

Université de technologie de Compiègne – Thesis proposal

Part 1: Scientific sheet	
Thesis proposal title	Recommendation of pedagogical resources within a System of Information systems
PhD grant	Doctoral work contract based on a Ministry of Research Grant
Research laboratory	laboratory : HEUDIASYC research team : CID, scientific axis 'knowledge and data treatment / knowledge modeling for capitalizing, explaining, reasoning web site: www.hds.utc.
Thesis supervisor(s)	Marie-Hélène Abel
Scientific domain(s)	Computer science and information technologies Science and technology
Research work	<p>Today, with the intensive use of Information and Communication Technologies (ICT), learners operate in a learning ecosystem that can be defined as an ecological model of learning and teaching (Frielick, 2004) including e-learning infrastructure (Gütl and Chang 2008). It can be seen as a virtual learning space in which the technologies that contribute to learning (hardware, software and network) are used, in order to foster interactions between communities of actors and content. In this introduction, we present both the social, scientific context of our research and the problem we wish to solve.</p> <p>Social context In the context of "learning together", many information systems are used by learners. These systems provide heterogeneous resources (video, text, e-book, online forum, etc.) to different users (students, teachers). According to Guy and Carmel (2011), the multitude of resources, relationships and interactions can lead users to undergo an information overload that makes them unable to assimilate the available information. In order to reduce this overhead, it would be useful to offer assistance to users so that they can choose the resources that may be most relevant in a given situation. One of the possible ways in this direction concerns the sharing of information and the voting systems well known to Internet users. It is therefore interesting to consider the association of these different means within the framework of a learning ecosystem in order to produce targeted recommendations. The purpose is to allow a learner to act by becoming aware of what he shares, why he shares it, with whom, when and how.</p> <p>Scientific context Information retrieval in the context of e-learning remains a challenge. In the literature, this challenge is generally addressed by considering the profile of the learners in particular in the work on information filtering in order to propose to learners relevant documents. In the context of information filtering, several approaches are possible: (i) content-based approach (Pazzani and Billsus, 2007) which makes recommendations by comparing the semantic content of resources with the user's tastes; (ii) knowledge-based approach (Burke, 1996) which makes recommendations using user knowledge and pre-established heuristics; And (iii) collaborative filtering approach (Goldberg, 1992) that makes recommendations by analyzing both the user's opinions about the resources he has visited and those of other users on the same resources. Under the latter approach, collaborative filtering may be associated to the profile of each learner (who consults what?). Although more precisely these systems do not consider the context of collaboration and the possibility of sharing resources from different systems.</p> <p>Research problem As part of this thesis work, we wish to address the problem of recommending teaching resources within a learning ecosystem by considering the following points: - The willingness to share, recommend resources with a community in order to achieve a common goal; - The fact that shared, recommended resources could come from different information systems.</p>

	<p>It is therefore a question of taking into account the context of collaboration. The approach we propose to follow combines semantic modeling (ontology) and collaborative filtering techniques. We propose to consider a learning ecosystem as a system of information systems developed from a collaborative model and including a recommender system based on the actors' vote (learner, teacher). Such a model should be based on semantic web standards. Filtering techniques should take into account the established model and the semantic traces that it will have recorded. This work can be based on the work of the laboratory (Li, 2014), (Saleh, 2016), (Wang, 2016) and (Ben Ameer et al, 2017).</p> <p>References</p> <p>Mohamed Ali Ben Ameer, Majd Saleh, Marie-Hélène Abel, Elsa Negre: Recommendation of Pedagogical Resources within a Learning Ecosystem. MEDES 2017: 14-21.</p> <p>Abel, M.-H., Wang, N., Barthès, J.-B., Negre, E. (2017) "Trace-based computer supported cooperative work as support for learners group design." Proceedings of the 21th IEEE International Conference on Computer Supported Cooperative Work in Design, CSCW in Design '2017, April 26-28, 2017, Wellington, New Zealand.</p> <p>Burke,R., Hammond, K. and Cooper, E. (1996). Knowledge-based navigation of complex information spaces. In Proc. of the 13th National Conference on Artificial Intelligence (AAAI'96), pages 462–468, Menlo Park, Canada.</p> <p>Frielick, S. (2004). Beyond constructivism: An ecological approach to e-learning.</p> <p>Goldberg, D., Nichols, D., Oki, B.M. and Terry, D. (1992). Using collaborative filtering to weave an information tapestry. Communications of the ACM, 35(12):61– 70.</p> <p>Gütl, C. and V. Chang (2008). "Ecosystem-based theoretical models for learning in environments of the 21st century." International. Journal of Emerging Technologies in Learning (iJET) 3: 50- 60</p> <p>Guy, I., Carmel, D. (2011). Social recommender systems. In Proceedings of the 20th international conference companion on World Wide Web. ACM 283-284</p> <p>Li, Q., Abel, M-H., Barthès, J.P. A. "Modeling and exploiting collaborative traces in web-based collaborative working environment." Computers in Human Behavior, CHB, Vol. 30 (jan.). pp. 396-408, 2014.</p> <p>M. Pazzani and D. Billsus. (2007). The Adaptive Web, chapter Content-Based Recommendation Systems, pages 325–341. Springer Berlin / Heidelberg.</p> <p>Saleh, M., Abel, M.-H. (2016) "Moving from Digital Ecosystem to System of Information Systems." Proceedings of the 20th IEEE International Conference on Computer Supported Cooperative Work in Design, CSCW in Design '2016, May 4-6, 2016, Nanchang, China.</p> <p>Wang, N., Abel, M.-H., Barthès, J.-B., Negre, E. (2016) "An Answerer Recommender System Exploiting Collaboration in CQA Services." Proceedings of the 20th IEEE International Conference on Computer Supported Cooperative Work in Design, CSCW in Design '2016, May 4-6, 2016, Nanchang, China.</p>
Key words	System of Information Systems, Learning Ecosystem, Recommender System, Decision Support System
Requirements	java, PHP programming Ontology, OWL, SPARQL Recommender system
Starting time	Fall semester
Location	Heudiasyc laboratory, UMR CNRS-UTC 7253

Part 2: Job description

Duration	36 months
Additional missions available	Teaching
Research laboratory	Computer science Heudiasyc laboratory, UMR CNRS-UTC 7253
Material resources	Computer, collective office, scientific database access
Human resources	Researchers, professors, associate professors, PhD students
Financial resources	
Working conditions	Weekly meeting
Research project	MEMORAe
National collaborations	LAMSADE, Paris Dauphine
International collaborations	No
International cosupervision (cotutelle)	No
Contact	Marie-Hélène Abel, Professor, Heudiasyc laboratory, UMR CNRS-UTC 7253 +33 (0)3 44 23 49 50, marie-helene.abel@utc.fr

Please contact first the thesis supervisor before applying online on <https://webapplis.utc.fr/admissions/doctorants/accueil.jsf>