



**Chasteen Educational  
Consulting**

# Get the Facts Out: 2019 Annual Evaluation

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**ACS**  
Chemistry for Life®  
AMERICAN CHEMICAL SOCIETY



MATHEMATICAL ASSOCIATION OF AMERICA

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physics

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PHYSICS EDUCATION



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## Executive Summary

Get the Facts Out is an ambitious project, aiming to address a complex, systemic problem (the lack of qualified K-12 STEM teachers) through tested marketing campaign which addresses most levels of the educational system. The project is in the early phases, setting up structures, norms, and identifying needs to achieve its' vision. Even in this early stage, the project has many successes, including engagement of many partners across disciplines, establishing communication mechanisms and decision-making structures, and holding many discussions and meetings. The accomplishment of this element of the project should not be underestimated, as this is a *much* more complex project than is the norm in educational reform, with multiple stakeholders and diverse project strands.

The strengths of this project are:

1. **The interdisciplinary focus,**
2. **The engagement of multiple stakeholders** (including highly motivated Change Agents) around issues that they care about,
3. **A multifaceted approach** to change which includes resources, communication, project activities, and research, and
4. **An evidence-based approach** to change which includes audience-tested materials and data to help stakeholders make informed opinions.

These elements all have strong potential to lead to real change in the number of students choosing to pursue teaching as a career.

## REPORT OVERVIEW

The very strengths of this project are also its' biggest challenges, and the leadership has struggled in some key areas which directly arise from this rich project, including:

1. **Operationalizing the common vision**, including norms for the quality of data on teaching as a profession, and what counts as “success” for the project.
2. **Communication mechanisms**, including horizontal and vertical communication across many layers of leadership and audience.
3. **Managing multiple project strands**, including the rich but overwhelming stream of information and feedback coming from multiple stakeholders, needs that have naturally emerged from a developing project (such as communication mechanisms, working groups, and additional meetings), and a crushing research site visit schedule.

The project leadership (both PI Adams and the disciplinary PI team) has remained flexible and adaptable to the emerging project needs and is in the process of operationalizing many of the communication structures which are needed. The leadership team is doing an excellent job and attending to many critical issues across a complex project, including responding directly to the majority of evaluation recommendations. The evaluator cautions the team against *scope creep*, as it will be easy to over-extend the project beyond the resources of time and money that are available. In retrospect, a softer roll-out of the project (e.g., in one discipline) may have been warranted to make the first few years of the project more manageable, with fewer unexpected needs.

Based on the broad look across the project, this evaluator makes the following recommendations.

- |                         |   |
|-------------------------|---|
| <b>1. Strategy</b>      | Use strong, flexible leadership to support collective action. Leadership is a strength, but additional structures, such as an annual Strategic Plan, operationalizing the project vision, avoiding scope creep, and balancing the project research and process, will be helpful.  |
| <b>2. Communication</b> | While communication processes are being placed, I suggest a working group focused on strategic communication across the project as a whole (including horizontal <i>and</i> vertical communication) which ensures easy sharing without overload.  |
| <b>3. Propagation</b>   | Based on the research on persuasion, effective dissemination, and behavior change, several recommendations are made to further support the adoption of GFO-relevant attitudes and practices – such as creating a propagation plan, focusing on the impact on students, clearly suggesting action steps, ensuring active data processing by participants, and scaffolding effective campaigns. |
| <b>4. Feedback</b>      | With many stakeholders arises much feedback. To ensure a user-centered design, curating and interpreting this feedback and its' impact for action steps for the project. I recommend sifting this feedback out to the working groups.   |
| <b>5. Data</b>          | Use the new Toolkit working group to carefully curate the career data that is collected, including providing norms for high-quality valid data which can be used and creating high-quality visualizations to enable cognitive processing.   |

Attention to these recommendations as appropriate may help the project achieve greater, longer-lasting impacts on the number and quality of future STEM teachers.

# Report Overview

Get the Facts Out is at the end of its' first year of activity, and this report summarizes the observed progress and open questions at this point in the grant. The evaluation focuses on whether the project is laying a solid foundation to achieve the expected change, and adapting appropriately as the project develops.

This evaluation takes a **developmental evaluation** approach, in the spirit of supporting an emerging innovation in a dynamic and complex environment, where multiple pathways forward exist. Developmental evaluation is appropriate for projects where exploration and innovation are necessary and outcomes are (at least in part) emergent. The evaluation thus has developed measures and tracking mechanisms quickly as these outcomes and needs emerge, addressing the pragmatic needs of Change Agents and PIs, and is attending to unanticipated consequences.

This annual review is guided by the following evaluation questions:

**Are the project processes and products likely to lead to the successful achievement of the vision?**

- What is the impact of the project so far?
- What are the main strengths and challenges?
- Is the communication and decision-making process effective?
- To what degree does Get the Facts Out as a project have the characteristics of impactful innovations?

Data reviewed for this report include the following (detail on each in the [Appendix](#)):

- **Previous evaluation reports**
  - 2018 Change Agent Interviews
  - 2018 PI Interviews
  - 2018 Kickoff Meeting Evaluation
  - 2019 Workshop Evaluation
  - 2019 Mini-Evaluation of Persuasion Techniques
- **Project-wide documentation and artifacts**
  - GFO Toolkit
  - GFO Website
  - Observations of PI meetings
  - Annual reports submitted from each discipline
  - Short written reflection from project PI Adams
  - Project responses to evaluation feedback
- **GFO Site Visit documentation**
  - Notes from site visits, including quizzes for faculty, resources, and suggestions arising from site visits.
- **Change Agent activities**
  - Activity Tracking Checklist results
  - Notes from Change Agent discussions in disciplines
  - Survey results from Change Agent workshop participants

## WHAT IS THE PROJECT IMPACT?

### What is the project impact so far?

While the project is in its' early stages, it can already boast many successes, as outlined in the informational graphics below.

## Get the Facts Out



### THE GOAL



Change faculty perceptions about teaching.  
Engage faculty in using Get the Facts Out materials & methods.



Change student perceptions about teaching.  
Increase the number of STEM students seeking certification.

### PROGRESS TO DATE

**4** societies partnered

**3** disciplines engaged



ACS  
Chemistry for Life®  
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MAA  
MATHEMATICAL ASSOCIATION OF AMERICA



APS  
physics  
PHYSICS EDUCATION



AAPT  
PHYSICS EDUCATION

Held over **13** PI meetings and **1** in-person kick-off

#### Get involved

Join our mailing list  
Start a local campaign

Created **logo**  
**website**  
**newsletter**  
**email list**



Improved and added to **toolkit**

**13**



*change agents engaged*

over **500** students, faculty and staff reached  
across **9** states *in just 6 months!*

**38** departments enrolled

at **26** institutions

in study to gather large-scale data. **5** site visits completed!

## What are the main strengths and challenges?

In reviewing the data and materials from the project so far (see Appendix) I found many common themes across different elements of the project, from the Toolkit, to Change Agents, to project processes. These themes were associated both with strengths and with challenges, reflecting that project features are not inherently positive or negative.

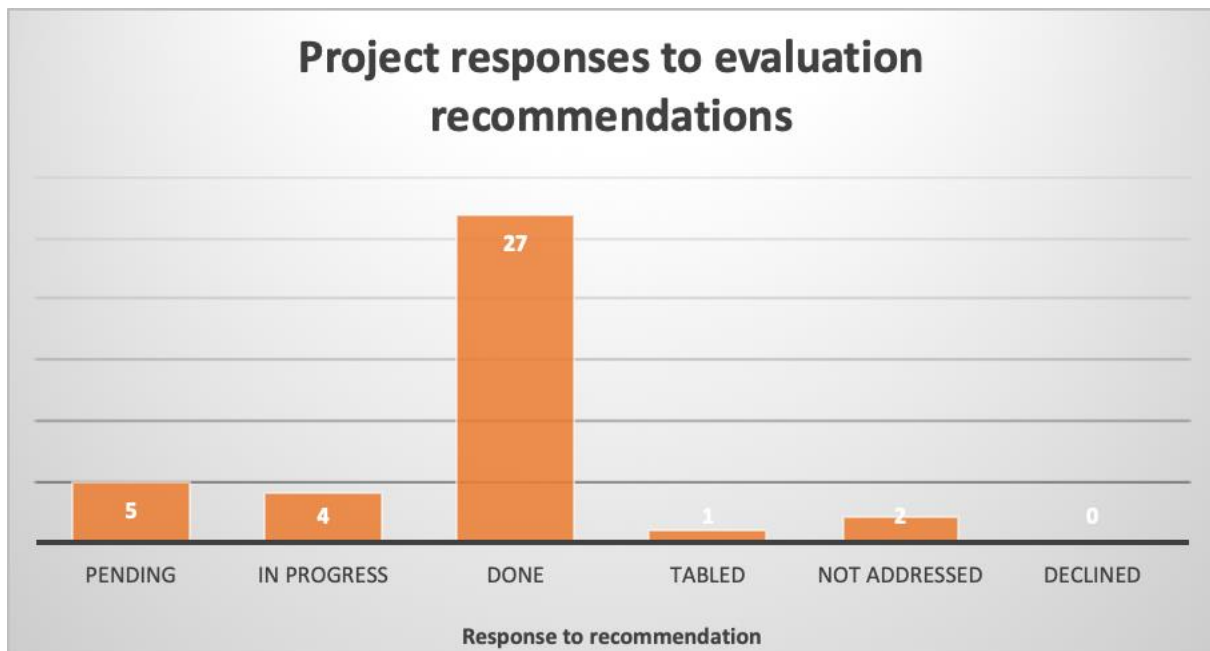
Theme	Strength for project	Challenge
<b>Interdisciplinarity</b>	Enables collective action across disciplines, increasing power, visibility, and learning.	Different disciplines have different data needs and cultures.
<b>Change agent capacity</b>	Change agents are expert and motivated and able to lead campaigns. Many are able to act across disciplines as well. They want to engage with the national network.	Change agents are very busy and do not have time to attend to all project communications, and time and expertise to lead activities vary.
<b>Multiple project stakeholders</b> (at all levels of system)	The project has a great potential for collective and systemic impact across disciplines and at different levels of the system. There are many options to collect feedback on materials and approaches.	It is challenging to establish a collective vision and fidelity. There are many project communication strands (horizontal and vertical) which are difficult to attend to. There is a lot of Toolkit feedback to keep track of.
<b>Multiple project strands</b> (including substantive research)	The multifaceted approach (communication, stakeholder engagement, resource materials, and research sites) has a great opportunity for impact, and to add to generalized knowledge.	There is a lot for PIs to attend to. The substantive research component is a major focus of PI Adams and her team, reducing their ability to attend to other elements.
<b>Focus on data</b>	Attention to tested messages and relevant data has persuasive power and provides a strong evidence base.	Norms are needed for quality data and data visualization. Faculty (including Change Agents) must work directly with data to feel they understand it, and for it to have maximum persuasive power. Collecting relevant data (local or discipline-specific) takes time.

## What is the project response to evaluation recommendations?

Leadership has integrated the project evaluation across many elements of the project. To date, the evaluation has conducted observations, interviews, or surveys in the following areas, resulting in evaluation mini-reports and recommendations:

1. **PI Interviews** (September 2018). Interviews with disciplinary project PI's to surface assumptions and potential roadblocks.
2. **Change Agent Interviews** (October 2018). Interviews and focus groups with Change Agents to identify concerns and characteristics of this group.
3. **Kick-off meeting observation and survey** (November 2018). Observations, field notes, and a post-meeting survey to identify issues and lessons learned.
4. **PI Meetings** (Fall and Spring 2019). Attending regular PI meetings surfaced some areas of concern.
5. **Cross-project evaluation** (May 2019). This report, as well as one on Persuasion Evaluation and Workshop Evaluation, were conducted to look across the project as a whole.

Each of these has resulted in recommendations from the evaluation to address any areas of concern. As much as possible, these recommendations are written in collaboration with the PIs, to enhance the utility and feasibility of the feedback. PIs are encouraged to substitute their own action items to address issues if those suggested by the evaluator are not seen as a good match for the project. These recommendations and responses are recorded in a Google Doc to allow the evaluator and PI team to close the feedback loop by periodically revisiting the recommendations and action items. Based off this Google Doc, the project responses to evaluation feedback are plotted below; the vast majority of items have been addressed, with a small number pending or in progress. This suggests a high level of attention to evaluation and continuous improvement of the GFO project.

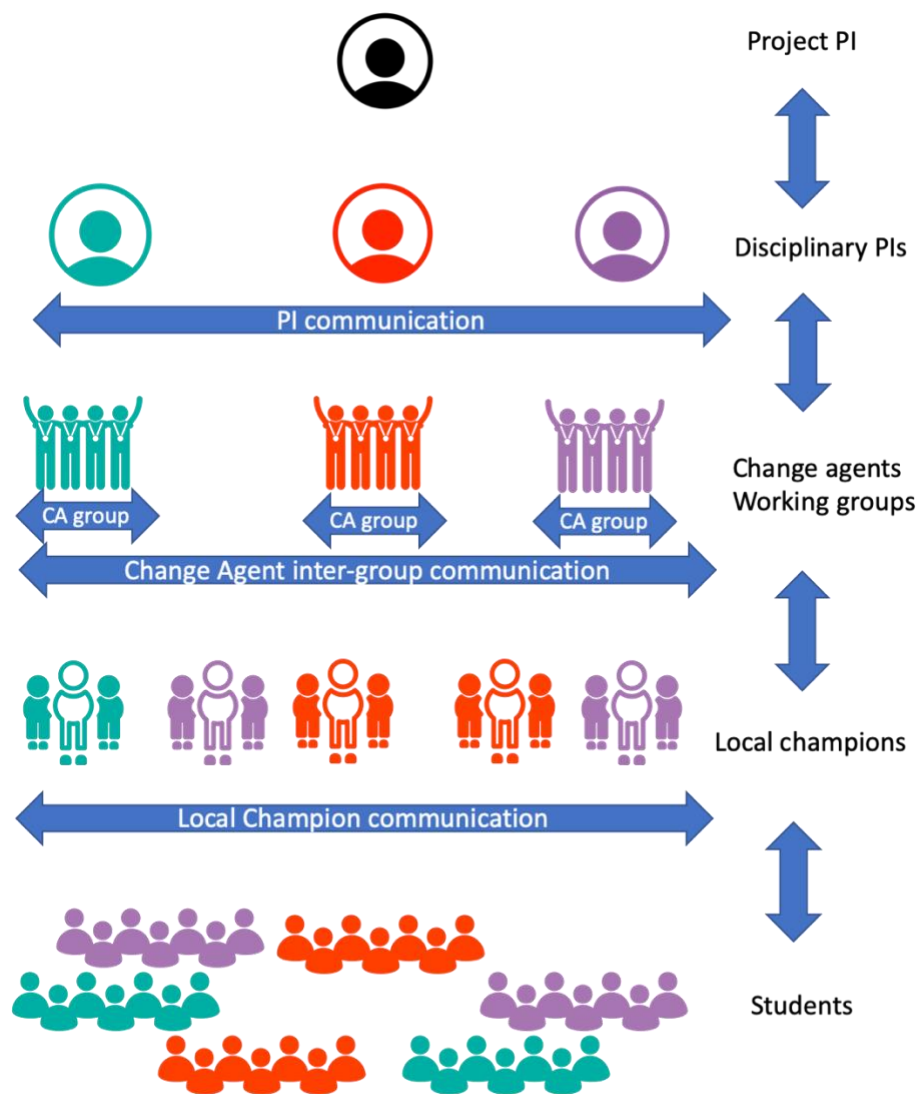


## Is the communication and decision-making process effective?

Many of the above challenges highlight the importance of effective communication and decision-making processes for the following purposes:

1. **Horizontal** communication among PIs
2. **Vertical** communication between PIs, Change Agents, and Local Champions.
3. **Decision-making structures**, including meeting minutes, action items, and closure on open issues.

The challenge of these different communication structures is illustrated below, with horizontal and vertical communication depicted with bidirectional arrows. Each of these communication needs is being attended to, but have not yet been fully operationalized.



## IS THE COMMUNICATION AND DECISION-MAKING PROCESS EFFECTIVE?

Some of the main findings regarding project process, communication, and decisions are below.

### **Project leadership has been flexible and adaptable to communication issues.**

PI Adams set norms for meeting engagement early and has adapted meeting structures (such as frequency, note-taking, and agenda-setting) to meet the emerging needs of the project. A Kick-Off Meeting was created to address the identified need for early face-to-face contact, and working groups established. However, the intensive research focus has also taken significant PI attention.

Continuous attention to communication and structural issues will be needed in the coming year. The time required for the research activities is a concern in allowing time for this focus to the project process – though the advent of working groups will help distribute responsibility.

### **Closing the loop on various discussions is a challenge starting to be addressed.**

Early in the project, it arose as a challenge to attend to the various decisions and pieces of feedback arising across the project (e.g., evaluation, Change Agent, research sites, and PI feedback). Decision-making in meetings has now been more formalized and feedback is starting to be gathered in centralized places.

Attending to feedback will be a continuing challenge in a developing project with many stakeholders, and requires systematic processes for collecting and managing such information.

### **Communication structures are being operationalized.**

As shown on the previous page, there are many stakeholders with different communication needs, horizontally and vertically. Email lists, newsletters, working groups, and communication norms are being established.

It is critically important that the project approach communication with an eye to these different stakeholder needs, including internal stakeholders who may be overwhelmed with multiple communication streams.

### **Issues have surfaced while bringing to scale, which is normal.**

While the general approach of GFO had been established, bringing it to scale with the use of Change Agents and multiple disciplines have surfaced unexpected issues (such as communication and data needs). This is typical in complex, systemic change projects.

Project leaders should consider these discoveries a natural part of project expansion and development. A lesson learned for the future: GFO may have benefited from a softer roll-out, with Year 1 comprised of activity in a single discipline plus Change Agent activity.

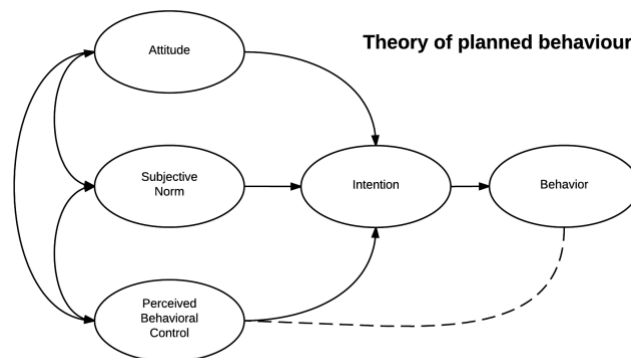
### To what degree does Get the Facts Out as a project have the characteristics of impactful innovations?

In this section, I reflect on Get the Facts Out project compared to several different frameworks.

1. Theory of Planned Behavior (Ajzen)
2. Characteristics of Dissemination Success (Bourrie et al.)
3. Increase the Impact (Henderson et al.)

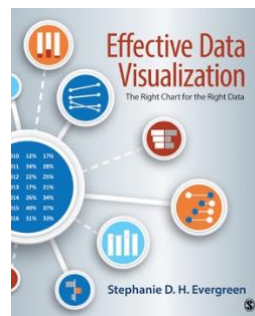
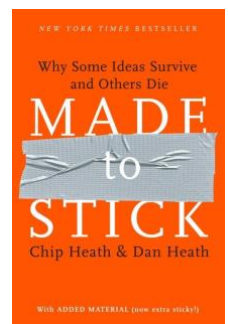
#### *Theory of Planned Behavior*

The *Theory of Planned Behavior*<sup>1</sup>, diagrammed below, is a theory of how attitude change leads to behavior change. It is similar to the Rogers (2003) *Diffusion of Innovations* (Knowledge – Persuasion – Decision- Implementation – Confirmation) but with a more systemic lens which includes peer influence and personal sense of control that may influence the connection of attitude change to behavior change.



As discussed in the separate *2019 Mini-Evaluation of Persuasion Techniques* for GFO, the project uses many effective elements of attitude change, such as presentations by like-individuals, using audience-tested messages with high intellectual content that emphasize issues that are important to recipients (such as student happiness) and require active mental processing (by analyzing and identifying relevant data). Recommendations to enhance attitude and behavior change from that report and perspective include the following, as well as to consult the books shown to the right:

1. Emphasize the impact on students' lives to motivate action.
2. Weave action steps directly into the GFO messages.
3. Ensure that faculty data-mining actually requires them to work directly with data to generate active mental processing.
4. Repeat GFO messages at the national and local level to result in repeated exposure.
5. Share what other GFO participants (Change Agents and Local Champions) are doing, to generate subjective norms.
6. Re-engineer data visualization to produce high-quality persuasive data visuals.

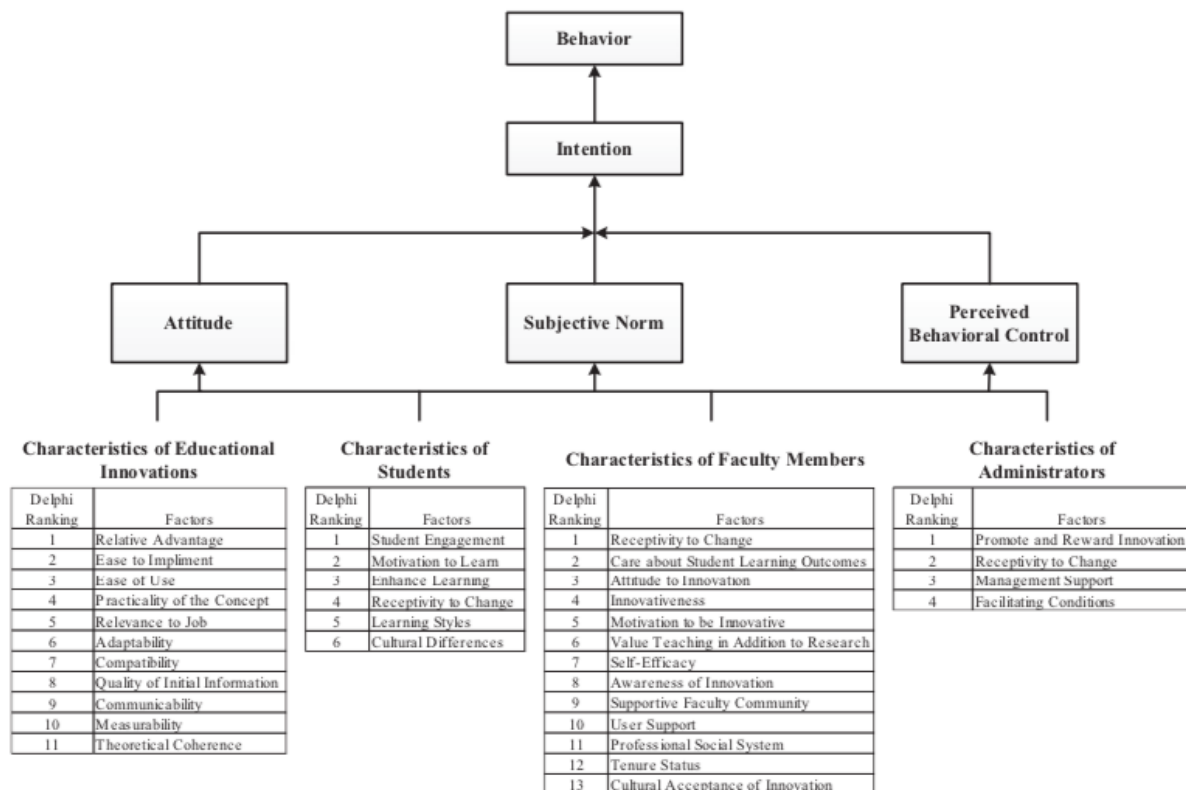


<sup>1</sup> I. Ajzen. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl and J. Beckmann (Eds.), Action-control: From cognition to behavior. Heidelberg: Springer.

## Characteristics of Dissemination Success

The *Characteristics of Dissemination Success (CODS)*<sup>2</sup> framework was developed by Bourrie and colleagues to identify characteristics that enhance the likelihood that educational innovations will be adopted. CODS builds on the *Theory of Planned Behavior* to include the characteristics of innovations which relate to attitude change, subjective norms, and perceived behavioral control, as shown below in the figure from Bourrie et al. (2014).

**Figure 2:** Characteristics of Dissemination Success (CODS) framework.



This framework may be useful to the project in considering the needs and intentions of its' audience members. In terms of GFO as a project, the "Characteristics of Educational Innovations" portion (first box) is of greatest importance. Below I outline the elements of GFO as they relate to CODS framework. Items are listed in order of importance-ratings by experts, so I address the first four here (combining the two items of "ease").

<sup>2</sup> D. M. Bourrie, C. G. Gegelski, L. A. Jones-Farmer and C. S. Sankar, Identifying Characteristics of Dissemination Success Using an Expert Panel, *Decision Sciences Journal of Innovative Education*, 12(4), 2014.

## CHARACTERISTICS OF IMPACTFUL INNOVATIONS

### Characteristics of dissemination success

Characteristic	Strength for project	Challenge
<b>Relative advantage.</b> <i>Better than other techniques that are out there.</i>	For faculty/advisors interested in teacher preparation, GFO offers materials that are not available anywhere else, and address what is known to be a critical issue (perceptions of teaching).	For faculty/advisors not interested in teacher preparation, significant attitude change is required to see the need and advantage. However, attitude change among faculty/advisors is one aim of the project.
<b>Ease of use.</b> <i>Easy to understand and implement (including the amount of work required).</i>	The Toolkit includes ready-to-go materials for use in different situations. Some, such as posters, are grab-and-go.	Learning to conduct workshops takes time, and modifying data for local relevance takes significant time. The website must be easy to navigate to find relevant materials.
<b>Relevance to job</b>	The project centers on an issue that is at the heart of what faculty/advisors do – help students find their life path.	Faculty/advisors have many responsibilities and advising for teaching careers is only one of many.
<b>Adaptability</b>	Materials are designed to be adaptable to local and disciplinary context.	Adapting the materials is a major time barrier at the national and local level.

## CHARACTERISTICS OF IMPACTFUL INNOVATIONS

### *Increase the Impact*

*Increase the Impact* is a project by Charles Henderson and colleagues to identify and communicate the features of educational innovations which have led to broad and sustained use by the intended community. The focus of the accompanying guide<sup>3</sup> is **user-centered design and dissemination**, where the intended users are involved at every step of the innovation. The guide includes many worksheets and reflection questions that would be useful for GFO working groups to consider. Unlike the models above there is no overarching framework, but the chapters of the guide provide a useful guide to their recommended steps. Below I review those steps and place the GFO project with respect to those steps.

#### Recommendations from Increase the Impact

Recommendation	Current status in GFO	Recommendation
<b>Understand the gap between current and desired system.</b>  <i>Understand the product, your adopters, and the system.</i>	GFO is at an extreme advantage in this area. The resources are based on detailed research into the gap between perception and reality, the gap between needed and desired student numbers, the reactions of audiences to the messages and materials, and an in-depth knowledge of the educational system.	None, except to continue in this vein with additional materials that are developed.
<b>Develop an interactive propagation plan.</b>  <i>Test your materials iteratively with the audience, motivate the audience to try the product, and support them in doing so.</i>	GFO is again at an extreme advantage, with user-testing at the very heart of the project. User support is also at the heart, through the pyramidal structure of the initiative, with support of Change Agents by PIs, and support of Local Champions by Change Agents.	Test the additional propagation materials (website, communication) with audiences as possible. Check continually to see if support is adequate.
<b>Regularly review propagation plan.</b>  <i>Given the resources available, continually evaluate and refine the propagation plan to reach the right audiences effectively.</i>	Increase the Impact outlines 3 stages: <i>Getting Started</i> (1-3 years), <i>Refinement</i> (1-3 years) and <i>Expansion</i> (3+ years). GFO is in the <i>Getting Started</i> phase; it is important to identify adoption barriers and develop strategies, and ways to get feedback on those strategies.	Create a list of adoption barriers. Make a plan to review propagation plans annually, using Increase the Impact. Keep plans within the project budget.

<sup>3</sup> C. Henderson, R. Cole, J. Froyd, D. G. Friedrichsen, R. Khatri, and C. Stanford, *Designing Educational Innovations for Sustained Adoptions*, Increase the Impact (2015). Accessed at <http://increasetheimpact.com>.

# Recommendations

Based on the findings above, plus the details within the Appendix, I make the following broad picture recommendations for the project for the next year. I have attempted to frame these so that previous, unresolved evaluation feedback is incorporated into one of these recommendations.

## 1. STRATEGY: Use strong but flexible leadership to support collective, coherent action.

The project has benefited from a flexible, adaptive leadership structure, and many project structures have evolved to meet emerging needs. Give the complex, developmental nature of the project, additional attention to project strategy may be needed in Year 2, especially given the intensive research focus in Year 1 which is likely to continue.

<b>Maintain flexibility</b>	The flexible, adaptive leadership structure has been a true strength of the project, which is well-suited to its' developmental nature.
<b>Documentation</b>	Develop clear project timelines. Develop a Google Doc structure for the new Working Groups which allows for organizing files, meeting minutes, and action items.
<b>Project vision</b>	Find ways to operationalize the project vision, such as norms for what constitutes effective data, a list of critical features for successful implementation of GFO ( <i>Fidelity of Implementation</i> ), and lists of what might constitute a GFO campaign – for Change Agents and for Local Champions. Address the lingering question of “What is fixed and what is flexible?” across the different elements of the project, including the Toolkit, national and local campaigns, and data use.
<b>Beware scope creep</b>	Many structures and possible tasks are emerging. Use strong, decisive leadership to ensure that you are sticking to your project vision and the available resources. An annual Strategic Plan which outlines what is and is not within scope may be one option.
<b>Balance research focus</b>	Explore ways to balance the focus on research with a focus on project process and management.
<b>Softer roll-out</b>	While it is too late to consider for the current project, for future projects consider a softer roll-out, such as focusing on a single discipline and the research activities in Year 1.

## 2. COMMUNICATION: Develop a strategic plan for project communication.

While communication processes and mechanisms are being put into place, this evaluation has found that the communication elements of the project are both complex and critical. The proposed working group structure has no group devoted to communication.

<b>Working group</b>	Create a working group that is tasked with project communication, which can strategize across the different elements of the project.
<b>Strategic plan</b>	Develop a strategic plan for project communication which addresses horizontal and vertical communication (see report), with care for streamlining and not overloading.
<b>Ensure sharing of campaign strategies</b>	In this strategic plan, outline multiple ways to address the sharing of GFO approaches among local champions and change agents, such as the new email listserv. One idea is to have a GFO “Share A Thon” at PhysTEC and related conferences. Sharing of strategies will be important for successful persuasion and propagation.

## 3. PROPAGATION: Give focused attention to persuasion, messaging and users to support propagation.

While the project is based on user-centered design and evidence-based practice, research on persuasion, and effective dissemination of innovations, suggest ideas for further impact.

<b>Impact on students</b>	Throughout materials (including workshops) emphasize the potential impacts on students’ lives of having accurate advising. This framing can motivate faculty to listen to viewpoints different from their own (including teachers and industry).
<b>Action steps</b>	Weave intended action steps directly within GFO messaging (e.g., “go visit this website,” “attend this guidance meeting.”) Within workshops, suggest next-steps for local activities, or have participants brainstorm them or make plans.
<b>Active processing of data</b>	Many of the GFO persuasion techniques for faculty (including Change Agents) require active mental processing of data about teaching as a career, but this does not always happen. Scaffold active processing of data within workshops with worksheets or guided activities to ensure this critical step.
<b>Scaffold effective GFO campaigns</b>	Provide lists of what activities might constitute a GFO campaign (e.g., “give a workshop to advisors”) as well as the critical features that align such a campaign with the principles of GFO (e.g., “refer to data,” “use multiple touches.”) The Fidelity of Implementation framework may suggest such lists. Support Change Agents and Local Champions in using these lists in planning and reflection.
<b>User testing</b>	Test the additional materials being developed for GFO with the intended audience, even if briefly. These include the website, new Toolkit materials, and data visualizations.
<b>Propagation plan</b>	Develop a propagation plan, as outlined in Increase the Impact. Within this plan, create a list of adoption barriers and strategize how to overcome them. Review the plan annually.

## 4. FEEDBACK: Systematically curate and interpret feedback on project elements, and decide what to do.

One of the project's strengths is its involvement of multiple stakeholders. Those stakeholders, however, have a lot of feedback and relevant for the project in many areas, including the Toolkit, campaign approaches, and project strategy. Attending to this feedback upholds the principle of user-centered, responsive design. Project leadership will need to find ways to curate this feedback so that it can be used effectively, without losing track of ideas (or one's sanity).

### Curate existing feedback

Feedback is currently within many different places, including the Kick-Off Meeting Notes, Site Visit Recommendations, GFO Resource Ideas, and the newest evaluation reports (*2019 Workshop Evaluation* and *2019 Mini-Evaluation of Persuasion Techniques*). Systematically organize the feedback on the project so far into different categories, such as "website," "toolkit," "career data," "project strategy" and "other." Give these pieces of feedback to relevant working groups in a Google Doc. Ensure each Working Group has such a Feedback or Ideas document.

### Identify action items

Each working group should organize that feedback – for example, "To do now," "To do later," and "Parking lot." Ensure such action items get assigned to someone and put into the workflow for the working group (e.g., in meeting agendas). Not every piece of feedback needs to lead to an action item.

### Curate new feedback

As new feedback comes in, this can be shared with the relevant working group to curate in a similar fashion.

## 5. DATA: Ensure that career data is high-quality and uses quality visualizations.

Attention to the quality of the teaching career data and how it is presented will help ensure the project maintains a strong evidence base and persuasive power.

### Working Group

It seems that the Toolkit Working Group is most suited to dealing with issues of data curation and visualization. The data-mining needs are potentially vast, however, and the working group may need to be expanded to include local partners interested in these kinds of investigations.

### Quality norms

Set norms for what constitutes quality data that could be incorporated into the project (at a national or a local level). What types of sources are valid?

### Interpretation

Attend to issues of clarity and interpretation in the data, such as axis labels, identifying the populations included or excluded, considering useful comparison data, and aggregating or separating out different populations to better make a point. See the *2019 Workshop Evaluation* report.

### Visualization

Help readers make easier comparisons and judgments by using best-practices in data visualization based on cognitive science. See the *2019 Workshop Evaluation report* and *Effective Data Visualization* by Evergreen.

### Identify templates

Which of the data provided are national data which can be used directly, and which are templates/examples which should be updated for local or disciplinary data?

# Appendix: Data analysis

## Evaluation activities

Evaluation activities and products from the last year include:

Reports created:

- 2018 Change Agent Interviews
- 2018 PI Interviews
- 2018 Kickoff Meeting Evaluation
- 2019 Workshop Evaluation
- 2019 Mini-Evaluation of Persuasion Techniques

Instruments created:

- Change Agent activity tracking form (with public results display).
- Faculty-facing workshop survey.
- Student-facing workshop survey.
- Implementation questions for end of FPTaP and PTaP (FSI, SSE surveys).
- Project Responses to Evaluation Feedback document.

Other measures:

- Feedback on website design and personas.
- Fidelity of Implementation critical features list (draft).
- Participation in PI meetings.

## Project process

From participatory evaluation and several reports, we find the following.

Findings:

- (From 2018 Kick-off Meeting Evaluation). Project PIs were still struggling to identify discipline-specific needs in the project, and to understand their roles, the project timeline, and how the project would be structured (including file sharing).
- (From 2018 Kick-off Meeting Evaluation). Relationships among PIs are still forming, and project norms and visions are still being understood.
- (From 2018 PI interviews) PIs requested clear expectations, roles, timelines, project communication, and decision-making structures.
- Addition of Kick-Off meeting was a good one.
- Attention to the qualitative site visits distracted PI attention from critical process elements during the Winter.

Issues addressed include:

- Structures for communication, meetings, decision-making, and expectations.
- Creation of working groups.

Issues still to be addressed include:

- Clearer project timelines, shared folder use.
- Working group process and communication flow.
- Consensus on project vision.

## Change agent discussions

The evaluator joined a few Change Agent discussions and was given copies of notes from previous discussions as available.

Findings from the Fall 2018 evaluation include:

1. Change Agents are deeply committed and have extensive expertise, but with individual variations.
2. Change Agents are interested in expanding their professional networks.
3. Change agents ultimately want to see students making the best decisions for themselves and choosing careers that lead to happy, productive lives. This motivation is likely to be shared by others advising students.
4. Change Agents may wish to act across disciplines (e.g., reaching out to local STEM center).
5. Change Agents appreciated meeting one another at the Kick Off and were excited to engage.
6. The choice of Change Agents greatly impacts the roll-out of activities, including their availability, interest, relationships, and positions. PIs had wondered if Change Agents in school districts would be useful.

Findings from the past year include:

1. Change Agents are undertaking activities, and peer-sharing of ideas is likely to spark further action.
2. Change Agents are generally thoughtful and knowledgeable about next steps. The few that are not
3. Many are talking to local advisors.
4. Change Agents have many connections (current and potential) with qualitative and quantitative sites, and are able to draw on them.
5. Physics is not updating Toolkit materials, but this is a big focus for Math. Chemistry has had some discussions about chemistry-specific data.
6. Coordination within Change Agent groups is a challenge, with only Math managing monthly meetings. Others are bimonthly or quarterly. In 2018 there was discussion of having central change agent for each group.
7. Coordination of information across Change Agent groups and with GFO Central is a big challenge, such as follow-up with workshop participants, finding out what is happening centrally in the project in terms of marketing, evaluation, toolkit development,

quantitative sites, etc. There is a concern that Change Agents can't sift the essential messages from the noise.

Things that have been done:

- Reflected about what skills change agents need to have.
- Replaced a change agent in Math.
- Engaged Change Agents in Kickoff and through ongoing discussion within discipline.
- Newly added elements such as shared Google Folders and email discussion forums are likely to help. Email discussions at [gfo@aps.org](mailto:gfo@aps.org) have been allowing some meaty input, and identifying major issues.

Things which may support further action:

1. A list of potential things to do in a local campaign, such as talking to advisors.
2. Identifying a local team that a Change Agent might work with on a local campaign.
3. Incorporating the evaluator more regularly into meetings to take stock of progress and issues.

## Change Agent Activities

The below findings come from the Change Agent Checklist at <https://www.surveymonkey.com/r/GFO-Tracking>.

A total of **12 activities** were logged by 8 change agents.

- A total of **400 participants** were reached by these activities.
- The pieces used from the toolkit were student-facing mythbusters (N=9) and faculty-facing mythbusters (N=4).
- Change Agents felt that these activities were successful as they led to good discussion, interest among students and faculty, and participants found it informative.

About the activities

- Most of activities were for **mixed audiences**
  - Students-only: 3
  - Faculty/staff only: 3
  - Mixed students/faculty: 5
- **All but 1** of these activities were for a local audience (rather than national).
- Most were for **broad-STEM** audiences (rather than a single discipline)
- Several (N=4) focused on **community college** audiences

## PI Adams' Reflection

In May 2019 PI Adams was asked to reflect on major changes in the project, and successes and challenges so far.

### The most significant impact

With every focus group and every presentation we give, a few undergraduate and graduate students indicate a new found interest in pursuing a teaching license. Every indication is that the

resources are opening doors for students who had decided not to pursue the career due to some basic factual misconceptions.

The 2<sup>nd</sup> most significant impact this year has been identifying faculty misperceptions about the teaching profession. We found that they are strong and consistent across the nation. Many are consistent with student misconceptions but there are others that are only held by faculty that give them a very negative view of the profession. Our preliminary data suggests that faculty may hold one of the most negative views of the profession compared to the general public, students, and parents. Theoretically this makes sense since faculty are also teachers and have made a specific career choice to teach at the college level which is now part of their identity.

### **Biggest challenges**

The biggest challenge has been collecting large scale PTaP and FPTaP data from 25 physics, 25 math, and 25 chemistry departments. We have collected only 1/3 of our target and have set up a plan to collect again in Fall '19.

Another challenge has been engaging math with the GFO resources. Feedback from the new PI and lead change agent are that they only feel comfortable presenting math specific data and not data representing STEM teachers or teachers in general. We are not aware of this type of data having been collected by a math society, like AIP for physics, so it has created a barrier to math engaging in local or national campaign activities.

### **Feedback from Change Agents**

The biggest two pieces of feedback on the GFO resources this year from the Change Agents is 1. The data appears to be for Physics and not Math or Chemistry and 2. The energy barrier for looking up their own local data appears to be too high for a small number of CAs.

The data used with the GFO resources is almost all general to teaching but there were two examples that were physics specific. The AIP data on satisfaction and intellectual stimulation as well as the data showing average starting salaries for physics majors who are either working in STEM related careers, non-STEM, high school teachers or military. All other data, base pay, retention, retirement, schedule, reasons for day to day satisfaction, did you know's are general for all teaching. To address this concern, new satisfaction data has been located that applies to all teachers from a Gallup study about work life balance of all US professions. To address the pay comparison we have located a chart that shows all STEM major starting salaries.

There was also concern about the posters and brochures not being customized to math and physics. There were posters and brochures that were specific to each discipline but all used the same pictures. We are currently testing out some potential math and chemistry specific photos to put on these posters and brochures.

There is also a comparison between industry vs. teaching career. This comparison sheet focuses on a Mechanical Engineering position vs. teaching position in Denver, CO. We have hired an

undergraduate to develop a few new sheets that focus on a career that requires a BS in Physics, a BS in Chemistry, and a BS in Math.

To address the energy barrier of looking up local data, we are having the same undergraduate look up local teacher salaries, retirement benefits, housing costs, and other STEM career salaries for these few CAs as well as the qualitative sites and a few other locations where we've heard folks indicate that their location is unique.

## New working group structure

As of May 2019 the new working group structure proposed is below.

- **Working Groups**
  - Each group has a **chair** (who sets agenda and facilitates meetings) and an **organizer** (who is main point of contact, takes notes, sends out action items; if none is indicated, then the chair acts as organizer as well)
- PI team
  - **Wendy**, Mark/Beth, Monica, Terri, Ray, **David**, Drew, Brea, Stephanie
- Research team
  - Study site engagement
  - **Wendy**, **Richard**, Savannah, Stephanie, Adria, Dawson
- Change agents by discipline (chemistry, math, physics)
  - Physics: **Monica**, **David**, Gay, Karen, Vince, Duane, Drew?, Mark?
  - Chemistry: **Terri**, Jenn, Willy, Etta, Ellen, **Kenetia**, **Jessica**
  - Math: Ray, **Judith**, Ben, Christina, Tim, Rose Mary, **Brea**
- Toolkit development
  - Data mining
  - **Wendy**, **Drew**, Richard, Savannah, Adria, Mark?
- Society campaigns
  - Newsletter
  - **Monica**, Mark/Beth, Terri, Ray, David, Drew, Brea
- Evaluation
  - Wendy, **Stephanie**, Monica, ?
- Website design
  - **Wendy**, David, Sam, Stephanie, Drew, Rose Mary, Willy
- Communications
  - **Decision**: Use PI agenda for WG updates, then send single monthly email to GFO listserve so that change agents get updates as well.
- Google drive structure to record minutes, store documents
  - Each WG has a folder
  - Current folder that everyone on [gfo@aps.org](mailto:gfo@aps.org) has access to (PIs, staff, change agents, postdocs) is called [Change Agent workspace](#), but we can change the name.
    - **Terri** will check with change agents about whether to move from ACS shared drive to google drive.
- Decision making
  - WG make decisions within their area of responsibility
  - Each WG should have at least one PI, who can decide to refer a decision to full PI team when they think they should.
  - PI team has overall oversight of the project and has final say on project direction

## GFO Toolkit

The below comments come from various review of documents and previous evaluation reports.

### General Toolkit findings

- (From 2018 Change Agent evaluation). Change Agents indicated they would like the Toolkit to allow for easy modifications and to have a professional look.
- (From 2018 Kick-off Meeting Evaluation). Change agents had concerns about discipline-specific materials, such as industry comparisons in Chemistry.
- (From 2018 Kick-off Meeting Evaluation). Change Agents wanted to know what constitutes high-quality data, to enhance the evidence-based claim. They need to know the details of the data so they can answer questions too.
- Feedback for the toolkit comes from many sectors (qualitative sites, PIs, Change Agents, workshops, evaluator). This is a strength, but also a challenge to juggle.
- Change Agents and disciplinary PIs have a strong stake and become concerned when new materials are posted without a stamp of approval from them.
- Discipline-specific information for Math and Chemistry is a concern for those groups.
- Which items need modification? Many stakeholders (Change Agents and workshop participants) wonder which items need to be updated for discipline-specific data, or local data.
- There are many ideas still in the [Google Doc from the Kick-Off Meeting](#).

### Findings specific to faculty-facing workshop

- (From 2018 Kick-off Meeting Evaluation). Meta-reflection could be useful for the workshop, including exiting the experience as a participant.
- (From 2018 Kick-off Meeting Evaluation). Facilitator moves are implicit and not clearly documented in the Toolkit.

### Steps that have been taken:

- Collected Gallup data about work/life balance across US professions.
- Located a chart for STEM major starting salaries.
- Testing math and chemistry specific photos.
- Hired an undergraduate to develop sheets comparing industry vs. teaching professions, and research location-specific data for Change Agents and qualitative sites.

### Next steps that could be useful:

- Identify the documents which are general, versus discipline-specific or region-specific.
- Streamline a pathway for managing feedback. As a start, make an organized document of prioritized “things to do” and “parking lot ideas” where these various toolkit ideas can be documented and spark potential action, or tabled for later. These can be collected from the Kick-Off Meeting Google Docs, Site Visit Recommendations, and GFO Resource Ideas Doc.

## Core vision of the project

From several pieces of documentation, the following questions arise about the project core vision or coherence.

Findings:

- (From 2018 Change Agent evaluation). Change Agents would like to know what success looks like for their work: Reach lots of people? Change attitudes?
- (From 2018 Change Agent evaluation). Change Agents would like the toolkit to have an honest core message, of helping students make informed decisions about their career choice. There is a concern to not sugar-coat the profession.
- (From 2018 PI interviews) Decisive leadership which helps the project adhere to its' vision is seen as critical.

Things still needing to be addressed:

- Identify what is fixed, and what is flexible.

## Fidelity of Implementation

Part of the evaluation work has been to develop metrics for measuring Fidelity of Implementation, to assist in evaluation of the question “**What kinds of campaigns are developed at the national and local level.**” This will help evaluate what the project central principles are and how they guide the work. This will help development of workshop surveys as well as the FSI and SSE surveys on implementation. It may also help communicate expectations to GFO agents.

I am primarily using a framework developed by Century et al. (2010)[4]. They define Fidelity of Implementation as: *The extent to which an enacted program is consistent with the intended program model*, operationalized as *the extent to which the critical components of an intended program are present when that program is enacted*.

Draft critical components as of May 2019.

	<b>Structural critical components</b> <i>Materials, activities, and basic steps</i>		<b>Process critical components</b> <i>Behaviors and interactions</i>	
	<b>Procedural elements</b>	<b>Champion elements</b>	<b>Local champion behaviors</b>	<b>Campaign recipient behaviors</b>
Campaigns	Basic steps <ul style="list-style-type: none"> <li>• Exposing students to teaching as a career option</li> </ul>	<ul style="list-style-type: none"> <li>• Aware of GFO materials</li> <li>• Aware of common misperceptions</li> </ul>	<ul style="list-style-type: none"> <li>• Use tested messaging</li> <li>• Refer to good data</li> </ul>	<ul style="list-style-type: none"> <li>• Engage in campaign resources or activities</li> </ul>

<sup>4</sup> Century, J., Rudnick, M., & Freeman, C. (2010). A framework for measuring fidelity of implementation: A foundation for shared language and accumulation of knowledge. *American Journal of Evaluation*, 31, 199–218. doi:10.1177/ 1098214010366173.

## APPENDIX

	<ul style="list-style-type: none"> <li>Includes conversations with students</li> </ul> <p>Dosage</p> <ul style="list-style-type: none"> <li>Frequent* exposure of students to messages (&gt;1/semester)</li> <li>Use multiple strategies</li> </ul>	<ul style="list-style-type: none"> <li>Do not hold misperceptions (FPTaP)</li> <li>Be aware of high-quality data (and what data to trust)</li> <li>Respect for audience</li> <li>Respect for teaching as a profession</li> </ul>	<ul style="list-style-type: none"> <li>Correct misperceptions</li> <li>Use GFO materials</li> </ul>	<ul style="list-style-type: none"> <li>Engage in conversation with faculty/Ss</li> <li>Receive multiple touches</li> <li>Notice multiple touches</li> </ul>
Workshop specific	<ul style="list-style-type: none"> <li>Workshop duration adequate</li> <li>Inclusion of local data on teachers</li> <li>Inclusion of narratives from teachers</li> <li>Inclusion of narratives from industry</li> </ul>	<ul style="list-style-type: none"> <li>See above.</li> </ul>	<ul style="list-style-type: none"> <li>Facilitation of participant discussion.</li> <li>Focus on persuasion</li> </ul>	<ul style="list-style-type: none"> <li>Engage in discussion</li> <li>Engage in analyzing local data</li> </ul>

\*Frequent has yet to be determined. Once/week? Once/month? Once/semester is inadequate.

### Moderating variables:

- Experience providing professional development for the intended audience.
- Knowledge of regional issues in teacher preparation
- Motivation to improve teacher preparation
- Personal characteristics: Enthusiasm, “can do” attitude, reputation