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Incentive systems in knowledge management to support cooperative distributed forms of creating and acquiring knowledge

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Abstract
From currently using electronic communication forums in academic teaching we have learned that a motivation for proactive participation of the forum's attendees is indispensable. K3 is a collaborative management system with an embedded incentive system for the motivation of participants. Traditional ways of assessment such as marks and grades are replaced or complemented by flexible procedures. This paper discusses the theoretical aspects of the system's incentive methods and how the components are operated in K3. K3 will undergo profound evaluation at a later time, so the practical results will not be discussed in this paper, yet.

Keywords: Incentive system, knowledge management, electronic forum, e-learning

1.0 Introduction

This paper discusses theoretical aspects of collaborative learning systems and presents first findings on the application of incentive systems at work. Collaborative methods are increasingly considered key success factors in organizational environments. We attempt to transfer some of these findings to the field of collaborative learning.

Growing competition makes knowledge an increasingly important success factor for enterprises. Some experts even name it the fourth resource. The resource based view rates creation, organisation, and use of intellectual capital an essential competitive issue [2; 3]. Since knowledge is often exclusively attached to interpersonal exchange [8, p. 224] the cooperative and communicative aspect becomes highly important when it comes to knowledge management. Success of knowledge management is strongly depending on the way communication and interaction are working in a company.

There are various instruments of knowledge management. They all aim at making knowledge usable to increase productivity and the quality of performance. Thus, the use of knowledge

and the availability of knowledge are gaining importance and become an important indicator for the success of knowledge management. In many companies knowledge management projects are carried out with technical support of an intranet. A study by KPMG consulting quotes 56% of the leading European[1] and US companies as using their intranets as technical module for knowledge management [5]. Electronic platforms are mainly used for distributing explicit knowledge so far. But in accordance with the the paradigm of cooperative and communicative knowledge management it is necessary to get over the dominating approach of knowledge warehouse and to see to the value added functions of electronic communication and interaction platforms for generating knowledge [6].

We also notice an increased demand for means of motivating staff to provide the organisation with their implicit knowledge and to take a proactive part in knowledge management. Knowledge within a company is very much attached to staff - how can the company make them disclose their personal knowledge? How can they be encouraged to make use of the available knowledge? An how can good use of electronic platforms support a proactive participation in knowledge management?

The answer to this is very simple: Staff have to be motivated. This motivation can be achieved through incentive systems. Their part in knowledge management is to provide a structured and steady transfer of knowledge. The difficulty is the setting of incentive systems: Should one use immaterial incentives only, material incentives only, or rather a blended type of both?

2.0 Kinds of incentives

When it comes to the effect of incentives on individuals one can differ between extrinsic motivation and intrinsic motivation. Extrinsic incentives serve the indirect satisfaction of a need, the extrinsic approach is “a means of satisfying needs” [9, p. 15]. Something is done only to have positive outcomes or to avoid negative consequences. The classic extrinsic motivation is monetary gratification whereas intrinsic motivation it is just the opposite: Satisfaction is achieved immediately from the activity or its aim. Most individuals are not exlusively either intrinsically or extrinsically motivated. These extremes rather are the two opposite ends of a scale. Incentives can be categorised by two different aspects: First, derived from the difference between extrinsic and intrinsic motivation, they are divided into extrinsic and intrinsic incentives. In a second step, they are differentiated to material and immaterial incentives by their object of motivation [7, p. 15].

Extrinsic incentives consist of material and immaterial incentives. Material incentives may be direct monetary allowances or grants of immediate monetary nature, i.e. special benefits. Such monetary incentives have the advantage of being variable, easily controlled, and absolutely universal [9, p. 14].

Since the effectiveness of monetary factors tends to be decreasing from a certain level on, purely material incentive systems are added-on by immaterial incentives. These immaterial incentives are defined by six features: Career, corporate culture, personal environment, leadership, working environment, and qualification. It should be mentioned that it is

[1] Though currently only 41% of the companies in Germany already use KMS, 98% consider the use of KMS to be important or highly important in the future.

demanding to apply immaterial incentives for they often depend on a current situation, different people have different receptions of it, and they are difficult to control [12, p. 131 f.].

Intrinsic incentives are strongly connected to work and its setting for motivation derives directly from their contents or results. Such incentives are almost of an immaterial nature. One can define the aspects of

- Knowledge of what the work is all about
- Responsibility for work
- Awareness of the work's results [4, p. 77]

2.1. Requirements to an incentive system

From the findings of motivation psychology we can define seven issues that are required for an incentive system:

Tab. 1: Requirements to an incentive system

What is wanted	*What it means*
Transparency	Show the connection between motivation for action and the usefulness action. Ensure frequent feedback of participants' performance
Individuality	Appeal to the individual's specific motives for performance
Sustainability	Adapt to the participants' motivational structure, step by step
Qualification	Ensure the participants' qualification for taking part in the knowledge management system. Learning components such as tutorials and courses should be applied.
Flexibility	Adapt the system to changing conditions and circumstances, i.e. the motivational instruments have to meet changing motivational structures.
Performance	Make performance results quantifiable on the basis of adaptable measurement. Fit rating of participants' results to their performance, i.e. achievement, outcome, and conditions.
Economy	Ensure balance of input and output, i.e. introduction and maintenance of incentive components must not require more effort than the success they generate.

2.2. Tools of an incentive system in companies

Taking into account external and internal motives the following levels of incentive systems can be defined. Different incentives can be given and be carried out by suitable means:

- Working climate, contents of work, the company's prestige, income, opportunities, (social) benefits, and time models[2].

Tools that encourage giving away knowledge as well as making use of knowledge are:

- Being honoured by co-workers, getting time-off, bonuses, material incentives (travels, books), prestigious office ambience, training, publications, promotions, or bigger internal budget.

[2] This ranking is the result of interviews with staff of 314 SMEs. 75% of these companies were already using incentive systems in knowledge management. The results are quoted from [1].

A well-dosed use of these instruments on the different levels of an incentive systems is the crucial part with knowledge management. The specific qualities and characteristics of the organisation have to be considered. So there is no ultimate incentive system, but there are various incentive systems which are specifically designed for the specific company.

3.0 An incentive system for the use in scientific education

To create incentives in the environment of scientific learning is fairly difficult for there is only intrinsic motivation to appeal to. This is what K3 tries to achieve.

K3[3] is an open software system that supports collaborative and distributed production of conceptual knowledge in academic learning environments by using heterogeneous resources and moderated electronic communication forums. Further information competency is to be gained by embedding external information resources (from the WWW and the scientific community). This knowledge is strongly linked, structured by context and semantics as well as visualized to ensure comfortable navigation.

A special feature of K3 is the crediting/rating system by which all students' contributions are to be assessed through a flexible crediting system. Each and every entry, i.e. a comment on a thread in a communication forum or adding a descriptive external link, is accredited to the individual or the group. Thus a dynamic and individual evaluation of learning success (that also takes into account the groups' behaviour) is enabled.

By flexible and frequently published crediting and feedback methods the traditional ways of assessing students are supposed to be replaced/to be supplemented. Every student can frequently control their success and their current standing in the group. Since K3 is a cooperative system, there are totally new opportunities of assessing a student's progress and learning success, one does not longer have to rely on the mere repetition of facts by written exams. Now, a student's performance may be assessed by their active use of the system, the frequency of contributions and entries, the entries' reception, and the quality of contributions. The big aim behind this is to develop competency of information and communication. Due to the great number of entries that have to be assessed automatic evaluation methods have to be found. So it is necessary to develop incentive and crediting systems that meet the collaborative approach and appeal to the participants' reputation. Therefore it is every single student's intrinsic motivation that has to be addressed, for it is the nature of studies that they are originally intrinsic-driven.

3.1. Incentive system

Intrinsic rewards or incentives come from work itself. If the proper motives, e.g. striving for excellence, are given, intrinsic motivation comes immediately with acting, with personal success. But there is more to intrinsic motivation: The technical design of the communication forum, the abilities of the participants, and the group and its structures do influence intrinsic motivation. To show intrinsic qualities a task must contain various elements [11, p. 60]:

[3] K3 is a system that is currently being developed at the university of Konstanz/chair of Information Science. It is a project funded by the German Ministry of Science and Education (BMBF, Projectnumber: 08C5896). For further information see the project's website: www.k3forum.net

Tab. 2: Intrinsic motivation: What a task needs. Source: [11, p. 60] and author's supplements

Subject of work	*Interesting and demanding tasks to fulfill*
Diversity	One must appeal to the different abilities, commands, and qualities of the individuals
Holism	The individuals are working on a task throughout its whole life cycle
Social interaction	The individuals are working collaboratively
Autonomy	The individuals have opportunities to choose from, they are entitled to make decisions
Feedback	There is regular feedback on each one's performance
Clarity, acceptance, and difficulty of aim	The aims of a task have to be clearly defined
Holism	The individuals are working on a task throughout its whole life cycle

To create incentives in the environment of scientific learning is fairly difficult for there is only intrinsic motivation to appeal to. With K3, we use different ways:

- *Learning contract*: At the beginning of the course the participants agree on a contract which defines goals, subject, methods, coverage, rights, and obligations. It is a psychological rather than a legal contract [10, p. 24]. There are mutual expectations of both the participants' and the organisations' side. These expectations cover how much work has to be done, how this work is to be gratified, and the whole range of rights, privileges, and duties between the individuals and the organisation.
- *Job orders*: The participants get detailed orders that are challenging and interesting.
- *Roles*: Every individual plays different roles, from beginner to expert.
- *Group building*: All participiants have to gather in groups to fulfill job orders. So collaborative and cooperative working is supported.
- *Personalized K3 "My K3"*: Every participant may have his individual credits and performance displayed in different views. So they can learn about their strengths and weaknesses and may work on it. It is also shown which tasks still have to be done, so work may be planned accordingly. In 'My K3' also the continuous feedback is being received from the lecturer.
- *Anonymization*: This components shows the individuals' ranking among all other participants and within the own group. In different views the individual strenghts and weaknesses are displayed.
- *Regular personal attendance*: To support the social motivation of the participants and to improve group dynamics regular meetings of all participants are held.
- *Feedback*: By receiving continuous and frequent feedback from the lecturer as well as from co-participants the individual is motivated to improve their performance.

4.0 Summary

For the design and control of the organisational knowledge base in their knowledge management enterprises mainly make use of material motivation of staff. Using KMSs in academic education "only" immaterial motivators are possible (though they may have

monetary results in the long run). The more it is important to have an increased and targeted motivation of the participants. That is why K3 – a collaborative knowledge management system in academic education – contains an immaterial incentive system for the motivation of extrinsically and intrinsically motivated individuals. The participants' different motivational structures are taken into account by a rating and crediting system. The requirements, characteristics, and instruments of the K3 incentive system given in this paper will come to use in the summer term 2004 courses for the first time. There will be a final evaluation and examination of the hypotheses on which the system has been built up.

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