Increasing the Efficiency of Accelerated Knowledge Sharing Processes Used for Educating Young Software Developers

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Abstract: - The article approaches the subject of speeding-up the process of knowledge sharing and identifies elements that increase the efficiency of accelerating the educational process of young software developers. The focus of the article is on identifying elements that catalyze the process of knowledge sharing. The authors present a set of detailed practical results obtained while experimenting with an original knowledge sharing method applied for training young software developers in order to enable them to work for the world's most demanding IT companies. The main result of the article is a comparative analysis between a set of motivational factors tested experimentally.

Key-Words: - knowledge sharing, software development education, motivational factors, ABAP

1 Introduction

Training young software developers is a common activity in the society we live in nowadays. IT companies are learning organizations and human aspects of knowledge creation are critical for sustaining the development of learning organizations [1]. In the IT industry the competitiveness of a company is largely determined by the knowledge it possesses and the knowledge of an organization is considered to be derived from its employees [2],[6].

Providing the right training in a minimal amount of time is a critical factor for any software development company that is active in today's highly competitive IT industry. This is why many companies are now looking for ways to reduce the training periods of their employees and to train them in a manner faster then the conventional training on the job.

In order to accelerate the educational process the authors of the current article have developed a framework for accelerating that sharing of knowledge between experienced software developers and trainees. The model, described in details in [3], started from the bold idea of an Italian IBM partner who approached Romania's largest university and proposed the development of a method that would transform young IT graduates in internationally competitive ABAP programmers in a matter of months. The endeavor that followed was successful, and the result was a framework that ensured both the transfer of explicit and tacit knowledge.

Briefly described, the knowledge sharing system that resulted from the above mentioned process, and will be used in the current article, consists of two main components: the explicit knowledge sharing component and the tacit knowledge sharing component(Fig. 1).

The explicit knowledge sharing component is responsible for ensuring the transfer of explicit knowledge. This is the knowledge that is available in books, reports, forums or oral discussions.

The tacit knowledge is knowledge that people keep in their minds and is difficult to access. It often happens that they are not aware of the knowledge they possess or how it can be valuable to others. Tacit knowledge is considered more valuable because it provides context for people, places, ideas, and experiences. Effective transfer of tacit knowledge generally requires extensive personal contact and trust [4].

In a few words, according to a famous aphorism of the knowledge management community, having tacit knowledge means that "we know more than we can tell".

In order to share the tacit knowledge, the tacit k-sharing component of the system presented here uses the concept of scenario. A scenario is a replication or a repetition of a real or possibly real situation which allows people to share tacit

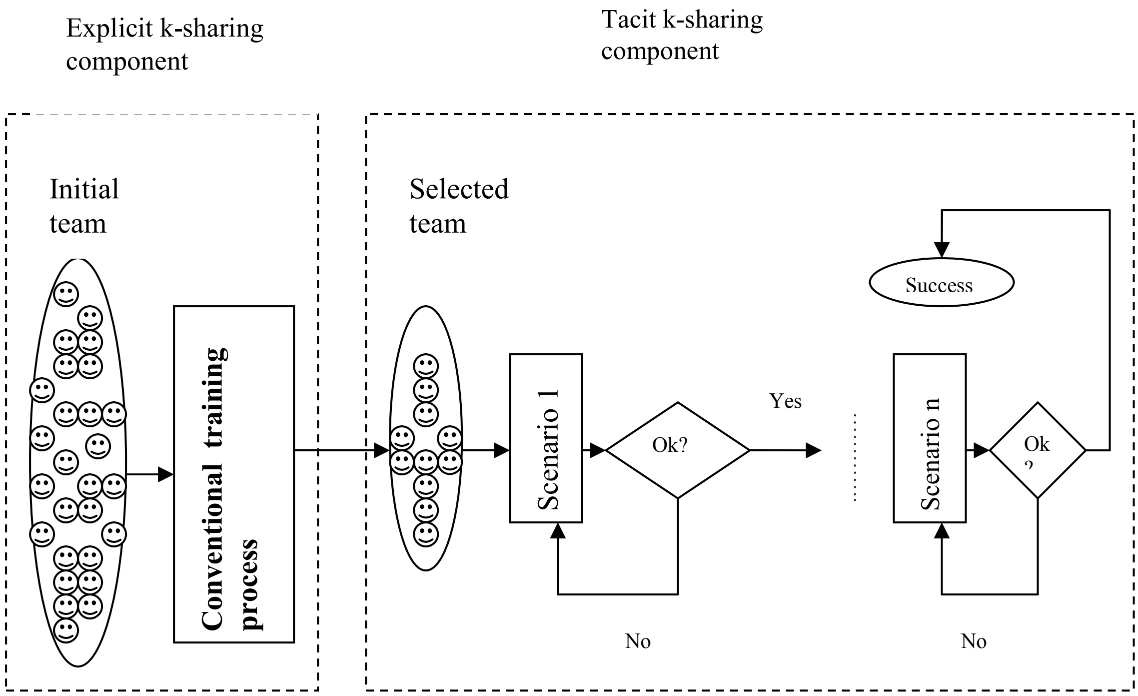

Fig. 1. The knowledge sharing system

knowledge. The use of scenarios comes from observing the episodic nature of the tacit knowledge to be shared. Episodic knowledge is based on experimental knowledge, or episodes [5].

In practical terms, during the training process the students have to undergo both the explicit knowledge sharing process and the tacit knowledge sharing part. At the beginning the training starts with a large initial team out of which, after the explicit knowledge sharing process, a selected team is subtracted. The members of the selected team are chosen based on their results on a simple test. After that, the students from the selected team undergo a tacit knowledge sharing process which is based on scenarios. They have to go through a number of scenarios and in case they fail, the scenarios are repeated.

The knowledge sharing system described above has been successfully tested six times between 2004 and 2007 and over 160 students have successfully accelerated their training process reaching in about 6 months the level of experience that would have otherwise taken two years of classical training on the job.

While experimenting with this framework the authors have identified a model that estimates the efficiency of speeding-up the knowledge sharing process.

This indicator defines the global efficiency indicator E as depending on the two variables T and P:

$$E = \frac{Tm}{T} + \frac{P}{Pm} \qquad (1)$$

where:

T=The amount of time needed by a trainee to reach the amount of knowledge that would normally require two years of training on the job;

P=The percentage of the students from the initial team that make it in the selected team after the test;

Tm=Average amount of time needed by a trainee to reach the amount of knowledge that would normally require two years of training on the job;

Pm=Average percentage of the students from the initial team that make it in the selected team after the test.

It can be easily noticed that the formula is a simple and realistic measurement of the efficiency of the process because the indicator E gests higher as the time is shorter and the percentage P is higher.

2 Problem Formulation

Over the years the authors attempted to increase the efficiency of the knowledge sharing process by motivating the students to study harder in order to obtain quicker results.

There were two main types of motivational factors introduced during the various trainings: prizes in objects and interesting job opportunities.

The aim of the current analysis is to find out which motivational factors work better and to compare them in terms of efficiency using the above indicator (1). Basically, we are interested in analyzing if students are more sensible to getting a good job or obtaining an interesting prize such as a car.

3 Problem Solution

In order to solve the problem we will have to run a comparative analysis considering the various motivational factors used in the five sessions presented in Table 1.

3.1 The motivational factors

In the educational process the authors have used interesting job opportunities and attractive prizes in order to stimulate the students to study harder and to reach quicker the desired result.

In order to allow a comparative analysis between the efficiency of the motivational factors, they have not been used simultaneously. In each session only one motivational factor was used.

Because of availability reasons, in the first four sessions, the authors used interesting job opportunities in the SAP community to attract students and to stimulate them to learn. This changed in the last session when a high value prize consisting of a full options car was offered as a prize for the best student. The car was placed in from of the computer science department for a period of four months and after that the students were evaluated and the best one got the car. No job opportunities were promised in order to make the comparative analysis accurate.

The data needed for the analysis has been recorded over the years and is synthesized in Table 1. It basically represents the input for the Efficiency indicator E, described in formula (1).

3.2 Comparative analysis

Using the model defined above in (1), we will compute the efficiency indicator E for each session and after that we will compare the results.

Session#	Size of initial team	Size of selected team	P %	T
1	50	15	30.0	6
2	38	10	26.3	5.6
3	36	10	27.8	6.2
4	80	26	25.0	5.4
5	376	106	28.2	3.7

Table 1. Team sizes for ABAP training

The values of the parameters Pm and Tm can be easily computed as they are the average values of the last two columns of Table 1:

Pm=27.45 and Tm=5.38

By applying the efficiency indicator described in (2) to the set of data from Table 1, considering the average values computed above we obtain the efficiency indicators presented in Table 2.

E
1.99
1.92
1.88
1.91
2.48

Table 2. The efficiency indicator E

One can easily notice that the average value of the efficiency indicator for the first four sessions is about 1.9 while fort the last training the efficiency indicator is much higher.

Actually one can also notice that the average efficiency for the first four sessions, when only job opportunities was used as a motivational factor, is 1.92 which is 28% smaller then the efficiency indicator of the last training session which is 2.48.

This is a clear indication that high value prizes attract and motivate students better than interesting job opportunities and, according to our indicator, the efficiency of high value prizes is 28% higher.

4 Conclusion

The efficiency of the two motivational factors used in the above analysis is considerably different and high value prizes are a much better motivator then interesting job opportunities when it comes to stimulating students to learn computer programming.

This result can be used in order to design strategies for accelerating the educational process of young software developers that are so badly needed in today's fast growing knowledge based economy.

As a future research, the authors intend to combine the two motivational factors in a single session and to test the efficiency of the combination.

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