

SENCER and the Dual Poster Concept:  
Translating Science into Common Language  
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General Description of the Session

Dual posters are an effective way for students to learn how to effectively communicate their research to non-science audiences. However, many students do not understand the process of removing jargon and translating their work for the general public. We have created a handbook with a step-by-step process for translating existing scientific posters into a dual poster version that is more easily understood by the general public. The handbook and posters were both tested for effectiveness.

This session introduces the concept of dual posters, their uses and effective methods of creating them. We will take our audience through the step-by-step process of creating a dual poster and how to use our handbook as a guide. Examples from the study will be shown in both their original and dual versions to demonstrate how students progress in communicating science ideas to a well educated, non-science audience. Results of our preliminary study of dual poster effectiveness are explained. Potential applications will be discussed as ideas for future opportunities using this exciting new model.

Introduction

Texas Woman's University (TWU) is a public university with campuses located in Dallas, Denton, and Houston, Texas. Founded in 1901 as the Texas Normal School for Women,

TWU today is the largest university primarily for women in the United States with a total enrollment of just over 14, 100. About eight percent of TWU students are male; and it is listed as one of the top 15 most diverse universities in the nation with about 45% of students being members of a minority. TWU has a large health sciences program, and is among the nation's leading providers of nurses and other healthcare professionals.

Early in 2010, the National Center for Science and Civic Engagement (NCSCCE) selected TWU as the SENCER (Science Education for New Civic Engagements and Responsibilities) Center for Innovation–Southwest. This is one of one of six regional centers throughout the United States. SENCER is a comprehensive faculty development and science education reform project funded by the National Science Foundation. With this honor, an added focus was placed on making science relevant, specifically in core classes for non-science majors.

### Challenges to Communication

Many scientists do important work that could have a profound impact on their own field as well as others, but then struggle when communicating their results. Part of the challenge is that each discipline, and specialty within it, has jargon that is often not understood by the general public or others in complementary lines of work. By learning to reduce jargon and describe highly complex scientific studies in a manner most well-educated people can understand, researchers in multiple disciplines will be better equipped to share the significance of their work with other researchers, more able to address problems together and better able to inform policy makers about their science.

At the 2010 SENCER Washington D.C. Symposium, Dr. Garon Smith (University of Montana, Missoula) introduced dual posters to the SENCER community as a way of addressing science communication difficulties. Over 1700 students who presented an existing scientific

poster at the 24<sup>th</sup> National Conference on Undergraduate Research (NCUR) held April 15-17, 2010 were invited to create a second “public version.” Only a handful of students agreed to do so. These paired posters were then presented together in order to show their scientific value within their own discipline, and communicate the relevance of their work to a general audience. While the concept was an innovative way of teaching science majors to communicate with the non-science public, there was considerable inconsistency in the results these students achieved. The original posters were often unintelligible to the average person and although it was obvious that the students had worked hard, the dual version posters were not always understandable either.

#### TWU Pilot Study

Maguire and Shepard were part of the TWU team attending the SENCER meeting where Garon Smith presented the dual poster concept and invited the audience to take the idea and develop it wherever an interest was present. Back home in Texas, they decided to do a trial study during the 2010-2011 school year to see if they could obtain more consistent results among TWU science students. At that time Shepard was a senior majoring in psychology. Maguire is a lecturer teaching mostly core science courses, but is not a researcher. Together they felt they would be an ideal sounding board to guide chemistry and biology student researchers toward completion of a dual poster. To organize the process, a handbook was created with a step-by-step guide for translating existing scientific posters into a dual poster version. At the same time, Maguire approached science faculty to ask their support in enlisting students enrolled in research to participate in the pilot study. Three students were identified: one undergraduate and two graduate. Two were enrolled in Chemistry programs, one in Biology. Each student had a different faculty mentor.

Students then worked through the handbook provided: either alone, with a Shepard as a mentor, or a combination of both to create their dual version posters. Because the use of jargon is so rampant within disciplines, it can be very difficult for students to explain their studies in the common vernacular. Most of our participants struggled with using common language in their work because either the concepts were especially complex or they preferred the more scientific sound of their original wording. By working through many small steps, the students learned how to keep the integrity of their science pure *and* explain it to a broader audience in an understandable way. When they felt it was “done,” Maguire reviewed each student’s dual poster and offered additional comments for their consideration. The final reviewers were the faculty mentors for each student participant.

To measure effectiveness of communication, each pair of posters (original and dual versions) were shown to students in an undergraduate core science class to gauge their understanding of each version. A short survey was administered during class; a total of 63 surveys were collected. Respondents first examined the original science version of a poster, and responded to four statements. Next, the dual version was shown along with the same four statements. Of those who responded 12 (19%) were lower division and 51 (81%) were juniors or seniors. Only eight (13%) were science majors. There were 58 (92%) women and 5 (8%) men. The mean age was 24.98 years old. In every measure studied, the dual poster outperformed the original. In addition, the more technically detailed the original poster, the greater the improvement in understanding for the dual version. Last, open-ended comments were solicited. One fairly typical respondent wrote that the original poster was “boring [and] hard to understand,” while the dual version was “...really important because I lost my grandma to cancer. We should study this more.”

### Future Possibilities

This study was the first empirical analysis of the effectiveness of dual posters. While it showed great promise, there is obviously more work to be done. Beginning in the summer of 2011, a follow-up study is planned. Eventually, the study authors hope that the creation of a dual poster will be institutionalized by inclusion in research coursework at both the undergraduate and master's levels for students doing scientific research at TWU.

The project leaders discovered that faculty mentors and student researchers varied considerably in their enthusiasm for the process of developing dual versions. Of the three students in our pilot project, one did not understand the significance of her research and has not completed her dual poster as of this report; however, she has expressed a desire to continue. Faculty anticipated this possibility and felt that the dual poster project would provide a good checkpoint, enabling them to ensure better comprehension of science topics within their own research groups. Once created, paired posters can be used as recruitment tools (for example, during an open house for prospective students who do not yet have an advanced understanding of the discipline), as the starting point for multidisciplinary work, or for teaching non-scientists about complex ideas in a more understandable way.

Texas Woman's has a unique student body that has a higher percentage of females and non-traditional students than most schools. Also, students who participated in this survey may already be more apt to respond favorably to the dual version posters because they seem consistent with the way their SENCERized science course was presented. The study should be repeated at more traditional schools to control for a gender or age effect.