Rationale for the US/UK Collaborative Effort

Preview and Context

The NJTEEA plans for the coming year, and the serious concern for growing the Association and the renewed vigor within the organization are really exciting. Therefore, we would like to share with you some successful efforts that hold promise as the organization moves forward. The following ideas and suggestions grew out of our UPDATE* Projects and other initiatives at TCNJ, as well as some of the strategic planning we have done over the years with Mike Hacker, Henry Harms, Clark Greene, Steve Barbato, George Willcox and colleagues from the United Kingdom. **UPDATE (Upgrading Practice through Design And Technology "Engineering" Education) and UPDATE/TEI (Teacher Enhancement Initiative) funded, in part, by the National Science Foundation.*

Specifically, we used the success of the UPDATE Projects to help George Willcox launch the Virginia Children Engineering (CE) initiative. CE is still active, more than 25 years after its start, having introduced some 4,000 teachers to design, engineering and technology (DE&T) that undergirds our Integrative STEM approach. The UPDATE Projects and CE set the stage for later initiatives such as Exploring Design and Engineering (ED&E) that culminated in the Engineers of the Future (EOF) project at Buffalo State College directed by Clark Greene.

Strategic Plan

This suggested effort is intended to help the NJTEEA implement a DE&T outreach that will support elementary teachers in using an Integrative STEM approach to teaching and learning. Additionally, this effort is intended to strengthen the Association in collaborating with the ITEEA, first regionally with NY, PA MD and DE, and later nationally. Our intent is to mount an effort for helping selected Technology and Engineering teachers become Engineering by Design (EbD) trainers, who can help NJ teachers adopt the EbD curriculum that addresses the Standards for Technology and Engineering Literacy (STEL).

NOTE: We need to clarify the strategy we have used in helping elementary teachers see the potential of DE&T as a means to integrate their teaching. Rather than trying to add another subject to the over-crowded elementary curriculum, we have shown in the UPDATE and later projects, how our 'Approach' can enhance reading, social studies, STEM and other subjects. The DE&T approach, through the integration of the school subjects, actually resulted in considerable instructional contact time for students. That

integration represents another opportunity for DE&T to enhance teaching and learning in elementary classrooms. This would take advantage of the extensive experience in the UK and the US in 'systems and control' that could enhance the practice of physical computing as well as language learning.)

The first step in this effort will be to (1) introduce a sound education approach (DE&T) that teachers would adopt, and (2) provide supportive tools and materials for implementing that approach to include a 'progression for improvement' in teaching and learning. In our earlier projects, this first part of this strategy was relatively easy to accomplish as the teachers had quickly grasped the DE&T potential. The second part was far more problematic as there are always many, impressive looking resources, that on closer examination and use fail to deliver the need expressed in part (2) of the above statement.

This perspective, focusing on the importance of 'tools and materials", shaped our work and contributed to the success of subsequent projects. However, there was, and is, a continuing concern about the lack of appropriate tools and materials that support Integrative STEM learning particularly in the early grades. Our desire to develop such materials reaches back more than 20 years, but our work was put on hold by the excessive attention given to testing and improving scores, rather than attention to learners and their growth. After more than a decade of frustration, we mounted an effort to develop tools and materials that would provide the foundational experiences needed for young children to engage in DE&T and Integrative STEM and, especially to understand engineering and technology; that means, engineering in practice, and technology in its larger meaning (that includes but is not limited to computers and media).

We chose to focus on the development of the Electronic Sentences (ES) system as a 'model' of low-threshold, high-ceiling teaching and learning. We have now reached a point where we can conduct pilot testing of the ES system with teachers. We are excited by the progress and potential of the ES system to support the DE&T approach, enhance computer skills and introduce systems and control' thinking. We are also excited about possible links with Language Arts. All of these should help enhance connections with other school subjects across the curriculum.

Purpose

Our intent is to provide practical workshops through Integrative STEM that will help form a state-wide, network of school-based sites in NJ to support teachers in addressing the Standards for Technology and Engineering Literacy (STEL).
The initial focus will be on elementary and later progressing to middle- and high-school. The ongoing CE experience indicates elementary teachers see the value of engaging in DE&T teaching and participating in ongoing CE-related professional development activities. The proposed support of NJ elementary teachers could encourage them to consider joining NJTEEA and the ITEEA, similar to what continues in Virginia.

Project Focus

The work of the US/UK Team for the last five years has been developing an Electronic Sentences© system as the newest addition to a set of resources we describe as a 'Family of Tools and Materials' — resources that support design, engineering and technology (DE&T) teaching and learning. Parallel to the ES© development effort we have been vetting other devices and materials for inclusion in the FT&M, providing they can help students engage in 'designing and doing' activities that reflect the STEL approach to teaching and learning.

Piloting-Testing: Let's turn attention to the preparation and planning of the ES© Piloting Workshop and the recruitment of participants.
Developing the Electronic Sentences© system has certainly been a rather long and demanding effort. However, the extended time has allowed us to cycle through many (repeat 'many') exciting and rewarding iterations. These DE&T efforts will provide a low-threshold, high-ceiling potential in the ES© Workshop experiences for participants.

The other ES-related attachments include a Cover Letter and a Summer Pilot-testing Workshop. These documents indicate some of the potential of the collaboration with NJTEEA and ITEEA. The most obvious of that potential is to enhance the Professional Development efforts and the Technology Students Association (TSA) coordinated by Henry Harms and the Engineering by Design (EbD) coordinated by Steve Barbato.

Recruitment: The recruitment of participants for the pilot-testing will focus on forming teams that would include a Technology and Engineering teacher and up

to three elementary classroom-teacher. We will also try to recruit language arts, science and math specialists.

Selected ‘priority tasks' for mounting the pilot-testing workshop

- Complete the survey so we can continue planning for the workshop.
- Inform us if you are interested in being involved as an in-person participant, or virtually via Zoom.
- Indicate if you already have a working relationship with one or more elementary teachers.
- Share info on the workshop with potentially interested teachers in you school(s).
- If interested, indicate they could observe the workshop via Zoom.