Steps Towards a Federated Course Model

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Abstract. As contribution to a requirements specification for a federated university course model, a collection of desirable characteristics along several distinct criteria or 'facets' is proposed. Two historical University of Oslo courses, "Information Design" and "Socio-Semantic Web and Knowledge Federation" are described that in part implemented those characteristics, which were intended to be predecessors and experimental environments for developing the federated course model; experience with those two courses is discussed. An initial plan for the actual knowledge federation course is proposed as a starting point for co-creating or federating an actual course model.

Keywords: Knowledge federation, self-organization in knowledge work, education, life-long learning, e-learning.

1 Introduction

Acknowledging that information about a subject can exist but the knowledge can still be lacking, knowledge federation relinquishes the assumption that when something is published it is known, and complements the conventional focus on production of information by a focus on (co-creation of) social processes and technology for production, custodianship and dissemination of culturally relevant knowledge or memes. We then look more concretely into how to co-create the knowledge that is necessary, remedial, transformative, shared, embodied and acted on.

As knowledge federation researchers we broaden our self-perception from 'creators of research articles' to 'members of real-life social structures whose task is to produce, maintain and disseminate the sort of knowledge that can help our society and culture make certain critical steps in its evolution – and co-creators of those social structures.' While we all in this community, I believe, share an understanding of the need for such broadening of knowledge work, a question remains – What can we do, concretely, to influence the actual practice? Naturally, education will be part of the answer. By developing a federated knowledge federation course we can disseminate our concerns and insights, develop a broader base of knowledge federators, evolve many concrete solutions for knowledge federation in general, and create a visible showcase that represents this way of working and its advantages in public.

The rest of this article is organized as follows. In the second section several facets or desired characteristics of federated education are discussed, which also point at various advantages and lines of contribution that are potential in knowledge

federation in general. In the third, an implementation of a subset of those characteristics is described, within University of Oslo Information Design course and the corresponding course model called FLEXPLEARN. In the fourth, an experimental predecessor of the Knowledge Federation Course is discussed – the University of Oslo Socio-Semantic Web and Knowledge Federation course. In the fifth, a plan for the future Knowledge Federation course is proposed, as an initial version to be discussed and modified and implemented by the Knowledge Federation community. In Concluding Remarks I offer some reflections about fundamental-academic sides of knowledge federation, based on the presented example of educational model design as illustration.

2   Facets of Federated Education

By discussing several facets or dimension of federated education, I point at lines of contribution that are potential in the Knowledge Federation project in general.

In keeping with my view that knowledge is not only 'objective' but also relational and emotional, and that part of our task is to 'motivate the motivators' (spread our messages and way of working, for ex. through the media) in this section I augment the dry language that is common in research by motivational metaphors.

2.1   Economies of Scale

Conveyor belt was a symbol of the Industrial Age. A possible approach to popularizing knowledge federation is to introduce it as an 'Information Age counterpart to conveyor belt' (while carefully avoiding the negative connotations).

More precisely, knowledge federation as an organizational model is a knowledge-work counterpart to the value chain model in modern business.

This facet of knowledge federation will be illustrated by the Knowledge Federation course – we undertake to develop a course that is co-created and maintained by experts and students worldwide, and attended by learners globally. When a researcher is responsible for only a single lecture or part of a lecture, substantial reductions of effort and improvements of quality can be achieved. When furthermore this work is shared with creative animators, film makers, story tellers… who are also members of the federation, learning can be made more attractive and engaging than playing computer games. And that is how it should be.

2.2   Education for the 21st Century

In an academic context, a knowledge federation may be thought of as a post-discipline – an organizational structure where experts from different disciplines can join other stake holders and co-create based on needs and interests that are beyond the conventional disciplinary ones; and in particular as an organizational structure that can mobilize human and other resources to work on urgent contemporary issues.

This facet of knowledge federation has an immediate application in education. We create a flexible educational structure, which allows people to learn exactly what they need and when they need it, independently of traditional disciplinary borderlines. In that way we also cater to demands that education should become life-long, and 'just-for-me' and 'just-on-time.'

2.3 Creating People for the 21st Century

The task of knowledge work is not only to provide book knowledge. In an era where book knowledge is widely available through new media and also quickly made obsolete, and where the human quality can have a deciding role [1], developing people who are able to find or create relevant knowledge themselves, and who are willing to take responsibility for non-standard tasks that are beyond traditional professional and even personal interests is becoming more important.

The Knowledge Federation course will be carefully designed to stimulate and nourish a complete range of relevant personal qualities, including the ethical ones.

2.4 Spreading Knowledge Federation through Education

The growth of knowledge federation will critically depend upon our ability to disseminate our messages and attract excellent young researchers.

The Knowledge Federation course will be an accredited graduate course offered to students of some of the leading international universities, through the Inter University Centre Dubrovnik, which is accredited to organize such courses.

We will also create a life-long-learning course and offer it to businesses. This will be implemented in collaboration with our corporate stakeholders, who will have interest in informing and educating their (potential) clients.

2.5 Enhancing Knowledge Federation through Education

In the era of collective intelligence and crowd sourcing education has an enormously large un-tapped potential. Just think of all the work that is being done only to satisfy course requirements, which is being thrown away once the exams are over!

We integrate education into knowledge federation. The Knowledge Federation course carefully integrates its students into a 'knowledge ecosystem,' where they have an essential role in composting knowledge artifacts and extracting nutrients. (This approach may provide at least partial answers to such questions as how to semantically organize of the global knowledge resources.)

2.6 Instigating a Larger Wave

A strategy I find especially attractive for spreading knowledge federation may be described metaphorically as 'instigating a much larger wave and riding on it.' There

is, namely, a need and a possibility for a development in the sciences that is analogous to the one that happened in the arts a century ago. The grounds for this are both fundamental (insight that in the sciences we are *not* discovering an objective picture of reality, which emerged in so many different ways in 20th century's science and philosophy) and pragmatic (need for re-focusing some of the academic machinery to work on contemporary issues). The mentioned analogy with the situation in the arts a century ago is rather accurate and interesting to reflect on: In art, for both epistemological and practical reasons, depicting reality by imitating the technique of the old masters ceased being considered as 'contemporary art.' To truly be considered a creative artist, one needs to be creative also in the form of expression and the technique. A result was an outburst of new styles and movements that marked 20th century art. (Here too we must carefully avoid the negative connotations: While the 20th century art was in spirit 'art for its own sake,' the 21st century science needs to perceive itself as part of the social organism, and fulfill the central role in our collective mind it has assumed.)

A task of Knowledge Federation course is to represent this new spirit, by reflecting it in style and in content.

This may attract to our ranks creative young people who may feel a bit bored by the 'scholastic' style and values in academia. Knowledge Federation as project and as community can be an initial 'alma mater' for this development.

An academic development of this kind may initiate a broader cultural revival, within which solutions to larger contemporary issues may naturally evolve.

3 University of Oslo Information Design Course and FLEXPLEARN Course Model

As a faculty member of the Institute for Informatics (Computer Science Department) of the University of Oslo, I developed my research and teaching as a showcase of what I called the *design* approach to academic work, where instead of following the traditional disciplinary patterns, we aim to serve all various key purposes within a larger whole or wholes (such as the academic culture, or global society). The Information Design Course and the corresponding course model called FLEXPLEARN (for FLEXible EXPLoratory LEARNing) were developed as prototypes of this approach in education.

Within the Information Design Course ways to implement a number of desirable characteristics were devised, which may be adapted and developed further for the Knowledge Federation course.

3.1 Class as a Flexible Learning Environment

We envisioned a university class as a *flexible learning environment*, where each student learns according to individual needs and interests, and in a number of ways, not the least by interacting with peers. A role of instructors was to set up this learning environment.

We can then think of a class as we usually think about an environment – namely as something whose role is to provide all the 'nutrients' for life and growth, at the point when they are ready to be absorbed.

New technologies were part of this environment. We used for example Wikis and topic maps to organize the learning resources, and blogs to keep record of each student's personal contributions.

All learning resources including videotaped lectures and group sessions were available online.

3.2 Course as a Design Project

The Information Design course was conceived as a design project, where the students and instructors co-create the course and the learning materials. We told the students that with respect to this task they would be in the position of early globe explorers – organize themselves into small teams, venture into an area of their choice of our subject space, explore it and bring us back their findings.

Hence instead of being passive learners, the students were made responsible for the course, and we were able to grade not only what they got out of the class, but also what they contributed.

3.3 Domain Map

If we should allow the students to choose their own learning path, and even make them active contributors to our knowledge base, what could be more natural than to provide them a map of the current knowledge for reference and orientation? We used a specifically designed information object called *domain map* to represent subject domain of information design and organize the learning resources. A difference between a *domain map* and a conventional topic map is that while the latter would normally be used for organizing the existing resources, the purpose of a *domain map* is to represent the domain, by also pointing at large areas where knowledge resources are lacking.

The *domain map* offered material at different levels of detail. It also provided a 'mountain-top view' of the whole field, that a student could use at the beginning of semester to determine a personal learning itinerary.

The *domain map* replaced the usual linear organization of a course by a three-dimensional structured space of topics. In this way the existing dependencies of various parts of the material ('you need to process A before you can understand B') can easily be represented.

Each student brought a personal *domain map* to the oral exam, where individual *learning itinerary* and personal contributions to the course knowledge base were marked.

3.4 Information Design Course as an Experiment

To a small fraction of the students this course was a meaningful experience and in individual cases a 'life-changing' experience. About two thirds of the students enjoyed the learning environment and were in tune with the challenges it presented. A small fraction of the students were frustrated and said (in an anonymous questionnaire) they needed a course that provided a lot more structure and guidance and not a 'construction site' as this course was staged.

Improvements can be made by better funding and thorough organization.

An important issue in education is legitimacy – the instructors are perceived as standing against the established order. 'Is this how and what people are supposed to learn at a university?' Better environment for flexible education may be secured through media and institutional support.

4 University of Oslo Socio-Semantic Web and Knowledge Federation Course

A graduate course called Socio-Semantic Web and Knowledge Federation, which was taught at the Institute for Informatics in Spring 2009, was specifically designed as a pre-cursor to Knowledge Federation course [3].

4.1 Subject Matter

The selection of themes that this course was teaching may be used as a starting point for developing Knowledge Federation curriculum.

A lecture titled 'Wikipedia vs. Britannica' showing specific arguments on two sides of a debate, was used to motivate knowledge federation as a way to combine the positive aspects of both and avoid the negative ones.

Some material needed to be imported from classical fields, for example from knowledge organization, where related questions have been studied for centuries.

Knowledge federation also has its own icons or 'classics,' and we named Doug Enelbart, Vannevar Bush J.C.R. Licklider and Ted Nelson.

We introduced technical ideas from areas like semantic web, topic maps and dialogue mapping. A guest lecture on subject identity was given by Steve Pepper, providing the 'depth of field' and motivation for technical research.

We studied applications in wicked problem solving, scientific communication and education.

4.2 A Possible Federation Scheme

We used the Compendium dialogue mapping tool to create a *domain map* and organize the learning resources.

A possible organization for our projected Knowledge Federation course is to use an online version of Compendium.

4.3 Socio-Semantic Web and Knowledge Federation Course as an Experiment

This was a small graduate course, announced to students at the last moment and offered only once.

The course did not have design projects and hands-on teaching of technical tools, and that was its largest perceived disadvantage, and a large possibility for improvement.

5 Projected Knowledge Federation Course

I propose to Knowledge Federation to develop two variants of the Knowledge Federation course – one for university students, and the other one for life-long learning and businesses. Both may be implemented as two functionalities of a single platform.

5.1 Knowledge Federation University Course

An especially convenient side of Inter University Centre in Dubrovnik where the knowledge federation workshops are staged is that it can offer accredited courses to students from its member universities – which are 161 universities distributed globally, including for example the Central European University Budapest, the University of Oslo, the University of Tokyo, and of course as some of the most famous ones such as Sorbonne, Oxford, MIT and U.C. Berkeley.

My proposal is to organize a pilot graduate Knowledge Federation course and offer it to students of IUC's member institutions in connection with our next workshop, which will be in October 2012.

As I mentioned, such course will have highest strategic value for Knowledge Federation development.

5.2 Knowledge Federation Lifelong Learning Course

Education is anticipated to become an increasingly active and attractive business niche in the 21st century.

An important part of the Knowledge Federation mission is to develop suitable business models that will secure spreading and growth of knowledge federation. Life-long learning seems to be an excellent place to begin.

Knowledge Federation seems to be also a uniquely attractive content for marketing this sort of course. Indeed, if the nuts and bolts of how knowledge is created, organized and delivered are about to be changed, this will affect every business in 'knowledge economy.' Furthermore, problematizing the age-old modalities of

communication, which have evolved based on written text as medium, is intrinsically interesting.

I propose to develop this side of Knowledge Federation course in collaboration with our Corporate Stake Holders. In addition to the named advantages, for them this course may provide an additional advantage of being an excellent medium for marketing knowledge federation technologies and solutions.

Partly for this purpose a group of young entrepreneurs / business plan developers will be present at this year's workshop.

6 Concluding Remarks

As I am writing about these strategic and other points regarding the development of Knowledge Federation, I am aware of a fundamental objection that may be raised – Is this sort of occupation and material worthy of being considered 'academic research?'

While I am acting as a facilitator for the Knowledge Federation development, making sure that 'all the wheels are in place and well lubricated,' I amuse myself with the thought that what I am doing, and what we all are doing together, is in fact *basic research* – in a sense that suits the 'contemporary science' of the 21st century.

The conventional idea of 'basic research' grew on now obsolete 'reductionistic' premises. Also the premise that the goal of academic research is to merely describe 'reality' in academic publications can be challenged, not the least because it tends to make the academia increasingly irrelevant, in a media-dominated and commerce-dominated world.

On the other hand, a pro-active approach to questions such as:
- How to reorganize the academia and mobilize the academic resources to bear upon contemporary issues?
- How to implement the basic academic function – of producer, custodian and disseminator of culturally relevant memes – in a suitable way under contemporary circumstances?

becomes research that is in a rational sense basic (as its goal is to build a foundation on which viable academic work can develop).

I feel humbled, and at the same time intrigued, by the magnitude of the task that is before us – to evolve new quality standards and templates for academic research. Yet I believe that we have no choice but to begin by reconsidering the existing ones.

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