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Foundations and Frontiers of Physics Education Research 2009

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Organization: University of Maine

Submitted By:

Wittmann, Michael - Principal Investigator

Title:

Foundations and Frontiers of Physics Education Research 2009

Project Participants

Senior Personnel

Name: Wittmann, Michael

Worked for more than 160 Hours: Yes

Contribution to Project:

Name: Heron, Paula

Worked for more than 160 Hours: Yes

Contribution to Project:

Name: Scherr, Rachel

Worked for more than 160 Hours: Yes

Contribution to Project:

Post-doc

Graduate Student

Undergraduate Student

Technician, Programmer

Other Participant

Research Experience for Undergraduates

Organizational Partners

Other Collaborators or Contacts

Activities and Findings

Research and Education Activities:

The third Foundations and Frontiers in Physics Education Research conference was held June 15-19, 2009, in Bar Harbor, Maine. During the conference, over 65 active researchers in the field of physics education spent the week on the campus of the College of the Atlantic examining and articulating the current state of the field, exploring future

directions, and discussing ways to pursue the most promising avenues for future research.

The conference featured a series of plenary lectures given by established and emerging leaders in PER: Fred Goldberg (San Diego State University), Priscilla Laws (Dickinson College), Andrew Boudreaux (Western Washington University), Danielle Harlow (University of California, Santa Barbara), Stamatis Vokos (Seattle Pacific University), Leslie Atkins (California State University, Chico), Noah Finkelstein (University of Colorado), Andrew Heckler (the Ohio State University), Bruce Sherin (Northwestern University), Olivia Levrini (University of Bologna, Italy) and John Thompson (University of Maine). Each addressed the theme of 'Foundations and Frontiers' by synthesizing major accomplishments in the field and/or speculating on the directions they consider especially important and promising. Afternoons were unscheduled, and were variously spent exploring issues raised by the plenaries, developing collaborations, or enjoying the superb weather and natural beauty of Bar Harbor. Evening sessions included topical sessions devoted to specific research issues, a contributed poster session, and working groups on subjects of community-wide interest.

Findings:

Because the conference was organized with the mindset of a Gordon conference, no publications of presentations were published. This includes the plenary talks (given by 11 leading national and international researchers) as well as the targeted sessions (group sessions organized by researchers in the field).

The one exception lies with the working group reports. A 'working group' is a discussion group whose task is to develop a well-articulated position on the topic at hand. Working groups were convened for the following topics:

- * PER Lexicon
- * A PER textbook
- * Frontiers of the Resources Framework
- * Collaborations

Of these, two working groups were able to write reports which were published in the American Physical Society newsletter of the Forum on Education. The working group on the PER Textbook created a possible outline for a text, with suggestions for how to create and publish such a volume. The working group on Collaborations outlined benefits and costs of the collaborative process, described many of the possible types of collaborations, and gave recommendations for facilitating more collaborations in PER.

A third working group, on the Frontiers of the Resources Framework, successfully brought together a diverse set of researchers working in the 'knowledge-in-pieces' paradigm of PER. This working group established a common reference library (hosted at CiteULike, an online bibliographic manager) and established a wiki to facilitate communication among practitioners. Many members of the working group have since been active in the 'Knowledge in Pieces Workshops' which are organized around the edges of other meetings (such as the ICLS meeting in Chicago, 2010).

The fourth working group worked toward establishing definitions of commonly used PER terms, but these were not published. It was found that the discussion was incredibly valuable but the definitions themselves were not clearly defined to the point of being published.

Training and Development:

Outreach Activities:

Two working group reports were published in the American Physical Society Forum on Education newsletter. Reports on the conference itself were given at the national meeting of the American Association of Physics Teachers, 2009, in Ann Arbor, Michigan.

Journal Publications

Michael C. Wittmann, Paula Heron, Rachel E. Scherr, "Overview of the Foundations and Frontiers in Physics Education Research Conference", American Physical Society Forum on Education newsletter, p. 10, vol. Fall 20, (2009). Published,

Sam McKagan, "Working Group Report: A Physics Education Research (PER) Textbook", American Physical Society Forum on Education newsletter, p. 14, vol. Fall 20, (2009). Published,

MacKenzie Stetzer, Michael Loverude, "Working Group Report: Collaborations in PER", American Physical Society Forum on Education newsletter, p. 11, vol. Fall 20, (2009). Published,

Books or Other One-time Publications

Web/Internet Site

URL(s):

<http://perlnet.umaine.edu/~ffper/2009/>

Description:

Conference web site.

Other Specific Products

Contributions

Contributions within Discipline:

The FFPER conference brings together leading national and international researchers in physics education.

Conference participants came from Argentina, Canada, Finland, Italy, South Africa, Sweden and throughout the U.S. The international connections established through the conference have led to ongoing discussions and collaborations among participants.

Among the participants were 12 PhD students. Having roughly 20% of the attendees be leading graduate students in the community establishes students' connections to researchers and strengthens their own research work.

Though many of the results from the conference are not public, certain kinds of collaborations did get established. Among them are writing groups, in which teams of researchers at several institutions collaborate to write and submit papers. Several papers have been submitted since 2009, based on this work.

Contributions to Other Disciplines:

The working group on Frontiers of the Resources Framework contained many members who have since then become instrumental in building a community of researchers working within the Knowledge-in-Pieces research paradigm. This work (building off of work done by Andy diSessa, on phenomenological primitives, David Hammer, on conceptual and epistemological resources, and Bruce Sherin, on symbolic forms, nodes, and modes) has continued at

meetings of the American Education Research Association and the International Conference of the Learning Sciences.

Contributions to Human Resource Development:

A total of 15 PhD students participated in the meeting in either an official or support role. Of these, several have finished their PhD and are now continuing their work in physics education research. Others are still in progress.

Contributions to Resources for Research and Education:

The 2009 conference was the 3rd biennial such conference, and was a crossroads for the future success of FFER conferences. The first two FFER meetings were well attended, and there was great enthusiasm for them afterward. They had been created and organized with limited financial support. The audience involved was relatively narrow, and the ability to get certain speakers was outside the ability of the organizers. During the third FFER meeting, high caliber speakers from around the world were able to attend. This helped establish the meeting as a high prestige and (for the moment) permanent element of the physics education research community. The fourth biennial meeting will be held in the summer of 2011, funded primarily through registration from participants.

Contributions Beyond Science and Engineering:

A successful conference builds infrastructure that allows for others to continue their work. Based on the results of the FFER meeting in 2009, the host institution (the College of the Atlantic) has sought out additional conferences and meetings to make use of their summer facilities.

Conference Proceedings

Categories for which nothing is reported:

Organizational Partners

Activities and Findings: Any Training and Development

Any Book

Any Product

Any Conference