



# Uncovering Change Catalysts: Examining Community of Practice Members as They Leverage Individual Course Improvements to Achieve Systemic Departmental Change

## 2024-2025 Evaluation Report

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## I. Overview

### Project Overview

The Department of Biological Sciences at Fort Hays State University (FHSU) was awarded a grant from the National Science Foundation (NSF) for the project *Uncovering Change Catalysts: Examining Community of Practice Members as They Leverage Individual Course Improvements to Achieve Systemic Departmental Change*. Running from October 1, 2024 through September 30, 2027, the goal of the three-year project is to guide the department in undergoing transformational change to meet the needs of its changing student population and improve student learning experiences. The project has the following aims:

- **Aim 1:** Create a community of practice (CoP) that encourages collaboration and a broad understanding of change theory and STEM reform leadership. The CoP interacts with an external CUREs consultant to develop a strategic plan with defined activities to achieve the goals of the strategic plan.
- **Aim 2:** Create small successes by revising foundational lecture courses before tackling more impactful and needed changes described in aims 3 and 4.
- **Aim 3:** Develop, deliver, and assess course-based undergraduate research experiences (CUREs). CUREs benefit students by increasing science identity, self-efficacy, motivation, and scientific thought processes, and have also been shown to increase graduation rates in STEM and encourage students to pursue research careers.
- **Aim 4:** Design online courses and CUREs that can be delivered in various modalities (i.e., online, hybrid, or remote).

More broadly, this project seeks to provide a framework for how to build capacity for lasting change while contributing to national calls to improve STEM education by engaging students with evidence-based pedagogies known to recruit and retain a more diverse population of students.

### Year 1 Implementation

In Year 1, the project focused on creating the CoP, developing a strategic plan with the assistance of the CUREs consultant, mapping the curriculum, and developing CUREs. Faculty attended professional development (PD) and learned about change theory, participated in a book study on Master of Change, and engaged in collecting and analyzing student data.

### Evaluation Overview

FHSU contracted with the Texas Advanced Computing Center (TACC) Evaluation Services team at The University of Texas at Austin to design and conduct an independent evaluation of the project's implementation and outcomes. With formative and summative components, the external evaluation is designed to address the following evaluation questions:

1. To what extent is the project making progress toward its goals to reform curriculum to improve the student learning experience and better serve a more diverse and changing student population?
2. How effective is the project's CoP and PD in increasing faculty collaboration, understanding of change theory, and leadership skills needed to achieve systemic departmental reform?
3. What project inputs, activities, and/or outputs move faculty toward achieving change?
4. What challenges are encountered and how are they addressed?
5. What are best practices and recommendations for improving the project inputs, activities, outcomes, and impacts?

## Year 1 Evaluation

In Year 1, TACC's external evaluation employed a mixed-methods approach to collect and assess quantitative and qualitative data on the project's implementation and outcomes. The evaluation team designed the evaluation instruments in collaboration with the Principal Investigator (PI) to address the evaluation questions. Quantitative data was analyzed using descriptive statistics and content analysis was conducted to identify themes in qualitative data, with representative quotes provided. The evaluators also shared findings and feedback in evaluation meetings with the PI throughout the year to inform and strengthen the project and its impacts. The data sources used in the Year 1 evaluation are below:

- **Document and data reviews** of program materials (e.g., the proposal).
- **Faculty Pre-Survey** conducted in Fall 2024 to assess faculty knowledge and perceptions of organizational change theories, perceived role as STEM reform leaders, attitudes towards course offerings and modalities, and perception of the skills and knowledge that students need (see Appendix A for survey).
- **Annual Faculty Survey** conducted in Summer 2025 to serve as a post-survey for comparison on the pre-survey items and assess faculty engagement in and satisfaction with the CoP and PD activities and collaborations, effectiveness of the CoP components to achieve their intended outcomes, satisfaction with the curriculum and courses, perceptions of workload efficiencies, concerns, challenges experienced, additional resources or supports needed, best practices, and recommendations to improve the project and its activities, outcomes, and impact (see Appendix B for survey).
- **Faculty Focus Group** conducted virtually in Summer 2025 to further examine faculty perceptions of the CoP, PD, CUREs development and implementation, workload efficiencies, and department culture; their engagement in CoP activities and in implementing reformed curriculum, courses, and practices; their identities as change agents for STEM education reform; concerns about student learning; challenges experienced; additional resources or supports needed; best practices and learnings; and recommendations to improve the project and its activities, outcomes, and impact (see Appendix C for focus group protocol).

This report presents findings from the Year 1 evaluation methods, followed by a summary and recommendations for the project moving forward.

## II. Faculty Pre-Survey Findings

### Participant Profile

Of the 15 faculty members who were invited to take the Faculty Pre-Survey, 14 took the survey for a response rate of 93%. Of the 11 respondents who reported their race/ethnicity, most identified as White (82%), with fewer identifying as Black or African American (18%) and/or Hispanic or Latino/a (9%; see **Table 1**). One respondent selected more than one category (both Black or African American and Hispanic or Latino/a). Of the 12 respondents who reported their gender, two-thirds identified as female (67%), and one-third identified as male (33%). Respondents had taught at FHSU for an average of nine years, with a range of one to 26 years.

**Table 1. Respondent Characteristics**

	#	%
<b>Race/Ethnicity* (N=11)</b>		
Black or African American	2	18%
Hispanic or Latino/a	1	9%
White	9	82%
<b>Gender** (N=12)</b>		
Female	8	67%
Male	4	33%
<b>Years of Teaching at FHSU (N=14)</b>		
0-4	5	36%
5-9	5	36%
10-14	1	7%
15 or more	3	21%

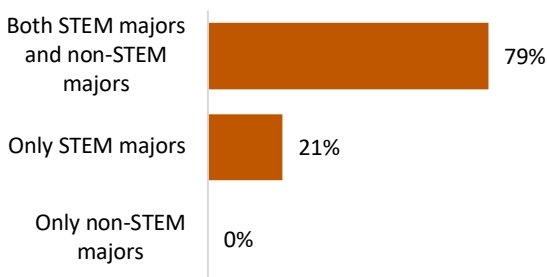
\*Percentages sum to greater than 100%, as respondents were asked to select all that apply. Response options: American Indian or Alaska Native, Asian or Asian American, Black or African American, Hispanic or Latino/a, Middle Eastern or North African, Native Hawaiian or Other Pacific Islander, White, and Prefer to self-describe.

\*\*Response options: Female, Male, Prefer to self-describe, and Prefer not to answer.

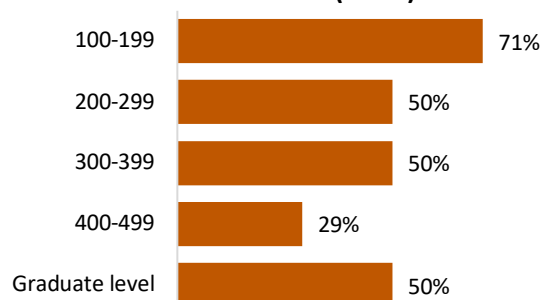
### Students and Courses Taught

At the time of the survey, most respondents (79%) were teaching students with both STEM and non-STEM majors, while the remainder taught only STEM majors (21%; see **Figure 1**). Nearly three-quarters of respondents (71%) were teaching 100-199 level courses; half were teaching 200-299 level courses (50%), 300-399 level courses (50%), and/or graduate level courses (50%); and less than one-third (29%) were teaching 400-499 level courses (see **Figure 2**).

**Figure 1. Types of Students Taught (N=14)**



**Figure 2. Levels of Course(s) Taught in Fall 2024 (N=14)\***

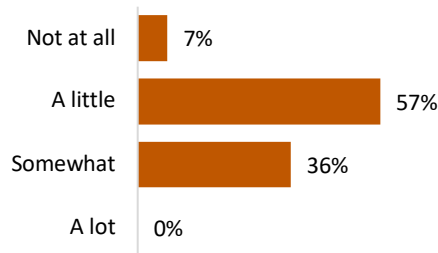


\*Respondents could select all that apply.

### Experience Incorporating Research in Courses

As shown in **Figure 3**, at the time of the survey, more than half of respondents had previously incorporated research experiences in their courses *a little* (57%), while just over one-third had incorporated them *somewhat* (36%). Less than one-tenth selected *not at all* (7%), while no respondents reported incorporating research experiences in their courses *a lot*.

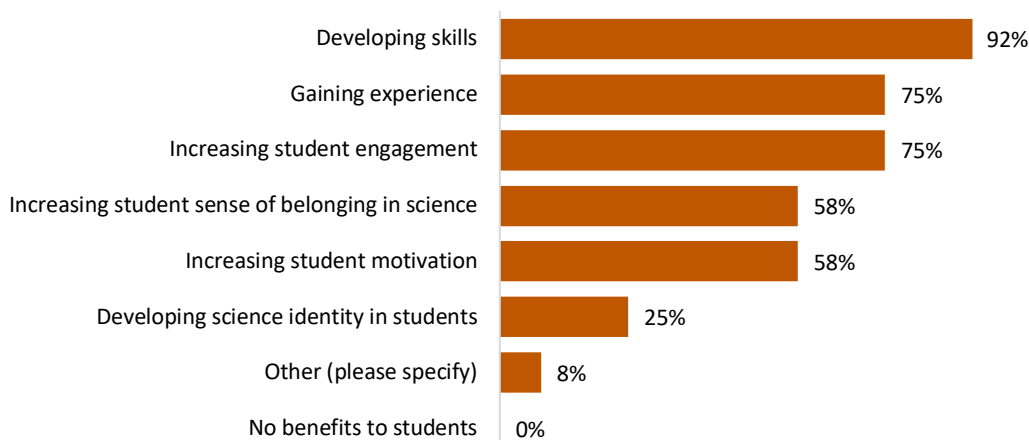
**Figure 3. Extent of Incorporating Research Experiences in Courses (N=14)**



### Motivation to Implement CUREs

Respondents were asked which potential benefits to students would motivate them to implement CUREs (see **Figure 4**). Almost all respondents (92%) selected developing skills as a potential benefit, while three-quarters said gaining experience (75%) and/or increasing student engagement (75%). More than half selected increasing student motivation (58%) and/or sense of belonging in science (58%). One quarter (25%) chose developing science identity in students. The one respondent who selected *Other* specified the potential benefit as “Exploration of alternative careers/interests.”

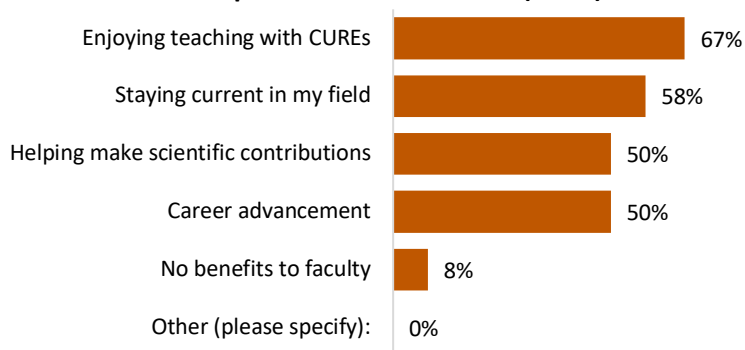
**Figure 4. Potential Student Benefits that would Motivate Implementation of CUREs (N=12)\***



\* Respondents could select all that apply.

Respondents were also asked which potential benefits to faculty would motivate them to implement CUREs. Two-thirds (67%) selected enjoying teaching with CUREs (see **Figure 5**), and the majority (58%) said staying current in their field. Half of the respondents indicated helping make scientific contributions (50%) and/or career advancement (50%) would motivate them.

**Figure 5. Potential Faculty Benefits that would Motivate Implementation of CUREs (N=12)\***



\* Respondents could select all that apply.

## I. Faculty Pre-Survey Findings

## Additional Perceptions and Needs

Respondents were also asked open-ended questions about the project, increasing faculty buy-in, and additional supports or resources that would be helpful for implementing CUREs. Their themed responses and sample quotes are provided below, with some responses fitting multiple themes.

### Perceptions of Project

*What part of this project are you most excited about, and why? (N=11)*

Respondents said they were most excited about opportunities the project provided for collaboration, understanding and implementing CUREs, the potential positive impacts of the grant, increased departmental agreement and support, and increased student engagement and interest in STEM.

- **Collaboration** (36%): “Helping peers implement CUREs,” “To share tips and tricks with my peers on how to do it,” and “I would like more collaboration and integration of ideas.”
- **Implementation of CUREs** (27%): “The actual implementation of CUREs in the classroom” and “Understanding more about CUREs and applying them to field-based courses.”
- **Neutral or not excited** (27%): “Feeling neutral” and “I am not.”
- **Potential positive impacts** (18%): “Everything; [the] possible positive impact” and “The prospect of making changes to courses that prove successful.”
- **Department agreement/support** (9%): “I am excited about more department[al] agreement and support for CUREs.”
- **Student engagement and interest** (9%): “I am interested to see how it improves student engagement and interest in STEM.”

“I am excited to learn how to implement CUREs. I have tried to do this before on my own, but I am looking forward to having a support system or community of practice because I feel that this will make the experience go more smoothly.”

- Pre-survey respondent

### Resources and Supports Needed

*What do you think would increase faculty buy-in to change? (N=12)*

Respondents suggested that faculty buy-in to change could be increased by fostering a culture of support and collegiality, providing incentives and/or recognition, showing evidence of efficacy of proposed changes, making the changes easy to implement, and offering support and resources, including funding, materials, guidance for implementation, and professional development opportunities. Other suggestions included linking or aligning changes to common goals and values and engaging faculty early in the process.

- **Foster positive culture/collaboration** (33%) “Better attitudes,” “More support of one another,” and “Foster of culture of collaboration (collegiality).”
- **Incentives/recognition** (25%): “Incentiv[ize] participation” and “Too much stick and not enough carrot.”
- **Proof of efficacy** (25%): “Evidence of success.”
- **Ease of implementation/instruction** (25%): “Ease of use/implementation” and “Easier/better teaching experiences.”
- **General resources/support** (25%): “Provide support and resources” and “Support ... from the administration.”
- **Adequate funding** (17%): “Proper support going beyond temporary grant funding” and “Have a realistic understanding of the costs involved. ... The

“Provide evidence of positive student outcomes, offer recognition or incentives such as stipends or teaching credits, and ensure access to necessary resources, including lab space and administrative support. ... Fostering a community of CURE faculty encourages collaboration and support.”

- Pre-survey respondent

implementation of CUREs in the classroom will require extra budget.”

- **Instructional materials/guidance** (17%): “Provided materials,” “Offering suggestions or examples that actually apply to our courses,” and “Professional development opportunities, such as training and mentorship, can build confidence.”
- **Alignment with goals/values** (17%): “Link changes to shared values and goals” and “Aligning CUREs with institutional goals and offering pathways for scholarly contribution, such as publications, can appeal to faculty focused on research.”
- **Engaging faculty early** (8%): “Engage faculty early in the process.”

*What additional supports or resources would be helpful in implementing CUREs? (N=12)*

Respondents identified several resources and sources of support that would be helpful in implementing CUREs, including training and guidance (such as workshops and mentoring), lab space and equipment, funding, time, evidence of the efficacy of and need for the changes, and instructional materials or resources.

- **Training and guidance** (33%) “Established expectations throughout the department,” “Help framing possible negative student reviews,” and “Workshops, mentorship, and training in CURE design and assessment.”
- **Lab space and equipment** (25%): “Availability of various laboratory kits and equipment” and “Supporting the needs of current foundational labs at an appropriate level.”
- **Funding** (17%): “Money” and “Mini-grants and institutional or external funding for course materials and research costs.”
- **Time** (17%): “Time” and “More time to create/redesign courses.”
- **Evidence of efficacy/need/value** (17%): “Evidence of success” and “Connect change to societal need. Demonstrate evidence of effectiveness.”
- **Instructional materials/resources** (17%): “Database/compilation of resources” and “Predesigned materials that can be adjusted as needed. Starting from scratch is more time than I currently have.”

“Dedicated lab space, access to essential equipment, and virtual lab[s].”

- Pre-survey respondent

Results from additional closed- and open-ended pre-survey items that were also asked as post-items on the Annual Faculty Survey are provided in the next section as those responses are compared at pre and post time points.

### III. Annual Faculty Survey Findings

#### Participant Profile

The 12 participating faculty members who were still in the department by the end of the academic year were asked to take the Annual Faculty Survey, and 11 responded for a response rate of 92%. Nine of these 11 respondents had provided demographic information on the Pre-Survey. Of these, more than three-quarters (78%) identified as White, while less than one-quarter (22%) identified as Black or African American (see **Table 2**). Of the nine respondents who reported their gender, more than half identified as female (56%), while less than half identified as male (44%).

**Table 2. Respondent Demographics (N=9)**

	#	%
<b>Race/Ethnicity*</b>		
Black or African American	2	22%
White	7	78%
<b>Gender**</b>		
Female	5	56%
Male	4	44%

\*Response options: American Indian or Alaska Native, Asian or Asian American, Black or African American, Hispanic or Latino/a, Middle Eastern or North African, Native Hawaiian or Other Pacific Islander, White, and Prefer to self-describe.

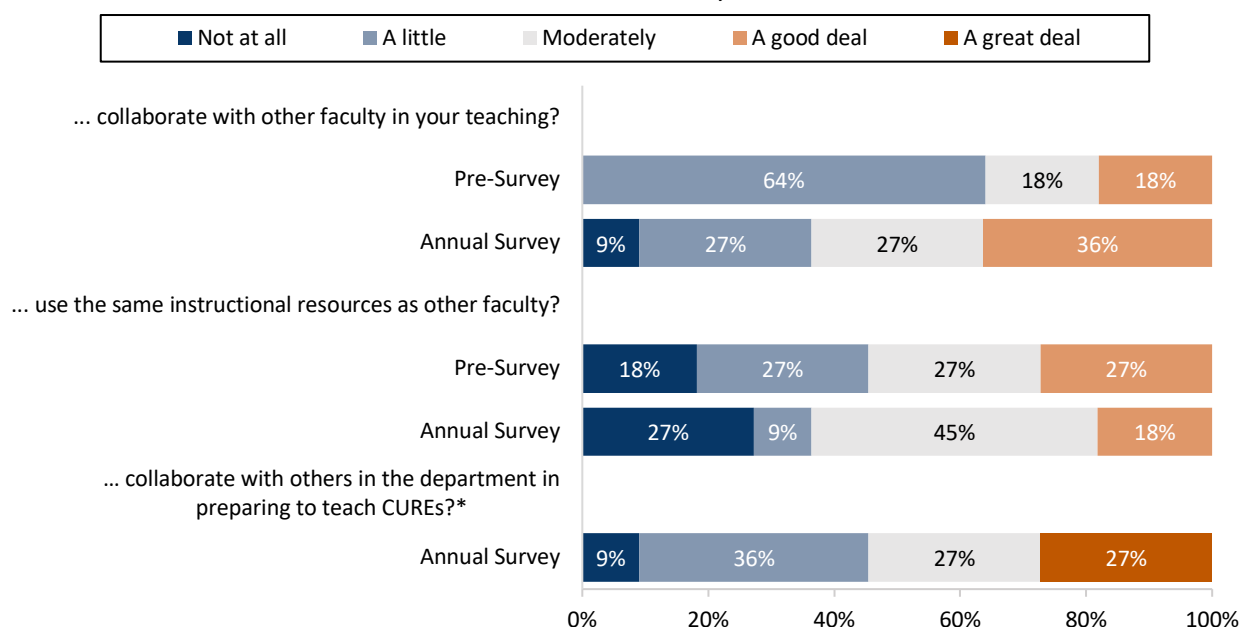
\*\* Response options: Female, Male, Prefer to self-describe, and Prefer not to answer.

#### Collaboration and Use of Same Resources

**Figure 6** shows that the percentage of respondents who reported collaborating with other faculty in their teaching *moderately* or *a good deal* increased from just over one-third (36%) on the Faculty Pre-Survey to nearly two-thirds (63%) on the Annual Faculty Survey. In addition, the percentage of respondents who reported using the same instructional materials as other faculty *moderately* or *a good deal* increased from slightly more than half (54%) on the pre-survey to nearly two-thirds (63%) on the annual survey. On the annual survey, more than a quarter of the respondents (27%) reported that they had collaborated with others in their department in preparing to teach CUREs *a great deal*, while more than a quarter (27%) did so *moderately*.

**Figure 6. Collaboration and Use of Same Resources (N=11)**

*To what extent do you...*

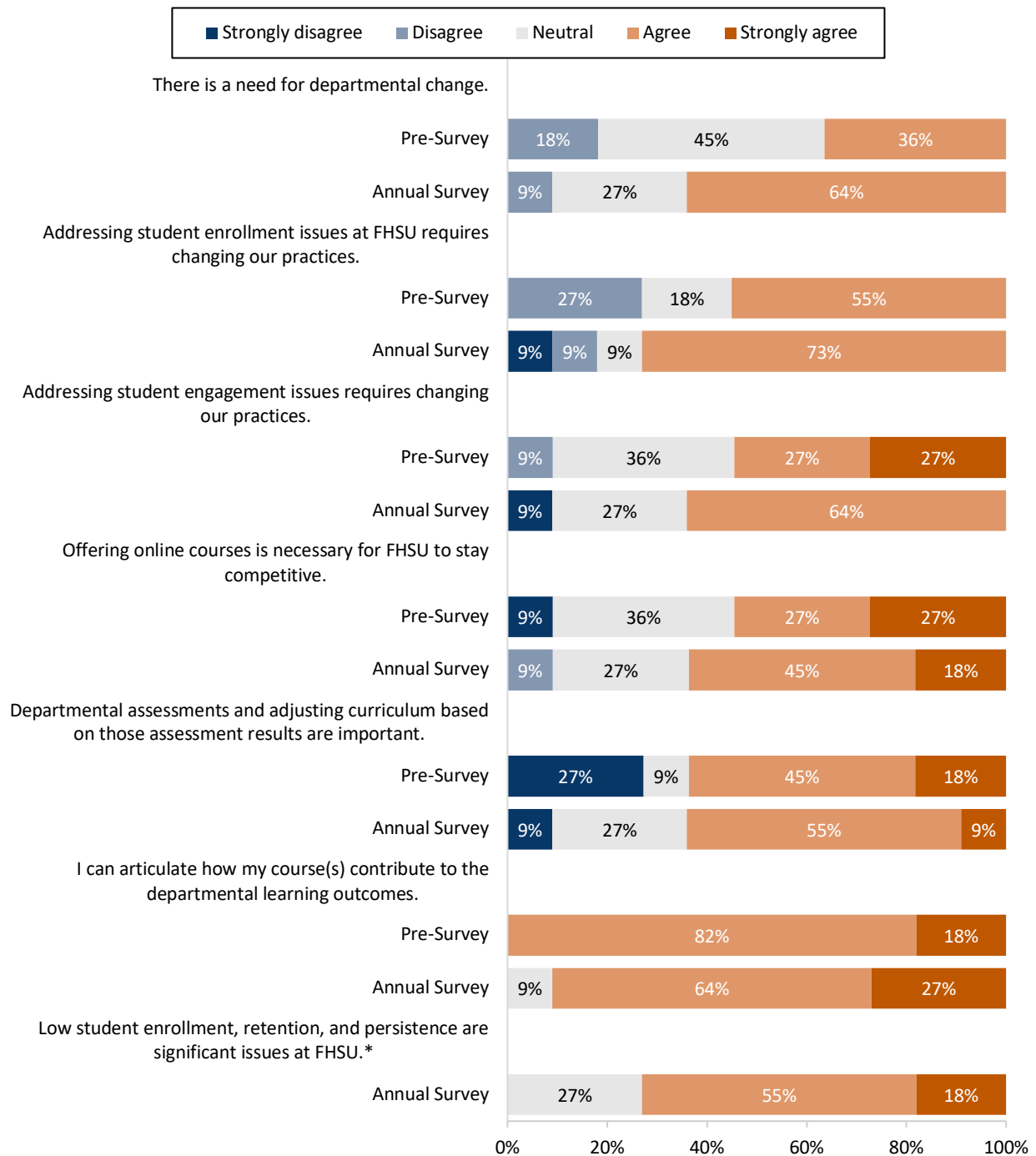


\*Note: this item was asked only on the Annual Faculty Survey.

### Attitudes Toward Change

Items that were asked on both the Faculty Pre-Survey and Annual Faculty Survey show positive shifts in attitudes toward change (see **Figure 7**). From the pre-survey to the annual survey, the percentage of respondents that *agreed* there is a need for departmental change increased substantially from just over one-third (36% pre-survey) to nearly two-thirds (64% annual survey). The percentage of respondents that *agreed* that addressing student enrollment issues at FHSU requires changing their practices increased from slightly more than half (55%) on the pre-survey to nearly three-quarters (73%) on the annual survey. There was a smaller increase in the percentage of respondents who *agreed* or *strongly agreed* that addressing student engagement issues requires changing their practices or that offering online courses is necessary for FHSU to stay competitive (54% pre-survey, 63-64% annual survey). On both surveys, nearly two-thirds (63-64%) *agreed* or *strongly agreed* that departmental assessments and adjusting curriculum based on those assessment results are important, and all or nearly all (91-100%) *agreed* or *strongly agreed* they can articulate how their course(s) contribute to the departmental learning outcomes. Annual survey respondents were also asked whether low student enrollment, retention, and persistence are significant issues at FHSU, and nearly three-quarters (73%) *agreed* or *strongly agreed*.

**Figure 7. Attitudes Toward Change (N=11)**



\*Note: this item was asked only on the Annual Faculty Survey.

### Reasons for Disagreement

Four respondents to the Faculty Pre-Survey and three respondents to the Annual Faculty Survey who *disagreed* or *strongly disagreed* with items in Figure 7 offered explanations for their responses. Their themed responses are provided below.

#### *Faculty Pre-Survey (N=4)*

On the pre-survey, two respondents indicated that there are challenges and/or change is needed but did not agree with the approach to addressing those challenges or needs, while one felt that assessment was not a good use of time, and another did not think there was a need for change.

- **Appropriateness of changes** (N=2): “A great deal of the challenge with enrollment and student perception is outside of departmental control” and “There is always a need for change, but that does not mean any change. The administration does not seem to realize this.”
- **Redundancy of assessment** (N=1): “Assessment is redundancy, and not a good use of our time.”
- **No need for change** (N=1): “The current system is successful.”

#### *Annual Faculty Survey (N=3)*

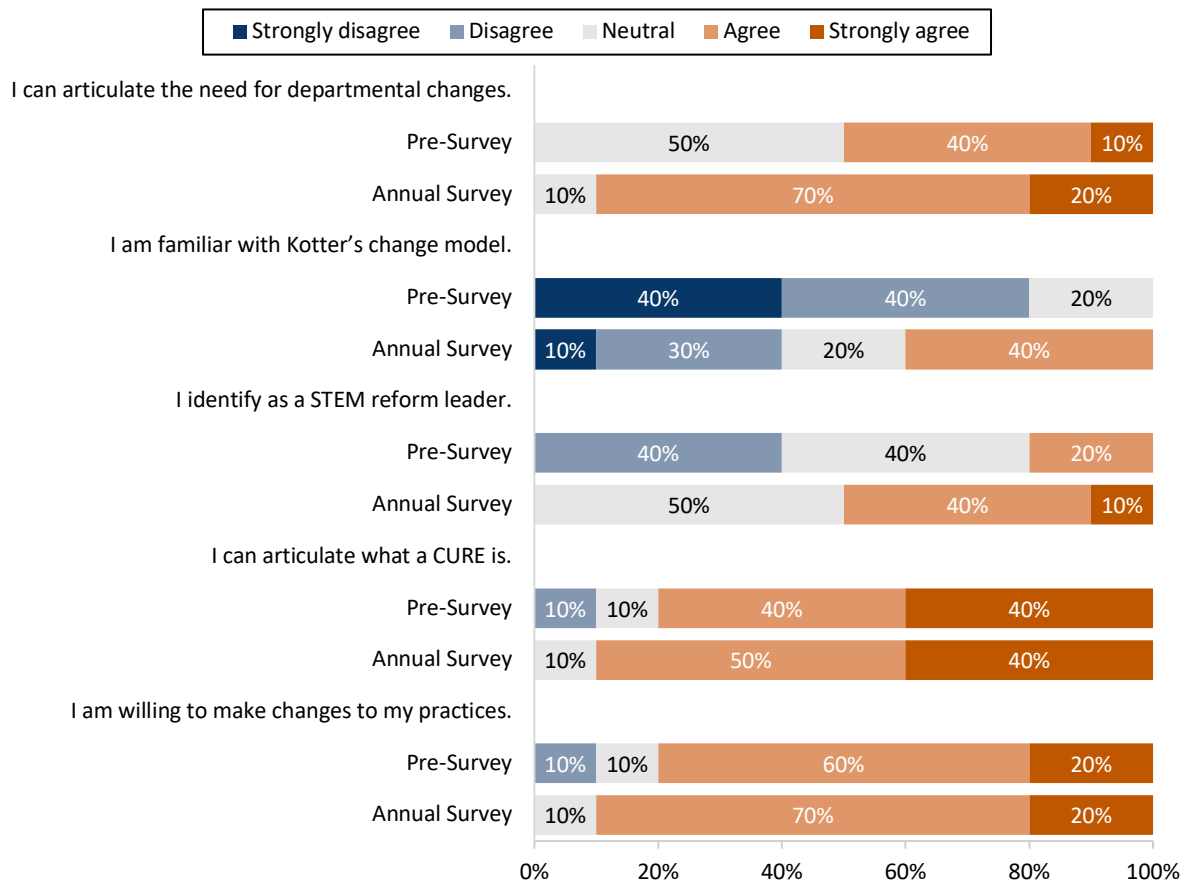
On the Annual Faculty Survey, one respondent said they felt change was unnecessary, while another questioned the benefits of online courses.

- **No change needed** (N=1): “We’re doing fine. Historically, enrollment issues balance out, regardless.”
- **Perspective on online offerings** (N=1): “Increasing online offerings might be helpful for the biology minor, but I don’t buy that this is the best solution to increasing enrollment in biology.”
- **N/A** (N=1): “N/A.”

### **Attitudes Toward Role in Change and Resources, Tools, and Supports Needed for Change**

Comparing responses on the Faculty Pre-Survey and Annual Faculty Survey shows notable shifts in respondents’ attitudes regarding their preparedness and willingness to make changes to their practices (see **Figure 8**). The percentage of respondents who *agreed* or *strongly agreed* that they can articulate the need for departmental changes increased substantially from 50% on the pre-survey to 90% on the annual survey. Familiarity with Kotter’s change model also increased significantly, as the percentage of respondents who *agreed* they are familiar with the model increased from 0% on the pre-survey to 40% on the annual survey. In addition, the percentage of respondents who identified as a STEM reform leader increased from 20% on the pre-survey to 50% on the annual survey, and the percentage of respondents who *agreed* or *strongly agreed* that they can articulate what a CURE is and that they are willing to make changes to their practices increased slightly from 80% on the pre-survey to 90% on the annual survey.

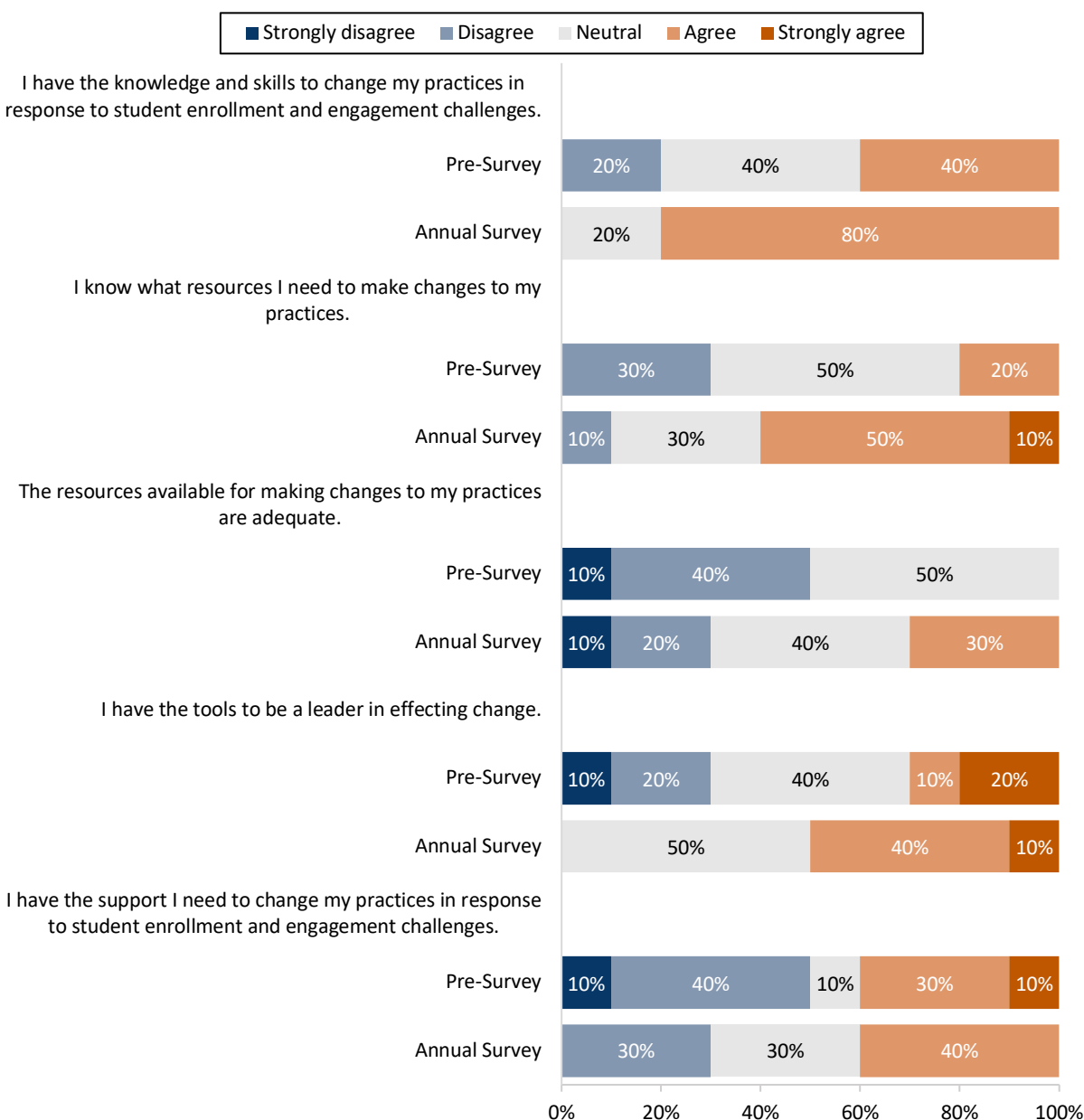
**Figure 8. Attitudes Toward Personal Role in Change (N=10)**



There was also an increase in the extent to which faculty perceive that they have resources, tools, and supports needed to make change from the Faculty Pre-Survey to the Annual Faculty Survey (see **Figure 9**). The percentage of respondents who *agreed* that they have the knowledge and skills to change their practices in response to student enrollment and engagement challenges grew from 40% on the pre-survey to 80% on the annual survey. Similarly, the percentage of respondents who *agreed* or *strongly agreed* that they know what resources they need to make changes to their practices increased from 20% on the pre-survey to 60% on the annual survey. The percentage of respondents who *agreed* that the resources available to change their practices are adequate also grew from 0% on the pre-survey to 30% on the annual survey. In addition, the percentage of respondents who *agreed* or *strongly agreed* that they have the tools to be a leader in effecting change increased from 30% on the pre-survey to 50% on the annual survey.

While the percentage of respondents who *agreed* or *strongly agreed* they have the support they need to change their practices in response to student enrollment and engagement challenges did not change, the percentage of those who *disagreed* or *strongly disagreed* decreased from 50% on the pre-survey to 30% on the annual survey, with more respondents indicating *neutral* on the annual survey (30%) than on the pre-survey (10%).

**Figure 9. Resources, Tools, and Supports Needed for Change (N=10)**



### Reasons for Disagreement

Respondents who *disagreed* or *strongly disagreed* with items in **Figure 8** or **Figure 9** were asked to explain the reason for their response. Ten respondents provided explanations on the pre-survey, while eight did so on the annual survey. Their themed responses on each survey are provided below, with sample quotes. Some responses fit multiple themes.

#### Faculty Pre-Survey (N=10)

On the Faculty Pre-Survey, respondents mentioned unfamiliarity with items mentioned; skepticism or lack of agreement around what the problem is, whether there is a problem, and what the solutions should be; need for training, support, and resources; and need for more time and/or capacity.

- **Not familiar** (33%): “I don’t know what it is,” “I am not familiar with the Kotter thing,” and “I am not familiar with those items.”
- **Skepticism/lack of agreement around problems or solutions** (33%): “[These] questions assume a perspective or objective truth that is not apparent or held by all,” “If there truly is a sea change in student engagement, it should be dealt with organically, and not by mandate,” and “I do not believe that the higher administration supports our changing our efforts to support CURRENT students; it feels as though any changes we are encouraged to make [are] to recruit new students.”
- **Need for training, support, and resources** (33%): “There is little university support. ... For example, improved multimedia equipment would be needed for moving classes to an online mode (e.g., better microphones, professional backdrop)” and “FHSU does not provide ongoing teaching practices professional development for faculty. When [PD] are offered, they are often not comprehensive. ... I struggle to understand what drives student engagement.”
- **Need for more time/capacity** (20%): “I don’t feel like I have the time to think deeply or reflectively about any of my responsibilities, whether it’s teaching, research, mentoring, or service” and “We are often overloaded with teaching responsibilities, research commitments, and administrative duties. Implementing new teaching strategies requires time for experimentation, reflection, and adaptation. We do not have the bandwidth.”

“If FHSU does not offer data on how students engage with course materials, or if FHSU lacks tools to assess and analyze student participation in real-time, we are left without clear guidance on how to improve engagement strategies.”

- Pre-survey respondent

#### Annual Faculty Survey (N=8)

On the Annual Survey, the most frequently cited explanation was lack of familiarity with Kotter’s change model, while some also expressed a desire for more resources, more time, or a fairer workload distribution among faculty.

- **Unfamiliar with Kotter’s change model** (N=4): “I don’t know what that model is” and “I don’t recall discussing the specific change model mentioned.”
- **More resources needed** (N=2): “We currently have limited or no resources available to improve our courses.”
- **More time needed** (N=1): “The major resource I need is time. We are expected to make the change during our personal time. There is no time during the school year/work week.”
- **Workload and distribution** (N=1): “Too many tasks are assigned to the faculty load, preventing faculty from focusing on reforming their courses. Course load, service, and research loads should be fairly distributed among faculty to allow those who want to change how they implement their course to do so.”
- **N/A** (N=1): “N/A.”

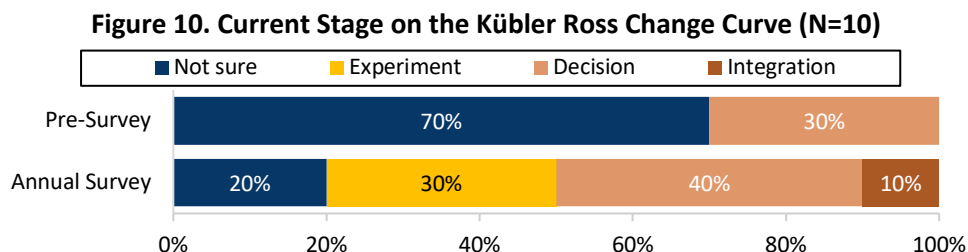
“Transitioning our in-person courses to hybrid or fully online formats requires ... equipment (e.g., high-quality microphones, green screens, etc.). [So far] the focus has remained largely theoretical, with minimal attention to the practical infrastructure needed.”

- Annual survey respondent

#### Stage on the Kübler Ross Change Curve

The majority (70%) of respondents were not familiar with the Kübler-Ross change curve model on the Faculty Pre-Survey, compared to only 20% on the Annual Faculty Survey (see **Figure 10**). On the pre-survey, 30% of respondents indicated that they were in the *decision* stage (*learning how to work in a*

*new situation*) compared to 40% on the annual survey. Additionally, 30% of respondents on the annual survey indicated that they were in the *experiment* stage (*initial engagement with a new situation*) while 10% indicated they were in the *integration* stage (*changes integrated, a renewed individual*). No respondents indicated they were in stages of *shock*, *denial*, *frustration*, or *depression*.



Response options:

- *Not sure: I am not familiar with the Kubler Ross change curve model*
- *Shock: Surprise or shock at the event;*
- *Denial: Disbelief, looking for evidence that it isn't true;*
- *Frustration: Recognition that things are different, sometimes angry;*
- *Depression: Low mood, lacking in energy;*
- *Experiment: Initial engagement with new situation;*
- *Decision: Learning how to work in new situation, feeling more positive;*
- *Integration: Changes integrated, a renewed individual.*

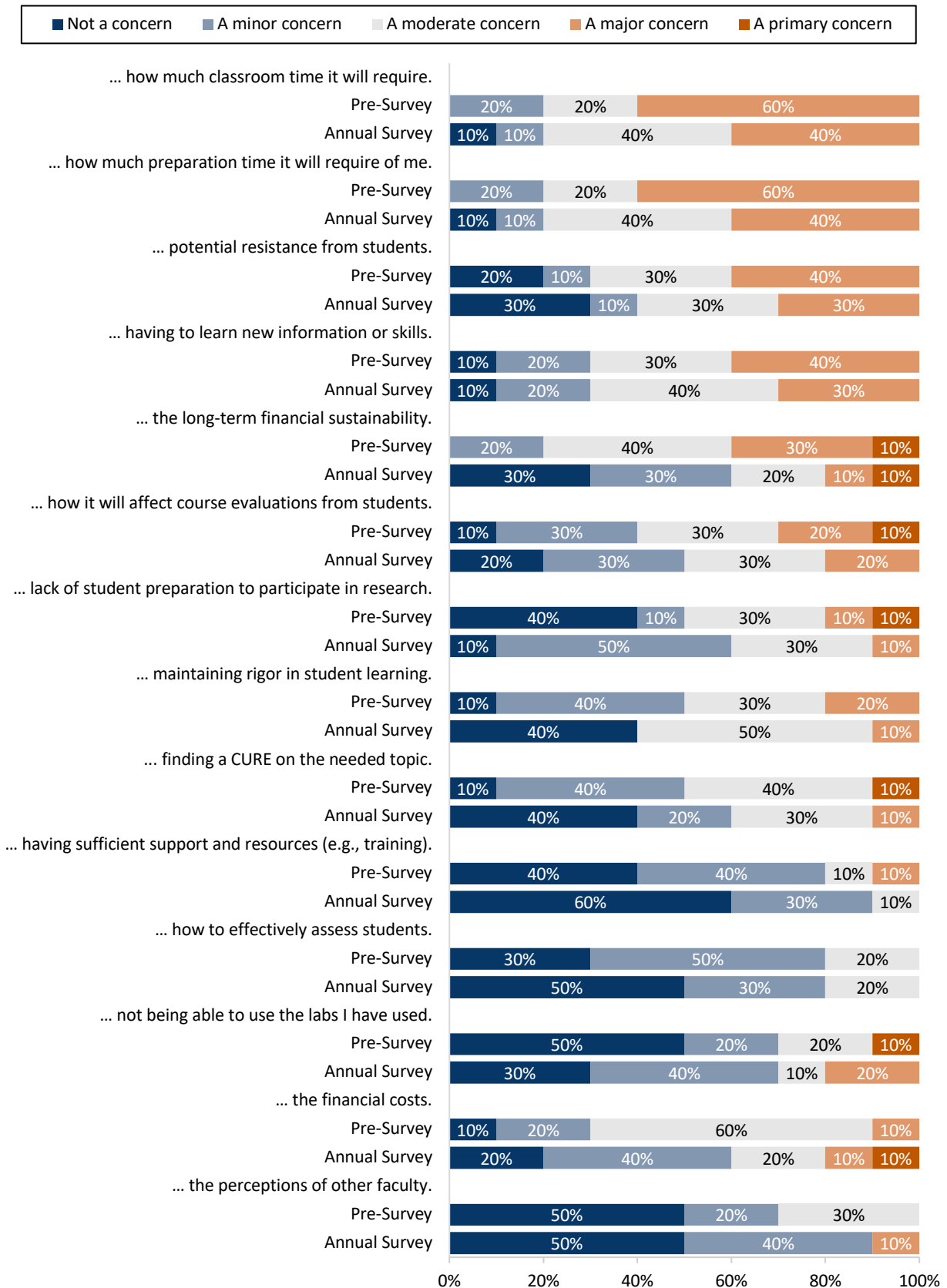
### Concerns about Implementing CUREs

For almost all aspects of implementing CUREs, the overall level of concern reported dropped from the Faculty Pre-Survey to the Annual Faculty Survey (see **Figure 10**). For how much classroom and preparation time CUREs will require, the percentage of respondents who indicated that those were *a major concern* decreased from 60% on the pre-survey to 40% on the annual survey. Similarly, for concerns about potential resistance from students and having to learn new information or skills, the percentage of respondents who selected *a major concern* decreased from 40% on the pre-survey to 30% on the annual survey. Concerns about the long-term financial sustainability also dropped, with 20% labeling those as a *major* or *primary concern* on the annual survey, compared to 40% on the pre-survey. The percentage of respondents who cited how CUREs will affect course evaluations from students as a *major* or *primary concern* decreased from 30% on the pre-survey to 20% on the annual survey. Concerns about lack of student preparation to participate in research and maintaining rigor in student learning also dropped, with 20% indicating it was at least *a major concern* on the pre-survey, compared to 10% on the annual survey. Levels of concern around finding a CURE on the needed topic decreased, with 50% of pre-survey respondents indicating that it was at least *a moderate concern* compared to 40% on the annual survey. Concerns about having sufficient supports and resources also decreased, with 10% listing it as at least *a major concern* in the pre-survey compared to 0% on the annual survey. Concerns about how to effectively assess students decreased as well, with 50% indicating this was *not a concern* on the annual survey compared to 30% on the pre-survey.

In contrast, for concerns about financial costs and not being able to use the labs they have used, the percentage of respondents who listed those as at least *a major concern* increased from 10% on the pre-survey to 20% on the annual survey. Concerns about the perceptions of other faculty also increased slightly, with 0% indicating this as at least *a major concern* on the pre-survey, compared to 10% on the annual survey.

**Figure 10. Concerns about Implementing CUREs (N=10)**

*My concerns about implementing CUREs are...*



## Reasons for Concern

Twelve respondents from the Faculty Pre-Survey and six from the Annual Faculty Survey who indicated that some items were *major* or *primary concern* offered explanations for their responses. Their themed responses and sample quotes are provided below with some responses fitting multiple themes.

### Faculty Pre-Survey (N=12)

- **Time and effort** (N=8): “Class time, [because] other skills and ideas also need time,” “Many of my courses already use the lecture time completely,” and “The time required to prep[are] a new lab, particularly field-based labs, is incredible and it does not feel like I have enough time.”
- **Student satisfaction and impact on course evaluations** (N=3): “Some students may enroll in your course with specific expectations ... and they might not initially see the value of a hands-on research project. If they don’t understand the purpose of CUREs or how they fit into their overall academic goals, they might resist the shift” and “Students may be used to traditional lecture-based or structured formats, and CUREs introduce a more open-ended, inquiry-driven approach. This can create discomfort for some students, especially if they’re unfamiliar with research processes. If they struggle with the project or feel unprepared, they may express dissatisfaction in course evaluations.”
- **Financial cost** (N=2): “The cost of implementing CUREs long term is a serious issue, particularly because many CUREs necessitate frequent purchasing of consumables” and “CUREs in my area of expertise are expensive, and I do not see that my university is aware of these costs or preparing to shoulder them.”
- **Preserving existing course content/labs** (N=2): “I also have labs designed for skill development, so I want to ensure that those are maintained” and “To implement [CUREs] requires that I cut content from the course. Deciding what to cut is very difficult as I consider what I already include to be very important.”
- **Identifying appropriate CUREs** (N=2): “I have spent a lot of time trying to come up with good subjects for CUREs in my courses with little success” and “Identifying CUREs that will be a good fit for introductory students is a challenge. ... CUREs that integrate a wider range of techniques and experiences would be better for the diverse students in principles labs. I want students to be interested and engaged, and I want them to believe that they are experiencing a high-quality education.”
- **More support needed** (N=2): “Support from administrators to create and carry out those labs in the long or short term [is needed]” and “The graduate assistants in the department currently do not provide adequate support or knowledge, and implementing CUREs in large enrollment courses without additional support is challenging.”

“CUREs often require more hands-on mentorship, time, and effort from the instructor. If students feel that they are being asked to take on more responsibility, they might perceive the course as more difficult or demanding, leading to lower ratings on course eval[uations].”

- Pre-survey respondent

### Annual Faculty Survey (N=6)

On the Annual Faculty Survey the most frequently mentioned concerns were around time, followed by the applicability of CUREs to respondents’ content areas. Other responses mentioned concerns around the finances needed for material resources and student resistance and lack of preparation.

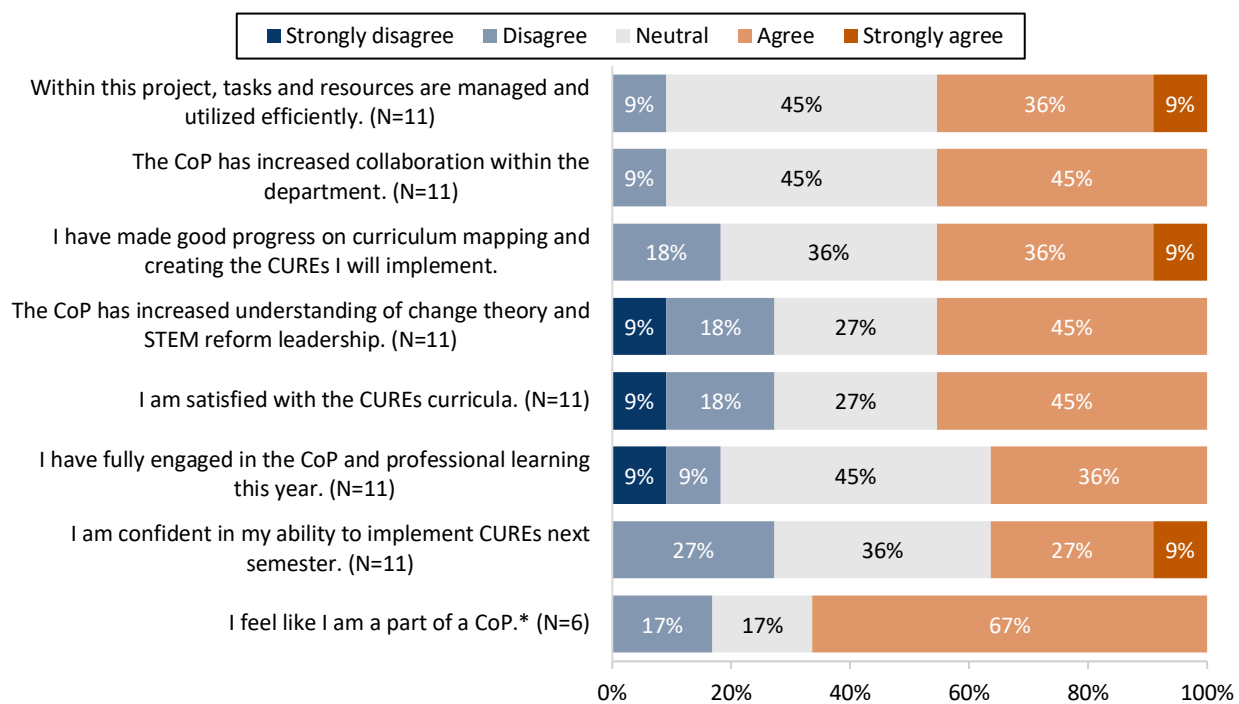
- **Time** (N=4): “Developing, delivering, and implementing a CURE takes time” and “The quantity of information that needs to be covered as governed by the Board of Regents does not give me much class time.”
- **Applicability of CUREs to particular subjects** (N=2): “The material I teach does not easily lend itself to CURE projects.”
- **Financial resources** (N=1): “Implementing CUREs ... requires new materials for students to actively engage with. Yet ... there has been minimal attention given to the tangible resources need[ed] and how to purchase them.”
- **Student resistance/lack of preparation** (N=1): “Students are often not prepared for reach-type activities and resent expectations beyond the absolute minimum.”
- **N/A** (N=1): “N/A.”

“As an [Anatomy and Physiology] faculty member I am not sure what sorts of CUREs would be effective and if I have the time and knowledge to implement them.”  
- Annual survey respondent

### Perceptions of Project and Progress and Levels of Engagement and Confidence

On the Annual Faculty Survey, respondents were asked to reflect on the Community of Practice (CoP) developed through the NSF grant. Nearly half (45%) of respondents *agreed* or *strongly agreed* that tasks and resources are managed and utilized efficiently, the CoP has increased collaboration within the department, they have made good progress on curriculum mapping and creating the CUREs they will implement, the CoP has increased understanding of change theory and STEM reform leadership, and they are satisfied with the CUREs curricula (see **Figure 11**). Just over one-third (36%) of respondents *agreed* or *strongly agreed* that they are confident in their ability to implement CUREs next year and they have fully engaged in the CoP and professional learning this year. Of the six respondents who are members of the CoP, two-thirds (67%) *agreed* that they feel like they are part of a CoP.

**Figure 11. Perceptions of Project, Engagement, and Confidence (N=11)**



\*Note: only responses from faculty who are part of the CoP are included in this item.

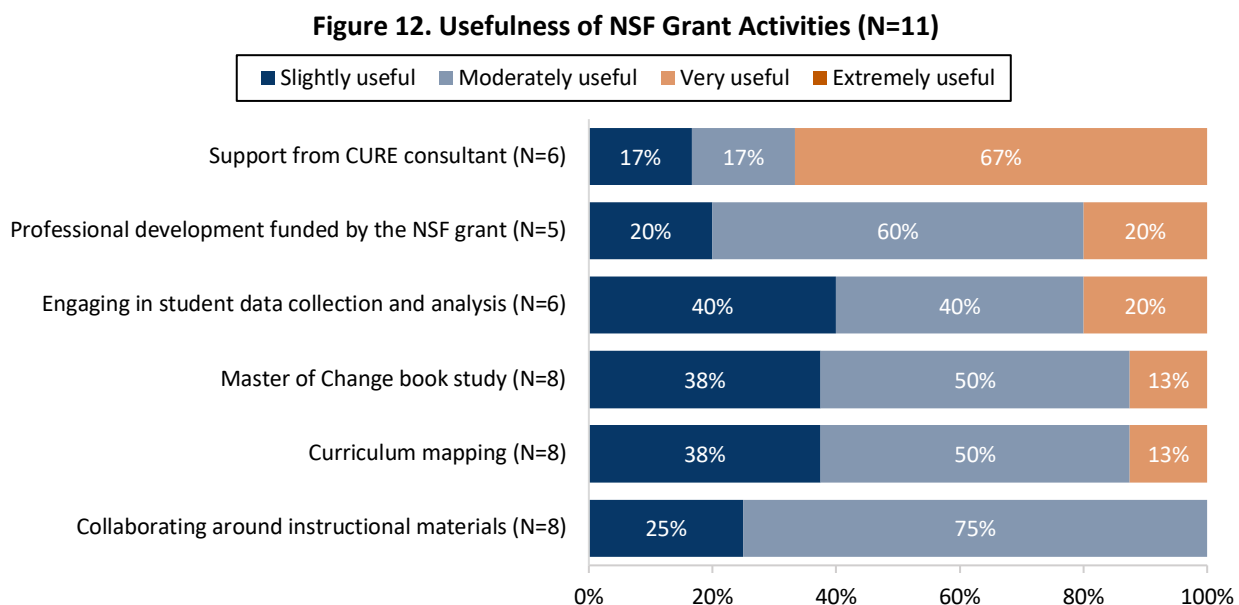
### Reasons for Disagreement

Respondents who *disagreed* or *strongly disagreed* with items in Figure 11 were asked to explain why, and six provided responses. Some shared that they have made little or no progress on implementing CUREs, did not participate in an activity, did not perceive that there is a CoP, were not yet confident in implementing CUREs, and/or felt the emphasis up to that point had not been on change theory.

- **Little/no progress on implementing CUREs yet** (N=2): “I have no CUREs planned for my courses for next semester” and “I haven’t made much progress in creating CUREs this semester, but I plan to in the future.”
- **Did not participate or N/A** (N=2): “Not participated” and “N/A.”
- **Lack of collaboration** (N=1): “For the most part, I do not perceive a CoP. We are individuals working on different projects that do not intersect.”
- **Not yet confident in implementing CUREs** (N=1): “I won’t be confident on this until I have succeeded in the delivery a few times.”
- **More emphasis on CUREs than change theory** (N=1): “We’ve talked a lot about implementing CUREs, not so much on change theory.”

### Usefulness and Impact of Grant Activities

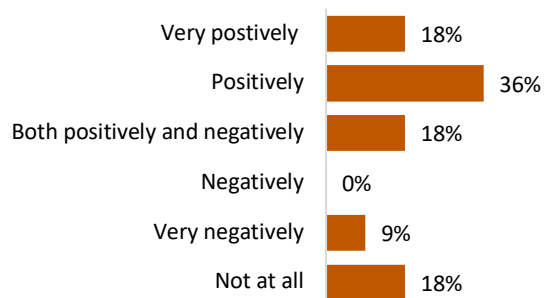
Respondents were asked on the annual survey how useful they found various aspects of the NSF grant. Two-thirds (67%) of the respondents rated the support from the CUREs consultant as *very useful* (see **Figure 12**). The majority of respondents rated the following as *moderately* or *very useful*: professional development funded by the NSF grant (80%), engaging in student data collection and analysis (60%), and curriculum mapping and the Master of Change book study (63%). In addition, three-quarters (75%) found collaborating around instructional materials to be *moderately useful*. For each item, between three and six respondents indicated that they did not participate.



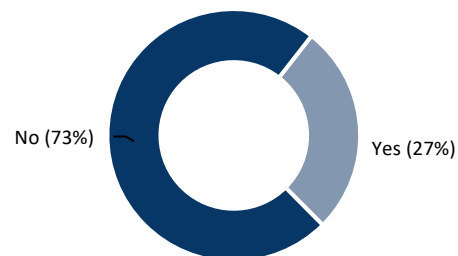
When asked how the NSF grant has influenced how they see departmental and institutional change, the majority (54%) of respondents reported that it has influenced them *positively* or *very positively* (see **Figure 13**). Nearly one-fifth (18%) reported that they have been influenced *both positively and negatively*, nearly one-tenth (9%) have been influenced *very negatively*, and nearly one-fifth (18%) have been influenced *not*

at all. **Figure 14** shows that just over one-quarter (27%) of respondents had implemented a CURE in the past year.

**Figure 13. Influence of NSF Grant on Perceptions of Departmental and Institutional Change (N=11)**



**Figure 14. Implemented a CURE in the Last Year (N=11)**



### Impacts on Faculty and Teaching

Respondents were asked open-ended questions about the impacts of the grant on their understanding of change theory and/or of the leadership skills needed to STEM education reform, as well as how the grant has impacted their teaching. Their themed responses and sample quotes are provided below with some responses fitting multiple themes.

*How (if at all) have the NSF grant activities impacted your understanding of change theory and/or the leadership skills needed for STEM education reform? (N=9)*

When asked in an open-ended item about the impacts of the NSF grant, most respondents reported that the grant activities had no impact or were not applicable to their understanding of change theory and/or the leadership skills needed for STEM education reform. Some shared that the grant activities increased their understanding of these concepts and underscored the need for actionable leadership and the importance of financial resources.

- **No impact or N/A (N=7):** “N/A,” “Not at all,” and “No. I was there already.”
- **Increased understanding of change theory and leadership (N=1):** “The NSF grant activities have sharpened my understanding of change theory and the leadership needed for STEM reform by emphasizing collaboration, strategic planning, and inclusive, evidence-based implementation within a community of practice.”
- **Importance of actionable leadership (N=1):** “Our project-driven discussions have illustrated for me that effective STEM education reform requires not just lofty goals and positive vision but clear, actionable leadership that drives change beyond mere discussion.”
- **Importance of financial resources (N=1):** “Most importantly, I have seen how crucial it is [to] secure the necessary financial resources to translate our change goals into meaningful, sustainable change implementation.”

*How has the NSF grant impacted your teaching? (N=10)*

When asked how the NSF grant had impacted their teaching, half of the respondents shared that the NSF grant had minimal or no impact yet, while others reported that it prepared them to implement CUREs. Some respondents also shared that the NSF grant increased collaboration, improved course planning and student experiences, increased the use of real-world examples and experiences, and/or motivated them to reflect on their instructional practices.

- **No/minimal impact or no impact yet** (N=5): “Not at all,” “It hasn’t yet,” and “To date, the NSF grant has had only a minimal impact on my teaching, as the project has largely remained in the discussion phase.”
- **Preparation to implement CUREs** (N=3): “It has opened the possibility of future CURE implementation” and “[I am] planning on implementing a CURE into [a] course for Spring 2025.”
- **Increased collaboration** (N=1): “I anticipate it will ... strengthen connections across departments and with the broader academic community.”
- **Improved course planning and student experience** (N=1): “It has already shaped my planning by encouraging more inclusive, research-driven curriculum design. I anticipate it will enhance student engagement [and] foster collaborative inquiry.”
- **Increased use of real-world examples/experiences** (N=1): “[It] dramatically increased the amount of real-world examples and experiences I am using.”
- **Reflecting on instruction** (N=1): “[It has] made [me] revisit what I am doing and what works and does not (primarily, to make room for the CURE).”

“The NSF grant is positioning me to transform my teaching by implementing a CURE-based approach starting this fall.”  
- Annual survey respondent

## Challenges and Recommendations for Improvement

Respondents were also asked open-ended items about the challenges they encountered related to the NSF grant recommendations for improving the activities of the grant. They were also asked to share any additional comments, questions, or concerns about the NSF grant.

### Challenges

*What (if any) challenges have you encountered related to the NSF grant, and how (if at all) were they addressed?* (N=7)

Most respondents reported that they had not encountered any challenges related to the NSF grant, while others mentioned a lack of resources and challenges balancing responsibilities.

- **None or N/A** (N=5): “N/A” and “None.”
- **Lack of resources** (N=1): “One key challenge has been the lack of attention to the practical classroom resources needed for implementing the planned CUREs, such as funding for essential course materials.”
- **Balancing responsibilities** (N=1): “One challenge has been balancing CURE planning with existing teaching and service responsibilities. I addressed this by setting clear timelines, streamlining course design tasks, and seeking support.”

### Recommendations and Feedback

*How could the activities of the NSF grant be improved?* (N=8)

More than half of respondents did not provide suggestions for how the activities of the NSF grant could be improved, while others recommended more collaboration or action.

- **None or N/A** (N=3): “N/A” and “I do not see any major areas for improvement.”
- **Unsure** (N=2): “Unsure” and “Not sure.”
- **More collaboration** (N=2): “Treat people in the CoP as actual collaborators” and “While I recognize the need for a person to be in charge of the grant, it seems that the PIs are directing with limited input. For the rest participation seems limited.”
- **More action** (N=1): “It is high time to move from discussion to action.”

*Please share any additional comments, questions, or concerns about the NSF grant here. (N=3)*

When asked if they had any additional comments, questions, or concerns, one respondent expressed appreciation for the support and structure provided by the NSF grant.

- **N/A** (N=2): “N/A.”
- **Appreciation for support and structure** (N=1): “I appreciate the support and structure provided through the NSF grant. It has laid a strong foundation for implementing CURE and fostering lasting change. I look forward to continued collaboration and sharing outcomes with the broader community.”

## IV. Focus Group Findings

All six members of the Community of Practice (CoP) were invited to a virtual focus group interview on August 11, 2025, and four participated. Three participants were female and one was male. Participants were asked about the impact of the NSF grant activities, what they would like their roles to be in grant activities, how the grant activities have alleviated their concerns around implementing CUREs, changes around collaboration, challenges encountered, and recommendations for improvement. Themed responses and representative quotes for the focus group questions are provided below, with themes reported in order from most to least mentioned.

### Attitudes Toward Change and Role in Change

#### Impact on Departmental and Institutional Change

When asked how the NSF grant activities had influenced how they see departmental and institutional change, two participants expressed that the NSF grant activities had increased their focus on student engagement and/or increased their use of hands-on and practical activities. One reported that the grant had expanded their focus from their own course to the department and institution more broadly, and another shared that they had become more aware of the literature on change.

- **Increased focus on student engagement:** “[It has affected] my teaching ... by involv[ing] the students more with hands-on and practical [activities] and having the student[s be] more engaged in their course.”
- **Increased focus on departmental and institutional change:** “Prior [to the grant] I’ve been more focused on my own courses and maybe the courses that my courses lead into, but less about change as an institution or a department. So that has increased for me.”
- **Increased awareness of change theory:** “The NSF grant has definitely highlighted that there is a vast amount of theoretical, almost philosophical, literature on change that I was not aware of.”

“The students ... are facing so many challenges [and] changes, and they are definitely different from students from three or four generations ago. So, to keep them engaged, [we] have to [use] different resources, workshops, and things like that, to understand their mindset ... and meet them where they’re at.”

- Focus group participant

### Role in the CoP, Implementing CUREs, and Departmental Change

#### Faculty Role in Departmental Change

Participants saw the role of faculty in making change in the department as planning and implementing the changes, assessing the impacts of the CUREs, supporting students in succeeding in CUREs, advocating for making changes that benefit students, and convincing other faculty to buy in to making the changes.

- **Planning/implementing change:** “We are literally the ones doing it [and] the ones practicing it” and “We are both the planners as well as the implementers of that change. I have the feeling that currently we’re primarily in the planning part, and hope that we soon move over to the implementation part.”
- **Assessing impact:** “Eventually, [we will be] the evaluators, ... because we [and the students] will need to assess how well our CUREs fit into the overall course curriculum.”
- **Supporting student success:** “We have to ensure that we carry the students along [and] that we incorporate their research into their work, and ensure that we’re able to be there for them ... and [that] the project is actually realistic.”

“The buck stops with the faculty in terms of what happens in our classrooms. If we had not bought into this, making the changes would be extremely difficult from an administrative perspective.”

- Focus group participant

- **Advocating for students:** “I think we need to advocate for our students. ... It’s our responsibility to show that this [change] is what we need [and] what the students are asking for.”
- **Fostering faculty buy-in:** “[We need to] keep giving evidence-based [explanations] of why [each] meeting [on change] is important at the department level. ... Say ‘Hey, other faculty, let’s get on board to [make] this happen.’”

### Role in the CoP

When asked what they would like their role in the CoP to be in the next year of the grant, participants mentioned contributing (e.g., providing ideas) and giving or receiving support or information.

- **To contribute:** “Contributing member” and “Someone who’s there to contribute either ideas or [serve] as a sounding board.”
- **To receive support/information:** “A receiver of a little bit more information regarding where our departmental change is supposed to lead us. We’ve talked more about the theory of change, but less about where our journey is supposed to go.”

“[I want to be] somebody that will contribute in terms of either seeking help or giving help or advice.”  
- Focus group participant

### Role in Implementing CUREs

Participants were asked what they would like their role to be in implementing CUREs in Year 2. Three of the four participants said they had implemented CUREs in their courses in Year 1, and all said they plan to implement them in Year 2. (All faculty are expected to incorporate CUREs in their courses in Year 2.) One participant mentioned they plan to make improvements in Year 2 based on their experiences in implementing the CURE in Year 1. One participant who has prior experience with CUREs said they hope to support others in implementing CUREs.

- **Incorporating CUREs into course(s):** “I would be implementing the CURE in my ... course,” “I am currently doing [a CURE] with one of my labs. I would like to expand to other labs that I have,” and “I am implementing CUREs in pretty much every lab course that I offer, some of which I had already been doing.”
- **Adjusting implementation iteratively:** “I would also be teaching [the same] class in the spring of 2026, so if there are any changes noted based on the implementation of the CUREs, I would also be making those changes.”
- **Serving as a resource:** “[Designing CUREs] is not super new to me. I hope to be a resource for folks that are newer to this as it makes sense or as I have experience that might help.”

“I am implementing a CURE in [an existing] class and I have set up a new course.”  
- Focus group participant

### Role in Implementing Departmental Curricular Change

With respect to their role in implementing departmental curricular change in Year 2, participants said they would like to contribute to mapping and planning curricula, collaborating with colleagues to make change, positioning the department as a role model for other departments, and implementing new courses.

- **Mapping/planning curricula:** “Being one of the folks in the department that’s planning how our curriculum maps across courses” and “We have a curriculum committee. I am not part of that, but I view myself as a contributor. I would like for the curricula to change in a way that makes sense to everyone [and] that all of us are comfortable with.”
- **Collaborating with colleagues:** “Collaborating with my colleagues to see how we could move these changes forward.”
- **Serving as a role model:** “[I] want [my department to] be a role model. ... We could also influence the other departments to do better as well.”
- **Implementing new courses:** “I’m part of the group that implemented a new freshman-level class.”

## Impacts on Concerns, Collaborations and Practices

### Concerns around Implementing CUREs

Participants were asked if anything about the NSF grant activities had alleviated their concerns around implementing CUREs. Participants most frequently mentioned support from the CURES consultant (e.g., about fair grading methods) and support from each other (e.g., in the regular meetings). One participant also mentioned that attending a teaching science workshop had made them more aware of the need for change and how to implement it in an inclusive and engaging way. One participant noted that their concerns around funding had not yet been alleviated, and another said they did not have concerns because they already had experience with CUREs.

- **Consultant support:** “One of my main concerns initially [was] fair grading. ... That [concern] has been alleviated by our conversations with Dr. Lance Barton. ... He proposed and conceptualized for us certain grading methods that I believe can be implemented in a CURE.”
- **Support from each other:** “All the people on the committee, they’re accessible as well, so it’s not like I’m walking this journey on my own.”
- **Workshops on teaching science:** “I attended [a] teaching science workshop [that] made me more aware of the need [for] change and how to implement it in an inclusive, engaging way. ... You really need to understand how to teach science in an engaging manner, especially with this generation [of students], and in an inclusive manner. Once you know how to do that [and] you’re comfortable [using] practices that are evidence-based, that naturally will lead to you wanting to implement CUREs.”
- **Lasting concerns about financing CUREs:** “My concern about financing [CUREs] was not alleviated yet.”
- **No initial concerns/positive comment:** “I came into this without really having concerns about implementing CUREs, because I’ve done it [before]. It’s nice that we have money to do professional development, and to pilot projects that we might not otherwise have been able to do, but I didn’t have concerns.”

“One of my concerns [was] about [getting] help [and] who I’m going to go to if I am stuck. ... The regular meetings that we have as a faculty and the access to Lance [helped].”

- Focus group participant

### Impact of the CoP on Departmental Collaboration

Several participants said that while there had been collaboration within the department before the CoP, the CoP had improved collaboration. For example, one noted that in working on CUREs, they had collaborated with people they would not otherwise have worked with. Another stated that having the CoP support made it easier to implement CUREs. Others shared that the NSF grant activities had provided structure that facilitated teaching improvement.

- **Improved/broadened existing collaboration:** “The collaboration [was] already there, [the CoP is] just improving it,” “I’m collaborating with folks on implementing or designing CUREs that I might not have otherwise collaborated with,” and “Collaboration ... was always there, but the NSF [grant helped it] come in a more natural and organic way [toward] understanding how to implement CUREs. You don’t have to do it alone, which also made it easier to make that change. ... You have this community that is behind you and will help you any way that they can.”

“The activities of the NSF project have given us a semi-structured way of talking about teaching improvement ... in a more structured and focused way than our regular departmental meetings would otherwise have allowed.”

- Focus group participant

- **CoP structure facilitates teaching improvement:** “It’s also nice to have a semi-structured setting with the folks in the CoP to talk about teaching generally and specifically [about] CUREs. I’m not sure that we would necessarily get together and talk shop in this way without having a CoP.”

### Collaboration Within the CoP

When asked the extent to which they have collaborated within the CoP, one participant shared that the CoP has been exploring the conceptual aspects of change, which the department overall has not done. Others indicated they had already discussed enhanced collaboration in their responses to prior questions.

- **Nothing beyond what was already mentioned:** “[Nothing] beyond what I’ve already mentioned” and “I don’t think I have anything else [to share].”
- **Focus on conceptual aspects of change:** “We have been exploring the conceptual aspects of change, and I think that only pertains to our CoP bubble. ... I don’t think the department has talked about these theoretical aspects at large.”

### Impact of CoP on Teaching Practices

When asked how participating in the CoP had changed teaching practices of faculty in the CoP, some participants said they did not expect the CoP to change teaching practices much while others anticipated that practices would change during Year 2 as CUREs were implemented. Two participants shared that the CoP had fostered the exchange of ideas, while another mentioned incorporating project-focused approaches and translatable skills.

- **Little change:** “There’s not going to be much of a change, but I think it’s still going to help with the students” and “I don’t think my teaching practices have changed dramatically, since there are a lot of things that I, even before being part of this CoP, already implemented.”
- **Sharing ideas:** “[We have been] exchanging ideas on how we might implement the same practice, but a little bit differently. ... We had one meeting where we [discussed] what everyone is doing and [gave] pointers.”
- **Potential future change:** “The teaching practices themselves have not yet been strongly influenced, because we have primarily worked on [other aims] so far.”
- **Increased translatable skills in lab:** “While I’m designing my lab for this fall, one of the things that I focused on [was taking a] project-focused approach and [including] more translatable skills.”

“Teaching practices haven’t changed yet, but I think they’ll change in the future. Having this community of practice helped [with] getting ideas for how I could change my teaching or assessment [practices].”

- Focus group participant

### Understanding of Change Theory and STEM Reform Leadership

The participants were also asked how the CoP had increased understanding of change theory and STEM reform leadership among faculty in the CoP. Some participants felt that there had not yet been much emphasis on these topics because the focus had been on planning for the CUREs. Others shared that they had been exposed to change theory and leadership reform concepts such as the reading and Kotter’s eight steps of reform.

- **Little focus so far:** “We’ve touched on it a couple of times, but [we’ve] been a lot more focused on putting together the CUREs” and “I read the book, [but] I haven’t really spent time thinking about change theory and how people deal with change theory. I’ve been more involved in STEM reform leadership. [My thinking about change theory] has increased from not thinking about it to thinking a little bit about it.”

- **Exposure to change theory:** “Our NSF project so far exposed [me] to change theory and leadership reform concepts” and “The reading [helped me] understand that there are different strategies of change theory. ... Being introduced to Kotter’s eight steps of reform was also new and helpful for me.”
- **Focus on implementation before leadership:** “It’s not really about the leadership aspect [yet]. [Instead, we are] trying to gather the evidence. After [implementation we will have] something to showcase to the other members of the faculty. ... If there is an impact, a change, and a review ... then [we] can show and tell people, ‘This is what I’ve done, and it can be implemented.’”

“We’ve danced around these topics, but we haven’t talked specifically [about] the leadership piece, or the reform leadership piece, [and we’ve talked] just a little bit on change theory, so I would be okay with a bit more on that.”

- Focus group participant

## Challenges, Resource Needs, and Recommendations

### Challenges

Participants were asked about challenges they had encountered related to the NSF grant and how they could be addressed. Two participants said they had not yet encountered challenges, while one expressed concern about teaching freshmen for the first time in a while and another identified challenges around the costs of implementing CUREs.

- **No challenges:** “I haven’t encountered any challenges” and “At this point, I have not [encountered any challenges]. I’m excited to implement some new CUREs starting in a week.”
- **Teaching a freshman course:** “My only concern is [that] I haven’t taught freshmen in a while.”
- **The cost of implementing CUREs:** “To conduct a CURE ... is expensive. ... I don’t think we have, as a CoP, really considered yet how to deal with these costs, and if we can share them. ... I would need to know what materials others need and ... what resources we have available through the grant.”

### Additional Resources or Supports

When asked what additional resources or supports were needed to develop and implement CUREs, participants called for more of an exchange of ideas around what is effective, guidance for budgeting CUREs, and clarity around logistics (e.g., materials, TA support).

- **Exchanging ideas:** “I would like to see more meetings where we are exchanging ideas, especially [once] we’re already implementing, [to discuss] what worked [and] what didn’t work.”
- **Guidance for budgeting:** “[I need] financial support [and] an understanding of the parameters we have. I can devise the CURE with more or less [of a] budget in mind, but I need the starting number, and this is not something we have really talked about.”
- **Clarification on logistics:** “It would be good to have had a meeting [in] late spring [to] talk about the logistics [and answer questions like] can we share, can we pool materials, who needs what, [and] do we have special TA support just for the CUREs?”

### Additional Suggestions

When asked for additional thoughts on how the activities of the NSF grant could be improved, participants recommended clarifying and reiterating the end goal and action items toward it and including input from all involved.

- **Clarify the end goal and the plan to get there:** “We need to be aware of our [desired] outcome ... as well as what we are working on” and “Where are we going? ... What’s the end goal? What do we need to do next? ... Now we need to have ... action items or more orientation and structure.”
- **Co-create action plan:** “[We should consider] how we want to move forward [and] how we want to implement our CUREs [and] make sure we all have some input on how we want the project to move forward.”

“I would appreciate if [we could] remind ourselves of the final product that we want to achieve.”

- Focus group participant

## V. Summary and Recommendations

### Summary

The Year 1 external evaluation findings for the *Uncovering Change Catalysts: Examining Community of Practice Members as They Leverage Individual Course Improvements to Achieve Systemic Departmental Change* project demonstrated the progress made toward the project's goal of catalyzing departmental change. In Year 1, the project created a community of practice (CoP) to encourage collaboration and understanding of change theory and STEM reform leadership, and faculty underwent a curriculum mapping process and developed CUREs. On the Annual Faculty Survey, about a quarter of respondents reported that they implemented a CURE in Year 1.

### Perceptions of CUREs and Attitudes Toward Change

On the Faculty Pre-Survey, respondents identified multiple potential benefits of CUREs to both faculty and student that would motivate implementation of CUREs. Several respondents expressed enthusiasm around the potential of the grant activities to lead to more collaboration and positive impacts of change.

Comparisons of the Faculty Pre-Survey and Annual Faculty Survey results showed positive shifts in the level of agreement around the need for change. There was an increase in the percentage of faculty who agree there is a need for departmental change, addressing student enrollment issues requires changing practices, addressing student engagement issues requires changing their practices, and offering online courses is necessary for FHSU to stay competitive. However, a small number of faculty members were either not yet convinced that there is a need for change or do not agree with the approach to change.

### Role in and Capacity for Change

The evaluation results also showed growth in faculty's understanding of change and their role in it. From the Faculty Pre-Survey to the Annual Faculty Survey, there was an increase in the percentage of faculty who said they can articulate the need for departmental changes, they are familiar with Kotter's change model, they identify as a STEM reform leader, they can articulate what a CURE is, and they are willing to make changes to their practices. Survey findings also showed growth in faculty's self-reported capacity to effect change. There was an increase in the extent to which faculty perceive that they have resources, tools, and supports needed to make change; they have the knowledge and skills to change their practices in response to student enrollment and engagement challenges; they know what resources they need to make changes to their practices; the resources available to change their practices are adequate; and they have the tools to be a leader in effecting change.

While there was substantial progress on what stage faculty are in on the Kübler-Ross change curve model, a small percentage of respondents indicated on the annual survey that they are still unfamiliar with the model. Similarly, some respondents reported that they are not yet familiar with Kotter's change model.

In the Faculty Focus Group, faculty said they saw their roles as planning and implementing changes; contributing to mapping and planning curricula; supporting students in succeeding in CUREs; advocating for making changes that benefit students, serving as a role model, and convincing other faculty to buy in to making the changes; assessing the impacts of the CUREs; contributing to the CoP; and collaborating to give and receive support.

### Concerns about Implementing CUREs

Respondents' level of concern around implementing CUREs decreased from the Faculty Pre-Survey to the Annual Faculty Survey in most areas. However, at the time of the annual survey, some participants (20-

40%) still had concerns around how much classroom and preparation time CUREs will require, potential resistance from students, having to learn new information or skills, the financial costs and long-term sustainability, how CUREs will affect course evaluations from students, and not being able to use labs they have previously used. In their responses to open-ended items, some respondents also expressed concerns around lack of student preparation and the extent to which CUREs would apply to their content areas.

When asked what had helped alleviate concerns that they held earlier in the project, focus group participants shared that support from the CUREs consultant and from each other had helped alleviate concerns. One participant also mentioned that attending a teaching science workshop had made them more aware of the need for change and how to implement it in an inclusive and engaging way.

### **Project Satisfaction, Engagement and Usefulness**

Nearly half of respondents reported that tasks and resources are managed and utilized efficiently within the project, the CoP has increased collaboration within the department, they have made good progress on curriculum mapping and creating the CUREs they will implement, the CoP has increased understanding of change theory and STEM reform leadership, and they are satisfied with the CUREs curricula. Just over one-third reported that they fully engaged in the CoP and professional learning this year and are confident in their ability to implement CUREs next year. Most faculty reported that the NSF grant activities were at least moderately useful, with support from the CUREs consultant being rated most highly.

### **Impact of Grant Activities**

Comparisons of the Faculty Pre-Survey and Annual Faculty Survey results demonstrated that since the start of the NSF grant activities, there has been an increase in collaboration among faculty. In the focus group, participants further explained that while there had been collaboration before the CoP, the CoP had expanded and improved it. They stated that the NSF grant activities had provided structure that facilitated teaching improvement, and that having the CoP support made it easier to implement CUREs.

On the Annual Faculty Survey, most respondents reported that the NSF grant activities have positively influenced how they see departmental and institutional change. Responses to open-ended survey items and focus group questions show that the grant activities had made faculty more aware of the literature on change, expanded their focus from their own courses to the department and institution more broadly, and illustrated the need for clear and actionable leadership in effective STEM education reform. In the focus group, participants explained that there had not yet been much emphasis on understanding of change theory and STEM reform leadership because the focus had been on planning for the CUREs, but that they had been exposed to change theory and leadership reform concepts (such as reading Master of Change and learning about Kotter's eight steps of reform).

Faculty also discussed impacts of the NSF grant activities on their teaching practices on the annual survey and in the focus group. Faculty reported that the grant activities improved course planning and student experiences, increased the use of real-world examples and experiences, motivated faculty to reflect on their instructional practices, increased their focus on student engagement, and increased their use of hands-on and practical activities. In the focus group, some participants expressed that the grant activities had not yet impacted their teaching practices, although some of them noted that they expect there to be changes in Year 2.

### **Recommendations**

Based on the Year 1 evaluation findings, TACC evaluators suggest the project consider the following recommendations to strengthen the project and its impacts:

- **Continue fostering faculty buy-in to change:** Survey respondents suggested that faculty buy-in to change could be increased by fostering a culture of support and collegiality, providing incentives and/or recognition, showing evidence of efficacy of proposed changes, making changes easy to implement, linking or aligning changes to common goals and values, engaging faculty early in the planning process, and offering support and resources, including funding, materials, guidance for implementation, and professional development opportunities.
- **Clarifying the goals and action plan:** As some faculty expressed wanting more clarity around where the project is going and what the plan is for getting there, reiterating the end goals of the project and discussing the action plan with the whole department is recommended.
- **Increased collaboration:** Faculty expressed an interest in more collaboration, including exchanging ideas around what works and what does not, and some noted that they want everyone to have input in the project. To this end, it would be beneficial to continue to facilitate regular structured opportunities for faculty to work together.
- **Additional support and resources:** On the Annual Faculty Survey, nearly one-third of respondents disagreed that they have the support they need to change their practices in response to student enrollment and engagement challenges. Faculty identified several resources and sources of support that would be helpful in implementing CUREs, including training and guidance (such as workshops and mentoring), lab space and equipment, teaching assistants who are prepared to assist with implementing CUREs, evidence of the efficacy of and need for the changes, and instructional materials or resources. To the extent possible, we recommend providing more of these resources.
- **Time and balancing priorities:** While the level of concern around the amount of time required to plan for CUREs and making space for them in classroom time decreased from the pre-survey to the annual survey, some faculty are still concerned about time, and one respondent raised concerns about the workload distribution among faculty. Consider exploring options for providing planning time or reducing other responsibilities to allow faculty to focus on CUREs and evaluate the current faculty workload distribution to identify areas for potential rebalancing.
- **Funding:** Consider providing more guidance around budgeting for the materials needed to implement CUREs, including planning for sharing costs of materials and the financial sustainability of CUREs.

## Appendix A: Faculty Pre-Survey

Responses to this survey will be used for evaluating the CUREs initiative at FHSU. Your responses will be kept confidential by the external evaluators and reported in aggregate, so none of the answers you provide will be attributed to you personally. Thank you for your valuable input.

1. What level of course(s) are you teaching this semester? Check all that apply.

- 100-199
- 200-299
- 300-399
- 400-499
- Graduate level

2. Which type of students do you teach?

- Only STEM majors
- Only non-STEM majors
- Both STEM majors and non-STEM majors

3. To what extent have you incorporated research experiences previously in your courses?

- Not at all
- A little
- Somewhat
- A lot

4. How many years have you taught at FHSU?

\_\_\_\_\_

5. To what extent do you currently...

	Not at all	A little	Moderately	A good deal	A great deal
... collaborate with other faculty in your teaching?					
... use the same instructional resources as other faculty?					

6. Please indicate how strongly you disagree or agree with the following statements about change.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
There is a need for departmental change.					
Addressing student enrollment issues at FHSU requires changing our practices.					
Addressing student engagement issues requires changing our practices.					
Departmental assessments and adjusting curriculum based on those assessment results are important.					
Offering online courses is necessary for FHSU to stay competitive.					
I can articulate how my course(s) contribute to the					

departmental learning outcomes.					
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*Only given to respondents who selected disagree or strongly disagree above.*

6a. For the items that you *disagreed* or *strongly disagreed* with, please explain why.

\_\_\_\_\_

7. Please indicate how strongly you disagree or agree with the following statements about your role and experience in change at FHSU.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I can articulate what a CURE is.					
I can articulate the need for departmental changes.					
I am willing to make changes to my practices.					
I have the tools to be a leader in effecting change.					
I identify as a STEM reform leader.					
I am familiar with Kotter's change model.					
I have the knowledge and skills to change my practices in response to student enrollment and engagement challenges.					
I have the support I need to change my practices in response to student enrollment and engagement challenges.					
I know what resources I need to make changes to my practices.					
The resources available for making changes to my practices are adequate.					

*Only given to respondents who selected disagree or strongly disagree above.*

7a. For the items that you *disagreed* or *strongly disagreed* with, please explain why.

\_\_\_\_\_

8. How do you see your role in each of the following parts of the project?

- Community of Practice: \_\_\_\_\_
- Implementing CUREs: \_\_\_\_\_
- Implementing Departmental Curricular Change: \_\_\_\_\_

9. At what stage are you currently on the Kübler Ross change curve model?

- Shock: Surprise or shock at the event
- Denial: Disbelief, looking for evidence that it isn't true
- Frustration: Recognition that things are different, sometimes angry
- Depression: Low mood, lacking in energy
- Experiment: Initial engagement with new situation
- Decision: Learning how to work in new situation, feeling more positive
- Integration: Changes integrated, a renewed individual
- Not sure: I am not familiar with the Kubler Ross change curve model.

10. Please rate the extent to which each statement about implementing CUREs is or is not a concern to you.

My concerns about implementing CUREs are ...	Not a concern	A minor concern	A moderate concern	A major concern	A primary concern
... finding a CURE on the needed topic.					
... how much preparation time it will require of me.					
... how much classroom time it will require.					
... having to learn new information or skills.					
... how to effectively assess students.					
... maintaining rigor in student learning.					
... potential resistance from students.					
... lack of student preparation to participate in research.					
... how it will affect course evaluations from students.					
... not being able to use the labs I have used.					
... the perceptions of other faculty.					
... having sufficient support and resources (e.g., training).					
... the financial costs.					
... the long-term financial sustainability.					

*Only given to respondents who selected disagree or strongly disagree above.*

10a. For the items that you identified as a *major* or *primary* concern, please explain why.

11. Which of the following potential benefits to *students* would motivate you to implement CUREs?

Please check all that apply.

- ☐ Increasing student engagement
- ☐ Increasing student motivation
- ☐ Increasing student sense of belonging in science
- ☐ Developing science identity in students
- ☐ Gaining experience
- ☐ Developing skills
- ☐ Other (please specify): \_\_\_\_\_
- ☐ No benefits to students

12. Which of the following potential benefits to *faculty* would motivate you to implement CUREs?

Please check all that apply.

- ☐ Enjoying teaching with CUREs
- ☐ Career advancement
- ☐ Helping make scientific contributions
- ☐ Staying current in my field
- ☐ Other (please specify): \_\_\_\_\_
- ☐ No benefits to faculty

13. What parts of this project are you most excited about, and why?

---

14. What do you think would increase faculty buy-in to change?

---

15. What additional supports or resources would be helpful in implementing CUREs?

---

16. Please share any additional comments, questions, or concerns about the CUREs initiative here.

---

17. Which of the following best represents your gender?

- Female
- Male
- Non-binary
- Prefer to self-describe: \_\_\_\_\_

18. Which of the following best represents your race/ethnicity? Please check all that apply.

- American Indian or Alaska Native
- Asian or Asian American
- Black or African American
- Hispanic or Latino/a
- Middle Eastern or North African
- Native Hawaiian or other Pacific Islander
- White
- Prefer to self-describe: \_\_\_\_\_

*End of Survey Message: Default*

We thank you for your time spent taking this survey. Your response has been recorded.

## Appendix B: Annual Faculty Survey

This survey asks about how the activities in the NSF grant have impacted you. As part of the grant, the department has undertaken the following activities:

- Curriculum mapping
- Launching a Community of Practice (CoP)
- Providing professional development focused on implementing CUREs
- Student data collection and analysis

Responses to this survey will be kept confidential and reported in aggregate, so none of the answers you provide will be attributed to you personally. Thank you for your valuable input!

Please indicate how strongly you agree or disagree with the following statements about change.

1. Please indicate how strongly you disagree or agree with the following statements about change.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Low student enrollment is a significant issue at FHSU.					
There is a need for departmental change.					
Addressing student enrollment issues at FHSU requires changing our practices.					
Addressing student engagement issues requires changing our practices.					
Departmental assessments and adjusting curriculum based on those assessment results are important.					
Offering online courses is necessary for FHSU to stay competitive.					
I can articulate how my course(s) contribute to the departmental learning outcomes.					

*Only given to respondents who selected disagree or strongly disagree above.*

1a. For the items that you *disagreed* or *strongly disagreed* with, please explain why.

---

2. Please indicate how strongly you disagree or agree with the following statements about your role and experience in change at FHSU.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I can articulate what a CURE is.					
I can articulate the need for departmental changes.					
I am willing to make changes to my practices.					
I have the tools to be a leader in effecting change.					
I identify as a STEM reform leader.					
I am familiar with Kotter's change model.					
I have the knowledge and skills to change my practices in response to student enrollment and					

engagement challenges.					
I have the support I need to change my practices in response to student enrollment and engagement challenges.					
I know what resources I need to make changes to my practices.					
The resources available for making changes to my practices are adequate.					

*Only given to respondents who selected disagree or strongly disagree above.*

2a. For the items that you *disagreed* or *strongly disagreed* with, please explain why.

\_\_\_\_\_

3. How do you see your role in each of the following parts of the project?

- Community of Practice: \_\_\_\_\_
- Implementing CUREs: \_\_\_\_\_
- Implementing Departmental Curricular Change: \_\_\_\_\_

4. At what stage are you currently on the Kübler Ross change curve model?

- Shock: Surprise or shock at the event
- Denial: Disbelief, looking for evidence that it isn't true
- Frustration: Recognition that things are different, sometimes angry
- Depression: Low mood, lacking in energy
- Experiment: Initial engagement with new situation
- Decision: Learning how to work in new situation, feeling more positive
- Integration: Changes integrated, a renewed individual
- Not sure: I am not familiar with the Kubler Ross change curve model.

5. Please rate the extent to which each statement about implementing CUREs is or is not a concern to you.

My concerns about implementing CUREs are ...	Not a concern	A minor concern	A moderate concern	A major concern	A primary concern
... finding a CURE on the needed topic.					
... how much preparation time it will require of me.					
... how much classroom time it will require.					
... having to learn new information or skills.					
... how to effectively assess students.					
... maintaining rigor in student learning.					
... potential resistance from students.					
... lack of student preparation to participate in research.					
... how it will affect course evaluations from students.					
... not being able to use the labs I have used.					
... the perceptions of other faculty.					

... having sufficient support and resources (e.g., training).					
... the financial costs.					
... the long-term financial sustainability.					

*Only given to respondents who selected disagree or strongly disagree above.*

5a. For the items that you identified as a *major* or *primary concern*, please explain why.

---

6. Since the start of the NSF grant, to what extent do you currently...

	Not at all	A little	Moderately	A good deal	A great deal
... collaborate with other faculty in your teaching?					
... use the same instructional resources as other faculty?					
... collaborate with others in the department in preparing to teach CUREs?					

7. Please indicate how strongly you agree or disagree with the following statements about CURES and the CoP (community of practice).

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I feel like I am part of a CoP.					
I have fully engaged in the CoP and professional learning this year.					
The CoP has increased understanding of change theory and STEM reform leadership.					
The CoP has increased collaboration within the department.					
Within this project, tasks and resources are managed and utilized efficiently.					
I am satisfied with the CURES curricula.					
I have made good progress on curriculum mapping and creating the CURES I will implement.					
I am confident in my ability to implement CURES next semester.					

8. Please rate how useful you found the following aspects of the CoP.

	N/A (did not participate)	Not at all useful	Slightly useful	Moderately useful	Very useful	Extremely useful
Professional development funded by the NSF grant (e.g., CUR Connect, NIST)						
Support from Lance (CURE consultant)						

Master of Change book study						
Collaborating around instructional materials						
Engaging in student data collection and analysis						
Curriculum mapping						

9. How (if at all) has the NSF grant influenced how you see departmental and institutional change?

- Very positively
- Positively
- Both positively and negatively
- Negatively
- Very negatively
- Not at all

10. Have you implemented a CURE in the past year?

- Yes
- No

11. How has the NSF grant impacted you or your teaching?

---

12. How (if at all) have the NSF grant activities impacted your understanding of change theory and/or the leadership skills needed for STEM education reform?

---

13. What (if any) challenges have you encountered related to the NSF grant, and how (if at all) were they addressed?

---

14. How could the activities of the NSF grant be improved?

---

15. Please share any additional comments, questions, or concerns about the NSF grant here.

---

## Appendix C: Focus Group Protocol

### Introduction

This focus group is part of an evaluation of the NSF grant funded CUREs initiative. To help enhance the initiative, we will go more in-depth on topics we asked about in the survey. The focus group will last about one hour.

Your participation in our discussion is voluntary. **Please be honest in your responses. The information you share is confidential.** Findings from our discussion will be reported from the group as a whole and will not include your names.

To help us accurately capture all the information you share, **we would like to record the conversation.** The recording will only be seen and heard by our evaluation team.

Does anyone have questions before we begin the discussion?

Does everyone agree to participate in the focus group and be recorded? — *Start the recording.*

### Attitudes Toward Change

1. We would like to get a sense of how you been involved in the grant activities. Please raise your hand if you have been involved in...
  - i. Being a Co-I on the NSF grant proposal
  - ii. Planning the implementation of the NSF grant
  - iii. Professional development with Lance
  - iv. CUREs planning
  - v. Attending grant-related conferences
  - vi. Reading Master of Change
2. How (if at all) have the NSF grant activities influenced how you see departmental and institutional change?
  - a. *Follow up needed:* How did you feel about change before this grant, and how do you feel now?
3. What is the role of faculty in making change in this department at FHSU?
  - a. *Follow up needed:* In Year 2 of this grant, what would you like your role to be in...
    - i. The Community of Practice
    - ii. Implementing CUREs
    - iii. Implementing departmental curricular change

### Impacts of Grant Activities

4. What, if anything, about the NSF grant activities has alleviated your concerns around implementing CUREs?
5. To what extent (if at all) has the CoP impacted collaboration within the department?

The following questions ask specifically about how NSF grant activities have affected CoP faculty in particular, rather than the whole department.

6. To what extent have you collaborated within the CoP?
7. How has participating in this CoP changed teaching practices of faculty in the CoP?
8. How has participating in this CoP increased understanding of change theory and STEM reform leadership among faculty in the CoP?

### **Challenges, Additional Resources, and Recommendations**

On the survey, we asked about challenges encountered. We would like to hear more in-depth about the challenges you experienced and explore possible solutions.

9. What (if any) challenges have you encountered related to the NSF grant, and how could they be addressed?
  - a. *Follow up if needed:* For each of the challenges mentioned, what are ideas for possible solutions?
10. What additional resources or supports are needed to develop and implement CUREs?
11. Beyond what you have already shared, do you have additional thoughts on how the activities of the NSF grant could be improved?
  - a. *Follow up:* Please share any additional comments, questions, or concerns about the NSF grant you have.