Proposal to
The Wallenberg Global Learning Network Funding Program

Personal Learning Portfolios: Folio Thinking

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Part I. Executive Summary/Overview

The following is a proposal for funding under the Wallenberg Global Learning Network innovative curriculum opportunity. The research thrust under which our project falls is *Personalized Learning for the Student*. We believe that the activities described herein, will lead to a set of tools and behaviors which will help students track and reflect upon their formal and informal learning experiences in a effort to improve the quality of undergraduate education. In the following sections we outline the problem we intend to solve, the target audience best served by the solution, how we intend to solve the problem, our intended deliverables, and an appended brief budget overview.

What Problem Does this Project Strive to Solve?

In short, this project strives to solve the problem of "fragmentation of purpose" within the student populations of Sweden and the United States. The term "fragmentation of purpose" refers to the notion that faculty and academic advisors increasingly feel that the 21st Century student experience lacks coherence. The problem of coherence can be traced to a lack of individual student attention by professors and advisors, and is exacerbated by increased use of large lecture classes and the broadening of selection of majors and courses offered students. This is coupled with several demographic phenomena in the U.S and Sweden. Within the U.S., a predicted shrinking of the student body over the last 15 years has not occurred. To the contrary, student enrollment in post-secondary institutions has risen at an alarming rate in both Sweden and the United States. Since 1990 the Swedish university student population has doubled without a concomitant increase in number of professors. This increased rate of enrollment, coupled with a non-concomitant increase in the professorate and a perceived fragmentation of learning suggests we should strive to solve the problems of:

- Risk of fragmentation in the students learning career;.
- Low degree of reflection in the learning process due to a vanishing learning history on the part of the student
- Decreasing student of motivation
- Lack efficiency in how students handle information
- Low level of reuse of information and knowledge by students
- Bad or absent meta-data system to help students manage their knowledge

How Do We Intend To Solve This Problem?

We intend to solve this problem by creating a partnership of three universities (KTH, Uppsala, Stanford) to prototype and build a next generation learning portfolio, along with an appropriate curriculum of practice designed to serve core and extended students. This learning tool and the accompanying practices will instill the notion of *Folio Thinking* within six testbeds in Sweden and the United States. Operationally speaking, *Folio Thinking* is a set of behaviors and a mindset that leads to four ultimate outcomes:

- Improved student problem finding and solving;

- Greater meta-discursive analysis (Students conceptualizing their own learning);
- Increased student self awareness; and
- Increased awareness of others' ways of thinking.

How will we reach these goals? We intend to reach them via a set of inter-related strategies which include the development of guidelines for how students will engage in *Folio Thinking*, with the guidance of trained elder students at each testbed and the involvement of testbed faculty who will channel their course activities in such a fashion that supports the use of an electronic portfolio. This project is enhanced by our co-development approach. We will test our ideas and theories at the same time as we develop the requirements for an electronic portfolio technology.

In short, project faculty in the testbed universities will provide encouragement to and guidance for their students to channel their course work and student products into a prototypical learning portfolio. Both the students and the elder students will be trained in the methods of Self-Coaching, the successful personal coaching model developed by Dennis Matthies of the Microsoft Corporation (formerly of Stanford University) and Monica Worline of the University of Michigan and implemented in the Stanford Learning Lab's Learning Careers project. In its simplest terms, Self-Coaching is a working model of learning through experience and requires both active and reflective engagement with the students' own experience of learning. In the Learning Careers project, Self-Coaching has facilitated the personal reflection that brings the most benefit to students engaging in the process of developing and maintaining a personal learning portfolio. During the first year, the elder students will help the students track their own behaviors such that, consistent with the notion of co-development, we will have a better understanding of student habits and practices around the use of portfolios that will not only inform the development of a more refined pedagogical approach but also the development of a more refined portfolio prototype.

Our theory of change (that is, our theory of how and why this initiative works) suggests that when students are exposed to: 1) faculty who recognize the importance of creating a learning portfolio that tracks a student's academic and personal development over time; 2) elder students who support and guide reflective activities; and 3) a portfolio tool that is easy to use, there will be an increase in the students' relational thinking across disciplines as well as a well-documented path of the learning process. In addition, students will, we theorize, possess a greater motivation and incentive to share and reuse the knowledge and experiences they have captured over time. Furthermore, we also believe this process will lead to design information on how students actually use portfolios and data about how such tools can enhance conversations about knowledge. In the end we are provided with improved software and improved knowledge about not only the tool itself but also the ultimate learner outcomes noted above regarding conceptualization and awareness. This initial theory of change will be refined at the proposal stage and at the initial funding stage, yielding a map of the "program logic" of the project and the identification of the "evaluand," (the focused subject to be evaluated). Formative and outcome evaluation methods and indicators will be set based upon the theory of change agreed upon by all members of the *Folio Thinking* project team.

What will the Project Deliver?

The project will deliver guidelines and practices for universities to implement *Folio Thinking* at different levels of scale and in different disciplinary and geographic settings (as evidenced by the testbeds). In terms of tools, the project will deliver, by the end of year one, a research-based, co-developed prototype of an electronic portfolio which supports the pedagogical notions valued by the project participants. In year two, with renewed funding, this tool will be refined and developed into a robust product for dissemination outside the research testbeds.

Conclusion

We strive to integrate applied learning and technology components in a manner that allows us to improve the quality of the educational experience for students and accelerate the diffusion of innovative pedagogically-informed technologies through multiple testbeds, multiple countries, and unified goals. Through this approach we will develop both generalizable means and ends so that other institutions can benefit from the ideas and experiences of this collaborating group.

Budget Request

For the activities described herein we request USD$349,600. A complete budget for year one and projections for year two is attached in a companion spreadsheet.

Part II. Testbed Descriptions

Introduction: What is the purpose of having these testbeds?

We want to develop a set of tools and practices that will facilitate the accomplishment of the above goals.

Each of the testbeds will assist with the development of these tools and practices by:

- creating technology prototypes that are piloted at the home university and are also shared and piloted at the other universities with students of varying disciplines, levels of study, languages, and cultures
- creating practices for self-reflection and self-awareness that are piloted at the home university and are also shared and piloted at the other universities with students of varying disciplines, levels of study, languages, and cultures
- identifying, documenting, and describing the range of communicative abilities and practices among students of varying disciplines, levels of study, languages, and cultures (identifying and describing how students use technologies to communicate, to express themselves, and what their abilities and habits are will be useful for helping us develop tools that students will use)

In the second year of the project we will develop a technology that has the reflective practices embedded within the design of the tool itself, thus combining both pedagogical and technological methods within one tool ("pedagogically-informed technology"). The design of this tool will be informed by what we have leamed during the first year of this research study through:

- Usability studies of the portfolio prototypes and other tools
- Description of baseline student abilities, habits, and practices (For example, there might be differences between the technological abilities of current graduate students vs. first year undergraduate students who have grown up using all of these technologies)
- Observations of and feedback from students
- Collection and analysis of quantitative and qualitative data via interviews, questionnaires, and focus groups.

Common Characteristics of the Testbeds

1. Tasks that are channeled through the Folio-thinking process.

a. Each Testbed Coordinator has identified a group of students that they have control over. This may be similar to the control a professor has over a class, or a project coordinator has over a group of participating students.

b. Each Testbed Coordinator has identified activities that the students will engage in (coursework, extracurricular activities, out-of-class experiences) and will be expected to reflect upon.

The *Folio Thinking* project will provide methods and recommendations for how Testbed Coordinators should instruct the students to capture and reflect upon these tasks.

At the beginning we will work with the students to determine a baseline of their own behaviors (how they capture, organize and reflect). Some students may reflect via conversations, others through writing. Capturing these behaviors over time, along with our suggestions, will lead to the development and specification of the tools we hope to have in the second year of the project.

2. Elder Students.

Each Testbed Coordinator has also identified a cadre of Elder Students to serve as mentors, coaches, and data collectors for the project. "Elder Students" implies a mentoring friend, and could be a faculty member, other university community member, or upper classman.

In the first year it's likely that the Elder Students will provide rich baseline data about the target students' behaviors. We feel that these first six months will be a benchmarking period. Our experience suggests that these first six months are crucial to the relationship-building mentors need with their students.

We expect that execution of the above activities will contribute to the following four outcomes stated in our letter of intent:

1) Improved student problem finding and solving
2) Greater meta-discursive analysis (students conceptualizing their own learning)
3) Increase in student self-awareness
4) Increased awareness of others' ways of thinking

Testbed 1: Media Technology Program, KTH

Testbed Coordinator: Leif Handberg

The testbed at KTH includes the students in the Media Technology program, a four and a half year Masters (M Sc) program. Each year, sixty students are accepted into the program where they study how media and media technology are used to support communication processes.

Since learning is a communication process, the students' own learning processes are also represented as a study object. This is done in the Program Summary course, a course that runs through all the students' years. The course consists of several seminars e.g. about learning styles, the use of E-Folios, when and where does learning take place etc. Within the course, the students are already encouraged to build and use an E-Folio as a tool for reflection and documentation. Elder students will also take part in the discussions within the program summary course. The concept of an E-Folio will be expanded within this proposed project in cooperation with our global partners

In the Media Technology testbed, we will study, develop and test a variety of methods and technologies to document both the learning outcome and the learning process. The students shall be trained to regularly reflect upon their learning and learning process. We will maintain close cooperation and communication with the other project partners and foster relationships among the students at the different testbed locations.

Testbed 2: The Two Testbeds at the Library and Information Science Program and Historical Department (Uppsala)

Testbed Coordinator: Janne Backlund

The LIS program
The LIS program is a two year Masters program located in the Department of ALM, Aestetichs and Cultural Studies at the faculty of History and Philosophy at Uppsala University. A minimum of two years of university studies is required of the students entering the program. By Fall 2001, there will be forty students in the second year of the program and fifty-five new students entering into their first year. This proposed project will cover both these groups.

Emphasis on pedagogical issues has always been a strong component of the LIS program and as a result, PBL (Problem Based Learning) has been the main teaching method for the past several years. The program is fairly intensive in its use of IT and the students learn about such topics as information management, meta-data, record retrieval as well as the more traditional subjects in library science. Some of the courses also involve database-driven dynamic web programming to a certain extent.

In our PBL approach, the students are divided into base groups of six to eight participants. These groups are reorganized every semester. The base groups are in their turn paired together with seminar groups which are submitted to a different kind of teaching along with lectures given to the student group as a whole. In this proposed project, the different divisions of groups will constitute a suitable structure for different kinds of work around *Folio Thinking*.

The Historical Department
The Historical department, in the same faculty, is a much older and more traditional educational institution than the Department of ALM, Aestetichs and Cultural Studies. However, their interest in pedagogical questions is strong and in the past year or so, associative professors John Rogers and György Novaky have been partly involved in a SweLL funded project, DRHUM, *Digital Resources in the Humanities*. In this project the students are given the opportunity to borrow Bluetooth networked computers to facilitate their learning. During this year, the students will also have access to a portfolio software developed elsewhere in DRHUM. Professors Novaky and Rogers have gladly agreed to be a part of our testbed.

Working with the Students
The work around *Folio Thinking* will follow three paths:

[i]. Both the first and second years LIS students will be given an introductory lecture on the concept of *Folio Thinking* involving topics like reflection upon the learning process, self awareness, personal information handling, meta-data and electronic portfolios as a tool for organizing information. The students at the Historical Department will be submitted to the same lectures. Of course the lectures also will present this proposed project.

[ii]. An inventory of activities and materials where the students might reflect upon their learning. These activities and materials are mainly already familiar to the students and comprise of, for example, different kinds of writings such as essays, seminar papers, lab reports etc. and all kinds of group activities such as seminar discussions, base group work, oral presentations and more. The inventory aims to provide a more systematic view of these activities and other kinds of more informal activities and writings that might not yet be known. The inventory will constitute a foundation for future work with the students even though a part of the inventory has to be constructed in the framework of direct work with the students (see below).

[iii]. Direct work with small student groups (6 to 8 students) three times per semester. At the LIS program the PBL base groups will be used and at the Historical department, assignment of students into subgroups will take place. These group activities will center around the discussion of the topics mentioned above. The participants will be asked to share their experiences of earlier studies, their improvements over time in the areas of reflection upon their learning and organization of their information and, of course, how the concept of *Folio Thinking* might improve upon their abilities. In short, the discussion will be about meta-learning. The group meetings will also serve as a point where feedback and input from project leaders can flow into the student group in order to enhance their abilities in *Folio Thinking*. Last, but not least, the work with the small student groups will also serve as one of the main sources for assessment and evaluation, where data will be gathered constantly through tape recordings and notes. During the first year of the project, there will be approximately 120 of these kinds of small group meetings in the LIS program and Historical department. This work will mainly be conducted by elder students (see below).

Using Students to Improve Learning

Advisors and mentors have been proven to be useful for improving contextual assimilation in learning environments. *Folio Thinking* is very relevant to the context wherein learning takes place and the notion of a mentor or advisor is a central component to this project. How can we disseminate experiences from elder students to younger students? One way of doing this is to use elder students in the work with the small discussion groups. However, in the LIS program some problems arise due to two circumstances: first, there aren't any elder students since the LIS program is the last course the students take before they leave university. The postgraduate program is currently too small (one doctorate) to serve as a recruiting area. Second, the second year LIS students won't be available during the second year of the project. Picking second year students to work for the project will therefore make it difficult or nearly impossible to maintain continuity for at least two years. On the other hand, all the students are "elder students" when they enter the LIS program since one of the prerequisites for applying is at least two years of university studies. Therefore we will try to recruit five students among the first year students entering the program this fall. Since many of the students applying to the program have extensive academic and often also working experience, we think it will be possible to find suitable "elder students" from this pool of students. The students engaged as elder students will participate in several introductory seminars together with their counterparts at the other testbeds in Sweden. Their first meetings with the small discussion groups will be supervised by the testbed coordinator.

The Portfolio Software

An important part of the project is the software that will be used as the tool for students working with portfolios. However, the software, though important, will be a secondary issue during the first year of this project. The tool used will be a matter of criticism in the work with the students.

In the LIS program a very simple software developed in-house will be used. The tool will be web-based (ASP or PHP and Java) and will allow for meta-data to be attached to the items stored in the portfolio. Rudimentary meta-data will be gathered automatically and with an easy-to-use function more meta-data can be attached manually. Locally the system will be driven using a database system but all meta-data will also be stored in an xml-file using RDF as a standardized format and Dublin Core as a meta-data schema (RDF allows for different schemas used at the same time). This solution allows for full portability of the portfolio since content and meta-data are stored together in one package. As mentioned above the Historical department will use another software tool in their project.

The portfolio prototype will be developed during the fall and introduced to the students in the second part of the semester. During the project the prototype will be further developed based on feedback from the users and in concordance with the progress of the PADLR project (Wolfgang Nejdl). Hopefully in the second year of the project a software tool will emerge that fulfills the needs of the students, the teachers, as well as the technical prerequisites of large content archives.

Testbed 3: Department of Teacher Education (Uppsala)

Testbed Coordinator: Jonas Gustafsson

Description
At the Department of Teacher Education, students are prepared for forthcoming careers as teachers in kindergarten, primary and secondary schools. During their time at the university, they spend a vast time at other departments, taking classes in History, English, Math or other subjects. The flexible structure of the Teacher Education programme makes it important for the students to develop the capacity to better organize their experiences from different classes and departments and to give a meaningful structure to all acquired knowledge.

This is extremely important since the Teacher Education programme also includes in-service training where the students spend their days at schools while also having tasks to discuss and solve together with other students. Their experiences from the in-service training are discussed and reflected upon together with their colleagues.

During the years in university, many students live far from the campus and take classes at different departments. As the students work in new groups or participate in projects that challenge the traditional boundaries between academic departments, the portable metafolio will make it possible for students to have access to a variety of sources even in contexts far beyond the traditional courses. Even if this situation is obvious to the students in the Department of Teacher Education, it is also valid for many other students attending university. Therefore, the experiences from this project will be generalizable to a large extent. One important aim for this project is to facilitate the process of developing the students' own structured understandings of complex problems related to both university classes and in-service training experiences.

An important aspect of the Department of Teacher Education approach to *Folio Thinking* will be access to digital archives. The linking of personalized student portfolios with content archives is an important question and will be discussed together with members of the PADLR group.

Goals
The goals of this testbed are:
- To facilitate the understanding of complex knowledge for the students
- To give students access to useful digital archives
- To facilitate the reuse of information in these archives
- To stimulate and facilitate the cooperation between students working with similar questions and problems
- To stimulate communication between students and teachers during in-service training
- To develop new working methods for Teacher students which they will be able to reuse in their forthcoming professional career

Working Plan

1. At the Department of Teacher Education, the tool will be developed together with partners from other academic departments including the Library and Information Science Programme at the Department for Aesthetics and Cultural Studies at Uppsala university and the Department of Media Technology and Graphic Arts at Royal Institute of Technology (KTH). It will be web-based and allow for full portability of the portfolio since content and meta-data are stored together in one package.

2. A group of approximately 200 freshmen will be given the opportunity to develop personal digital portfolios in September 2001. They will be introduced to such topics as how to use the portfolio for storing their own material, how to find and use archives and other sorts of usable information on the Internet, and how to communicate their work with other students.

3. A small group of elder students will be introduced as mentors, ready to give advice and support for the freshmen. These mentors will also document the students' work with portfolios.

4. The students will be given certain tasks to discuss and solve using the digital portfolio. They will also be encouraged to constantly use the portfolio to collect and structure valuable information gathered from all the classes taken by the students.

5. Seminars will be arranged for teachers and researchers about how to develop and use digital archives. This will be done in collaboration with other SweLL groups in Stockholm and Uppsala participating in the PADLR project, especially the PADLR module Personalized Learning Sequences (PleaSe) [liaison: Lars Borin] and the module Personalized Access to Large Text Archives (PALaTe) [liaisons: Donald Broady, Lars Borin].

The Student Portfolios

In the first year, convenient software will be introduced. Groups of students will be introduced to how portfolios may be used while in the meantime archives and other web-based resources will be developed within the testbed "Personalized access to large text archives in Languages and Humanities" together with Lars Borin, Department of Linguistics. Students will be encouraged to use the portfolios for creating personal archives but also for work in project groups. Special attention will be given to how to organize the content in order to make it flexible and reusable in various contexts outside the courses.

An important aspect of the student portfolios will be their ability to support the structure of a student's education beyond courses running for one term or shorter than one term. The student portfolio will recognize that during each student's university career, he/she is taking courses and participating in working groups in many different departments, thereby constructing his or her own unique body of knowledge. The proposed meta-folio, with its capability to create and develop an archive of facts, notes and references, and maintain links to other archives and databases, will make it possible for students to use and reuse different sources in new contexts. Therefore, the total outcome of the work completed using these portfolios cannot be fully evaluated until after the students have left university.

Deliverables

This testbed will deliver:

- A prototype of web-based student portfolios
- An increased ability of the Department of Teacher Education to implement and support the use of student portfolios
- An increased ability among students to develop and share a unique body of professional and academic knowledge
- An increased ability among students to share and reflect upon their experiences during the learning process
- A better understanding among the students in the Department of Teacher Education of how to support and develop the use of digital portfolios in their professional careers
- A better understanding of how the use of digital student portfolios can be related to modular content archives

Testbed 4: Stanford Study of Writing / Program in Writing and Rhetoric (Stanford)

Testbed Coordinator: Andrea Lunsford

Description
The Stanford Study of Writing will follow 15% of the Stanford Class of 2004 through their college years, gathering information on how writing and learning abilities develop across time and identifying ways to strengthen that development. Participants in the study will submit all of the writing they do during their Stanford careers to the Stanford Study of Writing database, in the process accumulating a very thorough portfolio of work on which reflect, analyze, and interpret. This study thus offers an ideal testbed for project proposed by the *Folio Thinking* group.

- **Student participants**. Of the roughly 1600 students in next fall's entering class, a random selection of 2% (36 students) will be invited to participate in this Folio Thinking Project.

- **Mentors**. A team of Study coordinators, including one faculty member, one senior lecturer, one advanced graduate student, and two advanced undergraduate students) will serve as mentors for the student participants. Additional mentoring will be available through Stanford's new Center for Writing and Rhetoric, due to open in September 2001.

- **Activities**. The Stanford study will be launched at a social gathering during autumn term so that the students can meet one another, talk about the project, and ask questions of the coordinators. Students will be invited to meet socially throughout the course of the Study, and they will receive a number of small rewards (including a $60 bookstore certificate each year) for their ongoing participation. At the first meeting of the group, students will be asked to
    - Begin keeping copies of all the writing they do in their classes as well as pertinent extracurricular writing.
    - Submit their writing regularly to the online Study of Writing database (prototype now viewable at www.stanford.edu/group/pwr/study/study.htm).
    - Respond to an initial demographic survey that will provide important information about background, preparation, expectations, and so on.
    - Meet with Study mentors to discuss the range of writing they are doing and to begin building a theory of they learn best as well as a set of strategies for making connections across all the learning and writing they are doing.
    - Respond to a survey, in the spring of each year, about the amounts, kinds, and quality of the writing they are doing, to reflect on the development of their writing and learning abilities, and to make connections designed to create a "big picture" of their development.
    - Participate, if they are part of a selected subsample, in at least one interview each year during which one or more of the Study coordinators explores with the student the development of writing and learning.

- **Deliverables.** Because very few longitudinal studies of student writing in the college years have ever been carried out, this Study will aim to provide baseline descriptive data about the amount and kinds of writing students do across four years, paying particular attention to the interaction of technologies of writing and learning. In addition, the Study aims to deliver
    - A database design that can be used at other sites to gather and sort huge amounts of student writing;
    - An instrument designed to guide student writers in reflecting on, analyzing, and interpreting their writing and writing development;
    - An interview protocol designed to elicit the kind of metadiscourse required for holistic conceptualization of learning;
    - A set of tools the coordinators will use to analyze features of student writing, including software to track features of syntax and style;
    - Annual research reports that feature significant findings of the Study while it is in progress. (Student participants will be invited to join a writing/research team.)

Testbed 5: Stanford Handheld Assistant for Reflective Education (S.H.A.R.E.), SUMMIT Stanford School of Medicine (Stanford)

Testbed Coordinator: Jennifer Stringer

Description

The SHARE project will follow 10-15 Stanford medical students through their entire two-year clinical training period. The participants in this study will be asked to electronically capture the information and experiences that, although part of the "culture" of medical training, are not part of the structured educational process. These include encounters with patients as well as varied pieces of clinical information. Currently students collect this information informally by carrying personal notebooks or bits of paper in their white coats. These notebooks or portfolios of clinical information and experiences are part of the informal culture of information gathering and processing that happens in the wards.

The Medical School currently has given all preclinical medical students a Palm PilotVx to use as a study tool and personal organizer. The students participating in SHARE will be given special tools and resources to use on their Palm Pilots that will allow them to capture the various patient experiences and other "bits of information" that they collect over this two-year period. Our goal is to replace their pocket notebook and bits of paper with a clinical experience portfolio that is available on digitally. Special tools loaded on the Palms and via the web will allow the students to index and classify the information and share their clinical information portfolios with other students, colleagues, and mentors.

The larger goal of all of our efforts is improved clinical care. Therefore, along with assessing the impact of the clinical portfolio on student problem finding and solving, we will assess the accuracy of the information the students put into their clinical portfolios. SHARE will give us an opportunity to assess the quality of the informal learning that takes place in our clinical teaching arena as well as the effect of reflective thinking on students' problem finding and solving skills and their awareness of other students' clinical thinking processes and data gathering techniques.

- **Participants** - We will put out a call to all students entering their first clinical year, about 86 students, to participate in the study. Our aim is to enlist 10 – 15 students.

- **Mentors** – One or two faculty members will meet with the students at least once per clerkship period (every 8 weeks). These faculty members will serve as mentors to the students. They will also assess the accuracy of the information that the students gather.

- **Activities**
  - Students will be asked to collect patient case information for a specific number of cases per rotation. The number of cases will be determined by the ease in which they can enter information and the amount of time it takes per case. This will be part of the student's clinical portfolio.

- § Students will be asked to collect general clinical information that they would normally gather on note cards etc. and enter it into their Palms. This data will be roughly indexed by the type of information and the major subject area. This will be another piece of the clinical portfolio.
- § Students will be asked to upload to a server the information they are gathering. This content will then be available to other members of the group.
- § Students will meet with the study group and a mentor once every clinical rotation (every eight weeks) to discuss their portfolios, share information with colleagues and mentors, and reflect upon their experiences
- § Mentors will assess the accuracy of the data that is uploaded to the server.

· **Deliverables**
  - · A baseline study on how clinical medical students gather and process clinical information.
  - · Tools designed for fast data input, indexing and retrieval on hand held devices.
  - · Protocols for assessing the accuracy of the information and data that students gather during their ward experiences.
  - · Research reports on the findings of this testbed study.

The SHARE project is an ideal testbed for the *Folio Thinking* proposal. It broadens the subject areas that our being addressed by adding medicine and the clinical sciences. The ability to leverage off of the other projects to inform our own project process and data analysis will allow us to have a much greater impact than if we were implementing this on our own.

Testbed 6: Stanford Learning Lab's Learning Careers Program (Stanford)

Testbed Coordinator: Helen L. Chen

Description
For the past three years, the Stanford Learning Lab's Learning Careers Project (LCP) has explored how the formal learning that occurs in the classroom and the informal learning that goes on in a variety of settings outside of the classroom can be integrated into a cohesive educational experience for Stanford undergraduate students. We have worked towards this objective by designing and implementing a community research program involving a cohort of thirty undergraduates from the Class of 2002. This program is founded on the idea that a community of people engaged in an ongoing conversation about learning can produce a comprehensive picture of what learning actually is and how it happens in the Stanford environment.

Self-Coaching and Folio Thinking
The concept of *Folio Thinking* and encouraging students to think and reflect on their learning experiences is very relevant to a key component of the Learning Careers Project: instruction in Self-Coaching that is taught by coaches Dennis Matthies and Monica Worline. Self-Coaching is a working model of learning through experience that provides students with a process for rapidly improving their own learning abilities. The model gives students a set of ideas and a vocabulary to promote informal learning through experience by emphasizing awareness, observation, experimentation, and evaluation as the basic steps to gathering rich lessons from experience. Students were provided with an introductory course in Self-Coaching that emphasizes a process using these four key concepts. As part of the *Folio Thinking* project, student conferences will be conducted by LCP's "elder students" Dennis, Monica, and Helen.

As part of the Learning Careers research program, these Self-Coaching techniques are reinforced in quarterly conferences that also serve as conversations about student experiences. These ongoing conversations have provided the basis for deep relationships that are based in reflective learning both among the Learning Careers students and between the students and project team members. Because of this unique design, we feel that Learning Careers that can serve as a source of information about the practices involved in in-depth mentoring that builds *Folio Thinking*.

As part of our participation in the *Folio Thinking* project, we would hope to systematize a set of pedagogical practices and sample mentoring conversations that we could share with the other testbeds. We know, for instance, that there is a rich literature about the importance of reflective learning for medical students (e.g., Lynch, 1998; Epstein, 1999). There is a similar tradition for students being trained as teachers (e.g., Freidus, 1998; Shulman, 1998). The *Folio Thinking* project has the potential to build a shared core of principles and practices that help various training programs facilitate reflective learning. Learning Careers could be central in this endeavor by codifying and sharing the Self-Coaching principles and practices as a potential foundation on which to build practices that are useful across multiple testbeds. For example, we

could see Self-Coaching having immediate use as one possible pedagogical method that would support the Program Summary course of the Media Technology Program at KTH or the introductory lectures given to the students at LIS program and Historical Department at Uppsala.

Several interesting research questions arise out of this attempt to codify and generalize a set of practices about reflection. For instance, we know that Self-Coaching has been beneficial for undergraduates at an American university, but how might they work for Swedish masters' students? Can the same vocabulary of observation and experimentation provide benefits for students in different professional settings? We believe they can, and we hope to explore these issues further by possibly conducting Self-Coaching workshops for the other testbeds, collaboratively writing about the usefulness of Self-Coaching ideas, and rigorously evaluating the outcomes of Self-Coaching interventions.

E-Folio and Folio Thinking

Self-Coaching as an idea is also built into other activities that the Learning Careers Project supports, such as reflective activities that are prompted by the E-Folio. In the Learning Careers Project, the concept of an "E-Folio," or **E**lectronic learning port**Folio,** is represented by a knowledge database that is easily accessible via the web, personalized and shareable. The E-Folio tool is used by students to document their evolving learning careers by helping them reflect upon, organize, integrate and re-use the results of their learning practices and experiences over time.

A working prototype of the E-Folio was presented to the students in spring 2000. Our technology team has continued to refine the actual format of the E-Folio based on the input from the student cohort on how this tool may be used to meet their needs. Given the interests of the testbeds in Sweden to explore technological prototypes for student portfolios, we hope that we will be able to share our current E-Folio prototype with our partners in order to further refine our prototype with feedback from members of different audiences and cultures. We also want to coordinate our technology development with the other testbeds since the purpose of the *Folio Thinking* project will be to focus our efforts on creating one comprehensive learning portfolio technology that has the power to span a variety of learning environments. The E-Folio tool that will be designed through collaboration with other testbeds will combine the best reflective techniques (through design, questions, and the like) with a technological interface that facilitates the capture and re-use of personal and academic information. We have come to call this the "Learning Careers Approach" but in many ways it is also what we envision as *Folio Thinking*.

Activities: The thirty undergraduate students will be engaged in a variety of community activities that encourage reflection on learning in a variety of ways through:

- Explicit conversations about the development of a lifelong learning career with advisers and peers
- Individual and group interactions with advisers and with peers that focus on different aspects of learning, especially on how learning takes place in informal environments outside the classroom

- Ongoing participation in a community of people engaged in Self-Coaching and reflective learning, with community events and markers that become part of the students' experience of Stanford
- Training and practice in Self-Coaching skills
- Use of an electronic learning portfolio (E-Folio) designed to support the individual and interactive reflective skills at the heart of the project
- Active self-documentation of the concept and development of a learning career in the final year of college

Deliverables:

- Refinement of the E-Folio tool for members of different audiences and cultures
- Codification, sharing, and refinement of pedagogical tools, principles, and practices that encourage students to integrate their formal and informal learning experiences across their undergraduate learning career
- Students will leave the project with a more coherent intellectual identity, an understanding of the value of reflection and experimentation in their learning, and an E-Folio that traces their experiences and skills.
- Research reports on the longitudinal study that address the importance of integrating formal and informal learning experiences, the effects of reflective practices on students and on learning processes, and factors of the university environment that facilitate or hinder students developing lifelong learning careers

References:

Epstein, R. (1999). Mindful Practice. Journal of the American Medical Association, Vol. 282, Issue 9, 833-839.

Freidus, H. (1998). Mentoring Portfolio Development. In N. Lyons (Ed.), With Portfolio in Hand (pp.23-37). New York: Teachers College Press.

Lynch, J. W. (1998). Regaining compassion. Journal of the American Medical Association, Vol. 279, Issue 18, 1422.

Shulman, L. (1998). Teacher portfolios: A theoretical activity. In N. Lyons (Ed.), With Portfolio in Hand (pp.23-37). New York: Teachers College Press.