Special Session - Creation of the "Milwaukee School of Magic"

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Abstract - **The objective of this special session is to create the "Milwaukee School of Magic" so that participants can discover the value of incorporating drama and magical illusions into a creative science learning environment. Villanova University's Science & Theatre Magic Program, now in its third year, has successfully created a dramatic and creative learning environment with a unique approach. The strengths and accomplishments of this program are reviewed and discussed in the session entitled Engineering the Magic School: Creativity and Innovation in Context. See also PIVOTS: Service Learning at the Science, Theatre & Magic Boundary by Papalaskari et al in FIE 2006. This session will be valuable for engineering educators interested in integrating multi-disciplinary STEM teaching with creative and performing arts. Participants will experience first hand how a well chosen theme and the right combination of constraints and open-ended problems can trigger the imagination and provide a powerful motivating force for exploration, group work, innovation, and design that can transcend any barriers associated with diverse cultural, social, or discipline/specialization backgrounds. Participants will easily be able to apply concepts presented to make their own learning environments equipped to improve technical skills as well as build teams among culturally, economically, and ethnically diverse populations of students.**

Index Terms – Teamwork, Multi-disciplinary STEM teaching, Performing arts, Creative teaching environment.

INTRODUCTION

The objective of this special session is to create the "Milwaukee School of Magic" so that participants can discover the value of incorporating drama and magical illusions into a creative science learning environment. Villanova University's Science & Theatre Magic Program, now in its third year, has successfully created a dramatic and creative learning environment with a unique approach. The strengths and accomplishments of this program are reviewed and discussed in the session entitled *Engineering the Magic School: Creativity and Innovation in Context.* See also *PIVOTS: Service Learning at the Science, Theatre & Magic Boundary by Papalaskari et al* in FIE 2006.

Creating the "Milwaukee School of Magic" in a 90-minute special session will require engaged, active involvement by all the participants who will take on the role of students. This session will give the participants first-hand experience with the value and the challenges associated with giving small groups of students an open-ended problem to solve as a team.

Since the timeline for this group learning experience is only 90-minutes long, each segment of the session will be tightly focused in order to achieve the desired result and have a worthwhile teamwork experience. The following assumptions will be made about this group of adult students: (1)at least four participants will have experience as team leaders and will volunteer to lead the small groups and (2) all participants will have a basic understanding and appreciation of the core elements of successful teamwork (listening, clarifying statements, and providing good feedback; keeping discussions on task; probing assumptions and evidence; eliciting viewpoints and perspectives; mediating conflicts; and summarizing and presenting findings [1].

DEFINE THE TEAMS: RANDOMLY ASSIGN EACH PARTICIPANT TO ONE OF FOUR TEAMS

To foster a "teamwork" atmosphere right from the start, as participants enter the conference room, color coded folders

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will be handed out. As soon as introductions are completed, participants will be directed to seat themselves according to their folder color and to introduce themselves using an assigned prompt. Volunteer leaders from each group will be identified, beginning the process of forming a team. By the end of the session participants will likely discover (or be reminded of) two important lessons about teamwork:" (1) Other members' input is a valuable resource and (2) *we* can accomplish something by working together that none of us could have accomplished on our own." [2]

Minutes	Focus of Segment
10	Overview of how student groups produce the American School of Magic during the Science & Theatre Magic Program at Villanova
10	Overview of how to create the Milwaukee School of Magic
30	4 teams develop skits
30	Performance of Milwaukee School of Magic
10	Discussion and Conclusion

DEFINE THE TASK: CREATE "MILWAUKEE SCHOOL OF MAGIC"

This segment will begin with a 5-minute video overview of Villanova's Science & Theatre Magic Program which will depict how small teams of high school students created "The American School of Magic." Observing this model will to help to define the task before them, giving everyone get an idea of what their final performance will look like and the kinds of roles that are available. The task will be further refined as the "skit schedule" is discussed. Refer to Table 1.

DEVELOP THE SOLUTION

Each team will be assigned one area of the room. Team leaders will facilitate flow of discussion as the information packets and science experiment kits are reviewed. The team leader will be advised to assign the following roles: 3-4 actors (to perform the experiments and deliver dialog), director (to be the timekeeper, to give actors feedback and cues), 2 technical crew (to troubleshoot experiments and make props available on cue).

Each team will be given a kit that contains all the equipment and supplies needed to conduct three simple science experiments. (The core elements of the kits have been developed by students during Villanova's Science & Theatre Magic Program.) These particular experiments have been chosen because they can appear to produce magical results when viewed by young children. In addition, the experiments can be conducted with inexpensive supplies that would be readily available to a resourceful science teacher. Each team will also be given a script that can be followed to create a context for the delivery of the science experiments. The teams will be encouraged to vary the script and experiments as their own experience and time allows.

THE SOLUTION: THE PERFORMANCE OF "MILWAUKEE SCHOOL OF MAGIC"

Each team, in turn, will perform their skit for the other teams. Collectively the performance will constitute "The Milwaukee School of Magic." The full performance may be presented at another time during the conference if desired.

CONCLUSION

The session will conclude with a discussion of the educational value of defining an open-ended problem that requires a creative, team approach. The following quote will be referenced for the discussion: "Problem-based learning is very suitable for engineering [and science] because it helps students develop skills and confidence for formulating problems they've never seen before. This is an important skill, since few professional engineers are paid to formulate and solve problems that follow from the material presented in the chapter or have a single 'right' answer that one can find at the end of a book. "[3]

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