Evaluating the Lead Teacher Program: Supporting K-12 Ambassadors and Leaders in Green Chemistry Education

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Abstract/Introduction

Green chemistry's educational impact is directly related to teacher's confidence and understanding of sustainable science. Beyond Benign's Lead Teacher Program (LTP) is a professional, collaborative, and educational support system that has been crafted to support educators that advocate and incorporate sustainable science within their classroom. This ongoing research project evaluates the LTP by analyzing the transcripts from phone interviews with the program participants in order to propose the LTP's purpose, successes, and areas of improvement. Then the authors identify what led participants to join the program, and how the chemistry knowledge is shared by each of the participants, and what it means to become a certified lead teacher. This research improves chemistry education by transitioning its language to include more sustainability and suggests that teachers need additional support, which the LTP uniquely offers.

Methods/Materials

On September 30, 2020, LUC's Institutional Review Board concluded that the project posed minimal risks to research participants and issued official approval. Research ethics training was completed by all members of the research team as required by LUC. Written consent was obtained from all participants. In its initial stages, the study relied on semi-structured phone interviews with 28 LTP participants. A primary researcher conducted the interviews and most lasted between thirty and thirty minutes. Inspiration from a grounded theory approach guided undergraduate researchers to transcribe the interviews within Microsoft Word. Emerging ideas, patterns, and questions were discussed in weekly meetings. This provided a foundation for the initial coding categories and a provisional coding list. Researchers were then introduced to the basics of coding and given the coding list. Each week the researchers would be paired together and given coding assignments. Initially, researchers coded their assignments as individuals. Then, researchers would meet together and create consensus code documents. Fairs varied week to week in order to check-code as a complete group. Through weekly meetings, the provisional start list of codes was continuously refined and updated according to a constant comparison approach. Additional readings were discussed and connected with a process memo. After all consensus coding was completed, the documents were uploaded to Nvivo. This program allowed researchers to further their analysis by identifying subcategories within codes and creating more comprehensive descriptions.

Limitations

Although this project implemented a mindful research process, there are some limitations present. While utilizing intent coding approach, some of the early coding analysis may be as refined as those done later on in the research. However, this grounded theory remains to be an effective approach as it allowed the codes to emerge from the data itself. Another limitation is that the interviews did not account for the varying time teachers spent in the program or individually in responses. This was especially obvious as the nature of the interviews was exploratory and open ended. To minimize this error this moving forward, follow up interviews and/or surveys could be used to accurately quantify the number of teachers that share a common opinion regarding the nature of the program.

Data & Results

Collaboration: “The advantage is that you get to meet other people. You get to share ideas... I get to listen to people from all over the country and then bring those ideas back to Massachusetts or share our ideas in Massachusetts and send them out. So, it’s a great collaboration between people who are all very passionate about a topic.”

Supportive Community: “The sense of community we’re fostering is what really sparked a lot to change.”

Informing Educators: “If it wasn’t part of the Lead Teacher Program, I don’t think I would be that active in teaching my kids about the structure of green chemistry as like an idea, as a field. I think I probably would just be changing up my labs and making them greener and doing everything behind the scenes. I think being in the Lead Teacher Program has gotten me more upfront about teaching green chemistry to my kids as a thing, as an idea, rather than just doing the behind-the-scenes stuff.”

Professionalism:


Acknowledgments

The project was funded to promote a collaborative environment that allowed teachers to feel valued. The support provided for teachers by this program is often offered, which work to enhance their experiences and adapt their teaching style within the classroom. The collaborative nature was found to be a large success of the program. Furthermore, it was found that the professional and development that they received it was seen that increasing the number of meetings and offering external opportunities for collaboration improves the take-aways for program participants. Moving forward, an aspect of this project that will be analyzed further includes classroom examples of how this program has transformed the teaching style of the Lead Teachers.

Table 1. Successes and Professionalism Code for the Evaluation of the Lead Teacher Program.

Table 2. Methods/Materials Code for the Evaluation of the Lead Teacher Program.

References


Summary & Ongoing project

The Lead Teacher Program was founded to promote a collaborative environment that allowed teachers to feel valued. The support provided for teachers by this program is often offered, which work to enhance their experiences and adapt their teaching style within the classroom. The collaborative nature was found to be a large success of the program. Furthermore, it was found that the professional and development that they received it was seen that increasing the number of meetings and offering external opportunities for collaboration improves the take-aways for program participants. Moving forward, an aspect of this project that will be analyzed further includes classroom examples of how this program has transformed the teaching style of the Lead Teachers.

Program Expansion

- Increasing the number of Lead Teachers within school districts
- Moving summits to regional and international opportunities
- Improved Program Durations

- “If you’re not at the Lead Teacher Summit anymore, then you kind of don’t know the people anymore, so you kind of phase out.”

Improved Program Organization

- Lead Teachers could be assigned more concrete topics and official assignments for a more structured approach to the program.

Potential improvements:

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- Improved Program Durations
- Improved Program Organization
- Increased number of Lead Teachers within school districts
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Table 1. Successes and Professionalism Code for the Evaluation of the Lead Teacher Program.

Sustainability

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- Informing Educators: “If it wasn’t part of the Lead Teacher Program, I don’t think I would be that active in teaching my kids about the structure of green chemistry as like an idea, as a field. I think I probably would just be changing up my labs and making them greener and doing everything behind the scenes. I think being in the Lead Teacher Program has gotten me more upfront about teaching green chemistry to my kids as a thing, as an idea, rather than just doing the behind-the-scenes stuff.”

- Professionalism:

- Methods/Materials:

- Collaborative Participants: "Resources: Worked Priorities Meet Teachers"
- Informing Educators: "Confidence: Expanding Teaching: Adjusting their Understanding Sustainable"
- Success: "Lead Teacher Program Successes: What participants think has worked well for Lead Teacher Program, and should be maintained."
- Professionalism: "Times when Lead Teachers describe being treated as professionals, or having an audience within the Lead Teacher Program specifically (not before or after the program). Creates feelings of “empowerment” and respect."

- Program Expansion:

- Improved Program Durations
- Improved Program Organization and Engagement

- Potential Improvements:

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Table 3. Improvement Code for the Evaluation of the Lead Teacher Program.

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