KnowPort
A Personal *Know*ledge *Port*folio Tool

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"If only I knew what I know"

Abstract

KnowPort is an *action-oriented* personal tool for *knowledge tracing* which assists professional individuals in the task of explicitely self-managing their personal knowledge resources (knowledge portfolio) with the aim of supporting them as individuals in meeting the challenge of working with a collective (team, organisation) knowledge management infrastructure for sharing knowledge. The KnowPort kernel implements a new method for obtaining a knowledge survey based on a *radical constructivist* view of knowledge. Its goal is to support the knowledge worker in producing different traces of knowledge relevant events in her work and thus focusing on her process of knowledge construction.

1 Introduction

The development of a prototype for the ***KnowPort*** tool is beeing carried out at Fachhochschule beider Basel (Basel Institute of Technology) as part of the ***KnowNet*** project, an industrial RTD project supported by the IVth Esprit programme within its 1997 thematic call "IT for Learning and Training in Industry" [Esprit97].

The KnowNet project [KnowNet98] addresses the knowledge management needs of business entities. It will develop an intranet-based tool at the enterprise level, collaborative tools supporting communities of practice at the team level and the *KnowPort* tool at individual level.

As soon as individuals begin working with a knowledge management infrastructure for sharing knowledge within their teams and enterprises, a profound *cultural* change in their competency requirements, roles and responsibilities takes place. The objective of the *KnowPort* project is to support these individuals in meeting the challenge of such a cultural change by helping them in the task of *self-managing* their own knowledge resources. For this we intend to cut across the classical domains of knowledge acquisition, human resource management, performance management, career planning, learning planning, computer based learning and self-management with the aim of explicitely transferring to the individuals the role of manager of their own *knowledge portfolio.*

KnowPort will allow individuals to manage their personal knowledge assets and in this way provide a basis for making them more effective in the tasks of developing learning capabilities and participating in knowledge sharing.

2 Collective Knowledge Management

After developing into an information society the West shows now a clear trend towards an open knowledge society [ArthAnd96]. A first clear indicator of this trend is that the knowledge content of technologies and products is rapidly growing: educational and training requirements demanded of employees are continuously being intensified, products life-cycles are being shortened dramatically, the necessary innovation rate increases constantly, the decay interval of knowledge decreases faster. A second well-known indicator is given by the exponential success of multimedia and Internet technologies which are rapidly changing our ways to work with informations and to communicate. Finally the acquisition of new knowledge skills is becoming

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increasingly complex: the volume of the required knowledge expands, learning intervals must be shorter, education must be continued a life long, etc.

To meet the challenge of this information overflow and knowledge ocean, many international organisations are developing Knowledge Management strategies and systems which enable them to better manage their core competences and knowledge resources.

A systematic account of knowledge management activities at department or enterprise level shows the following 6 core processes and 2 control processes [Probst97, 47-60]: (1) Identification, (2) acquisition, (3) development, (4) sharing, (5) application and (6) storage of knowledge, closed into a control loop by (7) the definition of knowledge goals and (8) the evaluation of goals achievment. Similar Knowledge Management frameworks distinguish between 4 and 7 processes [O'Dell97, 10-11], [Speck97].

3 Individual Knowledge Management

The basic idea from which the KnowPort concept has been started was that *the same 6 + 2 classes of activities* which help managers to deal better with knowledge in their enterprises and departments could also be used as *a paradigm for the individual* who aims at improving the management of his personal knowledge.

We suggest that the same critical factors which govern the successfull leveraging of an organization's knowledge capital, also determine the success of an individual in leveraging his personal knowledge within a knowledge-based company: capturing best practices, evaluating knowledge against specific business strategies and objectives, ability and willingness to improve structures around knowledge, willingness to share knowledge and to use knowledge sharing technologies.

Like in organisations [Hiebeler96], where the central issue is not creating organizational knowledge but figuring out what they already know ("*if only we knew what we know*", Jerry Junkins quoted in: [O'Dell97]), we suggest that the same approach should be applied to individual knowledge ("*if only **I** knew what **I** know*"),.

In order to find the major knowledge areas that should receive her management attention, we suggest that like an organization [Wiig93, 14ff.], also the individual "knowledge worker" should gain an overview of her knowledge and its use in her work. This task, that we designate by "knowledge survey" corresponds to the first of the above mentioned core processes of knowledge management at enterprise level, called there "knowledge identification".

At the beginning KnowPort will limit its scope to the "knowledge survey" task but our long term strategy is to extend its features step by step for supporting employees also in sharing personal knowledge, defining knowledge goals and evaluating goals achievement (see above core processes 4, 7 and 8 respectively).

4 Action oriented knowledge tracing

The main innovative concepts on which KnowPort is based lie in a new approach to the *method* for obtaining a *knowledge survey*. At company level the usual paradigm for surveying existing knowledge is that of *retrospective* knowledge analysis. An approach is for instance that first a self-assessment [APQC98] is done in which a number of knowledge management practices are scored and compared with data from a benchmarking database, then a detailed study is undertaken during which company operations, product lines, etc. are analyzed.

A large number of approaches and methods are being used to survey knowledge [Wiig94, 22ff] as part of the first pillar of knowledge management [Wiig93, Chp.6], i.e. "Explore the Knowledge and Its Adequacy". They support different uses, like new corporate practices, different HR practices, knowledge flow improvements, candidates for knowledge bases etc. but all make use of questionnaires, interviews, group sessions, inventories, reviews, etc. which basically rely on *looking back* for identifying knowledge in past events and on trying to *track down* the logical progression of experiences and thoughts in order to collect the material for knowledge analysis.

Transferring this *retrospective* approach to the KnowPort tool would run into a quite unsurmontable obstacle, the "awareness barrier", i.e. the fundamental difficulty that we all have in efficiently and effectively surveying and eliciting our own knowledge. Waterman describes this as "knowledge engineering paradox": the more competent domain experts become, the less able they are to make explicit their knowledge [Waterman86]. We infer from this, that a tool based on the retrospective approach to knowledge survey would *not be used*. In fact, if knowledge and experience consist of what the knowledge worker constructs - as proposes the radical constructivist approach - it follows that she should primarily focus on the process of constructing her knowledge if she wishes to obtain a knowledge survey.

For these reasons we will take in the KnowPort project an *action oriented constructivist* approach, based on the following principle:

> **"Trace your Tack".** For sailing on the right tack in the knowledge ocean and mastering the information overflow by entering safely new ports of knowledge ***trace your knowledge in action*** (on tack).

This means that KnowPort will have to support the user in producing a trace of *knowledge relevant events* during her "Knowledge Tack", i.e. her construction and use of personal knowledge in the context of a running task. Such traces will avoid the difficulty of retrospection, encourage the use of KnowPort, help the user in focusing on the process of knowledge construction and provide the basis for personal knowledge analysis.

5 Main design principles

One important decision which has to be made for defining the KnowPort tool is to select which activities users should trace, so that their traces will display knowledge relevant tacks. For doing this it is worth clarifying some of the salient properties of "Knowledge Work":

- Firstly, much knowledge work is dominated by *communication* - with special emphasis on negotiation and argumentation [Shum96] - and *computer* technologies (personal computers, multimedia, Internet, etc.).
- Secondly, *diversity and ad hoc* behaviour patterns are common in knowledge work: both the method and the output of knowledge work are continuously modified in an *opportunistic* way, depending on the changing context [Kidd96].
- Thirdly the most relevant knowledge of a knowledge worker does not reside in the mastery of widely shared beliefs of the kind that can be found in textbooks; in fact, consistent with von Glasersfeld's *radical constructivist* theory of knowledge [vonGlasersfeld95], we claim that knowledge and experience consist of what the knowledge worker *constructs*. The relevance of such knowledge is then directly proportional to the relevance of the constructive operations.
- Finally, knowledge work is taking place in cross-functional, transdisciplinary project groups, possibly with members from different countries, where the ability and willingness to *share knowledge* with others are becoming more and more critical for success [ArthAnd96, 25 ff].

A second major design principle of KnowPort is that of *simplicity*. We intend to design a personal tool like a word processor or a spreadsheet tool but without the complexity that comes with an elevated number of functions and customization parameters. So, one strategy for implementing ease of use and encouraging usage will be that of *minimizing* the set of functions needed without compromising the aim of supporting *efficient and effective* knowledge tracing. In an analogy to word processing this could be expressed by saying that we intend to implement a "Notepad", not a "MS Word" tool.

6 KnowPort components and features

Our approach for supporting *efficient and effective* tracing of *knowledge relevant* tacks is basically to combine in a composite environment several independent tools designed to meet the salient requirements of knowledge work (see above par. 5):

- a *communication* tool for tracing different-time E-Mail conversations
- an *agenda* tool for tracing contexts, objects and activities of tasks done
- a *file* tool for tracing files (applications and data) used
- a *word* tool for tracing and connecting critical concepts used

6.1 MailTack

This *communication* tool helps users in keeping a constant overview of different-time conversations and discussions done by E-Mail with several partners. Different topics that develop independently over time during a number of E-Mails and with contributions of different persons can be connected into independent *argumentation chains*; each chain can then be viewed as linear text output (without the text segments of other topics) or as map of linked nodes over the global map of the complete discussion.

6.2 TaskTack

This *agenda* tool provides a daily overview of all tasks done. A task is specified as a record of *date, context, object* together with the *activity* performed on that object in that context; optionally duration and a comment can be added. The user can organize contexts, objects and activities into classification and aggregation hierarchies that can be browsed in a graphic display. When a new entry for a task performed has to be added, the system supports reuse of existing *context, object, and activity* specifications so that the same task will always be described univocally. With interfaces to the most common planning tools, *TaskTack* will help user to become aware of the knowledge hidden in their flat lists of daily tasks data.

6.3 FileTack

This *file* tool records the chain of file handling actions, like starting an application, working with a started application, opening or closing a file and working with it, accessing an internet site, etc. The record includes date, time, operation, duration, file name and size. The

user can view charts of these records over a selected time interval (calendar days) and identify patterns of her use of software resources, for instance track down the historical progression of a particular file or find the amount of time spent using a specific application.

6.4 WordTack

This *word* tool supports the user in specifying her current understanding of critical concepts. The meaning of a word can be described by writing hypertext expressions and by drawing a semantic network. In the hypertext, the current description of a word is linked to the individual descriptions of the words it uses and in the semantic network a word is linked with the words of its description by different types of semantic relations.

These four tools for knowledge tracing, which will be implemented as Windows applications with interfaces between them as well as to the major office packages, constitute the *kernel* of the KnowPort architecture.

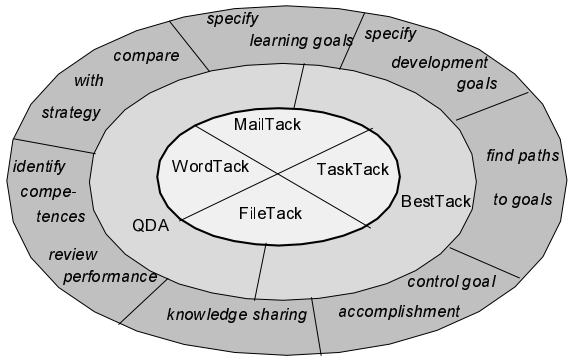

Figure 1: General *KnowPort* Architecture

7 Perspectives

Around the *knowledge tracing kernel* of the KnowPort architecture, various analysis and validation tools will be added later. They will assist knowledge workers in modeling and managing their individual 'knowledge portfolio' *on the basis of their traces of knowledge relevant tacks*. This will include supporting individuals to: a) review their own performance and identify their competencies, b) compare these competencies and performance against the requirements derived from their company's strategic goals, c) specify and prioritize learning and development goals according to corporate, team and personal needs, d) find appropriate paths for achieving these goals, e) control goal accomplishment and measure skill attainment and, last but not least, manage their activities of knowledge sharing (Fig. 1).

The first tool that we plan to implement around the tracing kernel will be an *experience* tool called *BestTack* for identifying and keeping track of best practices and ideas by analysing the available knowledge traces.

BestTack will be based on the approach of qualitative data analysis (QDA) developed within the context of social sciences [Coffey96]: it will assist the knowledge worker in structuring (categorizing) and linking knowledge documents identified as relevant by analysing the knowledge tacks produced with the KnowPort kernel.

8 FAQ

At this point of our research many question are still open for discussion within our group, for instance: Which are the advantages of tracking a knowledge tack ? What are the main principles of the methods for analysing the knowledge traces ? Which are the strength of this tool compared with other similar tools? How to solve the problem of information overload due to a lot of irrelevant stuff contained in the traces ?

8.1 Relevance and irrelevance

What we are interested in is primarily supporting the user to follow the course of development of knowledge-intensive tasks. For this reason, in the moment of doing such a task, a step is relevant to the user if it contributes to trace the course of development. Later the user criteria of relevance will change depending on what she will be focusing on: so, when she will look back at the tack followed, one and the same step will be one time relevant and another time irrelevant. In this perspective the traces do not contain a priori "a lot of irrelevant stuff".

8.2 Advantages and strengths

We expect that the main advantages of our tool will come from the main strength of our approach, namely its explicit foundation in knowledge theory. In fact, our method for obtaining a knowledge survey is strongly based on the constructivist view of knowledge developed by Ernst von Glasersfeld and known as *Radical Constructivism* [vonGlasersfeld95] which shows that knowledge and experience can never reflect a ready-made *rationally structured* real world. Instead, the rational structures that make up our knowledge *are determined* by what the subject makes in organizing and managing her flow of experience according to criteria of consistency and coherence. This is way focusing on *knowledge construction* is so important!

References

[APQC98] KMAT, Knowledge Management Assessment Tool, American Productivity & Quality Center, www.apqc.org

[ArthAnd96] Arthur Andersen, Improving knowledge sharing in international businesses, Andersen Worldwide, SC April 1996.

[Coffey96] Amanda Coffey, Beverley Holbrook and Paul Atkinson, 'Qualitative Data Analysis: Technologies and Representations', *Sociological Research Online*, vol. 1, no. 1, 1996, http://www.socresonline.org.uk/socresonline/1/1/4.html.

[Esprit97] Documentation was available from http://www.cordis.lu/esprit/src/call97sp.htm and http://www.cordis.lu/esprit/src/learners.htm

[Hiebeler96] Robert J. Hiebeler, Benchmarking: Knowledge Management, Strategy & Leadership, Vol 24, 2, pp. 22-29, Mar/Apr. 1996.

[Kidd96] Alison Kidd, Why you wouldn't take a spanner to a desert island, HCI'96: 11th British Computer Society Conference on Human-Computer Interaction, London, 1996.

[KnowNet98] See http://www. know-net.org or http://knownet.power.ece.ntua.gr/ or http://knownet.planet.gr/

[O'Dell97] Carla O'Dell & C. Jackson Grayson, If we only knew what we know, American Productivity & Quality Center, Houston, 1997.

[Probst97] Gilbert Probst, Steffen Raub and Kai Romhardt, Wissen managen, Verlag NZZ, Zürich,1997.

[Shum96] Simon Buckingham Shum, Negotiating the construction of Organisational Memory Using Hypermedia Argument Spaces, PAKM 96, Basel.

[Speck97] Rob van der Speck, André Spijkervet, Knowledge Management, Kenntniscentrum CIBIT, Utrecht, 1997.

[vonGlasersfeld95] Ernst von Glasersfeld, Radical Constructivism: A Way of Knowing and Learning, Falmer, London, 1995.

[Waterman86] Donald A. Waterman, A Guide to Expert Systems, Addison-Wesley, Reading, MA, 1986.

[Wiig93] Karl M. Wiig, Knowledge Management Foundations, Schema Press, Arlington, 1993.

[Wiig94] Karl M. Wiig, Knowledge Management, Schema Press, Arlington, 1994, p.22 ff.