Requirements for the Design of Lifelong Learning Organisers

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Abstract

We propose a set of general requirements for the design of Lifelong Learning Organisers (LLOs), based on our studies of personal learning practices. The studies showed [1] that learning activity is mobile between locations, time slots, and topic areas. Moreover, learning follows a hierarchical organization at three operational levels: learning activities are discrete acts, which are grouped to form learning episodes, which in turn are grouped to form learning projects. Objects are used in the process of carrying out learning activities, episodes and projects, which the learner organises based on a personal organisation system. On the way, the learner constructs personal, meaningful knowledge. We describe KLeOS, an example of a system to organise such knowledge over long periods of time.

1. Introduction

In seeking to design a system that supports a person's everyday learning over a lifetime, a descriptive Framework of Lifelong Learning (FoLL) was produced. The framework originated in a theory-informed phenomenological study of learning [1]. This study required 12 learners to keep diaries of their daily learning over 4 days and at the end to participate in a structured interview, which explored issues arising from the diary entries.

The FoLL led further to the definition of a set of general requirements for technology to support the organisation of lifelong learning. The requirements pointed to the need for tools that provide facilities for management of learning, of learning materials and resources, and of the learnt knowledge. Furthermore, mobility and flexibility with respect to time, place and topic were identified as important attributes of an enduring learning organisation system. Based on these requirements a prototype system, KLeOS (Knowledge and Learning Organisation System), was designed.

Section 2 of this paper presents the background to the requirements, based on the FoLL, which is fully described in [1]. Section 3 outlines the recommended general requirements for Lifelong Learning Organisers (LLOs), and section 4 briefly presents KLeOS (for a more detailed description see [2]).

2. Background

The phenomenological study of learning indicated three ways in which learning can be considered "mobile". Learning is mobile in terms of space, i.e. it happens at the workplace, at home, and at places of leisure. It is mobile between different areas of life, i.e. it may relate to work demands, self- improvement, or leisure. It is mobile with respect to time, i.e. it happens at different times during the day, on working days or on weekends.

The study also analysed the activities that people reported to carry out during learning. The participants were asked to report their learning experiences, without being given a strict definition of a learning experience. In some cases, a diary entry reported the performance of a single activity (e.g. reading a book). In other cases, however, a diary entry involved the performance of a number of different activities (e.g. reading, searching the internet, and taking notes).

The fact that people reported these as a single learning experience rather than as distinct experiences demonstrates that people differentiate between learning *episodes* and *activities:* distinct learning acts are grouped together by thematic, temporal and/or spatial proximity to form learning episodes. In some cases, people described episodes as forming part of a greater learning *project*. To group episodes into projects, people use purposes and outcomes: episodes that contribute to the achievement of a particular aim are likely to be grouped together under a single project. A number of learning projects may be pursued during the same period. Learning episodes may contribute towards more than one learning project.

While carrying out the learning activities, episodes and projects, people engage with various types of learning object. These can be *containers* (objects containing other objects), *conduits* (objects that allow the access of resources or that enable/assist the activity), *resources* (objects that contain the actual information to be learned), *stimulators* (objects that trigger reflections, thought processes, or discussions that lead to learning), *tools* (objects used to carry out an activity), and *pointers* (objects that point to other objects).

People reported several different ways of organising their learning objects: in chronological order of use, theme, by context of use.

Through the process of carrying out learning activities, experiencing learning episodes, and managing learning projects, people construct personal, meaningful knowledge by associating the new things they learn with the things they already knew. In many cases people make and keep a record of the things they learn in the form of notes. The notes may be taken during or after a learning episode, using a variety of recording devices (notebooks, logbooks, diaries), and the content ranges from personal thoughts to general information, comments, suggestions, summaries, etc. The structuring of notes varies as well, from no structure to date tagging, to reference information followed by detailed notes. In many cases, however, it is important that the person can trace back the origin of a piece of knowledge, for example for validation purposes.

3. Requirements for Lifelong Learning Organisers

Lifelong Learning Organisers (LLOs) is a proposed class of systems that assist the learner in organising learning: organise the carrying out of activities, events, and projects; organise the knowledge they learn; and organise the resources they use. It should be possible to do this for different topics, in different locations and times, in a way that assists the learner to integrate his or her learning experiences and construct personal, meaningful knowledge over a lifetime.

With respect to designing for the mobility of LLOs, we propose the following requirements:
1. A LLO should be easily transferable between places: it should be either implemented on a device that is easy to carry and use around, or it should be designed so as to run on a single computer system and be accessed remotely, via any system.
2. LLOs should be available and functional anytime, during any day of the week.
3. LLOs should provide a smooth transition between learning topic areas and support the user to construct meaningful, integrated knowledge.

With respect to designing for the functionality of LLOs, we propose that:
1. LLOs should assist the learner to organise his or her learning activities into events, and the events into projects (synthesise serendipitous learning). Conversely, LLOs should assist the learner to plan learning events for a project, and learning activities for an event (plan deliberate learning). Finally, LLOs should assist the learner to plan learning activities for an event that will be then linked to a project (manage semi-structured learning).
2. LLOs should assist the learner to organise his or her knowledge based on thematic or other associations.

3. LLOs should assist the learner to organise learning resources (i.e. objects that contain or embed information) based on context of use or thematic associations.
4. LLOs should assist the learner to make and maintain associations between learning events, resources, and the learnt knowledge, and use these associations as a means for the later retrieval of knowledge, for the reviewing of learning materials, and for the reviewing of past successful practices.

4. KLeOS: A Knowledge and Learning Organisation System

Personal organisers offer many of the attributes outlined above. For example, Microsoft Outlook allows the recording of events and their categorisation, and is mobile between different platforms. However, it does not provide for the organisation of the actual knowledge learnt, or of the learning materials that were used. The eduPAD [3] also incorporates basic functions of a personal organiser, but it is designed for use in schools and, although it provides for the management of learning resources, it does not provide for linking between resources and the organiser. The Electronic Learning Diary presented in [4] allows the user to organise their notes relating to specific learning events, but it is meant for use in a specific context (medical students) and it does not support reference to the actual learning materials, only to the learner's reflective notes. The WhizFolders Organiser [5] is another system for organising notes and personal information. However, it does not provide for the management of learning projects, and the organisation is based on a folder structure.

The prototype for KLeOS reflects the hierarchical organization of the learning practice described above and it demonstrates functionality in three different levels, allowing the user to (a) manage their learning projects; (b) monitor the learning episodes they complete and associate them with projects where applicable; and (c) perform learning activities whilst within an episode. Furthermore, activities and events are directly linked to the learning resources used.

The prototype also features a knowledge map, organised as a concept map or 'mind map' [6], which reflects the knowledge that the user has acquired over time. The knowledge map is not disconnected from the organiser. Rather, the two components are bridged together so that the user can update the knowledge map whenever a new piece of knowledge is acquired during learning, or alternatively the user can start from a map entry and trace back the learning episodes that led to this knowledge.

In effect, this combination allows for monitoring both semantic and episodic memories. Episodic memory is involved in the recording and subsequent retrieval of memories of personal happenings and doings, whereas semantic memory relates to knowledge of the world that is independent of a person's identity and past [7]. Episodic memory records have been used in the past for information retrieval [8, 9]. The working hypothesis for KLeOS is that an interlinked record of semantic and episodic learning memories will be a better aid for knowledge retrieval than a semantic-only or episodic-only record.

The interface is based on the timelines metaphor [10, 11]. Timelines are graphical representations (lines) that depict a period of time during which a specific event was occurring. For KLeOS, learning projects are represented by such lines. The user can zoom in and out in time to gain daily, weekly, monthly, yearly, and decade views. Episodes that are associated with a project appear as marks on the project line at the corresponding point in time. This presupposes that learning episodes exhibit time continuity, which is in accordance with learners' perceptions [1]. Episodic memories are organised chronologically [7]. Thus, it is reasonable to assume that a representation of learning events, which fall in the category of episodic memories, based on timelines, will be meaningful to the user.

When zooming into a learning episode, the screen changes to display contextual information about the episode at the bottom, relevant learning activity timelines in the middle, and the learning object used for a (selected) activity at the top.

The system provides two ways for retrieving electronic learning objects and/or the knowledge learnt through them: (a) by exploring project lines to locate relevant learning episodes and activities (i.e. based on the user's episodic memory), and (b) by navigating through a web of relevant concepts (i.e. based on the user's semantic memory). The knowledge map nodes are tagged with contextual information, so that the user can easily 'jump' to the relevant learning event if necessary.

KLeOS is now being implemented as a Java application. The system's architecture and functionality allow for the mobility of learning to be accommodated. The information about learning projects, episodes and activities is stored in a database. The Java application runs on any platform and is optimised for PC and notebook monitors. The Java platform is now available for the Compaq iPaq® and thus a version of the interface for small devices could be implemented in the future. The database could be held on the user's main PC or notebook locally and accessed from any other client device remotely. With the rapid improvements of telecommunications networks, this configuration will provide the flexibility needed to learn anywhere, anytime.

KLeOS's intrinsic functionality allows the user to transfer easily from one learning project to another, by navigating time and clicking on the appropriate project lines and episode marks, or by navigating the knowledge map.

5. Conclusions

Based on a Framework of Lifelong Learning, we propose requirements for the design of Lifelong Learning Organisers. The requirements relate to assisting the organisation of learning activities, events, and projects, the organisation of learning resources, and the organisation of knowledge. They also relate to supporting the thematically, temporally, and spatially mobile nature of learning. KLeOS, a prototype Knowledge and Learning Organisation System, was designed based on these requirements. A system evaluation will need to be performed once the system is fully implemented, in order to decide both the usefulness of the concept and the system's usability.

6. References

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