Project-Level Analysis of Expansion, Sustainability & Scale Survey Items

The NSF INCLUDES Coordination Hub's Collaborative Infrastructure Survey is designed to document respondents' assessment of their project's progress addressing specific components of each design element. The graphics on the site portray survey findings using *respondents* as the unit of analysis. While this perspective is useful, it fails to consider whether respondents within a given project agreed about the level of progress around the design elements. In addition, there is considerable benefit in considering *projects* as the unit of analysis (e.g., to assess which design elements projects appear to be addressing in a given year of NSF INCLUDES funding). To address this, we used item-response theory and confirmatory factor analysis to generate *project-level* composite scores for each survey item.[1] This approach allowed us to assess the extent to which Alliances have operationalized the design element of collaborative infrastructure at a given point in time. **Learn more about the methodology used to generate project-level findings**

Project-level survey responses regarding Expansion, Sustainability & Scale were relatively low (compared to the other design elements), with an overall score of 62.6 (and a range of 48.0 to 70.6 on a scale of 1 to 100). Additionally:

- At the item level, Alliance-level responses were highest for the following two statements: *"Our project contributes to the field's knowledge base about effective strategies for broadening participation in STEM"* (72.7) and *"Our project has a strategic vision of what activities will be sustained beyond the current award period"* (72.7).
- Alliance-level responses were lowest for the following statement: *"Our project has secured funding beyond the current award period"* (42.8).
- There were some noteworthy differences for Expansion, Sustainability & Scale across Alliances by year of NSF INCLUDES funding.[2,3] Specifically:
    - Alliances with 3 years of NSF INCLUDES funding were more likely to have higher composite scores for the following two statements: *"Our project contributes to the field's knowledge base about effective strategies for broadening participation in STEM"* (76.8, compared to 68.6 for Alliances with 2 years of NSF INCLUDES funding) and *"Our project has secured funding beyond the current award period"* (47.8, compared to 37.9 for Alliances with 2 years of NSF INCLUDES funding).

[1] These approaches are designed to assess the relationship between the latent construct and observed items to test the reliability and validity of the measurement and quantify the attributes of interest.

[2] Because the survey was administered for the first time in spring 2021, we presently have no data on respondents' perceptions of progress at the end of the first year of NSF INLCUDES funding. (Going forward, we expect to obtain Year 1 data from NSF INCLUDES Planning Grants and Cohort 3 Alliances.) As a result, we are currently unable to provide information about the relative progress that respondents would have reported for their initial year.

[3] In theory, one would expect that Alliances with more years of NSF INCLUDES funding would report more progress around the operationalization of a given design element. However, we are somewhat cautious when making such comparisons, because it is possible that the characteristics of Alliances funded in a given cohort differ (e.g., in terms of the maturity and complexity of their partnership structure, the range of barriers they are designed to address, the characteristics of their participant population, and the complexity of their approach). In addition, respondents' perspectives concerning their accomplishments (or the progress they still need to make) around a given design element may shift as they recognize the complexity of a given issue—with respondents realizing more work is needed as they begin to delve more deeply into a particular task.

- Alliances with 2 years of NSF INCLUDES funding were more likely to have higher composite scores for the following statement: *"Our project has a strategic vision of what activities will be sustained beyond the current award period"* (76.3, compared to 69.0 for Alliances with 3 years of NSF INCLUDES funding).

Project-Level score for Expansion, Sustainability & Scale

Survey item	Overall *(n=6 projects)*	Year 2 of project funding *(n=3 projects)*	Year 3 of project funding *(n=3 projects)*
Our project contributes to the field's knowledge base about effective strategies for broadening participation in STEM	72.7 *(63.5, 78.6)*	68.6 *(63.5, 72.2)*	76.8 *(75.0, 78.6)*
Our project has a strategic vision of what activities will be sustained beyond the current award period	72.7 *(47.7, 85.7)*	76.3 *(70.5, 83.3)*	69.0 *(47.7, 85.7)*
Our project has a written plan that outlines a strategy for sustaining activities beyond the current award period	52.9 *(39.6, 66.7)*	52.6 *(46.9, 56.3)*	53.3 *(39.6, 66.7)*
Our project has secured funding beyond the current award period	42.8 *(32.5, 57.1)*	37.9 *(32.5, 43.8)*	47.8 *(36.1, 57.1)*
Overall	62.6 *(48.0, 70.6)*	62.5 *(61.1, 64.9)*	62.7 *(48.0, 70.6)*

Note: The score for a given survey item represents the overall standardized scale score obtained from the item-response theory and confirmatory factor analysis. Each score has a range of 1 to 100, with 100 representing the highest possible score—i.e., all respondents within a project answered the highest response category (either "achieved" or "strongly agree") for a given survey item. In addition, we provide the minimum and maximum project-level standardized scale score response *(in italics)* for a given survey item.