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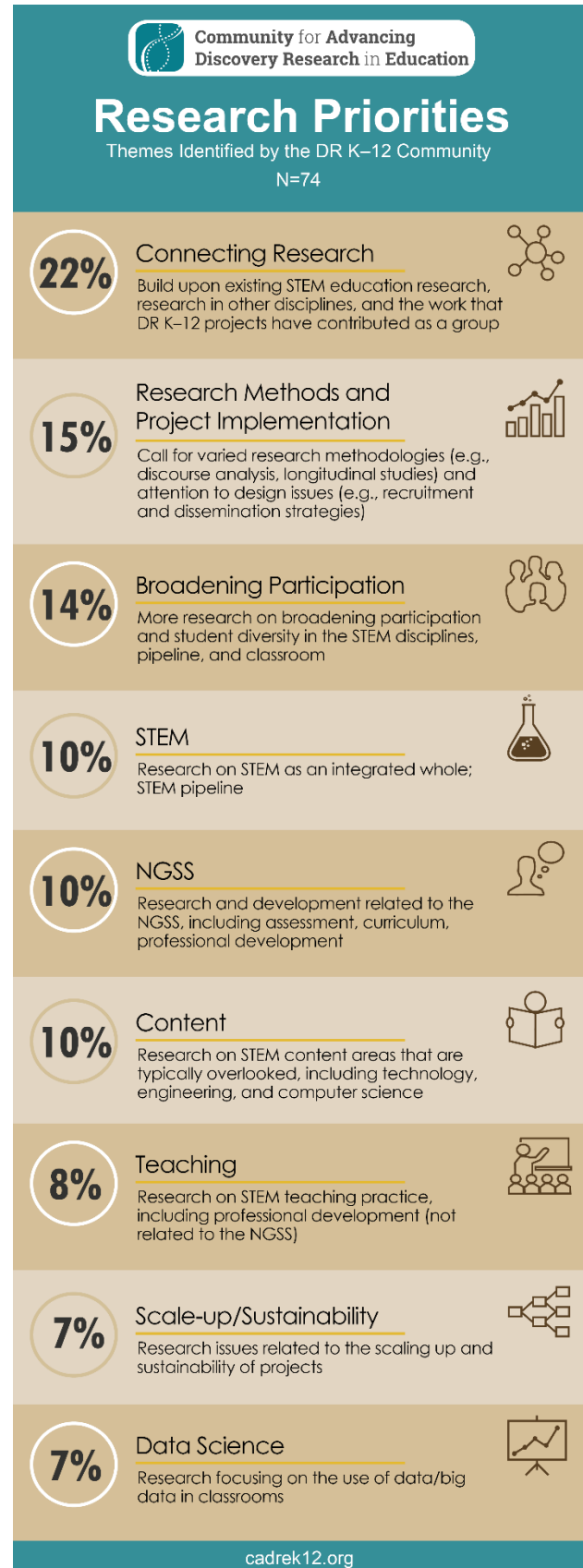
Future Research Priorities for DR K–12

This brief presents the results of a survey question asking DR K–12 awardees to suggest future research priorities for the DR K–12 program. Specifically, the survey question asked, "**What research questions or topics should be future priorities for the NSF's DR K–12 program research agenda?**" Seventy-four participants (69% of survey respondents) responded to this item. The infographic (right) displays the most common themes.

A more detailed description of each theme and examples of participant responses are provided below.

Connecting Research

Sixteen respondents (22% of N=74) commented that a future priority for the NSF research agenda should be related to connecting research, explicitly drawing on and linking to STEM education research. Responses described this as both (1) *aligning with and leveraging* existing research and (2) *collaborating* with researchers. Eleven of the 16 responses related to aligning and leveraging research. Overall, these responses noted the importance of developing a more coherent picture of STEM learning. For example, one respondent raised the question, "How do we pull together threads of research into a more coherent whole?" Similarly, another respondent commented specifically on the need to align research more closely in the DR K–12 program: "We need more lines of research and fewer 'one-shot' studies." Other responses highlight the importance of building on knowledge in general, notably, "figuring out how to capitalize on what has been learned about student learning, high-quality teaching, and teacher learning over the last 30 years."

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Research Priorities
Themes Identified by the DR K–12 Community
N=74

22% Connecting Research
Build upon existing STEM education research, research in other disciplines, and the work that DR K–12 projects have contributed as a group

15% Research Methods and Project Implementation
Call for varied research methodologies (e.g., discourse analysis, longitudinal studies) and attention to design issues (e.g., recruitment and dissemination strategies)

14% Broadening Participation
More research on broadening participation and student diversity in the STEM disciplines, pipeline, and classroom

10% STEM
Research on STEM as an integrated whole; STEM pipeline

10% NGSS
Research and development related to the NGSS, including assessment, curriculum, professional development

10% Content
Research on STEM content areas that are typically overlooked, including technology, engineering, and computer science

8% Teaching
Research on STEM teaching practice, including professional development (not related to the NGSS)

7% Scale-up/Sustainability
Research issues related to the scaling up and sustainability of projects

7% Data Science
Research focusing on the use of data/big data in classrooms

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Additionally, five responses emphasized the importance of collaboration. These respondents specifically discussed the importance of increased collaboration between DR K–12 projects, particularly using technology tools and project-generated data. As one respondent described, an emphasis in the future research agenda should be "fostering collaboration between projects and supplemental funding to link projects and explore crossover, finding and building on common platforms, or focusing on building and sharing cross-platform tools to reduce redundancy." Together, the responses that related to "connecting research" place a priority on generating more explicit connections between current studies and past research and to better leverage resources and findings for the DR K–12 program. Overall, responses in this category prioritize fostering connections and collaboration to enhance the impact of the DR K–12 program on STEM education.

Research Methods and Project Implementation

Eleven respondents (15%) indicated that the DR K–12 program should prioritize topics related to research methods and project implementation. In particular, 8 respondents suggested a focus on the use of *diverse research methods* in the future, specifically longitudinal studies or qualitative analytic methods, such as discourse analysis. Comments included, "I would like to see more diverse research methods and products of this work," along with "funding opportunities for longitudinal studies to provide evidence of impact in a meaningful way."

With respect to *project implementation*, four participants identified dissemination of findings as a priority. Comments included, "Dissemination continues to be a big topic. Understanding social media and how the public interacts with information is key," as is "how to be most successful with getting consent for your study and for dissemination videos."

Broadening Participation

Ten respondents (11%) commented on the importance of broadening participation in the future research agenda. Several specifically commented on the current NSF merit criteria, while others more generally commented on the importance of increasing student diversity in STEM and equitable teaching practices in the classroom. For example, comments included, "Broadening participation continues to be underrepresented in the DR K–12 agenda," as do "studies that address best ways for teachers and pre-service teachers to be developed and educated to teach a diverse student body." One participant raised this concern: "How can the diversity of PIs be increased?"

STEM

Seven respondents (10%) commented that the integration of STEM and/or the STEM pipeline should be a priority for future research. Three respondents highlighted the importance of *integration* among STEM disciplines. As one participant described, "I worry about the seemingly monolithic nature of STEM and the relative priority of math funding opportunities in light of a push for convergent research in STEM." Four responses focused specifically on

STEM *pipeline* issues, raising questions such as, "How do sustained communities of practice that include professionals in STEM fields and STEM educators support STEM teaching and learning? How can students farther along the STEM pipeline (from secondary through graduate school) serve as ambassadors to younger students in ways that increase interest, engagement, and participation in STEM learning?"

NGSS

Seven respondents (10%) recommended that the NGSS be the focus of the future research agenda in DR K–12. In particular, respondents identified curriculum development, assessments, and research into teaching practice as potential areas of focus. Typical comments about the NGSS included "developing stronger K–12 science assessments," "developing resources (including curriculum) that align with [the] NGSS," and "learn[ing] more regarding sustained professional learning to bring about change aligned to the Framework."

Content

Seven respondents (10%) highlighted the importance of focusing on content areas that are often overlooked with the emphasis on STEM, primarily related to technology/computer science (4), including technological literacy and coding, and/or engineering (3). These responses emphasized a priority in research and development in these disciplines. One participant raised a concern that STEM seemed to prioritize science, and other content areas needed to receive greater attention. For example, one participant commented, "I was surprised at the (seemingly) sole focus on science, and it would be helpful to address other STEM areas."

Teaching

Six respondents (8%) regarded teaching practice—not related to the NGSS—as a priority of future DR K–12 research. This includes teacher education, research on STEM teaching, and teaching practices to meet the needs of diverse learners. Respondents raised future research questions such as, "How do STEM teachers develop improved ways of teaching that build on what research tells us of students' ways of reasoning?" and raised topics including "systematic approaches to improving teaching."

Scale-up/Sustainability

Five respondents (7%) identified issues related to scale-up or sustainability as a priority for the future research agenda. Comments included "stressing the importance of scale and teacher training while maintaining the philosophical underpinnings of projects focusing on societal impacts" and "sustainability plans after the grant period."

Data Science

Five respondents (7%) identified data science, or "big data," in teaching and learning as a potential future priority for research, specifically supporting students in using big data. Questions raised include, "1. How can data science education at the school level be nurtured? 2. What are the opportunities and obstacles regarding introduction of data science as a core competency at the school level? Is it realistic to think that data science skills and concepts can be integrated into teaching across disciplines? If so, how? And on what time scale? 3. How do learners view data and the processes that transform data? 4. Is data science education research a viable field, and, if so, what should be its early priorities?" One participant also noted a priority in using big data more often in education research.

BACKGROUND

A survey was distributed by Policy Studies Associates (PSA), CADRE's external evaluator, to attendees of the 2016 annual DR K–12 PI meeting. The survey was open for one week following the PI meeting, and responses were collected between June 3 and June 10, 2016. Overall, the survey received 108 responses out of the 218 attendees at the PI meeting, for an overall response rate of approximately 50%. This brief presents the results of one question within the larger survey, asking participants to suggest future research priorities for the DR K–12 program. Potential future research agenda topics were also discussed informally in sessions, but this survey item is the only formal collection of participant thoughts. This was an open-ended item. Specifically, the survey question (#11) asked, "What research questions or topics should be future priorities for the NSF's DR K–12 program research agenda?" A total of 74 participants (69% of survey respondents) responded to this item.

Analysis consisted of open coding with the goal of identifying the most common priorities expressed in the responses. If participants expressed multiple ideas, each idea was coded separately, meaning one response could represent multiple codes. There was wide variation in the responses, though some common themes could be identified. The infographic displays the most common themes.