Project Description

Although information search systems have evolved from information retrieval systems to full-text information-intensive systems over the past two decades, search engines are often conceptualized as tools for finding factual information or short answers to satisfy people’s information needs instantly. According to this traditional perspective on searching, “information” refers to basic pieces of knowledge required for human learning. As a result, searching is often assessed based on the quality of outputs such as search results. We believe the traditional perspective on searching is limited when it comes to demonstrating the potential of search systems as learning technologies that provide rich online spaces in which people can learn and discover new knowledge, and use that knowledge to generate new ideas.

A new perspective to be taken in this project reframes searching as a learning process, focusing on human learning that occurs during the process of gathering and synthesizing information. A core concept of this perspective is “comprehensive search,” which refers to a variety of search-related activities that facilitate individuals’ critical thinking and support the development of creative ideas directly. The concept of comprehensive search leads us to investigate how searching can have impacts on human capabilities of explorative and integrative thinking that enable the comparison of diverse perspectives and generation of ideas. In other words, searching comprehensively may lead people to engage and critical and creative learning.

The project is composed of three research activities:

1. Developing a conceptual framework that constructs searching as a learning process that can support critical and creative learning. This will include a variety of information activities such as gathering related information, critically evaluating the information, incorporating pieces of information, making connections between pieces of information, and generating new ideas or insights.

2. Specifying design guidelines and principles for new learning technologies that support the creative thinking process. We will first survey existing technologies that are designed to support creativity. We will then specify features and functions that would support searching-related activities for creative learning effectively.

3. Conducting an empirical study in order to test a prototype of a new information system that is designed to foster critical and creative learning. Assessing learning as a process focusing on critical thinking and creativity requires rich representation of learning that not only captures the acquisition of new knowledge but also demonstrates multiple sources of empirical evidence of learning. New research methods, measures, and indicators will be developed to characterize the learning process beyond mere outcomes.
Summer 2016 Research Project

In Summer 2016, research efforts will concentrate on the following two aspects. First, we will do a comprehensive literature search on critical thinking, the concept of creativity, learning technologies supporting creativity, and the assessment of learning. Based on this extensive literature search, the research team will write up a comprehensive literature review at the end of the summer. Second, we will develop data collection instruments in order to collect empirical data about critical and creative learning.

Student Participation

The student trainee will serve as a research assistant for the project and will participate in weekly research meetings. He/she will: (1) search and organize literature in an area of research described above; (2) prepare a literature review to be submitted to a journal; (3) run a pilot study to test the validity of data collection instruments.

The student will gain experience with finding and compiling publications across multiple disciplines, including information science, learning science, and education, and will learn what is required to develop a publishable scholarly paper. The student will also be involved in developing data collection instruments, including: (1) search scenarios to be used in the user study; (2) pre- and post-search questionnaires to assess student learning outcomes; (3) interview guidelines to investigate student learning experiences.

Mentoring Plan

I will meet with the student on a weekly basis throughout the project. I will provide feedback on the literature search to be completed by the student. I will also provide an opportunity for the student to develop drafts of data collection instruments and work with the student to revise those instruments. I will also instruct the student in writing for a scholarly audience, and provide detailed feedback on manuscript drafts prepared by the student.