Expert Knowledge in Distance Learning Approaches

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Abstract

Growing economies require methods and technologies to develop the capabilities of a high number of people in short time. E-learning approaches cover the standard repertoire of academic knowledge, but the distribution of experience and expert knowledge is merely addressed. This paper describes the design of an initiative to deliver expert knowledge and experience by e-learning technology.

Keywords: e-learning, MOOC, expert knowledge

1. Background

The faster an economy grows, the more a capable workforce is required. Capability is developed from training and experience. Whilst the required training is delivered through academic education, the sharing of experience is often limited to day-to-day work in industry.

The second challenge is the distribution of training and experience. E-learning approaches like Massive Open Online Courses (MOOC) [1] help to deliver training to a high number of students, independent from location or timezone. But again, the challenge is to integrate expert knowledge into MOOCs and especially ensure detailed feedback from experts on specific or detailed questions, which is required to help workforce not only with their own development but with the solution of their daily challenges.

In the next section we will consider related research from the field of expert knowledge elicitation [2] as well as suitable approaches for distance learning [3]. After that we will combine both elements into an Experience Based Distance Learning approach. The paper is completed by a conclusion and outlook on future work.

2. Related Research

2.1. Expert Knowledge Elicitation

In the late decades of the last century, lots of European and US companies reduced their processes and workforce to the minimum, to only deliver their so called core competencies. Under core competencies fall all elements that contribute directly to the creation of value of the produced product or delivered service, and build a unique selling proposition – or be at least not too easy reproduced by competitors.

Companies easily accepted the loss in knowledge of the other, mainly outsourced, work – as this knowledge was not seen as crucial and they still had suppliers to continue, and maybe optimize, this knowledge. On the other hand a creeping knowledge loss started, which was not managed by most companies: the loss of application knowledge [4]. Application knowledge sits with the “how to”

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area of work. Companies as well as suppliers usually focus on standardization – leading to a situation where specialization is no longer covered. This specialization knowledge is seldom documented, but covered by long-year experts who developed this knowledge over time. The older these experts become, the higher is the probability that this knowledge is irretrievably lost.

Innovative companies have already started so called Silverback Programs (originating from the role of the silverback in a gorilla population) [2], to conserve this knowledge [5,6]. These programs are supported by some basic strategies and technologies:

1. Set up Silverback specific profiles
2. Connect to other Silverbacks
3. Share information (knowledge, questions, problems, etc.)
4. Comment on shared information
5. Reuse shared information
6. Rate shared information
7. Limit access to information
8. Allow direct contact
9. Calculate and deliver incentives

The first 5 elements are already widely covered e.g. by social networks allowing exchange of information, experience and knowledge. The other elements require further analysis:

Rate shared information - every information has to be rated on quantity, quality and domain level. Rating on quantity level means that it has to be measured, how often information has been requested. Rating on quality means that the benefits developed out of the information have to be measured. Finally it has to be analyzed in which domain this information has delivered benefits.

Limit access to information – not every information is useful for the intended user group. Therefore it has to be decided which information is made available to whom. One approach might be an independent clearance, defining which knowledge should be shared for what reason and for which user group.

Allow direct contact - to allow quick feedback and especially clarification, there must be the possibility to interact with the Silverbacks directly.

Calculate and deliver incentives – the whole approach stands and falls with the motivation of the Silverbacks. Only if these experts are willing to deliver and support, the integration of expert knowledge and experience can become a success.

2.2. Distance Learning Approach

Question now is how the requirements from the section above can be covered by a Distance Learning Approach. White and Low have performed the O_3 Project [3], which can help to fulfill the requirements:

"The principle behind the O_3 project is to utilize academic staff with expertise in e-learning, to mentor subject specialists in the process of moving their traditionally taught courses online. This may not, at first glance, appear to be an innovative approach, however, the institutional investment to the process, is what sets it apart. This support took the form of resource allocation and workload accounting, with the mentoring activity being recognized within the roles of the individuals concerned, demonstrating institutional commitment to the activity. A supportive organizational structure has:

1. an overall teaching and learning strategy that includes a vision for e-learning with accountabil-

ity measures at both management and practitioner levels; and
2. a vision for e-learning that is relevant, coherent and shared [7]"

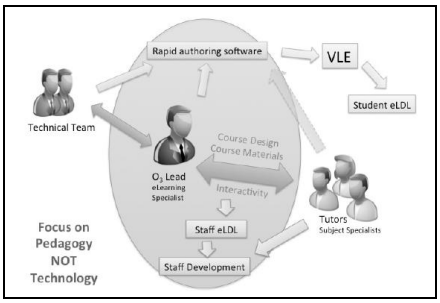

Fig. 1: O_3 Structure [3]

Described in a nutshell, an O_3 Lead is the interfaces between the Subject Specialist – in the case of this research the tutors – and the technical team. The O_3 Lead uses a Rapid Authoring Software to develop content for a Virtual Learning Environment, supported by a technical team on tool level and by subject specialists on content level.

By this approach it is ensured that the users are receiving all their information in the same environment. This prevents from cognitive overload [3], which otherwise would decrease the motivation of the user [8,9].

3. How to integrate Expert Knowledge

The O_3 Project delivers the means to fulfill the outstanding requirements. The O_3 Lead has sufficient oversight to rate the shared information, can analyze together with the Technical Team and the Subject Specialists (in this case the Silverbacks) which information should be published, and can also calculate incentives based on the usage or feedback of information.

The only element which is not covered by this approach is the direct contact element. Research from Zhao et. al. [10] has shown that a low tutor involvement has been described as being less helpful compared to those approaches with strong interactions.

4. How to build a System

Combining the requirements from the Expert Knowledge Elicitation with the O_3 Approach, taking into account that a strong interaction is useful, an integration approach, allowing a high number of users from different locations to attend, has to be defined as follows:

- The standard academic training content is provided by MOOCs. Content is delivered by Tutors.
- Each MOOC is enhanced by an Experience Section, covering specific – and special – application of the information delivered by the academic training. The content is delivered by the Silverbacks. Assignment of the content to a specific MOOC is aligned between the Tutors and the Silverbacks and moderated by the O3 Lead.
- To allow direct contact, online tutor sessions are offered, to discuss questions on academic content.
- Additionally online sessions with Silverbacks are performed in two dimensions:
    - In Pull Sessions the Silverbacks answer

questions from the users

- In Push Sessions, the Silverbacks are talking about a specific field of their experience – and by this raising the awareness of the users for topics they might have underestimated by now.

- In parallel user chat rooms are made available, allowing sharing information between the users, and also giving an opportunity to tutors and Silverbacks to understand which topics might require further clarification, and by this increase the quality of the MOOCs.

Based on the involvement of the Silverback and / or the number and quality of participation / feedback to a Silverback session, incentives can be calculated.

5. Conclusion and future work

We have shown how experience and expert knowledge can not only be conserved, but distributed to a user group in different locations and time zones.

Currently the approaches are mainly role based (O3 Lead, Tutor, Silverback). Plan is to document as much content as possible as well as process information in a repository to develop new training and knowledge dissemination strategies.

Next step will be to develop an approach for Expert Training the Expert, aiming for identification of users who are interested in specific topics and by this might be the successor of a silverback – not only based on their own preference, but based on data elicited from the MOOC and session feedback.

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