SIGCSE 2013 Poster Proposal

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Statement of Topic: Computing in Context

Significance and Relevance:

As computing moves into its sixth decade as a formal field of study, a great deal of attention is focused on the breadth of relationships between computing and other disciplines. Descriptors of this relationship include computing in context, computing with a purpose, computing + X, computational X, interdisciplinary computing, multi-disciplinary computing, and trans-disciplinary computing. Regardless of the descriptor, the goals for exploring the relationship remain the same: students need to understand how the power of computing informs and shapes ideas throughout the academy and society. They need to learn appropriate concepts in computing and to see these applied to other areas of study. This learning will be most effective when approached through active participation of students, as they tackle questions and problems coming from society's ever-growing and ever-changing reliance on computing devices and modes of interaction.

The Computing in Context project, funded through an NSF TUES grant, focuses on four areas, whose descriptions follow.

- **Computational linguistics:** an interdisciplinary field dealing with the statistical or rule-based modeling of natural language from a computational perspective. Computational linguists often work as members of interdisciplinary teams, including linguists, computer scientists especially those interested in artificial intelligence, mathematicians, cognitive scientists, anthropologists interested in the development of languages, and neuroscientists, among others. Computational linguistics has theoretical and applied components, where theoretical computational linguistics takes up issues in theoretical linguistics and cognitive science, and applied computational linguistics focuses on the practical outcome of modeling human language use.

- **Computing and music:** an older, extremely broad field of research, teaching and application that embodies approaches from the computing viewpoint (artificial intelligence, digital signal processing, programming languages) and from the music viewpoint (audio file structure and processing, music creation, and music identification).
- **Intelligence and security informatics**: an interdisciplinary research field involving information technologies, computer science, public policy, bioinformatics, medical informatics, and social and behavior studies. The research connects with work of local, state, and federal law enforcement and intelligence experts, and information technology industry consultants and practitioners and supports counterterrorism and national/international security missions of anticipation, interdiction, prevention, preparedness and response to terrorist acts.
- **Web science:** the study of the Web as a vast information network of people and communities including the study of people and communities using the digital records of user activity mediated by the Web. The field involves analysis and design of Web architecture and applications, as well as studies of the people, organizations, and policies that shape and are shaped by the Web. It is inherently interdisciplinary, integrating computer and information sciences, communication, linguistics, sociology, psychology, economics, law, political science, and other disciplines.

The project goal is to create course material that enhances student learning in these areas by involving the students in various forms of inquiry based learning. This material will be created by a small team of experts in each area and will be tested at the participating universities (Villanova University, North Carolina A&T University, Virginia Tech, and the Fayetteville campus of the University of North Carolina).

One purpose of the poster presentation is to connect with others who are actively using some form of inquiry-based learning in computing or who are connecting computing with other disciplines through teaching partnerships. Our project will be more successful if we can include a breadth of current work in our distribution network. This network will use the facilities of the Ensemble Project at computingportal.org to share resources and ideas on its way to creating tested and effective classroom and study room material.

Content of Poster:

The poster will have seven main areas: one for each of the four disciplinary combinations, a summary of project goals, a description of inquiry-based learning in computing, and an invitation to participate in developing and testing the course material.

Abstract: The breadth of relationships between computing and other disciplines has been the focus of much attention. Our NSF-funded project, titled Computing in

Context, fosters interdisciplinary computing education by creating exemplars of curricular materials, testing these materials in undergraduate computing courses, and disseminating the materials through computingportal.org. We focus our effort on four areas of applied computing: computational linguistics, computing and music intelligence and security informatics, and web science. Our materials will be designed for inquiry-based learning, whether this occurs in lecture as a brief conversation between pairs of students or in lab as loosely formulated problem or scenario or as a multi-week, team-based project.