Andreas Schmidt Simone Braun

<u></u>

Context-Aware Workplace Learning Support: Concept, Experiences, and Remaining Challenges



FZI Research Center for Information Technologies Information Process Engineering Karlsruhe, GERMANY

> {Andreas.Schmidt | Simone.Braun}@fzi.de http://www.fzi.de/ipe



Outline

Motivation

Concept

- Redefining Guidance
- Context-Steered Learning
 - o content-driven
 - o communication-driven

Experiences

Conclusions & Visions



Learning on Demand as a new paradigm

- Seminars and courses lead to inert knowledge
 - no immediate application



- Learning needs can be less and less anticipated
 - highly individualized learning paths
 - high level of fluctuation
 - rapidly changing requirements
- Learning offers have to respond to situative needs
 - working and business processes
 - individual competencies, preferences, characteristics, interests, ...



- Learning on demand is often misunderstood as completely learning on your own
 - surrenders to the complexity of individualized educational processes
- Self-steered learning processes
 - cognitively challenging
 - don't neglect the affective dimension (uncertainty)
- context-aware workplace learning support
 - where context-aware means
 - o knows about
 - o takes into account







Concept







Redefining Guidance



working processes



Two types of learning

Content-based

- recommended resources are artifacts suitable for learning
 - o learning objects, documents, discussion forums, ...
- learning by "absorbing"
- Communication-based
 - "informal teaching"
 - recommended resources are people
 - o experts
 - o colleagues
 - o members of your social network
 - learning by communicating



Content-Based Context-Steered Learning (1)

- Basic idea:
 - the system recommends learning resources that are subjectively relevant for the user and her current situation
 - proactive intervention into work processes
 - learning resources range from immature items to learning objects
- Problems:
 - when to recommend?
 - how to recommend?
 - what to recommend?
 - o what is objectively relevant for a situation?
 - o what can be understood and is thus helpful for the user?
 - o do we need additional resources first?
 - provide learning resources the possibility of adapting to the user



Content-Based Course Steered Learning (2)



Top-Level Overview of the Ontological Model



Communication-Based Learning Support

Informal teaching can be beneficial for the teacher

- deepening the understanding (cognitive elaboration)
- gaining social esteem
- ...
- but it can also be annoying, interrupting and disturbing
 - pulled out of own work and learning processes
 - classical problem of expert finder applications
- Like we need to integrate learning processes into work processes, we also need to integrate teaching processes into the work processes "on the other side"
 - balance interests on both sides!

- Context-aware communication mediation for better knowledge-sharing
 - overcome the gap in communication between the learner and the informal teacher

Steps:

- 1. Analyze the learner's and the teacher's context
- 2. Match the contexts to minimize the costs and to maximize the benefits on both sides
- 3. Adapt the communication mediation appropriately

Communication-based Context-Steered Learning

Experiences

<u>)</u>

FZI

Service-Oriented Implementation

FZI Research for Information Technologies | Information Process Engineering | www.fzi.de/ipe

Agent-based recommendations

								ð]	_IP -	Lea	rning	in Proces	s - Project	work	- Microsoft	nternet	Explorer			_ 🗆 ×
				N	4y Cor	mpute	er -	<u> </u>	e <u>E</u>	dit	⊻iew	F <u>a</u> vorite:	s <u>T</u> ools j	<u>H</u> elp						
					6	2	m	K Ba A <u>d</u> o	¦⊒ ack tress	• •	Forwar	rd Sta	p Refrest	h Ha 34B44D	Dime Sear 0042449F5923	h Favor 009629D	ites History 76A&relationtab	Mail	Project&OQS=	Edit 20
							is		LIP - Learning in Process							e	Hey! I think I have some useful documents for you.			
					Netv	work -	SI	St	art	w	orkpa	ackages	Current	LIP	Members	Sugge	stion Forms	Todo	Project	verk Links
				N	eighb	orhoo	od N													
king Micros	oft Excel									_				×	ect Man	ageme	nt		2	
<u>Eile E</u> dit	⊻iew Insert For	mat <u>T</u>	ools <u>D</u>	<u>)</u> ata	<u>W</u> indov	v <u>H</u> elp	5													AK I
i 🗌 🗌 🔁 🛛	- 2 - -	ABC (<mark>Ж 🖻</mark>) 🛍	10	- 🔒	Σ	f∗ Â	🛍	l 🔇	*]≣			*	A4					10
ut to E32	_	= =E	E31/E2	29															1	
.bat	wer.xls												- 🗆 🗵							
ybe I can help you w	vith B	С	D	E	F	G	н	1	J	к	L	M	N							
< "Filling the effort for	m".	VDA	VP1	VD2	VP2	VD4	VDF	VDC	VD7	VDe	Total								Associated	Folders
V 3	CIMNE	V FU	V F1	WF2	V F3	464	WP 5	WF 6	WP7	WF 0	Total				h Assessmer	<u>t</u> C	ate: 29.09.200	03 7	🖶 Reports (M	IRs and respon
4	Budgeted Sport (Boriod)	2.0	6.0	1.0	1.0	8.0	3.0	2.0	4.0	11.0	38.0								PRs)	
	Spent (Total)	2.0	6.0	0.2	0.2	6.4	0.0	1.8	2.4	7.2	27.4				onths Distrib	ution E	ate: 14.07.200	03	Entries: 1 - 1 of 1	1
	Completed	100%	100%	80%	80%	80%	0%	90%	60%	65%	72%				mber contac	tlist D	ate: 14.07.200	13	Lindical 1 - 1 - 1	
	Budgeted	6.0	7.0	15.0	2.0	22.0	4.0	7.0	5.0	5.0	73.0				mbor concide	<u>e 1150</u> - 1				
	Spent (Period)	0.0	0.0	3.0	0.4	3.3	0.0	0.6	0.4	0.0	7.7				ng LIP date:	E C	ate: 14.07.200	03		
12	*Completed	100%	100%	50%	80%	66%	0%	68%	64%	58%	65%				off Project	Г	ate: 14 07 200	13	Appointmen	ts
13	CAS														ice i rojoce		400, 11,07,200			
14	Budgeted Spent (Period)	0.0	4.0	0.0	0.0	0.0	12.0	6.0 0.3	4.0 0.3	4.0 0.2	47.0				orms (CPF)		ate: 14.07.200)3 I	No records fou	na.
16	Spent (Total)	19.0	4.0	0.0	0.0	0.0	0.0	2.9	2.7	1.5	30.1				er Namer		ata: 14 07 200	13		
17	Completed	112%	100%				0%	48%	68%	38%	64%				er warnes	L	ate: 14.07.200			
19	Budgeted	2.0	6.0	19.0	12.0	1.0	3.0	2.0	4.0	3.0	52.0						NAFR	1		
20	Spent (Period)	0.0	0.0	4.8	3.0	0.5	0.0	0.0	0.0	0.3	8.5									
21	Spent [Total] % Completed	5.3 263%	129%	14.3	63%	1.0	0.0	1.8	2.3	0.3	40.1									•
23	NSPL																		🖉 Interne	
24	Budgeted	2.0	6.0	1.0	20.0	1.0	8.0	4.0	4.0	3.0	49.0						ļ			90
25	Spent (Period) Spent (Total)	0.0	9.5	0.0	14.2	0.1	0.0	0.0	0.0	0.2	7.5									
27	Completed	250%	158%	0%	71%	60%	0%	3%	35%	7%	63%									
28	META4	10.0	00.0	10.0	41.0	40.0		17.0	10.0	10.0	100 5									
29	Budgeted Spent (Period)	16.0	22.0	12.0	14.0	10.0	11.0	17.0	16.0	10.0	128.0									
31	Spent (Total)	18.5	22.5	8.4	6.6	8.0	0.0	7.1	13.9	3.4	88.4									
32	% Completed	116%	102%	70%	47%	80%	0%	42%	87%	34%	69%									
33	IBIT Budgeted	9.0	10	0.0	0.0	0.0	12.0	4.0	4.0	4.0	25.0									
	N NI MD1 (MD2	/ MDC	A AND	4 / M				NAD 4	4	1.9	00.0									

Embedding in Portal Solution

AND ADDRESS OF THE AD	Muster AG Jean-Pierre Grimaud		🎯 <u>Drucken</u> 🎲 <u>Sitemap</u> 🤣 <u>Hilfe</u> 🦛 <u>Einste</u>								
Start Aktuell Mitarb	eiter Online-Formulare	Recherche eLearning									
Mitarbeitersuche GO		Lernen Sie mehr über diesen Kontext	<u>[X]</u>								
Benutzerservice Verbesserungsvorschläge Meine Vorschläge Alle Vorschläge Bearbeitbare Vorschläge	Status: Alle Nur offene Nur erledigte	Priorität ✓ A ✓ B ✓ C									
Urlaubsverwaltung	and as I	CO	21 PT								
Meine Checklisten	Suche: [Sor	Neuer Vorschlag								
	A Firmenwagen als Resopurce in genesisWorld verwalten										
	Fällig bis: 06.02.2004	Bearbeitungsstatus: noch nicht begonnen	0 % erledigt								
	A Automatische Installation von Security Patches										
	Fällig bis: 06.02.2004	Bearbeitungsstatus: noch nicht begonnen	0 % erledigt								
	A Kostenloses Obst für										
	Fällig bis: 06.02.2004	Bearbeitungsstatus: noch nicht begonnen	0 % erledigt								
	Einträge: 1 - 3 von 3		H A P H								

Tray Application/Sidebar

Tray application

- displays balloon tooltips
- or changes icon color

- When the user activates it:
 - sidebar appears

- Content-Based Context-Steered Learning
 - initially developed within the Learning in Process project
 - positive evaluation feedback in the two prototypes
 - currently transfer to industry
 - o SAP: integration of context-aware recommendations into SAP apps
 - o sitewaerts: context-aware adaptation of learning objects (SCORM extensions)
- Communication-Based Context-Steered Learning
 - first proof-of-concept prototype within a small group
 - larger scale and cross-organizational usage planned within the project Im Wissensnetz (in the knowledge web)

Conclusions & Outlook

- Context-steered learning provides a methodological framework for supporting learning on demand
 - structures system functionality along primitives
 - integrates informal teaching and context-based activities
 - first results are already transferred into "real-world" products
- Crucial is a robust user context infrastructure and the "right level" of simplification
- Future plans/current activities:
 - integration with competence management (reference ontology for competencyoriented human resource development -> OntoContent06)
 - social awareness
 - how to support more informal processes with emergent topics where state-ofthe art ontology-based approaches are no longer suitable (-> knowledge maturing)

http://www.professional-learning.eu

Im Wissensnetz

Vernetzte Informationsprozesse in Forschungsverbünden

Andreas Schmidt Team Manager "Knowledge and Learning" FZI Research Center for Information Technologies Information Process Engineering Andreas.Schmidt@fzi.de http://fzi.de/ipe

