

# Engaging Community through STEM Science Nights: An Elementary School Case Study

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## Project Description

The Teacher Enrichment Initiatives (TEI), housed at the University of Texas Health San Antonio (UTHSA), creates programs, based on teacher feedback, to empower local teachers through various programs, such as the Teacher Enrichment Leadership Academy (TELA).

The TELA is a teacher-led organization of K-12 STEM teachers. Collaborations between the TEI, UTHSA, and the TELA teacher leaders have resulted in a comprehensive program to support K-12 teachers across the San Antonio area. One such program is an annual one-day conference for K-12 STEM teachers. The conference provides professional development workshops and is the primary source for the TEI to gather feedback from area teachers.

## Study Description

Parental involvement increases K-12 student interest in STEM careers; however, when parents lack confidence in STEM content, or language and cultural barriers exist, parental engagement decreases. The TEI collects annual teacher feedback regarding the level of parental involvement with students during science nights, which laid the foundation for teachers to develop a science night training.

Using qualitative methods, this single-case study follows elementary teachers who participated in the TEI science night training as they implement a Science Night program at a majority-minority elementary school. Data were gathered by TEI staff during the inaugural and third year of the Science Night program showing an increase in attendance from 700 (2016) to 800 (2018) and an increase in parental engagement with their student in STEM-related activities from 46% (2016) to 62% (2018). The data and follow-up summary were used by the case study school teachers to write and secure grants to support an annual Science Night program.



## TEI Conference Evaluation Outcomes: Teacher Feedback Regarding Science Night

Conference Evaluations: Science Night Questions	Scale	2015	2016	2017	2018
Q1: A science night at my school would benefit students.	Agree	60% (N=102)	45% (N=56)	58% (N=72)	47% (N=53)
	Strongly Agree	37% (N=64)	52% (N=65)	39% (N=48)	45% (N=51)
Q2: A science night at my school would improve parental involvement.	Agree	60% (N=101)	41% (N=51)	5% (N=68)	48% (N=53)
	Strongly Agree	32% (N=54)	51% (N=63)	36% (N=44)	42% (N=46)

**Note:** The number of conference evaluation respondents (N) varied year to year (2015, N=171; 2016, N=124; 2017, N=124; 2018, N=113) for a total of 532 respondents.

## Observation Protocol

Developed a protocol to:

- Describe types activities: clear purpose, hands-on, demonstration
- Activity facilitators: teachers, community organizations, higher education institution
- Activity engagement: parent-student, student only, facilitator-student, facilitator-parent

## Observation Protocol Outcomes

Activities Observed	2016 (N=12)	2018 (N=17)
<b>Activity</b>		
Clearly identified purpose	8 (66%)	16 (94%)
Involved a hands-on activity	12 (100%)	16 (94%)
Included a demonstration	8 (66%)	8 (47%)
<b>Design</b>		
Designed for students	4 (33%)	8 (47%)
Designed for adults	0 (0%)	0 (0%)
Designed for both students and adults	8 (66%)	9 (53%)
<b>Facilitator</b>		
Engaged the participants with questions	10 (83%)	13 (76%)
Connect the topic to a real-world example	7 (64%)	11 (65%)
Share something about their work/studies	3 (25%)	8 (47%)

## Science Night Attendance

Attendee Group	2016	2017	2018
Students/Parents (Estimation - provided by school)	700	750	800
<b>Volunteers</b>			
TELA Teachers	7	7	8
UTHSA Faculty/Students	11	10	8

## Outcomes

This case study suggests Science Nights can be a mechanism to promote parental engagement with their student in hands-on STEM activities. Further, this case study suggests teacher feedback and inclusion in developing a science night model is central to successful implementation of a science night program.

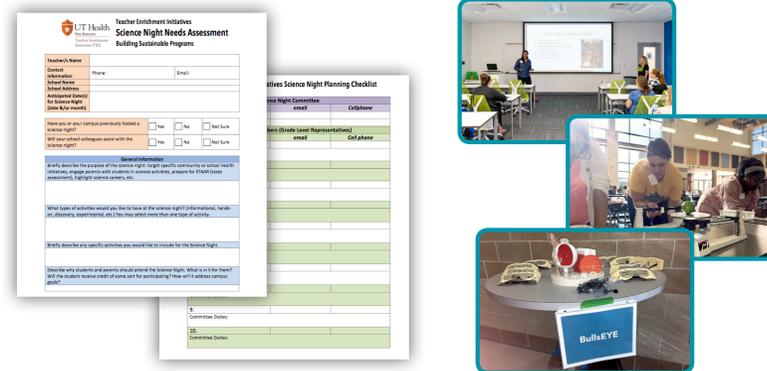
Case study teachers empowered themselves to assume informal leadership roles on their campus as they planned the Science Night. The success of the Science Night program empowered the coordinating teachers to present a workshop to other area K-12 teachers at the annual TELA 2018 and 2019 conference.

The case study teachers stressed the importance of the TELA evaluation protocol to obtain data to secure administration support and potential financial resources.

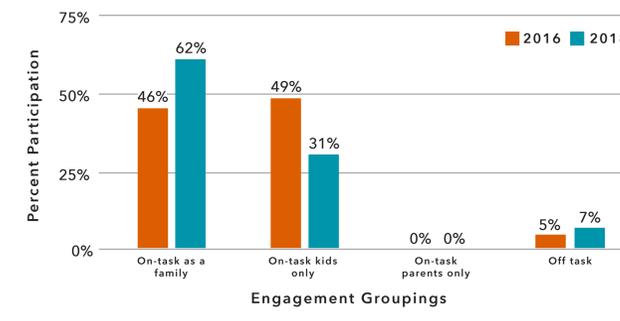
## Developing Science Night Training and Support

In response to teacher feedback, the TELA teacher leaders developed a Science Night training program and support tools grounded in literature and addressing specific teacher needs.

- Training Session: three-hour professional development workshop
- Tools:
  - Science Night Needs Assessment
    - STEM-focused
    - Identify Purpose
      - Address School or District Initiatives
      - Community Health
    - Goals and Objectives
    - Permissions
  - Science Night Planning Checklist
    - Planning Committee
    - Planning Timeline



**Figure 1. Science Night Participant Engagement Comparison**



**Figure 1:** Comparison of Science Night participation by category from 2016 to 2018. When comparing "on-task as a family", 2016 was 46% and 2018 was 62%. The "on-task kids only" category saw a decrease from 2016 (49%) to 2018 (31%). There were minimal to no changes seen for "parents only" and "off task" categories.

## Case Study Questions

- How are the TEI Science Night Training and tools applied by teachers
- How the Science Night model affects interactions between parents and students during the Science Night

