practical relevance are more likely to lead to learning success.

b.) Teaching material

Associated with the characteristics of the used tools the teaching material should be used in a structured and differentiated way. It has to be prepared accompanied by the didactical methods and the approach of different perceptions. The teaching material should also be accessible not only during lessons but also for the preparation and the post-processing done by the learners.

Learner

The last section of input factors is called *Learner*. The learner is participating in the learning service. He/she too has an impact on the success of the learning process and on whether it is rapidly accomplished or slowed down. The input-factors are divided in the following categories:

a.) Extrinsic Motivation

One of the first definitions of the two motivation differentiating notions “extrinsic” and “intrinsic” has been done by De Charms. Thereby, a learner is extrinsically motivated “when [he] perceives the locus of causality for his behaviour to be external to himself” (DeCharms 1968). To these extrinsic motivators count costs, fears, time availability, the prestige of the certificate, the pressure to perform and other inducements, especially on the part of the customer. Another extrinsic motivator is also the sympathy for the lecturer which influences the effort being made by the learner.

b.) Intrinsic Motivation

Conversely, a learner is intrinsically motivated “when [he] experiences himself to be the locus of causality for his own behavior” (DeCharms 1968). The greatest impact on the intrinsic motivation is made by personal interest in the taught subjects. Other causes for this kind of motivation are the individually expected benefits, the perceived relevance of the gained knowledge and other personal objectives.

c.) Capability

The capability of the learners varies widely. It includes the individual intelligence, the learning capability and performed diligence. Further characteristics that influence learning success are the willingness for preparation for a lesson and the preparation and post-processing of the learner itself, his/her engagement in class and the learner’s previous knowledge.

d.) Technology Readiness

The technology readiness of the learners affects the success of used IT-instruments. Therefore it is essential that the learner’s media competence is high and a possibility of accessing the IT-instruments at work, at home etc. is present.

4.2. Process of Service Delivery

The perspective *Process of Service Delivery* refers to the actual provision of the prepared educational service. Affected by all of the input factors the process delivery not only affects but also generates the success. It contains the following categories:

a.) Didactical characteristics

The didactical characteristics of the learning process, influenced by the lecturer seem to have an impact to the success of the learning process. Hence, the workshop revealed items like inquiringly learning, the training of the learning content in group work and the regular activation of the learners throughout the lecture that have positive impact. Furthermore, the requirements of the lecture should fit the precognition and the proficiencies of the learners. Within the service delivery, the supporting tools should be carefully chosen and regular exercises should be provided. To check the performance of each learner, not only matching inquiries should be performed but also possibilities for each learner to self-check should be offered.

b.) Service quality

The quality of service includes the ergonomics of the service, i.e. an easy handling which contains factors like self-explanatory instruments etc. The provided learning environment is another factor, positively influenced by e.g. harmonic and personal context.

c.) Temporal factors

Temporal restrictions like additional business can lower the success of the learning process as well as time pressure which in some cases also has a positive impact on the success. According to the workshop's participants, besides the absence of temporal restrictions and time pressure, the amount of time spent learning is raising success chances as well.

4.3. Learning Results

The outputs of the educational service are summarized under the item *Output*. Basically the results contain the consequences for the learners and the customer and consist of the following categories:

a.) Satisfaction

This factor reflects the customer/learner satisfaction and is the most important aspect in order to win new learners/customers and get earlier learners/customers to return (Kirkpatrick 2006). First of all the learners as well as the customer has to be pleased with the outcomes and with the learning process itself. The learners should experience emotional and motivational strengthening caused by the training. For the success of a process of education it seems to be essential that outsiders (e.g. colleagues, superiors, etc.) show a certain amount of approval to the results.

b.) Knowledge

An increase of knowledge is one of the three fundamentals to changing a learner's behaviour (Kirkpatrick 2006). Not surprisingly, the workshop revealed the learned knowledge as one result factors of educational services. This contains the amount of knowledge gained right after the training.

c.) Transfer / Use

The competencies which were acquired over a certain period of time were named as possible results of educational services. Especially for the customer this point seems to be of great importance. Based on b.) transferring the gained knowledge is the next level which is to be analyzed in order to evaluate service performance (Kirkpatrick 2006). Therefore the job of the lecturer has to be making the learners able to transfer the learning content.

d.) Results / Chances

Another outcome of the workshop is that accompanied by the points b.) and c.) the gained chances for the learners especially in work are signs of successful learning. This can be a consequence of the successful application of the competencies and improved economic results. These chances depend on the customer's application of trainings based career chances.

e.) Reputation

In order to raise the reputation of a lecture the outcomes should be published which vice versa makes the outcomes more valuable.

These dimensions and factors now have to be advanced into individually applicable factors, which can be mixed, depending on the strategy and priorities of educational service providers.

5. Discussion

After having divided the raised input-, throughput- and output-factors in six categories (i.e. environment, infrastructure, customer; lecturer; learning content; learner; process of service delivery; learning results) the objective of this research is to develop a learning scorecard approach which matches the requirements of evaluating productivity of (learning) services. To achieve that, a transformation of the four BSC perspectives is needed. For each factor within these six sections of factors, a ratio is necessary in order to compare the planned and the actual state of the desired outcome. However, measuring is not as simple for some of these factors e.g. intrinsic motivation, social competence etc.

The *internal business processes* perspective which refers to processes within businesses "that create customer and shareholder satisfaction" (Kaplanund Norton 2005) can be used without any transformation. So the category *process of service delivery* is sorted into the existing perspective *internal business processes*.

Similar to the process perspective the *customer* perspective is handled. Hence, the category *learner* matches to its meaning, namely "creating value and differentiation from the perspective of the customer" (Kaplanund Norton 2005). Here it is important to see that the differentiation between customer and learner, as mentioned above, has to be considered during the process of developing adequate key performance indicators.

The third original perspective, *learning and growth*, which contains factors that support the potential of organizational growth is being renamed to *potential*. It will embody three of the perspectives i.e. environment, infrastructure and customer, learning content and lecturer (Kaplanund Norton 2005).

Since the *financial* perspective refers to possible strategies for generating growth and profitability for the shareholders (Kaplanund Norton 2005), it is necessary to divide this perspective into two parts. The difference between these sections lies in the level of reflection. The first part (*customer value*) is the actual goal of an educational service which is to create added value for the customer, i.e. the company that delegates

the lectures. The second part is the financial insight of the service delivering party which is represented through *the costs of inputs and throughputs*.

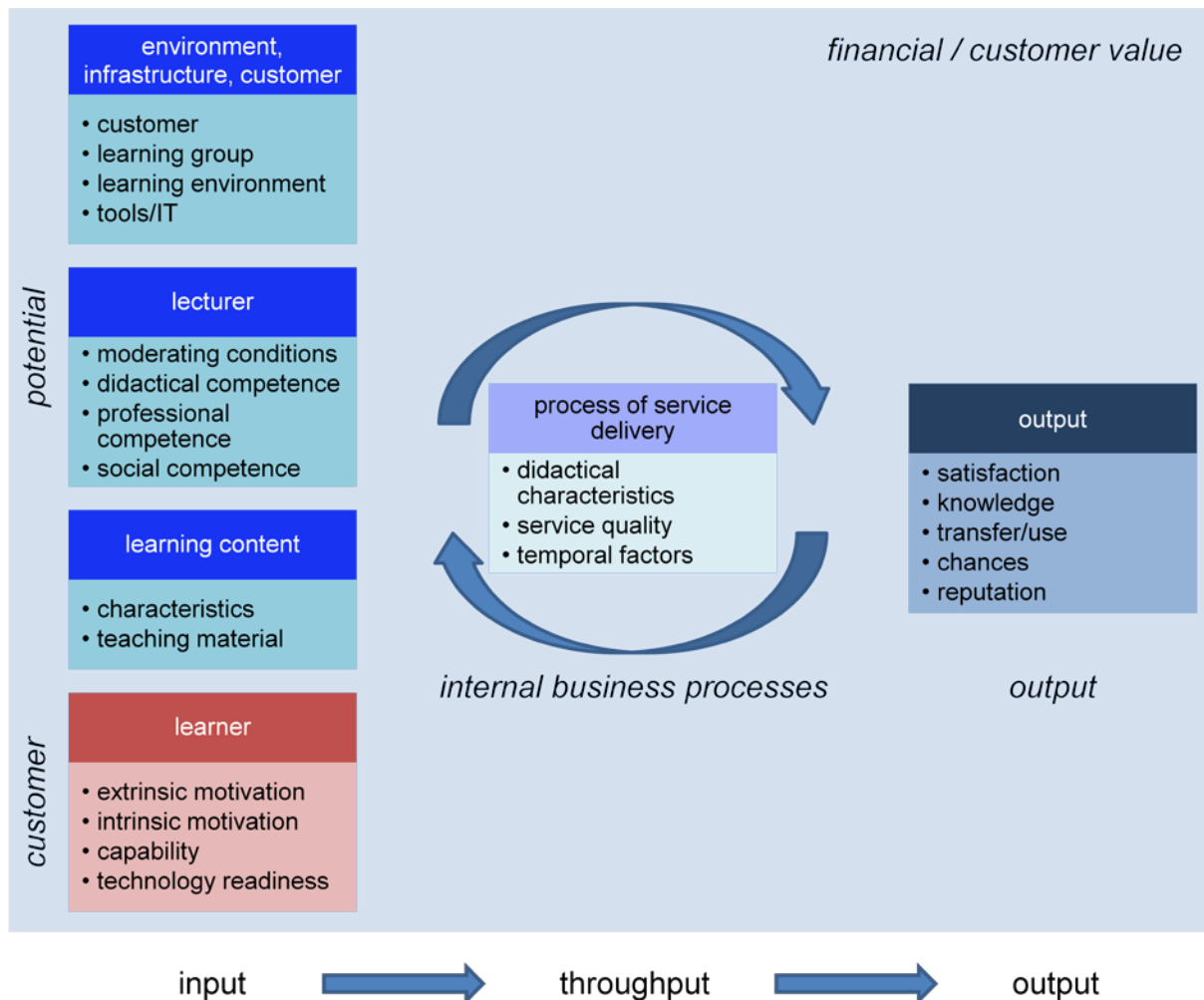


Fig. 2: The Learning Scorecard

In Fig. 2 the developed Learning Scorecard is presented and the four perspectives are differentiated by color. In order to work with this scorecard the actual user has to choose which perspective he needs and which of the categories he wants to consider. Therefore it should be mentioned again that the Learning Scorecard as well as the Balanced Scorecard just provide a template and are not necessarily applied unmodified. When the perspectives and the categories are chosen the user has to measure the factors within. Like earlier indicated many factors referring to educational services are hardly countable. Therefore questionnaires could be used to raise the needed data. The IS Success Model by DeLone and McLean (DeLone und McLean 2003) provides an instrument for measuring “soft” factors like these. Another way to handle the intangibility of the service quality is to use the GAP Model introduced by (Parasuraman, Zeithaml et al. 1985).

Besides the intangible factors of the services the “hard” factors can be measured with performance indicators. As IT services in general, IT-supported educational services are highly company-specific. Therefore a collaborative approach of the indicator development is possible, which support the collaboration between different stakeholders to develop a comprehensive and company-specific set of key performance

indicators (Bitzer, Hirdes et al. 2011). It is furthermore recommended that every company using tools like the learning scorecard develops individual, focus-dependent performance indicators. Due to the highly varying influencing factors in the service industry a general measurement tool is not possible to develop. In repeating the earlier statement, the scorecard approach is a guidance for companies which is still in need for specification and individualization.

6. Outlook & Limitations

Our above presented input factors influencing the learning process and its success resulted from a workshop as described in the method section. Hence, these results are grounded in the view of a limited and rather small number of people and are therefore no representative sample. Furthermore, we considered only the educational service delivery and not its creation. In a next step an examination of the creation process of the service delivery and of the used tools/IT is necessary and will be added to the input factors. Since we considered only the view of lecturers, another limitation to the completeness of the results could be the missing opinion of learners.

The next steps therefore have to be an empirical validation of the results. Furthermore, an application of the scorecard concept could help to estimate the value of the scorecard within educational service productivity measurement. Additionally an enlargement of the approach requires the consideration of service creation. Hence, an exploration of the service creation process has to be conducted.

6.1.1. Author address

Philipp, Bitzer, Dipl.-Kfm.
University of Kassel
Chair of Information Systems
Nora-Platiel-Straße 4
34127 Kassel
Germany
bitzer@uni-kassel.de

Eva A., Bittner, Dipl.-Kfm.
University of Kassel
Chair of Information Systems
Nora-Platiel-Straße 4
34127 Kassel
Germany
eva.bittner@uni-kassel.de

Jan Marco, Leimeister, Prof.Dr.
University of Kassel
Chair of Information Systems
Nora-Platiel-Straße 4
34127 Kassel
Germany
leimeister@uni-kassel.de

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