NCETE Research Study Progress Reports
October 2005

Title: Engineering Design Cognitive Capabilities Evaluation Instrument
Purpose: Develop an instrument that accurately determines the engineering design capabilities of pre-service and in-service technology educational educators.
Grant: $10,000
PIs: Dr. Robert Wicklein, Professor, Dept. of Workforce Education, University of Georgia
Dr. Stacey Neuharth-Pritchett, Associate Professor, Dept. of Educational Psychology, University of Georgia
Dr. David Gattie, Asst. Professor, Dept. of Biological and Agricultural Engineering, University of Georgia
Progress: All interviews have now been completed and data is being transcribed and analyzed. Follow up interviews will be conducted in next few weeks where necessary. This is slightly behind our initial schedule by 2 weeks. We are making steady progress in accordance with our schedule, and we do hope we shall be able to complete the study on time and submit our findings within our timeline. If any unforeseen circumstances are experienced we shall be in touch with the center to let them know of the new developments. It took quite some time before we got human subjects approval from the Institutional Review Board here at University of Georgia. Once our project was approved there were some challenges scheduling interview times. In one instance an intended respondent had a death in the family and a new source of data was identified. In addition, since this is a qualitative study and the initial plan was to conduct face to face interviews and hopefully observe some class session; high gas prices and the location of some of the participants, left the researchers with no other choice but conduct telephone interviews for one site, but interviews at the other two locations were completed face-to-face.

Title: Determining Outcomes for 9-12 Technology Programs that Infuse Engineering Design Processes
Purpose: Identify the engineering outcomes of technology education programs that infuse analytical and predictive processes and other engineering design processes into the curriculum.
Grant: $7200
PIs: Craig Rhodes & Vincent Childress, North Carolina Agriculture and Technology State University

Progress: It is important to note that we have kept Ron Terry, our research supervisor type, informed of our progress as you had directed us to do. The revised literature review is complete except for getting a newly discovered curriculum guide from the state of Virginia. We just completed the second of four focus groups yesterday and Craig is scheduling the last to with engineers in the DC area. The transcriptionist is almost done transcribing the first focus group recording for analysis. Then she will start in on this recent one. Rod and Chris got us to change the study from including tech ed folks in the modified Delphi to only include engineers and engineering educators. Later studies will include them and they can react to (and pick and choose from) the outcomes identified by the engineers. Greg Pearson (NAE) and Peggy Weeks (ABET) are currently identifying engineers and engineering educators for the Delphi panel and will get those lists to me by the end of next week. The timeline is now such that the focus groups should be complete by early October. They are very difficult to schedule. Meanwhile, the Delphi panel will have been recruited and set up. As soon as the last focus group is done, we will analyze the recordings along with the transcriptionist so we don't have to wait. Based on the findings of the last focus group, we will modify our round-one outcomes list for the Delphi panel. We should start the modified Delphi in mid to late October and complete the rounds by mid to late November. So far, the only problem is trying to schedule focus groups. It is like herding cats.

Title: Seventh Grade Females Perceptions of Technology
Purpose: Understand how young women think about technology and engineering.
Grant: $6198
PIs: Leah Roue, Master's Degree Student, University of Wisconsin-Stout
Brian K. McAlister, Professor, University of Wisconsin-Stout

Progress: The study originally proposed using an instrument from the ITEA/gallop poll. The research committee suggested that she find something more appropriate and recommended contacting Michael Daugherty to check on adapting an instrument he used in a previous study. In the end, it was more appropriate to work closely with a team on our campus that had already been collecting data on the STEPS program, a summer pre-engineering camp for middle school girls. Data were collected last summer and is now being analyzed. There will be a presentation on the preliminary findings at the Stout Technology Education Conference at the end of next week. There should be no problems completing the study in a timely manner.

Title: The Impact of Applying Students' Self-management of Cognition in an Engineering Design Project.
Purpose: Study engineering students' self-management of cognition in an engineering design task.
Grant: $5955
PIs: Oenardi Lawanto, Ph.D. Candidate, Department of Human Resource Education, University of Illinois at Urbana-Champaign
Progress: In general, I have finished collecting data and now in the process of analyzing and writing the report. However, if I need to confirm my understanding about specific data collected, I still have access to contact two of the team members. I am definitely making progress in my study. I don't see I cannot complete the study on time, in fact I intend to complete the project within in the next two months (i.e., end of Nov 2005). In general, I have not encountered any serious problem during the study. As my study is a qualitative study in nature, I intend to change the title of the study (by eliminating the word "impact", and to reduced my research questions that guide this study into two questions. The new title will be reported to you soon. These new research questions have helped me organize my analyzes and also my report better. Those two questions are: 1). How did individual members of the team execute their meta-cognitive ability as reflected in the way they plan, regulate, and evaluate any task they encountered? 2). How did the way they plan, regulate, and evaluate any encountered task fit together as the team evolved their design? These changes do not affect the focus of the study. This study still focuses on the student's meta-cognition issues.

Title: Critical Features of Engineering Design in Technology Education
Purpose: Identify the key features of the engineering design process and what critical elements should be assessed in an engineering design activity for technology education.
Grant: $7860
PIs: Paul A. Asunda, Graduate Assistant, The University of Georgia
Roger B. Hill, Associate Professor, The University of Georgia
Progress: The purpose of this project is to develop a process for identifying critical features of engineering design within technology education learning activities. While some very positive initiatives have taken place in the field of technology education, a number of critical problems still facing the profession must be addressed if the field is to survive and thrive. Infusing engineering design as a focus for the technology education curriculum has been proposed as a reasonable strategy to address these concerns. This project therefore, seeks to identify what engineering design is. What are the key features of the engineering design process? And, what are the critical elements that should be assessed in an engineering design activity in the context of technology education? The study will utilize a qualitative design paradigm and a phenomenological research approach will be used to collect and analyze data. Participants for this study will be conversant regarding technology education and engineering design, and potential candidates who do not possess this characteristic will be excluded from the study. An important outcome of this project will be development of a rubric to guide identification of key elements of engineering design within the context of technology education learning activities. This tool will represent a synthesis of the qualitative research to be conducted and will provide a basis for future research.

Title: Women, Career Choice, and Persistence in Engineering
Purpose: Better understand what attracts, supports, and helps women to persist in an engineering career.
Grant: $8770
PIs: John R. Duncan and Yong Zeng, Ph.D. Candidates, Department of Human Resource Education, University of Illinois at Urbana-Champaign
Progress: Due to a shortage of relevant quantitative studies, the meta-analysis will be replaced by a literature

review to confirm support mechanisms that relate to persistence of women in the engineering curriculum. This will require the extension of phase I from September till November. Phase I will be extended as described above, but Phase II – the qualitative study – will proceed on schedule with the exception of the interview period, which will be extended through November. After four months of searching publications, dissertations, libraries and online, talking to engineering program personnel, meeting with librarians including women's issues and engineering, students, and also contacting hundreds of personnel involved in groups such as WEPAN, WISE, etc. we were forced to change from a meta-analysis format to a literature review format to confirm support measures related to persistence of women in engineering programs.