

# Requirements for Operating Models of Virtual Educational Networks

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## ABSTRACT

In order to illustrate requirements of virtual educational networks (VENs), operating models and their structure, the functions and roles in VENs along with their value creation processes will be identified in the following. This article furthermore provides an overview of experiences that have been made with the establishment of WINFOLine, an interuniversitarian e-learning VEN in Germany. First requirements for the extension into a self-contained, efficient, and open network are presented. The focus of this article is on organizational changes in traditional universities which occur if they wish or are urged to act as suppliers or customers in VENs.

## PREAMBLE

Empirical studies show that German universities and their units (e.g. chairs), especially compared to, for example, US-American universities, behave with restraints towards private and institutional demand on the growth market of further education and especially of e-learning based educational offers [HUTZSCHENREUTER/ ENDERS 2002]. One reason that can be identified is the problem of organizing marketable educational (e-learning) offers and services. Support to the units can be established within the universities (e.g. through separate virtual universities) as well as through interuniversitarian approaches, like virtual educational networks (VENs). So-called VENs can act as brokers [BOLLIER, 1996] in the sense of cybermediaries and are able to coordinate the levels of providers and consumers on global educational markets.

The services of VENs are directed at a multitude of consumers to satisfy their specific needs for e-learning based education. Corresponding to the structure of a network, the providers of services are recruited from different fields [BOHL/GROHMANN/MARTIN, 2002]. Further profit results from a consolidation of chair- or institution-specific competencies due to the underlying network idea [MARTIN/SCHEER/BOHL/WINAND, 2003]. The following considerations are based on experiences which have been acquired since 1997 in the „Education Network WINFOLine“ in the field of higher education. The focus there is on internet-based training in the field of information systems through a range of high-quality educational products [BOHL/GROHMANN/MARTIN, 2002].

## VALUE CREATION PROCESSES OF VIRTUAL EDUCATIONAL NETWORKS (VENS)

A schematic inspection of virtual universities' as well as of VENs' value creation processes amounts to a list of separate operations or rather functions and roles. These individual features add up to the over-all outcome of educational networks. This approach is equal to Porter's definition and identification of value chains which subdivide a business enterprise into operations that are strategically relevant and may create competitive advantage themselves [PORTER, 2000].

Since operations of a VEN can be found in a decentralized way, and because they are scattered about those who are involved, one can speak of the investigation of a value system. Aiming at supplementing the value chain concept, Porter defines the value system as a firm's wide field

of operations in which the value chain is embedded [PORTER, 2000]. Before analyzing a complete value system it is important to find out which groups – e.g. persons, institutions or firms – have to be considered.

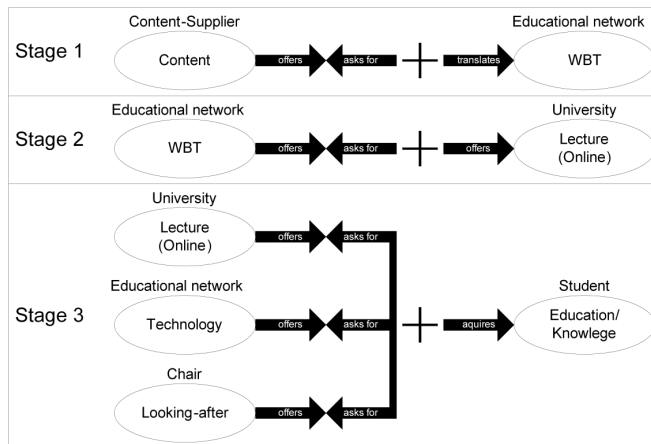
A temporary identification of the participants and their roles and functions with the help of a schematic illustration of the value creation process is instrumental. The following figure illustrates the prototypical configuration of a VEN's value creation processes.

VENs must handle their organization and create incentives for potential partners in a way that the depicted partial performances are carried out as good as possible. It becomes clear that all of these operations have to be implemented in order to assure a sustained VEN, but it is also possible that the functions may be held by other participants than those used in figure 1. The optimal implementation of operations – which is regarded as the main objective of VENs – includes the idea that persons can be found who are interested in carrying out the operation, and that those participants, who carry out the operations, strive for the optimal outcome [BOHL/SCHELLHASE/WINAND, 2002].

The call for an optimized implementation of operations is not restricted exclusively to service suppliers. For example, a functioning educational network also has to set sensible limits to an educational network's demand of lecture contents. The demanded and gained content has to be translated into educational offers. In the portrayed prototypical configuration it is assumed that this translation is carried out by the operators of the educational network, but in general additional people – e.g. external chairs or other service suppliers – should not be excluded [BOHL/FRANKFURTH/SCHELLHASE/WINAND, 2002]. Moreover, it is possible in the long run to entrust a special organizational unit within the network with the establishment or rather the implementation of educational offers. The configured educational services are offered to the market – in Figure 1 to the universities – by the VEN. At this point, the function of the demand for educational service on the side of the educational market has to become the regulator of supply. One can assume that the influence of the customers will grow due to their strong ability to negotiate with middlemen [PORTER, 1999]. In the portrayed configuration this means that students at a state university have less influence than students at a private university. This assumption results from the fact that the students' satisfaction at a private university and their decision for or against that university might have a financial impact on it that is stronger than it is at state universities. In spite of these various degrees of feedback intensities it must be stressed that, in the long run, the sustained development of educational networks depends on the satisfaction that can be reached with the customers and users of educational networks.

The terminology of a multi-tier distribution channel lies at hand because the merchants' demand potential is also influenced, by the demand of the ultimate users, although the middleman usually decides autonomously on his demand level. Here again, feedback effects are present. Due to the little influence that students have at state universities, one can speak of a double-tier distribution channel in this case because the educational network as well as the universities can be regarded as participants. According to this assumption, the state universities can be regarded as ultimate users, whereas the students can only be regarded as ultimate users but not as ultimate customers. The students' demand for a VEN's services at their universities is connected to the demand for

Figure 1: Prototypical Configuration of a VEN's Value Creation Processes



further services. Among other things this includes the technological supply of learning opportunities, including the administration and transmission of learner results, looking after the students as well as transmitting the results to the universities.

To sum up, it is important that all participants of value creation processes in VENs carry out their jobs in the best possible way. This is also true for VENs as organizations. Therefore, the integration of the involved "educational network" necessitates the consideration of adequate incentives that still need to be set up.

## PARTICIPANTS IN VIRTUAL EDUCATIONAL NETWORKS: A FUNCTIONAL VIEW

The following examples illustrate heterogeneous activities, necessary for the success of a VEN (as well as of a virtual university), which can be carried out by various participants:

- *Content*, which serves as a basis for the development of educational offers (e.g. WBTs), can derive from university teachers and chairs.
- The *transformation/translation of contents to educational offers* can be carried out by employees at participating chairs of the educational network. This procedure corresponds to present-day practice. However, it cannot be ruled out that the realization can also be carried out by other chairs or instructed third persons.

- The *demand for educational offers* may emerge from universities, but in view of the rising importance of decentralized general budgets [YORCK, 2001] chairs, or rather faculties, can be suppliers, too. Likewise, firms can be identified as possible consumers.

In addition, participants of the value creation process may have different kinds of expectations towards VENs, depending on their intentions, while taking part in the value creation process or which role they want to play in it. This assumption can be clarified with the help of universities, which participate in the value creation process of VENs with various intentions: First, a university could expand the range of lectures through the offer of VEN courses. Second, a university could offer additional degrees (e.g. a further course of study leading to an academic degree, e.g. master's or PhD degree) and merchandise them in order to generate additional revenues. In the second case the university's entitlement to a VEN is usually bigger, because tuition fee-paying students can claim an expanded service.

Since certain functions in VENs can be fulfilled by various participants and since their motives can vary extremely depending on their function, a categorization which is orientated towards the participants as a target group seems to make only limited sense. Furthermore, a specific participant, for example a single chair, may fulfill various functions. All this results in a function-orientated view of educational networks. One does not necessarily have to differentiate between those functions that are fulfilled by human beings and those that can be taken care of by electronic media.

The functions in Table 1 can be identified in the field of VENs.

Figure 2 illustrates the mentioned functions in the prototypical value system model of VENs, showing general directions of the incentives that still need to be created. The represented functions have to be fulfilled by certain persons, organizations, institutions, or systems. The persons, organizations, institutions, or systems that are identified as potential fulfillers of functions will be referred to as participants in the following.

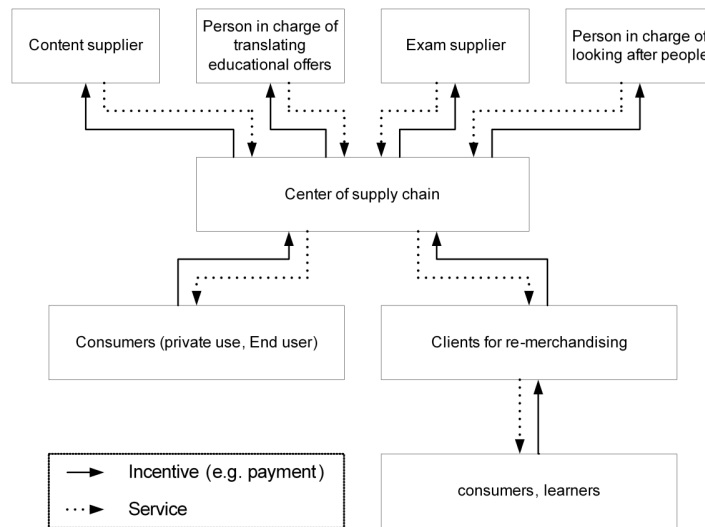
According to the portrayed function model the following actors can be participants in a VEN:

- university teachers
- chairs
- universities
- other educational suppliers
- learners
- center of the supply chain (for example the educational network WINFOLine)
- firms
- content merchandisers

Table 1. Functions and Activities in VENs and in Virtual Universities

function	activity
<i>Content supplier</i>	Provision of content for the realization of educational offers
<i>Person in charge of translating educational offers into action</i>	Processing of content into educational offers
<i>Exam supplier</i>	Preparation, conception and holding of exam performances in the educational network
<i>Person in charge of looking after people</i>	Looking after ultimate customers/ ultimate users
<i>Centre of supply chain</i>	Demand for educational offers, demand for content, demand for looking after services, coordination and merchandizing of educational services, provision of technological infrastructure, administrative work
<i>Ultimate customer / ultimate user</i>	Demand for lectures including direct sale as well as interposed educational institutions
<i>Consumers in the double-tier distribution channel</i>	Demand for educational offers that are <u>free of charge</u> for own students/ employees
<i>Consumers in the triple-tier distribution channel</i>	Demand for educational offers that are <u>liable to pay costs</u> for own students/ employees

Figure 2. General Directions of the Incentives' Effects



A distinction between university teachers and chairs is explicitly made. The chair is an organizational unit within a university, whereas the individual university teacher is a private person. The distinction between these two groups results first of all from thoughts about the right of ownership.

### Content Suppliers

For the sustained use of VENs it is important to acquire partners who provide learning Content. This function of the content supplier can be fulfilled by various participants. The educational networks introduced in this contribution acquire chairs or university teachers as content suppliers most of the time. Other possible content suppliers are content-merchandisers who hold the rights on interesting publications. Organizations outside the educational sector are thinkable, for example for the integration of case studies that refer to firms in action.

The role of the content supplier is limited to the task of supplying educational networks with meaningful input. The function of the person in charge of looking after people and the one of the person holding exams must be considered separately, even if it can be expected that the realization of these functions is usually bundled up in an institution.

### Person in Charge of Translating Educational Offers into Action

The position of the person in charge of translating educational offers into action integrates services that have to do with constructing an educational offer such as a web-based training (WBT) from content provided by content suppliers. The extent of the service depends on the supplied content, the desired complexity and the extent of the educational offer.

The position of the person in charge of for example producing WBTs can be occupied by chairs but also by other qualified participants. Alternatively, firms which specialize in producing WBTs and which gain importance on the overall market, can be taken into consideration.

For all persons and organizations that can possibly be in charge of translating educational offers into e.g. WBTs there is an equal necessity to cooperate closely with the content-suppliers. When producing WBTs various suggestions of the content-supplier should be taken into consideration because the content and its applied presentation are closely related to each other. A constant maintenance and cultivation of contents is in the interest of the merchandising VENs.

### Exam Supplier

The tasks of the exam supplier range from the preparation of content to the holding and the professional evaluation of exams. For the process it makes no difference, in which way the learner participates in the exam process.

Consequently, the exam process includes different organizational exam processes such as oral finals, assignments, seminar papers, theses, and written tests. In some cases students can be allowed to work in groups.

The various forms in which exams are realized make different demands on the exam suppliers. For example, the physical attendance of a specialist in the tested field of knowledge is not necessary for the winding up of a multiple-choice test. In an oral exam, however, it is essential to have a professional and experienced examiner, ideally the content supplier of the educational offer.

One thing that makes the classification of exam suppliers difficult is the fact that exam processes can be carried out by different suppliers. For the illustration of this connection figure 3 presents a schematic diagram of a possible exam process. The diagram shows that different kinds of exam concepts cause different costs. For example, an extensive automation of various processes causes low costs, provided that there are appropriate capacity utilizations. As a result, the choice of exam concepts is accompanied by the choice of the cost structure.

### Person in Charge of Looking After People

Within this contribution, the position of the person in charge of looking after people is identified to include the service of looking after learners with the exception of technical infrastructures. Likewise, the holding of exam performances or the supply of exam documents is not included.

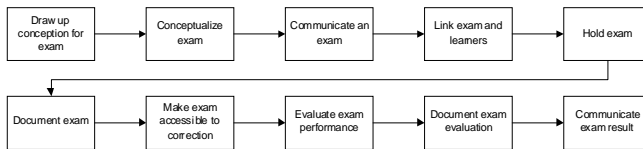
In this context, the position of the person in charge of looking after people can be occupied by various participants. For didactical and practical reasons it seems sensible that the content-supplier who provided the content should be put in charge because he is likely to have the professional knowledge that is needed. Other persons in charge of looking after people can be specialized service providers or even other firms, institutions, and individuals who usually do not come into touch with looking after learners.

### Center of the Supply Chain

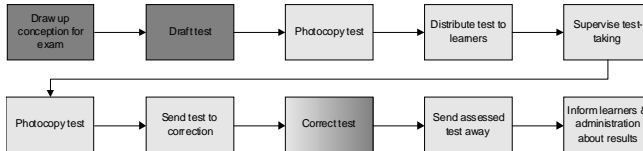
The center of the supply chain is the heart of educational networks and the centre of the value chain in the production process. The market-related demand for educational offers and for re-exploitable content, the market demand for servicing, coordination and merchandising of educational services as well as the provision of a technical infrastructure and

Figure 3. Exam Processes in General Form and in Special Shapes [HAGENHOFF, 2002]

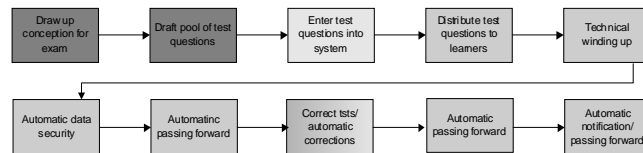
#### General description of the sub-process



#### Sub-processes of a written attendance test



#### Sub-processes on an internet-based multiple-choice test



- Sub-process can be automated
- Sub-process can be dealt with by persons lacking professional knowledge
- Sub-process requires profound professional knowledge in the field of educational offer

the assumption of classic administrative functions can be considered the main tasks in the production process. Usually the users of VENs take on these functions. A disincorporation or rather the out-sourcing of sub-sections provides options for the embodiment.

#### Institutional Clients for Private Use and End Users

This position of institutional clients covers the demand of educational institutions for educational offers, if the received services are resold neither implicitly nor explicitly. The position can basically be occupied by all kinds of educational institutions. Because of the mentioned reasons traditional state universities and end users who are undergoing primary or further education will more often than not take on this position in direct sale.

End users are those learners who use educational network services liable to pay costs with the help of a university, a firm, or middlemen. This includes firms which use educational offers for primary and/or further education of their employees. In that case, the firm appears as a customer of the educational network's offers, whereas the learner in a firm appears as an ultimate user.

#### Clients for Re-Merchandising

The position of the customer for the re-merchandising of educational services of VENs includes the demand of educational institutions for seminars, if the services that are received in this way are resold either implicitly or explicitly. Possible target groups are, for example, private universities and professional services in the field of personnel development. An exchange between the various educational networks and similar institutions as well as the offset by exchange models are further options in this context.

#### End Users, Learner

Possible end users are students at public universities, employees in firms, and other learners who are allowed to use the learning material without having to pay for it. Students at presence universities who take part in the offers of VENs have the opportunity to use internet-based offers of the educational network as an alternative to the seminars requiring attendance.

#### CONCLUSIONS

The article shows that the idea of a VEN that enables profits for its partners can be prosecuted successfully. In order to illustrate the requirements of VENs and their structural and operating models, the functions and roles in VENs along with their value creation processes were identified. Therefrom important requirements for structural models as well as for operating models of VENs were presented. Especially a transferable model of the configuration of VENs was illustrated. Due to experiences during the implementation of the open network the educational network WINFOLine can be considered as a reference model for establishing VENs.

It was shown that valid and sustainable incentives for all necessary functions/suppliers must be generated in VENs. But it is obvious, that through the co-operation in such initiatives every partner shares specific professional competence and may generate revenues. Constructed as an open network, VENs are able to realize an organizational structure which guarantees the highest possible flexibility for all of its participants. New partners can be affiliated anytime, as well as leaving the network is possible for present partners. Therefore the range of offered services is flexible and various. New topic areas can be covered at any time by affiliating new partners.

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