Purpose/Background:
The engineering design process begins with “Identifying the problem” and ends with “implementation of the end product”. “Identifying the problem” means to understand who are the users of the end-product and what are the characteristics/features that the users want in the end-product”; it also means to understand the function that the solution must fulfill and the constraints placed on those functions. Many STEM projects have focused on the student as the user and tried to develop learning strategies that meet the student’s desires and needs. We are not aware of data that considers faculty as a critical User of STEM activities and describes their desires and needs of STEM teaching and learning strategies. Both the University of Massachusetts Lowell survey and comments by Dr. Schechterle partially point out that this consideration is critical for success. It is common to use workshops to demonstrate to faculty that traditional instructional methods are ineffective and that instructional reform leads to better results; but the assumption is that faculty, when made aware, will change their teaching style. This assumption typically proves to be wrong. It is when faculty see that change will benefit both their needs and that of the student that acceptance is achieved. Thus, we contend that there is a need to determine what the “UGA User” wants as related to new strategies for STEM instruction. Why? Even the best designed product is a failure if that product is never used; marketing tells us that products are not used if they do not fulfill the needs and desires of the User. We need to understand the UGA user of STEM teaching and learning findings before we can ask them to adapt/change their disciplines in order to affect STEM enrollment and education. Thus, this proposal focuses on the faculty, not the student.

Purpose of the research project and its significance.
The overall goal of this project is to gain a clearer understanding of barriers for faculty to accept, learn, and implement the strategies/techniques being used to increase STEM student learning and enrollment. This project is to assess four issues (related to STEM reform): 1) Faculty Awareness- Is there a need for STEM reform, 2) Faculty Attitude- Who is the responsible for STEM reform, 3) Faculty Skill/knowledge- Does the faculty member, department, etc have the skills, background to implement reform and 4) Classroom Practice- How is STEM reform currently being done.

Successful completion of this study will impact our understanding of how the general faculty population approaches STEM reform and will provide a clearer picture of barriers which might prevent STEM reform success.
**Description of Research Project:**

A quantitative questionnaire, based on the Likert scale, has been developed where participants are asked 28 questions related to the integration of STEM and non-STEM topics. The constructs of the questions have been set to allow analysis using a SPSS statistical package which allow the responses to be scaled, compared according to means and correlations. After completing the questionnaire, participants are asked to participate in an interview for more descriptive information. Information provided will help us to understand the participants’ attitudes, awareness, knowledge, and classroom practices as related to the integration of STEM and non-STEM topics in their specific courses.

By integrating STEM and non-STEM topics, STEM students will be able to understand how their fields connect to social/societal issues, which will help them solve complex problems in their disciplines. Further, non-STEM students will be able to see how STEM issues are imbedded in their fields to help them solve complex problems in their disciplines. STEM usually appears to include disciplines that are isolated from other fields that do not have a STEM focus. Therefore, this integration can help show students that STEM and non-STEM fields are not isolated but are interconnected in their influences on society. Additionally, more exposure to STEM subjects may also encourage non-STEM students to choose STEM careers.

**Implementation of the research project**

Approval for administering the questionnaire was awarded on May 24, 2010 and therefore no conclusive findings can be reported here. Data collection is currently taking place using faculty from the College of Agricultural and Environmental Sciences and other colleges where faculty have 12 month appointments. Colleges populated by faculty on academic appointments will take place once the fall semester begins.

**Data Collection and Analysis**

 Twenty eight items in a questionnaire have been designed to determine faculty attitudes and awareness of the need to integrate STEM and non-STEM course content and their knowledge base required for such integration to occur in the classroom. A SPSS statistical package will be used to compare means and standard deviation of the responses and to engage general linear models to determine separations across faculty groups. Interviews will be used to provide qualitative data used to identify themes and patterns among participants.

**Findings:**

At this time, only five (5) responses to the questionnaire have been received so not conclusive findings are available.

**Conclusions/Recommendations:**

None at this time.

**Dissemination:**

Discussions and interviews of faculty from across the nation is occurring at the 2010 Symposium for Engineering and Liberal Education in Union College. Finding from this study will be presented at the 2011 Symposium.