1. **Proposer:**
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2. **Statement of Topic:** Instructional Module Development (IMoD) System: Building Faculty Expertise in Outcome-based Course design

3. **Significance and Relevance of the Topic:** At many colleges and universities, engagement in scholarly teaching is becoming a minimum expectation of faculty who are held accountable for the quality of the learning experienced by students enrolled in their course(s). These expectations are even greater for STEM faculty given the national demands for a well-trained STEM workforce [1]. Since education training is not typically included in the plan of study of most STEM programs, faculty who graduate with STEM degrees gain their teaching expertise post-appointment and “on-the-job”. In the absence of formal training, most faculty can take as much as five years to truly become proficient teachers, and during that period, it is the students who are most affected [2]. There is a growing demand and interest in faculty professional development in areas such as outcome-based education (OBE), curriculum design, and pedagogical and assessment strategies. In response to this demand, a number of universities have established teaching and learning centers to provide institution-wide, and sometimes program specific support. This project describes the development of the Instructional Module Development (IMoD) System, which further supports these ventures and broadens the impact and reach of professional development in the scholarship of teaching and learning, particularly to STEM faculty. The IMoD system is an open-source web-based course design software that:
   a. Guides individual or collaborating users, step-by-step, through an outcome-based education process as they define learning objectives, select content to be covered, develop an instruction and assessment plan, and define the learning environment and context for their course(s).
   b. Contains a repository of current best pedagogical and assessment practices, and based on selections the user makes when defining the learning objectives of the course, the system will present options for assessment and instruction that align with the type/level of student learning desired.
   c. Generates documentation of a course designs. In the same manner that an architect’s blueprint articulates the plans for a structure, the IMoD course design documentation will present an unequivocal statement as to what to expect when the course is delivered.
   d. Provides just-in-time help to the user. The system will provide explanations to the user on how to perform course design tasks efficiently and accurately. When the user explores a given functionality, related explanations will be made available.
   e. Provides feedback to the user on the fidelity of the course design. This will be assessed in terms of the cohesiveness of the alignment of the course design components (i.e., content, assessment, and pedagogy) around the defined course objectives.
The IMoD system is being developed using a user-centered, as opposed to technology focused, methodology. This approach is well suited for the project given the high cognitive nature of outcome-based course design tasks, and the high levels of interactions required between the user and the system to not only facilitate the development of course designs, but to help users build an enduring foundation of knowledge, skills and habits of mind about curriculum development.

4. **Content:**
   a. System Overview - A description of the IMoD system and feature set, along with the rationale for its development
   b. Theoretical Framework - The underlying model for outcome-based course design process
   c. System Architecture - A model of the structure and behavior of the IMoD system
   d. Ontological Model - The hierarchy of course design elements and their relationships
   e. Implementation - Descriptions and screenshots of key features of the IMoD system
   f. Technology - List of software tools and technologies used in the implementation of the IMoD system.

5. **Abstract:** A well-designed and constructed course plan or curriculum is an integral part of the foundation of effective STEM instruction. This poster presents a framework for outcome-based course design process and its translation into a semantic web-based tool; i.e., the IMoD system; which guides STEM educators through the complex task of curriculum design, ensures tight alignment between various components of a course (i.e., learning objectives, content, assessments, and pedagogy), and provides relevant information about research-based pedagogical and assessment strategies. The system architecture, and ontological model are also presented, along with descriptions and screenshots of the implementation of key features.

**References**
