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EVALUATION FINDINGS: HEWLETT FOUNDATION AWARD TO BATES COLLEGE TO SUPPORT OPEN EDUCATION PRACTICES OF SCORE AND QUBES

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Acknowledgements

The information provided within this report is summarized according to the author's understanding of data collected for evaluating the William-Flora Hewlett Foundation award to Bates College. The opinions, findings, conclusions, and/or recommendations expressed in this report are those of the author and do not necessarily reflect the view of the funding agency.



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LIST OF ACRONYMS

AEM: Accessible Education Materials

API: Application Programming Interface

CAST: Center for Applied Special Technologies

COMAP: Consortium for Mathematics and its Applications

FMN: Faculty Mentoring Network

ISKME: Institute for the Study of Knowledge Management

MMHub: Math Modeling Hub

NCTM: National Council of Teachers of Mathematics

OEP: Open Education Practices

OER: Open Education Resources

QUBES Hub: Quantitative Undergraduate Biology Education and Synthesis

SABER: Society for the Advancement of Biology Education Research

rTRES Consulting: RT Research, Evaluation and Statistical Consulting (pronounced r tres)

SCORE-UBE: Sustainability Challenges for Open Education Resources to Promote an Equitable Undergraduate Education

SERC: Science Education Resource Center at Carleton College

SGCI: Science Gateways Community Institute

S-JEDI: Social Justice Equity Diversity and Inclusion

SIAM: Society for Industrial and Applied Mathematics

SIMIODE: Systemic Initiative for Modeling Investigations and Opportunities with Differential Equations

SPLINE: STEMEd Project Leaders Inclusivity Network

STEM: Science, Technology, Engineering and Mathematics

UDL: Universal Design for Learning

EXECUTIVE SUMMARY

In April 2020, Dr. Carrie Diaz Eaton at Bates College was awarded a William & Flora Hewlett Foundation grant to support efforts of the SCORE Network to 1) support sustainability of the QUBES Hub infrastructure, 2) provide mini-grants to support new SCORE collaborations that pilot shared infrastructure and OER research, 3) implement a faculty mentoring network focused on assimilating UDL and inclusive teaching practices into OER/OEP, and 4) organize a learning community to foster conversations of social justice, equity and diversity aimed to center S-JEDI principles within organizational missions. Dr. Robin Taylor, Principal and Senior Evaluator of rTRES Consulting, was contracted by Bates College to evaluate the project. The following is a highlight of project activities and data findings.

| Sustainability of QUBES | Mini-grants to support SCORE collaborations | SPLINE program focused on UDL, DEI, and OER | S-JEDI learning community |
|---|--|--|---|
| QUBES Hub was established with funding from the National Science Foundation and is an online community of math and biology educators who share education resources and methods to support instruction of undergraduate students to use quantitative approaches to tackle real, complex, biological problems. The following services are offered to support sustainability efforts of the QUBES community: faculty mentoring networks, workshops and meetings, classroom space, open access to educational resources, project websites, and private working groups to support their ecosystem of educators in biology and mathematics and to support open education communities. | The mini-grant program provided synergistic opportunities for organizations to combine infrastructure and/or increase capabilities through partnerships which supported OER, OEP, social justice and equity. The program resulted in increased professional connections; opportunities to learn from other organizations and gain knowledge from their experience; enhanced financial sustainability by combining resources and sharing the QUBES Hub platform; and increased opportunities for future collaborations. | The STEM education Project Leaders Inclusivity Network (SPLINE) program provided professional development for 12 instructors, curricular developers, and other OER stakeholders to assimilate the Universal Design for Learning (UDL) framework, inclusivity teaching practices, and OER within their projects. Overall, participants demonstrated positive gains in their efficacy and understanding of UDL, inclusive pedagogy and OEP. Participants also reported how they have incorporated different components of the program within their work. | During Summer 2020, a total of 17 participants from the SCORE Network participated in weekly readings, discussions, and reflections to increase awareness of issues in social justice, equity, diversity, and inclusion. The curated list and structure of readings combined with the supportive community to address challenging and uncomfortable topics, diverse perspectives of members, and the action oriented approach to discussions were beneficial to attendees. A new S-JEDI series is being offered from April 07, 2021 through May 12, 2021. |

INTRODUCTION

In April 2020, the William and Flora Hewlett Foundation's Education Program awarded Dr. Carrie Diaz Eaton and Bates College a one-year grant to support the SCORE (Sustainability Challenges for Open education Resources to promote an Equitable undergraduate education) and QUBES (Quantitative Undergraduate Biology Education and Synthesis) communities in their work to support open education practices of STEM (science, technology, engineering and mathematics) educators. QUBES utilizes a virtual synthesis center model to support a community of individuals and organizations dedicated to reforming STEM education [1]. Likewise, SCORE is a network of stakeholders and organizations engaged in open education practices (OEP) collaborating to achieve sustainability and broader impact goals for open education initiatives [2]. The aim of the grant was to strengthen the QUBES and SCORE communities by:

1. Sustaining QUBES infrastructure,
2. Providing mini-grants to support new SCORE collaborations that pilot shared infrastructure and OER research, and
3. Implementing QUBES and SCORE Peer Mentoring Networks focused on building capacity and understanding of social justice, equity, diversity, and inclusion in higher education with a goal of influencing both OER curriculum and organizational strategies.

rTRES Consulting was contracted by Bates College to evaluate the project. The evaluation of the project is guided by the following evaluation questions:

- To what extent has the project achieved the goals of the grant?
- What challenges in project implementation emerged and how were these challenges addressed?
- How might components of the project be sustained beyond the grant period?

The report includes 1) a program description to provide details about project activities, 2) an overview of evaluation methods, 3) evaluation results, and 4) conclusions.

PROGRAM DESCRIPTION

Bates College was awarded a William and Flora Hewlett Foundation grant under PI, Dr. Carrie Diaz Eaton, Associate Professor of Digital and Computational Studies, to support efforts of the SCORE Network to continue collaborations for broadening the STEM education open education community. The grant award focused on four major project activities to 1) preserve functionality of the QUBES Hub, 2) support open education resource (OER) sustainability initiatives through a mini-grant award program, 3) provide a Faculty Mentoring Network (FMN) focused on assimilating Universal Design for Learning (UDL) and inclusive teaching practices into OER/OEP, and 4) organize a learning community to reflect on how diversity, equity, and inclusion is and/or should be manifested within OER efforts and organizational missions. A brief description of project activities follows.

SUSTAINABILITY OF QUBES HUB

QUBES Hub is an online community of math and biology educators who share education resources and methods to support instruction of undergraduate students to use quantitative approaches to tackle real, complex, biological problems. QUBES was established through a National Science Foundation award and the QUBES Hub was developed through HUBzero – “an open source software platform for building powerful websites that host analytical tools, publish data, share resources, collaborate and build communities in a single web-based ecosystem” [3]. QUBES currently offers a) faculty mentoring networks, b) workshops and meetings, c) classroom space, d) open access to educational resources, e) project websites, and f) private working groups to support their ecosystem of educators in biology and mathematics and to support open education communities:

SCORE COLLABORATIVE MINI-GRANTS PROGRAM

In October 2019, Bates College hosted the SCORE-UBE Summit which allowed members of OER-affiliated organizations to explore equity and sustainability challenges of OER, resulting in the SCORE Network. The mini-grants program was used to catalyze collaboration within the SCORE Network as members share common interests for supporting OER, OEP, social justice, and equity. Efforts to create and implement the program commenced in April 2020 as the leadership team immediately worked to develop a call and application for the program – see Figure 1. An advisory board of six members with expertise in OER, OEP, inclusive pedagogy (Figure 2) supported project staff in developing the application call and finalizing funding decisions for mini-grant awards. The call for applications was released on May 01 and proposal submissions were due May 22. Applicants were notified of funding decisions on May 31.

Five mini-grant applications were awarded funding to support efforts that support OEP and/or promoting diversity, equity, and inclusion;

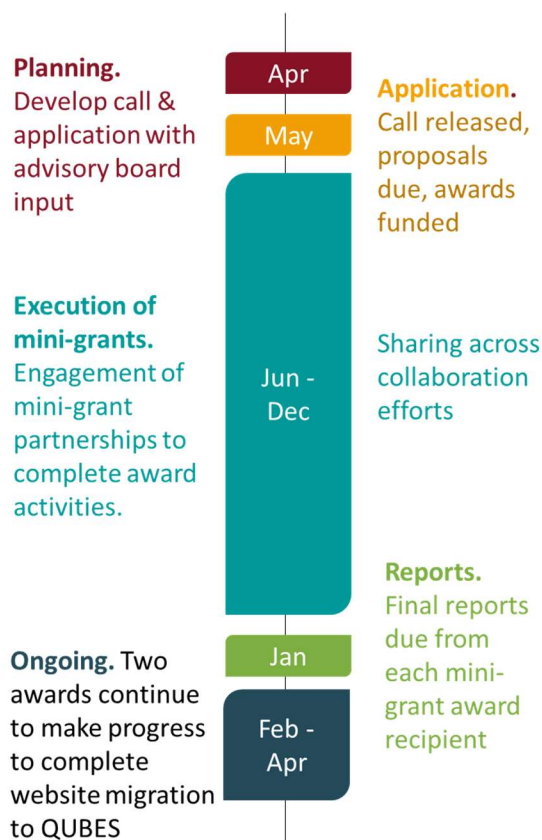


Figure 1. Timeline for mini-grant program

however, one project award was not able to proceed with their anticipated project due to the COVID-19 pandemic and impacts on personnel and time availability. A description of the remaining four mini-grants follow:



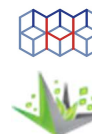
Piloting an Evaluation Framework for Accessible STEM OER. The Institute for the Study of Knowledge Management (ISKME) partnered with the Science Education Resource Center (SERC) at Carleton College to pilot test an evaluation framework previously developed by ISKME and the Center for Applied Special Technologies (CAST) to help determine the accessibility of multimedia OER based on varying learner needs.

SIMIODE to QUBES: Gaining Efficiency and Expanding Visibility. The Systemic Initiative for Modeling Investigations and Opportunities with Differential Equations (SIMIODE) collaborated with QUBES Hub to integrate the SIMIODE platform within the QUBES infrastructure.



Creation of a Sustainable Platform that Benefits CourseSource and QUBES Hub. CourseSource, an open-access journal of peer-reviewed teaching resources for undergraduate biological sciences collaborated with QUBES to begin integration of the CourseSource journal within the QUBES hub platform.

Math Modeling Writer's Workshop. The Mathematical Modeling Hub (MMHub) aims to facilitate integration of mathematical modeling into classroom teaching and collaborated with CourseSource to adapt their writing workshop model to support submission of OER content.











| | |
|---|--|
|  <p>Kaitlin Bonner, PhD. <i>Associate Professor at St. John Fisher College</i></p> <ul style="list-style-type: none"> □ Environmental data science professor and education researcher studying instructor adaptation, use and resharing of OER |  <p>Sam Donovan, PhD. <i>Lecturer in Biology at University of Pittsburgh, Director of OER (QUBES), Director of Undergraduate Research (BioQUEST)</i></p> <ul style="list-style-type: none"> □ OER Director for QUBES with a long history of leadership in digital OER projects including the National Digital Science Library |
|  <p>Karen Cangialosi, PhD. <i>Professor of Biology, Open Education Faculty Fellow at Keene State College</i></p> <ul style="list-style-type: none"> □ Expertise in the Open Education landscape especially Open Education Practices and Pedagogy |  <p>Michelle Smith, PhD. <i>Ann S Bowers Associate Professor of Ecology and Evolutionary Biology at Cornell University</i></p> <ul style="list-style-type: none"> □ Editor-in-chief of CourseSource, an open digital journal which links course materials to professional society curriculum standards in biology |
|  <p>Bryan Dewsbury, PhD. <i>Associate Professor of Biology at Rhode Island, Gardner Institute Fellow</i></p> <ul style="list-style-type: none"> □ Expertise in curriculum design and inclusive teaching practices. |  <p>Nate Snodgrass. <i>Technical Project Manager for HUBzero at University of California, San Diego</i></p> <ul style="list-style-type: none"> □ HubZero liaison to QUBES and SCORE; Leader in the Science Gateways Community Institute involved in infrastructure sustainability for the broader STEM research community. |
|  <p>Carrie Diaz Eaton, PhD. PI, Associate Professor of Digital and Computational Studies</p> <ul style="list-style-type: none"> □ Interdisciplinary curriculum development and faculty support for inclusive teaching practice |  <p>Maggie Diamond-Stanic, PhD. <i>Grants Manager for QUBES@Bates and SCORE-UBE</i></p> <ul style="list-style-type: none"> □ Grant specialist |

Figure 2. Advisory Board of the Hewlett Foundation award to Bates College

SPLINE

The STEM education Project Leaders Inclusivity Network (SPLINE) program is a FMN to support instructors, curricular developers, and other OER stakeholders with assimilating the Universal Design for Learning (UDL) framework, inclusivity teaching practices, and OER within their projects (Figure 3). SPLINE was facilitated by Dr. Jeremy Wojdak, Professor of Biology at Radford University and QUBES Professional Development Director. Meetings were led by six mentors with personal experience and professional expertise in or UDL, DEI, and OER (see Figure 4).

A total of 32 applications were received for the SPLINE program with 12 participants accepted. SPLINE participants were divided into three groups with each group meeting virtually on a weekly basis from July 09, 2020 to September 04, 2020. An overview of the SPLINE schedule and readings provided to the group are included in Appendix A.

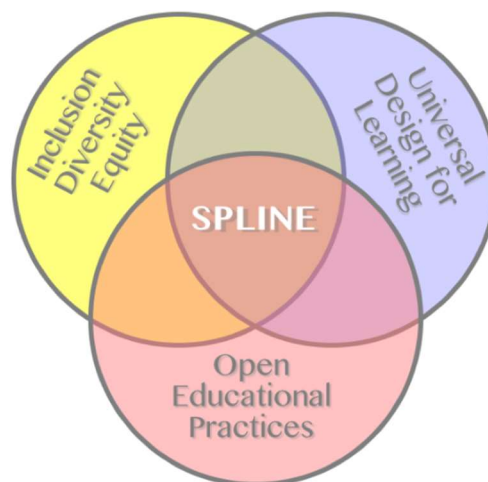


Figure 3. Components of SPLINE Program








| | |
|---|--|
|  <p>Bryan Dewsbury, PhD. <i>Associate Professor of Biology at Rhode Island, Gardner Institute Fellow</i></p> <p>☐ Expertise in curriculum design and inclusive teaching practices.</p> |  <p>Mays Imad, PhD. <i>Professor of Pathophysiology & Biomedical Ethics, Coordinator of Teaching & Learning at Pima Community College</i></p> <p>☐ Expertise in inclusive teaching and metacognition</p> |
|  <p>Ameer Evans Godwin, VP for Research & Development at ISKME</p> <p>☐ Expertise in UDL and OER</p> |  <p>Hayley Orndorf, PhD. <i>QUBES Project Manager & UDL Program Manager at BioQUEST</i></p> <p>☐ Expertise in UDL</p> |
|  <p>Andrew Hasley, PhD. <i>Assistant Director for UDL Initiative at BioQUEST</i></p> <p>☐ Expertise in UDL</p> |  <p>Luis Perez, PhD. <i>Technical Assistance Specialist for National AEM Center at CAST</i></p> <p>☐ Expertise in UDL and OER.</p> |
| <hr style="border-top: 1px dashed black;"/>  <p>Jeremy Wojdak, PhD. <i>Professor of Biology at Radford University, QUBES Director or Professional Development</i></p> <p>☐ Facilitator for QUBES Faculty Mentoring Networks</p> | |

Figure 4. Mentors of the SPLINE program and training topics

S-JEDI LEARNING COMMUNITY

A total of 17 participants from the SCORE Network participated in weekly readings, discussions, and reflections to increase awareness of issues in social justice, equity, diversity, and inclusion (S-JEDI) within teaching methods, research, programs, and organizations. The QUBES Community platform for SCORE was used as a forum for posting weekly assignments and allowed for continual communication across group members. Appendix B includes a curation of resources used for the S-JEDI learning community. The learning communities were facilitated by Dr. Pat Marsteller and Jasmine Roberts – see Figure 5. Participants were divided into two groups with each group meeting weekly between June 22, 2020 and July 28, 2020 to discuss readings and assignments.

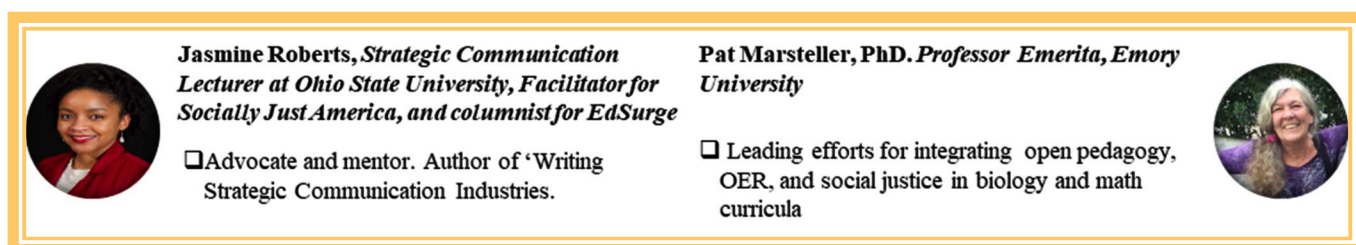


Figure 5. Mentors for the S-JEDI Learning Community

EVALUATION BACKGROUND

Dr. Robin T. Taylor, Principal and Senior Evaluator of rTRES Consulting was contracted in April 2020 to serve as the external evaluator for the Hewlett Foundation award to Bates College. The methods used for evaluating the project were chosen to support understanding for how project activities supported goals of the project and were aligned using a theory of change model outlined within the proposal – see Appendix C. In addition, an evaluation grant chart listing measurable outcomes was completed for the proposal submission and is also used to guide evaluation activities – see Appendix D. Evaluation findings are intended to inform implementation decisions of the project as well as to report findings to the funding agency. Data summary reports were shared with the leadership team at different time points in the project [4] [5] [6] [7].








Recognition of potential bias statement. I believe the data provided and summarized in the report are accurate and valid inferences from participants' responses. However, the majority of my work as a program evaluator, has involved supporting numerous STEM education and workforce development programs aimed to broaden participation of underserved groups across STEM. I am hopeful and optimistic that continual focus and efforts across meaningful and thoughtful initiatives will result in a robust and diverse STEM workforce in which all individuals are included and valued. I recognize that I may hold potential biases which may influence the positive interpretation of findings presented within this report. I am recognizing this potential bias in the hopes it does not compromise the evaluation processes and results.

EVALUATION METHODS

The evaluation includes a mixed-method approach to assess project implementation and to gauge progress towards meeting project outcomes across grant activities. The evaluation utilizes information provided through team meetings, program documentation, observations, survey administrations, interviews, and focus groups – see Table 1. A protocol of the evaluation was submitted to (and approved by) the Bates College Institutional Review Board to assure that data collection methods meet requirements for the protection of the rights and welfare of human subjects. Data collection instruments (e.g., surveys, semi-structured focus group and interview questions) are included in Appendix F. The evaluation is guided by the following questions:

1. To what extent has the project’s outcomes been accomplished? More specifically, to what extent has the project:
 - Supported the sustainability of QUBES Hub,
 - Strengthened relationships and leveraged expertise of OER, and
 - Built understanding and capacity for evidence-based pedagogy which promotes social justice, equity, diversity and inclusion in OER
2. What challenges in project implementation emerged, and how were these challenges addressed?, and
3. How might components of the project be sustained beyond the grant period?

Table 1. Overview of evaluation activities of the Hewlett Foundation Award to Bates College

| | | | |
|---|---|---|--|
|  | Surveys. SPLINE Pre/Post/ Follow-up surveys; S-JEDI post survey |  | Interviews. Conducted interviews with key personnel. |
|  | Program Documentation. Reviewed multiple sources of program documentation (e.g., meeting minutes, SCORE /SPLINE/S-JEDI communities, etc.) |  | Team Meetings. Attend weekly leadership meetings; monthly mini-grant evaluation meetings, and other meetings as scheduled. |
|  | Observations. Observer for virtual events such as QUBES Partnership, Mini-grant celebration, S-JEDI meetings |  | Focus Groups. Focus groups conducted with members of each mini-grant award/partnership. |
|  | QUBES data. The QUBES technical support team provided access to queries of users, group membership, roles, and additional data to understand characteristics of users since the implementation of the hub. | | |

Note. Icons were downloaded from <https://thenounproject.com>. Attributions for each icon used in the report are provided in Appendix E.

Additional details for data collection methods completed for the evaluation are provided and grouped by project components.

QUBES Infrastructure

Dr. Drew LaMar (QUBES Site Manager) and Jenny Kwan (QUBES Hub Web Designer) have provided queries of QUBES data related to users, groups, and online activities which have been used to explore and understand characteristics of the community across time. Major analyses have included examining patterns of new and returning users of QUBES; exploring characteristic data available for users; analyzing FMN data; and assessing the overlap of users across groups within QUBES Hub.

Additional information about QUBES was provided in weekly leadership meetings, program documentation (i.e., QUBES platform), and meetings with the QUBES leadership team. In addition, I reviewed lightening talks and posters created by QUBES partners for the Partners@QUBES Leadership Summit on December 14, 2020.

SCORE Collaborative Mini-Grants Program

Program documentation, weekly leadership meetings, periodic evaluation meetings to exchange ideas across mini-grant partnerships (agendas provided in Appendix G), mini-grant progress reports, and focus groups with members of each mini-grant award were used collect data about each mini-grant award. This data provides rich, qualitative data to understand project activities and partnership outcomes.

SPLINE

Participants in the SPLINE program were asked to complete pre- and post-surveys (before participating in the program and at the end of the program) as well as a follow-up survey during Spring 2021 (Appendix F). In addition, as a member of the SPLINE group community within QUBES, I was able to review program artifacts such as meeting agendas and notes, schedules, code of conduct, postings of resources provided by organizers and mentors of SPLINE, and forum discussions to understand implementation efforts of the SPLINE program.

S-JEDI

Participants of the S-JEDI learning community were asked to complete a post-survey (Appendix F) at the conclusion of the program, with a follow-up e-mail during Spring 2021 to ask how participating in the program influenced their work or organization. I was included as a member of the S-JEDI community and has access to all resources and forum posts shared within the group. Moreover, I attended weekly meeting sessions and discussions, such that I was an observer for one group and an active participator in the second.

EVALUATION RESULTS

TO WHAT EXTENT HAS THE PROJECT'S OUTCOMES BEEN ACCOMPLISHED?

Sustainability of QUBES Hub

The QUBES leadership team continues to develop working relationships and practices to guide the QUBES project. During this past year, the team focused efforts to determine and promote services which QUBES Hub can offer to enhance sustainability and support their partner organizations and research projects. This has resulted in more clearly characterizing the services QUBES offers, such as:

- **Faculty mentoring networks (FMNs).** Professional development opportunities intended to support educators with utilizing effective pedagogical approaches that can improve classroom instruction.
- **Workshops and meetings.** QUBES offers members the ability to create a community space that can support pre- and post-workshop community interactions which can be used to promote schedules, meeting resources, updates and discussion forums for conversations across members.
- **Classrooms.** Members can request private classroom space on QUBES to provide easy access to students for assignments, sharing resources, and interactions. A feature of the QUBES classroom space is the capability for students to access tools (e.g., R Studio and NetLogo) which run on the QUBES servers without requiring students to download and install the software.
- **Collaborative publishing.** QUBES Hub has an OER Resource platform which allows users to share and access open education resources using “share alike” licenses that allow others flexibility of adopting resources within their own classroom setting. Usage metrics are combined with resources to demonstrate impacts of shared OER.
- **Project websites.** QUBES Hub offers opportunities for projects to utilize the QUBES platform to design effective websites and share projects with the QUBES community.
- **Private working groups.** The QUBES platform can provide virtual space for easy collaboration for working groups or projects with features for scheduling, group communication, file sharing and managing team dynamics.

During this past year, I worked closely with Dr. Drew LaMar and Jenny Kwan to query data on registered QUBES users and to explore other metrics for understanding users' engagement across the QUBES Hub. As of April 2021, there were 1,245 results of OER within QUBES resources. The number of resources submitted within QUBES Hub peaked in 2018 ($n = 482$) with a total of 338 additional resources being submitted since January 01, 2020. OER maintained within the QUBES Hub can be accessed by registered and non-registered users; therefore, it cannot be determined how many individuals have accessed OER/OEP within QUBES. However, queried data does provide the number of times a webpage was accessed (the validity that access is being sought by an individual cannot be verified, nor is data available to determine duplicity for individuals accessing the site multiple times). Metrics for accessing the QUBES home page demonstrate continual increases over time – the front page has been accessed over 411,000 times, rising from an annual access of 509 hits in 2014 to 99,488 hits in 2020.

Figures 6 through 8 were created to explore the growth of QUBES since the project's inception. These waterfall charts are used to demonstrate the number of registered users utilizing the QUBES Hub platform over time while also examining how many users continue to use the platform and how many new users are registered each year. The queried data includes a last visit date for each user and this field was used to determine if users continued to use the hub platform after registering for the site. The data presented in Figures 6 through 8 are based on queried data provided on January 04, 2021 and may fluctuate with

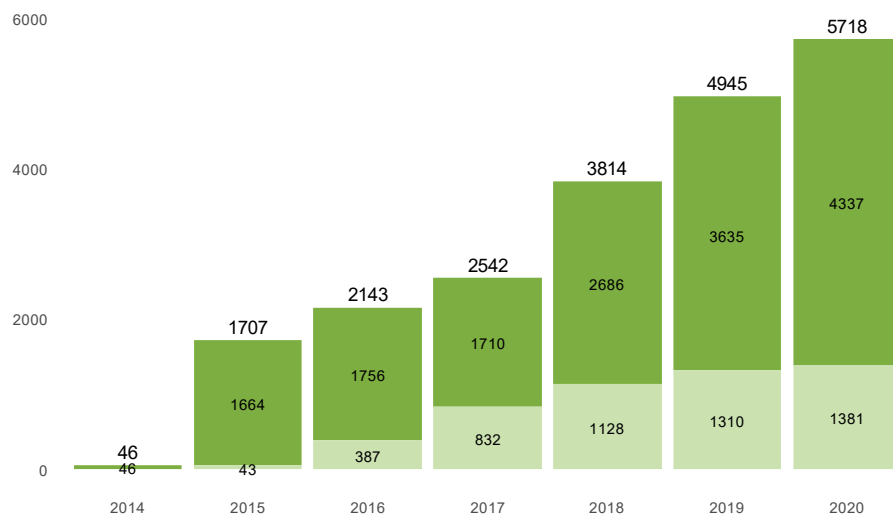
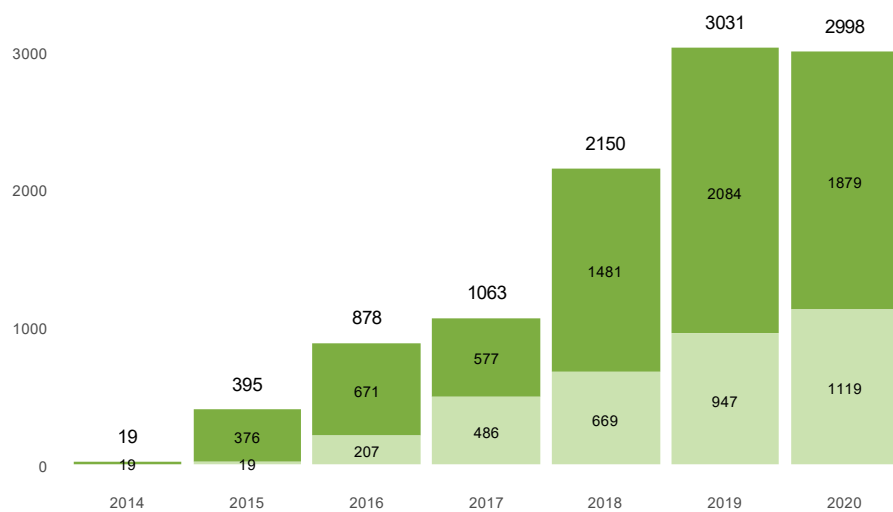
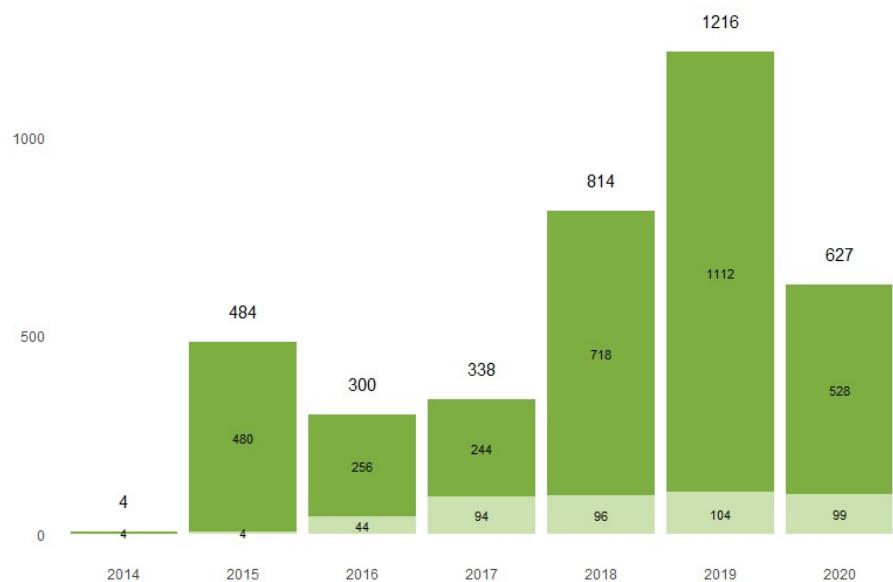


Figure 6. Total number of **returning** and **new** users to QUBES Hub by calendar year.

Note. Figure 6 includes data for those who did not indicate an affiliation, whereas this missing information is not included in totals for 6b or 6c.



6b. Total number of **returning** and **new** NON-student users to QUBES Hub by calendar year. (Also excludes users who did not indicate affiliation).



6c. Total number of **returning** and **new** student users to QUBES Hub by year.

changes in users' last visit date. A total of 15,915 persons are registered users within the QUBES Hub platform – including a total of 5,718 active users during the 2020 calendar year. The growth of registered users for QUBES has steadily increased across time with more than 1,000 users continuing to login to the hub over the last several years.

Since 2015, QUBES has offered 71 FMNs, i.e., professional development opportunities for educators. FMNs support the utilization of effective pedagogical approaches that can improve classroom instruction. A total of 797 individuals have participated in at least one FMN since FMNs were first offered by QUBES Hub.

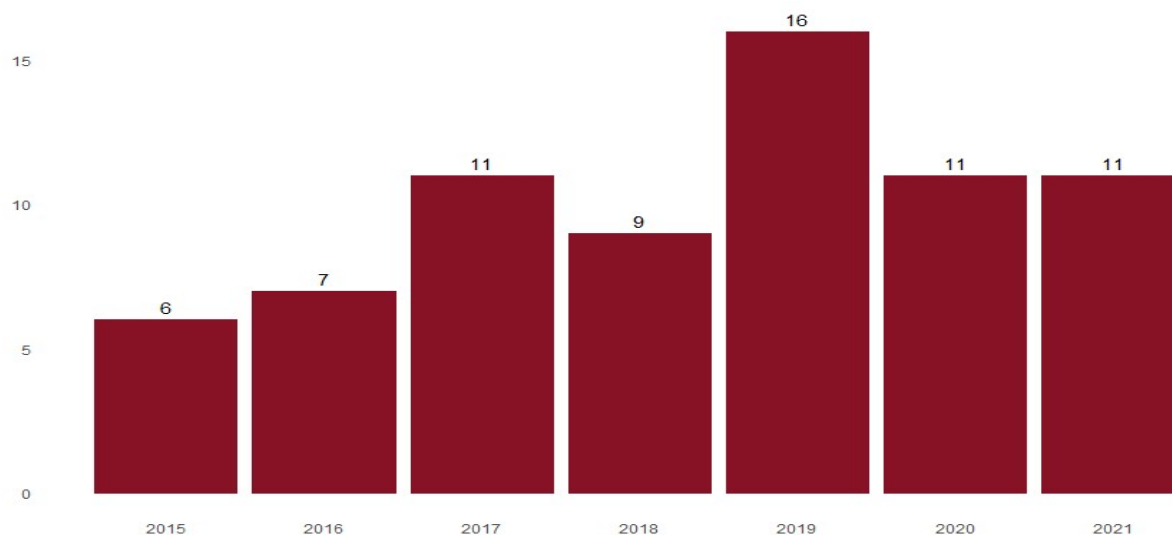


Figure 7. Total number of new FMNs by year. A total of 71 FMNs have been implemented since QUBES inception, supporting 797 participants

QUBES Hub uses groups as a way to share content and conversation for communities with a specific interest or topic. Groups can include communities such as FMNs, workshops and meetings, classrooms, project websites, and/or private working groups, etc. Groups are broadly categorized into three types: partnership groups (e.g., groups with collaborative working relationships with QUBES), groups (e.g., communities within QUBES, but which have not established a collaborative working relationship), and project groups (e.g., smaller applications or test groups within QUBES). Figure 8 shows the number of partnership groups (124 total) and other groups (369 total) created over time within QUBES Hub. A total of 993 project groups have also been created within the hub platform; but the creation of project groups over time cannot be explored due to large amounts of missing data related to date of creation for these group types.

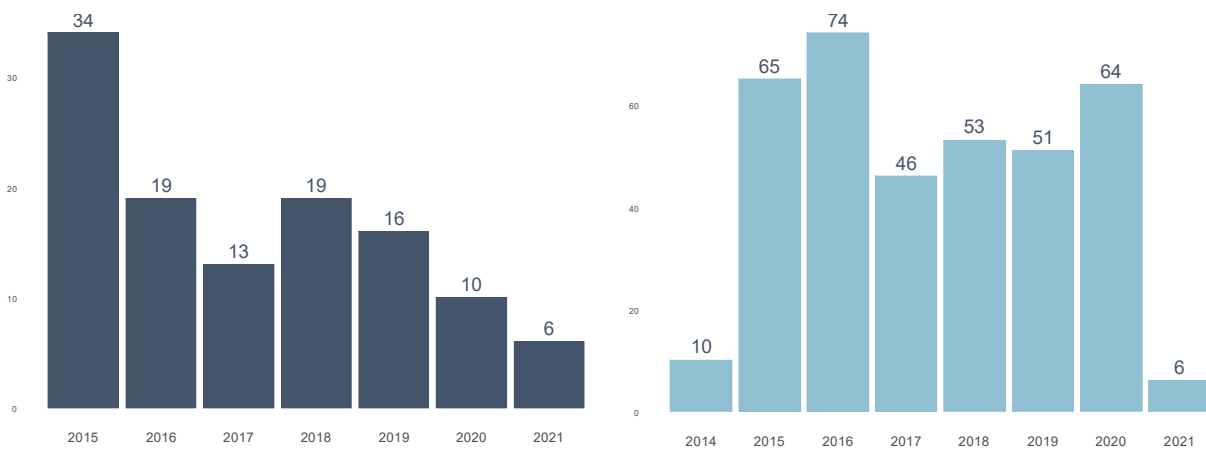


Figure 8. Total number of **partnership groups** and **other groups** by year

Figures 9 and 10 are used to explore connections across users and groups within the QUBES Hub. The preliminary results are based on exploring connections for 112 partner groups within the hub and examining the number of individuals with memberships across other partnership groups within QUBES. In the initial analyses, connections across groups were obscured due to the inclusion of QUBES leadership team members and staff included as group members. Individuals with more than 50 group memberships were removed from the network analysis, and the remaining connections are displayed in figures 9 and 10. While these results imply a strong overlap in group memberships which has and would likely facilitate communication across groups/organizations with a goal for transforming learning and practice; additional data cleaning and research is needed to understand network connections.

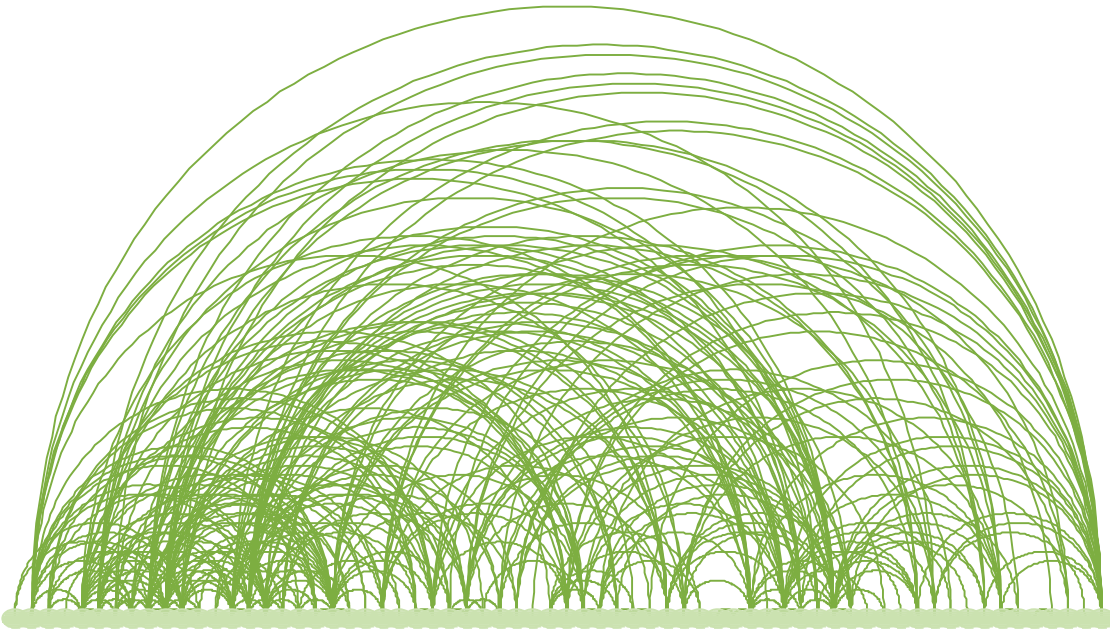


Figure 9. A dendrogram, or diagram, showing shared membership across 112 partnership groups.

Figure 10. Social network graphs where nodes represent 112 groups within QUBES Hub, and lines (edges) represent connections between the groups (i.e., connections where at least one member of the group is a member of the other group).

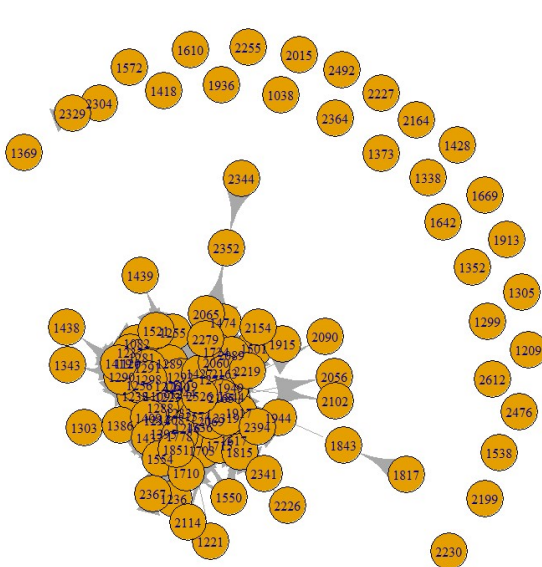


Figure 10a. Initial social network graph where groups which did not have members within other groups obscured connections between groups.

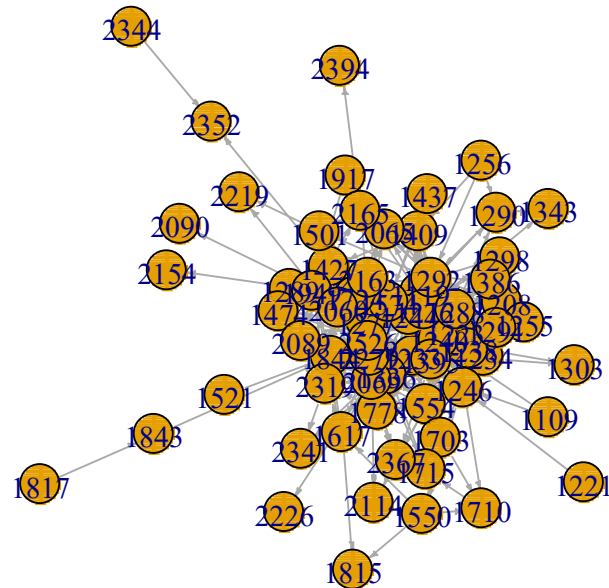


Figure 10b. Social network graph with 41 groups removed. There is a strong 'connectedness' across the 71 remaining groups. Additional cleaning and data analyses are needed, but preliminary results indicate that QUBES Hub has a strong capability to be a community of transformation for learning and practice within STEM.

QUBES has provided important support and insight into building a community of practice - think of it as the human infrastructure in addition to the technological infrastructure. QUBES has also provided networking with other OER organizations and communities of practice, especially through our participation in the SCORE-UBE Network.

QUBES Partner feedback

On December 14, 2020 QUBES hosted a Partners@QUBES Leadership Summit to highlight partners' accomplishments across the QUBES communities and to provide opportunities for networking and discussion among leaders of the QUBES community. QUBES partners submitted lightning talks and posters to showcase their work prior to the event [8]. The virtual event then provided partners the opportunity to learn about different partners and activities within QUBES, network, and participate in breakout sessions

SCORE Collaborative Mini-Grants Program



The mini-grant program provided synergistic opportunities for multiple open education organizations to increase capabilities within their organization and/or to combine infrastructures to ensure financial sustainability of OER platforms. Members of the mini-grant partnerships were asked how their involvement with the SCORE network and Hewlett funded grant activities influenced their work with open education practices. Responses included increased professional connections, opportunities to learn from other organizations and gain knowledge from their experience, enhanced financial sustainability by combining resources and sharing the QUBES Hub platform, and increased opportunities for future collaborations. Figure 11 provides responses from mini-grant partners.

I just think it's been an amazing set of activities that brought some amazing professional connections and collegiality – getting to know more folks in the networks and put DEI now, front and center. I think this was a really productive way for us to work together around producing some new value that can spread across all the networks.



It's been huge. We talk about ourselves in a totally different way – using OER frameworks, OER philosophy – it's made all the difference for us. I think the great thing is to see how we're part of this larger conversation to move to more OER materials within college education.

[T]he whole idea of the grant is to give us the ability not to have to even consider moving away from the open resources, giving us the sustainability and the stability to really focus on building SIMIODE.



I mean, for me, in a general sense, I gained a ton because it helps me to figure out what the overall broad needs are and desires for functionality, and it always helps our user experience because we get some really interesting players in the game that have different ways of thinking about how they're approaching a website. I think the collaborations have pushed some development items for us [QUBES Hub] that we knew we should do but hadn't quite done yet, like the search and stuff.

Especially as a young organization, the math modeling hub is still less than three years old, it's been a good opportunity for us to look at organizations like CourseSource as models, mentors to learn from their experiences, because they're a few steps ahead of us in that lifecycle. It's been very valuable.



Figure 11. Excerpts of responses to how the SCORE network and Hewlett funded grant activities influenced mini-grant partners' work with open education practices.

Introductory summaries of each organization involved with the mini-grant program are provided. In addition, a brief summary of SGCI and HUBzero is provided as they have provided additional support which has benefitted the QUBES Hub, SIMIODE, and CourseSource partnerships. The leadership team has also provided an overview of each project with lessons learned and product links on the QUBES Hub platform [9]. An overview of each mini-grant award and outcomes follows.



CourseSource is an open-access journal of peer-reviewed teaching resources for undergraduate biological science courses [10].



HUBzero supports the development of websites with capabilities to host analytical tools, publish data, share resources, while also building community within the online environment [3].



ISKME, established in 2002, is an independent, nonprofit supporting open education initiatives designed to improve practice of continuous learning, collaboration and change within the education sector both regionally and globally. These initiatives include 1) research to support contributions of knowledge management within education, 2) creation and sharing of tools to support teaching and learning through open solutions and practices, and 3) professional development workshops and training to build capacity for large-scale educational change [11].



MMHub – a joint venture between the Society for Industrial and Applied Mathematics (SIAM), the Consortium for Mathematics and its Applications (COMAP), and the National Council of Teachers of Mathematics (NCTM) – was launched in 2018 to support a community of math modeling educators across K-16 classrooms. MMHub is embedded within the QUBES platform as both groups promote community of practices which feature a) a repository of OER with space to create, revise, publish and evaluate modeling lessons and projects, b) network of colleagues, and c) a virtual space for collaboration [12].



QUBES Hub is an online community of math and biology educators who share education resources and methods to support instruction of undergraduate students to use quantitative approaches to tackle real, complex, biological problems [1].



SERC, housed within Carleton College, works with educational projects in STEM disciplines and allied fields to improve education across K-16. SERC offers workshops and professional development opportunities for educators; conducts research on effective pedagogy and implementation of changes within the classroom; and hosts a content management system, Serckit, to share information and resources across STEM disciplines [13].



SGCI – the Science Gateways Community Institute, funded in 2016 by NSF, supports members of the science gateway community. They provide services, resources, community support, and education for creating and sustaining science gateways, which are online platforms of shared resources specific to STEM disciplines [14].



SIMIODE is an open community of practice for teachers and learners dedicated to using modeling to teach differential equations. Students and teachers can freely access instructional texts, PowerPoint presentations, modeling scenarios, video, data, discussion areas, and space for projects according to their classification of instructor or learner [15].

Piloting an Evaluation Framework for Accessible STEM OER

ISKME and SERC partnered together to create an evaluation framework which can be used to guide educators in decisions about accessibility of different multimedia OER to meet learning needs of their students (e.g., auditory, visual, or neurological). The guidebook was developed through an iterative process that a) included collaboration across members of ISKME (Dr. Cynthia Jimes, Amee Godwin, Dr. Anastasia Karaglani, and Nick Lobaito) and SERC (Sean Fox); b) included input from a working group of four accessibility experts (Dr. Andrew Hasley (University of Wisconsin-Madison), Dr. Hayley Orndorf, (QUBES Project Manager/BioQUEST Curriculum Consortium), Dr. Hannah Davidson, (Accessibility Specialist, Plymouth State University), and Cynthia Curry (CAST/Director of Accessible Educational Materials); and c) was finalized after beta-testing the guidebook with 21 STEM faculty members.

The process of bringing in additional expertise with the working group resulted in 1) increased perspectives and understanding across multiple components of the framework; 2) exposed the team to additional tools available to support accessibility features of teaching material, 3) increased attention to the technical language included within the guide, and 4) influenced the overall organization and outline of the guidebook. Twenty-one STEM faculty were then asked to use the framework to evaluate and provide feedback on the accessibility for one of three pre-assigned OER. This provided the team feedback on each element of the framework as well as provided overall feedback from faculty for using the framework and how they perceived applying features of the guidebook within teaching materials/tools. This input resulted in additional wordsmithing of the language used in the guidebook, clarifying accessibility language that was unclear or unfamiliar to the faculty members, and prioritizing elements essential to STEM instruction.

The STEM OER Accessibility Framework and Guidebook [1] has been published and can be accessed through the OER Commons and QUBES platforms (Figure 12). The framework includes 23 accessibility elements organized across five key categories for **Perceivable** (can learners perceive the content?), **Operable** (can learners navigate and interact with the content?), **Understandable** (can learners understand the content?), **Robust** (can learners interact with the content?), and **STEM** (are components particular to STEM (e.g., data visualizations, simulations, mapping, and equations/formulas) accessible?).

The guidebook can be utilized as a checklist that will support faculty, instructional designers, and other curriculum design stakeholders to consider specific accessibility issues that might be addressed within STEM curriculum and instruction.

Utilization of the guidebook has the potential to improve instruction and instructional material by helping stakeholders incorporate specific learning concepts that support variability in learning. Since the completion of the framework, the project team has used a number of venues to disseminate the framework. For example, during February and March the team has included a project announcement within 1) an ISKME webpage, 2) article in ISKME e-news, 3) a blog post, 4) and a QUBES newsletter. Additionally the team has given presentations about the guidebook with the QUBES partner summit, the mini-grant celebration, SIMIODE Expo, and a public webinar in open edweek. As of March 23, 2021 the guidebook has been viewed 337 times and downloaded 53 times from QUBES Hub) or OER Commons.

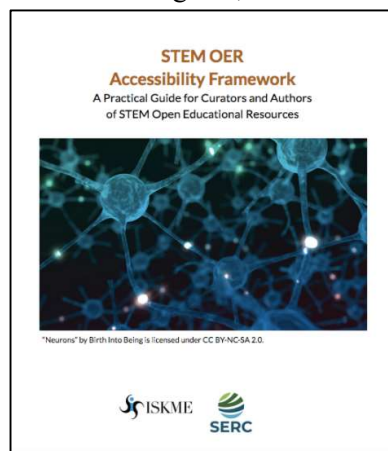


Figure 12. Guidebook developed by ISKME and SERC. The book can be accessed through QUBES Hub and OER Commons:

SIMIODE to QUBES: Gaining Efficiency and Expanding Visibility

The partnership to house SIMIODE within the QUBES Hub includes support from members of SIMIODE (i.e., Dr. Brian Winkel, Dr. Leigh Noble, and Mark Tourtellot) and QUBES (Dr. Drew LaMar and Jenny Kwan); and will allow the groups to combine resources so that QUBES technical support can manage the evolving technology and updates necessary to host the community platforms. This should subsequently allow SIMIODE's technical team to focus on features which support the needs of the SIMIODE community. The online platforms for SIMIODE and QUBES were created using HUBzero, an open source software platform created to support science gateways. Since its inception, SIMIODE has independently maintained their own server and support of part-time technical staff.

Mechanisms for migrating a stand-alone hub like SIMIODE into the broader community of QUBES are not readily available. Thus, the team has engaged HUBzero to support this transition - Figure 13. HUBzero, with financial support from Science Gateways Community Institute (SGCI), is currently in the process of 1) optimizing a search engine within the open communities to enhance the ease in which information can be discovered within each community, and 2) creating an Application Programming Interface (API) with functions to access data and interact across the SIMIODE and QUBES Hub servers in order to easily transfer the numerous resources kept in SIMIODE into QUBES Hub's publication interface.

The community pages and overall layout for SIMIODE has been developed within the QUBES Hub while the two groups wait for the mechanisms which will allow the transfer of information stored within SIMIODE to be successfully migrated to QUBES. During the timing of the mini-grant, the team has prioritized which components of SIMIODE will initially be moved into the new SIMIODE site within QUBES Hub while also determining which components within the current site are superfluous and not necessary for inclusion within the new site.

While the transition of SIMIODE to QUBES is still in progress, several advantages for the collaboration are evident, including 1) increased capacity building across the open education communities; 2) reduced cyberinfrastructure barriers for ongoing hosting and technical support of OER community platforms, 3) increased capacity for SIMIODE technical support to focus on content and processes important to users, 4) additional OER interdisciplinary communities within the QUBES Hub; and 5) HUBzero workflows to support community development and growth within QUBES Hub (and other HUBzero supported platforms).



Figure 13. Migration of SIMIODE into QUBES Hub utilizing the open-source HUBzero platform

Creation of a Sustainable Platform that Benefits CourseSource and QUBES Hub

CourseSource utilizes a website company to host their open-access peer-reviewed journal for undergraduate biology teaching materials that align to learning goals and objectives created by professional societies. The website allows instructors to access articles and supporting OERs which can help them teach their content area(s). CourseSource has worked with this website for years; however, to upgrade the website to the most recent and secure version of Drupal (a content management software), it would cost the open-access journal an unexpected \$60,000. This amount would negatively impact the financial sustainability of the OER journal, so the mini-grant collaboration provided a timely solution to explore the capability and feasibility for migrating the CourseSource website to the QUBES Hub portfolio.

The focus of the mini-grant was to create a prototype for a new website within QUBES Hub that could be reviewed by CourseSource's advisory board. A subset of CourseSource material was used to build pages that include content and features that support the purpose and mission of CourseSource. Once the prototype was completed, the team presented the new website to a CourseSource Website subcommittee; made changes to the template based on feedback from the subcommittee; then presented the final prototype to the CourseSource advisory board to receive final feedback and approval for migrating the website to QUBES Hub - Figure 14.

With the success of a prototype design and approval from CourseSource's advisory board, the partnership is continuing to work together to finalize a workflow which would migrate the remaining content of CourseSource into QUBES Hub by Summer 2021. This migration process will also be supported by the work provided by HUBzero within the SIMIODE/QUBES mini-grant (i.e., optimizing features of the search engine and creating an API to transfer resources across each site).

While the mini-grant and current work is focused on the migration of CourseSource into QUBES Hub, an plans are also being developed to build a new submission platform that can handle peer review. Currently, CourseSource utilizes eJournalPress, an online manuscript submission and peer-review system to support author submissions.

Mini-grant recipient feedback for value of collaboration

So the great thing about this mini grant is that it came with some pretty big outcomes and the first we're really excited about is that we're migrating all of the CourseSource articles to the QUBES Hub platform by July, and quite frankly we wouldn't had the time energy or expertise to get this done without the support from this mini grant, and we are extremely grateful for that. And the other nice thing is it brought upon long term collaborations... And so again we're really thankful that this mini grant brought us together in a way that we were ready to apply for future funding.

Create a prototype of CourseSource within QUBES Hub

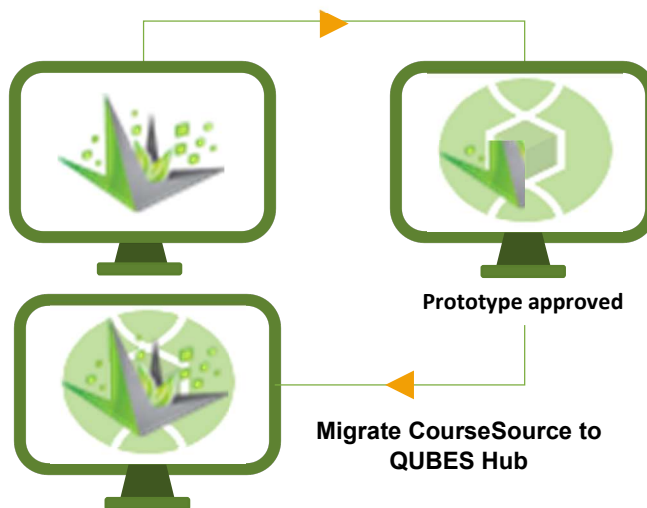


Figure 14. Illustration for moving CourseSource into QUBES Hub

Math Modeling Writer's Workshop

MMHub adapted CourseSource's Writing Studio to host a Writer's Workshop aimed to support the production and submission of mathematical modeling teaching materials to the MMHub platform. The CourseSource writing studio was first offered in 2018, at the Society of the Advancement of Biology Education Research (SABER) meeting to support the submission of OER materials to the journal. Since the studio's inception, CourseSource has seen a steady increase in submissions to the journal, an outcome MMHub would like to reproduce within their own community.

Due to COVID, CourseSource had to manage the logistics of changing the writing studio from a two-day in person workshop offered in conjunction with the SABER conference to a virtual online meeting. During Summer 2020, Dr. Michelle Smith and Erin Vinson hosted two virtual studios on three consecutive days within June and again in July. Two members of the MMHub steering committee separately participated as active observers in CourseSource's online writing workshops at two different time points (June 15-17 or July 21-23). The members then adapted the writing studio and materials for a half-day workshop held on three consecutive Saturdays in October.

MMHub targeted high school teachers with modeling experience to participate in the Fall 2020 workshop. High school teacher advisors who were on listservs from previous participation in the Society for Industrial and Applied Mathematics' (SIAMs') MathWorks Mega Math (M^3) Challenge and other modeling workshops over the last few years were invited to apply for the program. A total of 14 applications were submitted with 12 teachers participating in workshop activities.

Three members of the Math Modeling Hub's steering committee, Drs. Ben Galluzzo, Jason Douma, and Rose Zbiek delivered the MMHub Writers' Workshop, which included three one-hour community building and introduction sessions in September, three intensive writing sessions in October, and three follow-up sessions. Figure 15 provides a visual overview of mini-grant activities. At this point, it is too early to gauge the effectiveness of the new workshop for promoting submissions of OER to MMHub. However, MMHub members were able to use the partnership to establish a structure which can/will support members of their community convert classroom resources into publishable, shared OER. The scaffolding approach of the mini-grant familiarized MMHub leadership with the process CourseSource utilizes to guide participants through a worksheet of prompts aimed to facilitate the publication of teaching resources on their site as well as helped MMHub leadership pace workshop activities and guiding participant engagement. Mutually, CourseSource was able to solicit and receive candid, real-time feedback from MMHub active observers regarding their experience participating in the online workshops.






Figure 15. Overview of mini-grant activities for the Math Modeling Writer's Workshop

Themes Addressed by Mini Grants

At the SCORE summit, held October 2019, four major themes emerged as critical to SCORE Network members for the sustainability of open education practices. These included 1) balancing a commitment for freely available education resources and professional development with demands to stay relevant, 2) closing the OER life cycle, 3) bridging disciplinary conversations with institutional conversations, and 4) ensuring financial sustainability. Mini-grant recipients were asked which of the SCORE theme(s) were reflected within the focus of their organizations and mini-grant projects. A synthesis of responses are provided in Table 2.

Table 2. Examples for how mini-grant partnership organizations efforts relate to major themes for sustainability of open education practices.

| | |
|---|---|
|  | <p>Balancing a commitment for freely available education resources and professional development with demands to stay relevant.</p> <ul style="list-style-type: none"> ▪ The QUBES and MMHub communities are currently within QUBES Hub and by Summer 2021 SIMIODE and CourseSource will have migrated to QUBES Hub. These collaborative efforts to bring the communities on a single platform are intended to enhance the sustainability of the OER communities so that each organization can continue their commitments to ensure users (instructors and students) have free access to OER. ▪ CourseSource and MMHub intend to continue annual offerings of the CourseSource Writing Studio and MMHub Writer’s Workshop which are designed to support the creation of current and relevant OER. ▪ ISKME is a research-based organization and is not directly involved with the creation of curriculum content; however, the guidebook they created is a tool that faculty and OER developers can reference to create course material that is relevant and accessible for instructors and students. |
|  | <p>Closing the OER Life cycle. The OER life cycle refers to an iterative process in which users 1) find resources, 2) adapt the resources to their course needs, 3) use the resource(s) and assess student learning, 4) refine the resource after implementation, and 5) share new versions of the resource with others in the community.</p> <ul style="list-style-type: none"> ▪ The accessibility framework and guidelines provided by ISKME encourage adaptation of teaching material to address accessibility needs of different learners and provides background and knowledge for instructors and others to create, adapt, use and share materials. ▪ The discipline specific OER communities (QUBES, MMHub, SIMIODE and CourseSource) have been successful with different phases of the OER life cycle, especially with creation of OER; however, each community demonstrated an interest for increasing adaptation of OER by adopting QUBES’ adaptation process. |
|  | <p>Bridging disciplinary conversations with institutional conversations.</p> <ul style="list-style-type: none"> ▪ The accessibility framework addresses accessibility needs for STEM-related fields: <ul style="list-style-type: none"> “our final output, bringing STEM so much to the forefront, we’re kind of creating those bridges with institutional conversations around accessibility, and really bringing STEM into the fold - which hasn’t been done yet around this OER accessibility work. So in that case, in that sense, I think it’s also bridging those conversations.” ▪ CourseSource’s peer-reviewed process supports faculty recognition of their published work, providing opportunities for faculty to be formally recognized for their publications and encourage institutions to credit/acknowledge OER publication efforts. ▪ MMHub noted that networking and professional development opportunities provided within their online community supports sharing and discussions of instructional practices across educators and administrators both within and outside home-based institutions – opportunities that are also manifested within the QUBES, SIMIODE, and CourseSource communities. |

Ensuring financial sustainability

Financial sustainability remains a major concern for each OER organization once initial funding opportunities have ended. Organizations continually find funders indicating preference to fund new initiatives and not sustainability efforts for previous successful initiatives. This systemic issue results in both a heavy focus concentrated on 1) building revenue streams designed to support ongoing OER efforts without constraining access of the resources to stakeholders and 2) free volunteer labor efforts of advocates who provide personal investments to sustain commitments of free and accessible OER. Mini-grant efforts to combine resources should result in reduced costs of technical support; however, each OER community/organization recognizes the involvement necessary for building funding streams necessary to support OER efforts. Examples of funding ideas have included: grant/proposal submissions, workshops or professional development activities, textbook fees, conference registration fees, submission fees, etc.

SPLINE

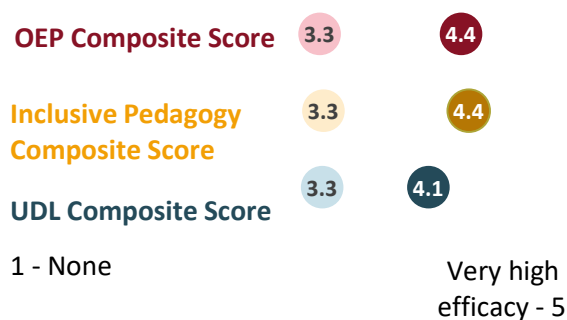
Participants of the SPLINE program were asked to complete a pre-survey prior to starting the program (June 2020) and a post-survey at the conclusion (September 2020). Results of the pre-survey were aggregated and shared with the leadership team and mentors of the program on July 07, 2020 and a summary of post-survey findings were shared within the SPLINE community on October 02, 2020. The post-survey findings are publicly available on the QUBES Hub [5].

The pre/post surveys included questions intended to gauge participants' efficacy and motivation towards UDL (10 items), inclusive pedagogy (16 items) and open education practices (11 items). These questions were created by myself and Dr. Jeremy Wojdak. Additional analyses have been completed to examine if the items demonstrate appropriate reliability and validity for combining items into scales which measure participants' level of efficacy or understanding related to UDL, inclusive pedagogy, and OEP. Overall measurement findings are included in Appendix H. Table 3 shows Cronbach's alpha, a measure of internal consistency/reliability of items within a scale for participants responses across UDL, Inclusive Pedagogy (DEI), and OEP scores at pre- and post. A composite mean score was computed for each construct at pre- and post (Figure 16), showing overall positive gains in participants' efficacy and understanding of UDL, inclusive pedagogy and OEP – similar to the results which were provided in the post-survey report.

Table 3. Reliability/Internal consistency coefficients for composite scores across SPLINE survey components

| Composite score | | Cronbach's alpha | | Mean | SD |
|-----------------|------|------------------|------|------|------|
| | | Raw | Std. | | |
| UDL Efficacy | Pre | .36 | .35 | 3.27 | 0.58 |
| | Post | .84 | .89 | 4.11 | 0.56 |
| DEI Efficacy | Pre | .72 | .66 | 3.28 | 0.80 |
| | Post | .73 | .69 | 4.43 | 0.28 |
| OEP Efficacy | Pre | .65 | .62 | 3.25 | 0.82 |
| | Post | .88 | .88 | 4.37 | 0.48 |

Figure 16. Overall composite scores at pre (●) and post (●) for efficacy towards UDL, Inclusive Pedagogy (DEI), and OEP.



The following are excerpts of participants feedback for how different components of the SPLINE program will be utilized in the participants work:

Utilization of UDL:

I was already generally familiar with the ideas but I am still working on implementing them in my classes and in my project materials. This network greatly deepened my understanding of the UDL framework and gave me more tools for implementing these strategies.

Before SPLINE I haven't heard of UDL or thought about using it in my teaching and other areas of my work. Though I don't feel an expert, I do feel confident in utilizing aspects of UDL and sharing with colleagues.

I am now approaching my instruction to be as accessible to all learners. Instead of just focusing on the average, I am trying to focus on the margins (very bottom and very top) of learners and that will reach the maximum numbers of learners

Utilization of Inclusive Pedagogy:

I believe that this is the topic I gained most from in this network, likely in part due to the fact that this was the area I knew the least about. This network dramatically changed the way I consider these issues in my own classroom and gave me many new strategies for increasing equity in my courses and project materials.

Inclusive pedagogy has been central to my ideas and the way I function in the workplace. However, SPLINE made me feel more confident in using this pedagogy and in learning about other resources to support this method.

I looked at inclusive pedagogy in a different way after the SPLINE sessions. While I believe I had the best intentions in mind in the past while trying to be inclusive, I neglected a few groups and did not consider how receptive they'd be to my teaching or program style.

Utilization of OEP:

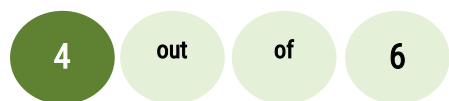
SPLINE introduced me to OER and I plan on incorporating aspects into my project and in other areas of my teaching. I also plan on sharing with my department to facilitate more engagement in these types of practices.

I considered open education to be free education and was not aware of the difference. Going forward, I will consider OER in my work to help me design programs, sustain programs and allow for them to be open for my target audience.

This component was also useful, but was also the area I had the most background in. I will continue to use OER practices in my project materials.

SPLINE participants were asked to complete a follow-up survey (Appendix F) during March 2021 to understand how participating in the SPLINE program impacted their work. A total of 5 participants completed the survey and all survey responses are provided in Appendix I. Highlights of these findings are also provided below:

Number of participant responses to survey items:

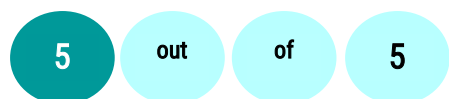


Fellows have used the mapping exercise to examine alignment of UDL guidelines to additional teaching resources.

Explanations provided to support utilization of SPLINE components:

“I find the UDL matrix to be a very useful tool, particularly for brainstorming new additions to materials, and continue to use it both for our SPLINE project as well as for my teaching.

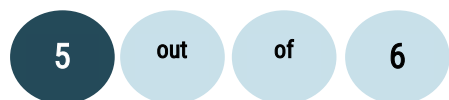
“I had my team doing UDL mapping exercises for training. I think it was helpful for us in evaluating our own resources and sparking some ideas for future improvements.



Fellows have used the action plan they developed during the SPLINE program.

“I have transformed the action plan into several different initiatives for our project!

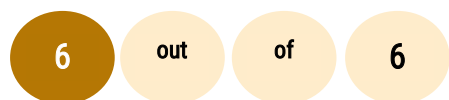
“I have merged it into another project that I am working on. I think it was useful for me to develop the action plan during SPLINE so that I had a basis from which to work.



Fellows indicated the SPLINE program impacted how they utilize UDL within their work.

“I am much more aware of the UDL principles and frequently use them as a starting point for new materials or new versions of existing materials.

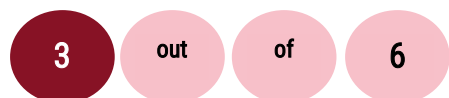
“Before SPLINE, I did not know very much about UDL. Now I feel more confident navigating and interpreting the guidelines and applying them to my own work.



Fellows indicated the SPLINE program impacted how they utilize inclusive pedagogy within their work.

“I feel much more informed and prepared to address diversity and inclusion in our materials. I have also reached out to several colleagues with more expertise in this area who are now collaborating on our project with a specific goal of addressing DEI and inclusive pedagogy, in part by adding new materials and revising existing materials.

“During my talks etc., I do my best to utilize the tools I learned in regards to inclusive pedagogy



Fellows indicated the SPLINE program impacted how they utilize open education practices within their work.

“[I] was the most aware of OER at the beginning of the network, but I learned more of the formal practices (different license options etc.) that have improved my use of OER in my work.

“Open education practices seemed too burdensome, community standards too high, and institutional support too low

S-JEDI Learning Community

Participants of the S-JEDI learning community completed a post-survey at the conclusion of S-JEDI meetings. A report of survey results was created and shared on QUBES Hub [4]. Participants indicated several aspects of the learning community as useful, including the curated list and structure of readings, supportive community to address challenging and uncomfortable topics, diverse perspectives and experience of the community, action-oriented approach to discussions, facilitation, and timing of the S-JEDI. In their own words:

The exposure to a wide range of perspectives and ideas was useful in exploring these topics. Also, these are not discussions that are easily incorporated into typical professional interactions so having an opportunity to explicitly address challenging and uncomfortable topics provided a chance to not only learn, but practice how to have these discussions.

I learned a great deal from Jasmine R; her perspectives and suggestions for resources were excellent. Delving more deeply into what it means to actively work to dismantle racism, and the reality that this is essential work, not a luxury, is very different then thinking more broadly about 'diversity'.

By far, the most useful aspect for me was the opportunity to develop a vocabulary and framework for discussing these issues. The S-JEDI group served as a 'safe' conversation space yet served to keep me accountable for responding to the need of equity and social justice.

All 12 participants who responded to the survey indicated the exchange of ideas during S-JEDI would influence their future work. In their own words:

It helps to hear a variety of ideas and perspectives when contemplating changes to institutional structures and professional practices, because many of the problems are masked by familiarity and it can be difficult to see where to start taking action. Exposure to new resources, ideas, and motivations was helpful in thinking about areas to address and ways to approach change.

The discussions, informed by the assignments and readings, felt powerful, meaningful and relevant to my work and apply to considering the nature of education broadly. The group's collaborative efforts and shared expression, including the exercise to revise the mission statement felt very worthwhile.

I now feel more equipped to support these conversations in my own organizations. And to some extent, I have accumulated a set of actionable steps that can be taken to achieve goals associated with equity and social justice.

In January 2021, participants were asked if the S-JEDI learning community influenced/changed organizations. The following responses are from two participants demonstrating the influence of S-JEDI for their organizations:

[The S-JEDI] activities supported me in my work around framing and designing a number of internal DEI group discussions and brainstorming sessions. The S-JEDI group was a fruitful opportunity for practicing small cohort professional learning that also connected directly to seeing our work through a more informed and more intentional social justice lens. As a company, we have emerged from this collective work done during fall 2020 with a revised vision and set of values for the organization, and a set of DEI resources, which I feel personally better equipped to contribute to going forward.

Thanks to the reading and conversations facilitated by the S-JEDI Learning Community, I feel more prepared to facilitate efforts by two professional communities in which I serve in a leadership role to think more intentionally about equity, diversity, and inclusion in the work that they do. [Professional society] is now forming a working group to develop specific recommendations to guide the committee's work going forward.

In August 2020, just days after the S-JEDI Learning Committee wrapped up its summer work, my home university formed a presidential task force to address issues of equity and diversity in our academic community. I serve on the task force, and several of my contributions to their discussions have been informed by what I learned over the summer.

Finally, an ultimate goal of the learning community was to have members reframe their organizational missions around principles of S-JEDI. This resulted in SCORE and QUBES updating their mission statements to the following:

QUBES is a community of individuals and organizations committed to accelerating STEM education reform. Supported by our social-cyberinfrastructure and commitment to teaching quantitative skills, we work to make sure that our teaching is effective, open, accessible, equitable, and inclusive.

The mission of the **SCORE Network** is to help our Network participants achieve their sustainability and broader impact goals by working together to amplify the value and reach of open education in STEM and to align our resources and practices with the principles of anti-racism, equity, social justice, and inclusion. In particular, we see open education as an approach and mindset to transform teaching and learning to center the needs of underrepresented and marginalized learners and instructors who have been systematically excluded from the benefits of traditional educational systems.

WHAT CHALLENGES IN PROJECT IMPLEMENTATION EMERGED, AND HOW WERE THESE CHALLENGES ADDRESSED?

COVID. The timing of the Hewlett Foundation award coincided with the COVID-19, global pandemic, which has had major impacts across every aspect of life. The leadership team, under PI Diaz Eaton and with the support of the project manager, Dr. Maggie Diamond-Stanic, was very proactive in adjusting the implementation of grant activities to meet and support the needs of the SCORE community. An overview of changes that occurred with the grant to address challenges which emerged include:

- Moving forward the timeline for the S-JEDI learning community to leverage discussions to explore inequities highlighted by the COVID pandemic and racial tensions across the nation. Participants of the S-JEDI learning community had indicated strong interest for continuing conversations; however, scheduling follow-up conversations was difficult due to limited capacity across mentors during the Fall and start of the spring semester. A new S-JEDI series: Educating our Next Generation of Scientists: Open Educational Practices, Open Science and Social Justice Learning community will be facilitated by Dr. Karen Cangialosi from April 07 through May 12.
- The SPLINE program was initially envisioned to launch at BioQuest's summer meeting in Pittsburgh, PA. The in-person meeting was designed to support special programming for launching SPLINE for recruiting and building trust with participants before they commenced hard conversations around diversity and inclusion, UDL, and OEP. With the cancellation of the summer meeting, the leadership team created an application for participants and targeted select individuals and QUBES communities to announce the SPLINE program. This resulted in a total of 32 received applications which allowed the leadership team to select a cohort of individuals who they believed could benefit most favorably from participation in the program. Prior to kicking off the SPLINE program, Dr. Wojdak had all participants and mentors introduce themselves using the SPLINE group page on QUBES Hub and provided a Code of conduct to set expectations and guidelines for participation within the community.
- Migration of SIMIODE to QUBES Hub was not completed during the duration of the mini-grant timeline; however, the team did successfully design a new group for SIMIODE within QUBES and have prioritized the information that will be most important to move from the current SIMIODE platform once HUBzero finalizes development of an API to move resources across HUBzero servers. The collaborative help provided by HUBzero and SGCI has strong potential to 1) improve search functions within QUBES Hub communities and 2) support additional partnerships within QUBES Hub. In fact, these tools will benefit the full migration of CourseSource into QUBES Hub now that the prototype created during the mini-grant has been approved.
- The proposed MMHub Writer's Workshop was originally intended as an in-person meeting and the partnership activity was to scaffold CourseSource's in-person Writing Studio. CourseSource was able to not only move the studio to a virtual offering, but also was able to offer the studio at two different times over the summer – reaching a total of 47 participants. This allowed two members of MMHub to actively observe the online studio and model the approach/process with a cohort of high school teachers using math modeling in their instruction. Both partners indicated mutual benefits for learning and receiving feedback about best practices and lessons learned through the implementation process.

- Funding for a fifth mini-grant was returned due to a decrease in resources during the pandemic. These funds were then used to support the QUBES Hub technical support team to advance efforts from the pilot projects, finishing parts of these communities, and developing OER browsing and display features that will be beneficial to OER communities such as MMHub, SIMIODE and CourseSource.
- The leadership team also reallocated funds from additional activities that were impacted due to COVID (e.g., travel costs, labor, etc.). This resulted in the following, additional project activities:
 - Honorarium to support speakers of the STEM Inclusive Teaching Practices Webinar Series organized by the Environmental Data Science Inclusion Network (EDSIN), Biological Universal and Inclusive Learning in Data Science (B(ui)LDS), and the Integrated Digitized Biocollections (iDigBio). The series included discussion topics related to inclusive teaching practices and building community among a diversity of STEM disciplines interested in creating more inclusive learning environments for undergraduate students. Appendix J includes details for the series webinars.
 - A research study to understand student perceptions towards OER/OEP and relationships across efficacy constructs, OEP perceptions, grades and student characteristics such as sex/gender, first generation status, and financial need.
 - A collaboration with ISKME to examine a meta-data tagging ontology that is intended to support tagging structures for finding and tagging accessibility features of OER.

HOW MIGHT COMPONENTS OF THE PROJECT BE SUSTAINED BEYOND THE GRANT PERIOD?

There are multiple components of the project which should be sustained beyond the grant period, including:

- Resources which were created with the grant will continue to be freely available and accessible. This includes:
 - STEM OER Accessibility Framework [16]
 - S-JEDI published curated list of readings [17]
- MMHub has a model and worksheet template which they can continue to utilize to encourage OER submissions for mathematical modeling examples to the hub.
- Sharing technical resources within the QUBES Hub platform should result in reduced overall costs for QUBES, SIMIODE, CourseSource, and MMHub, supporting the overall financial sustainability for each OER community. However, financial sustainability remains a major concern of OER communities as leadership across the communities seek resources (e.g., time, money, etc.) to support community building efforts and maintain relevance of available OER.
- Grant activities provided synergistic opportunities to build community and capacity building across OER organizations with potential for ongoing and future collaborations across OER organizations. Examples of opportunities and collaborations which have developed include:
 - The submission of NSF IUSE proposal from a SPLINE mentor to seek funding to support future implementation of the SPLINE program.

- Authors of the STEM OER Accessibility Framework present their work at the SIMIODE Expo in February 2021 to members of the SIMIODE community.
- Improved search engines for the OER communities and API to facilitate the transfer and migration of groups/communities across the HUBzero platform.
- An NSF-IUSE award to Dr. Michelle Smith, Editor and chief of CourseSource, in collaboration with BioQUEST and QUBES, was funded to provide additional support to CourseSource to ‘build adaptability for teaching online through peer-reviewed, active learning resources and professional development’.

CONCLUSIONS

A strength of the project has been the strong leadership and investment of the PI and leadership team to commit their time and effort to continuously support project activities. Since the grants’ inception, PI Diaz Eaton has met weekly to plan, implement, and debrief across project activities, as well as continued to meet regularly with different stakeholder groups to support their planning and implementation efforts of grant supported activities. Feedback provided from a participant of the S-JEDI learning community provides an example of Diaz Eaton’s involvement and participation to support the grant funded activities.

A difficulty many OER organizations face is sustaining OER efforts after initial funding ends. The SCORE network has initiated connections to share resources and learn from similar organizations – providing opportunities for continued, ongoing collaborations which may continue to result in awareness and increased knowledge for sustaining and promoting OER efforts. Unfortunately, I cannot offer recommendations which might support the continuous and ongoing sustainability for OER communities connected within the SCORE network; however, I did want to recognize the large time (and often unpaid) investments leadership teams within these OER communities commit to ensure teachers and students have free access to instructional materials that support learning.

I think Carrie did an amazing job of modeling how to be a generous and effective facilitator. Assigning tasks, keeping the conversation moving- but always listening respectfully, sharing brilliant thoughts in a kind way, and making it a safe environment for people to share their perspectives.

I believe the SCORE network has potential to continue growing a network of OER focused organizations dedicated to STEM education which can bring additional members to engage in dialogue that will allow members to learn lessons and best practices across organizations with similar missions. Additionally, the network’s mission of centering social justice, equity, diversity, and inclusion within open education in STEM promotes an alignment of resources and practices which focus on supporting the needs of underrepresented learners. The evaluation does not capture the snowball effect members growth may have on other individuals and organizations.

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APPENDICES

APPENDIX A: SPLINE

Timeline of SPLINE Project Activities



Curation of SPLINE Resources

Inclusive Pedagogy Resources (37)

- [From panic to pedagogy: Using...](#)
- [Start Talking: A Handbook for engaging difficult dialogues in higher education](#)
- [Humanize online teaching to equitize higher education](#)
- [Teaching a diverse student body – a proposed tool for lecturers to self-evaluate their approach to inclusive teaching](#)
- [In their own voice: Reclaiming the value of liberal arts at community colleges](#)
- [Picture Table – organizational inclusiveness pulled from resource below](#)
- [AAUW Diversity and Inclusion Toolkit](#)
- [Seven recommendations for helping students thrive in times of trauma](#)
- [Small world: Crafting an inclusive classroom \(No matter what you teach\)](#)
- [Weaving promising practices for inclusive excellence into the higher education classroom](#)
- [Inclusive Teaching](#)
- [On faculty development of STEM inclusive teaching practices](#)
- [Anti-Racist Educator Self-Examination Questionnaire + Rubric](#)
- [Stop Talking: Indigenous ways of teaching and learning and difficult dialogues in higher education](#)
- [Quotes pulled for “On listening” 2 different sources](#)
- [10 strategies to support students and help them learn during the coronavirus crisis \(opinion\)](#)
- [Principles and practices fostering inclusive excellence: Lessons from the HHMI Capstone Institutions](#)
- [QUBES Hub BUILDS site](#)
- [ASCN Presentations](#)
- [Pedagogies of Care collection for what’s next in Higher ed](#)
- [Design \(3\) – Teaching \(3\) – Collaborative Processes \(5\) – Assessment \(2\)](#)

- [Structure matters: Twenty-one teaching strategies to promote student engagement and cultivate classroom equity](#)
- [Equitable teams and groups \(5\)](#)
- [Evidence based teaching guide for group work](#)
- [How to guide for establishing agile team agreements](#)
- [Theory into practice strategies: Small groups](#)
- [CATME smarter team work](#)
- [Establishing a team working agreement](#)
- [Accessibility resources \(5\) all posted by Haley Orn.](#)
- [WAVE Web Accessibility Tool](#)
- [Designing Accessible OERs with POUR](#)
- [DO-IT Center Resources: Equal Access UDL](#)
- [DO-IT Center Resources: Accessible Technology](#)
- [Accessibility Infographics](#)
- [Course Design for Inclusive Learning](#)
- [Zoom hotkeys](#)
- [Accessibility Toolkit 2nd Ed.](#)

Unconscious Bias (3)

- [Unconscious bias in the classroom: How cultural stereotypes affect teacher assessment of students’ math abilities](#)
- [Blindspot: Hidden Biases of Good People \(Book\)](#)
- [How \(un\)ethical are you?](#)

Faculty development (1)

- [Insights from the inclusive environments and metrics in biology education and research network: Our experience organizing inclusive biology education research events](#)

Universal Design for Learning Resources (10)

- <https://journals.sagepub.com/doi/full/10.1177/0741932520908015>
- [Reframing UDL Plus One](#)
- [Literature Review UDL for Postsecondary STEM](#)
- [Accessible by Design:](#)
- [graphical organization UDL guidelines](#),
- [Rubric](#),
- [UDL: Theory and Practice](#) (CAST),
- [UDL Assignment](#),
- [UDLHE Network Digicon conference materials/presentations](#).,
- [UDL on Campus Website](#)

Institutions, workplace, policy structure (2)



- [Common academic experiences no one talks about: Repeated rejection, impostor syndrome, and burnout](#)
- [Academia isn't a safe haven for conversations about race and racism](#)

Open Educational Practices Resources (9)

- [CARE Framework for OER Stewardship](#)
- [OER Commons Virtual Academy](#)
- [Modeling the promise of open education resources](#)
- [Designing for open pedagogy](#)
- [Creating accessible OER](#)
- [Accessibility and OER](#)
- [ISKME's OEP Rubric](#)
- [OER Enabled pedagogy](#)
- [Defining OER Enabled Pedagogy](#)

APPENDIX B: CURATION OF S-JEDI RESOURCES

Figures/Illustrations


- [Inequality, Equality, Equity, and Justice](#) 
- [Equality vs. Equity](#) 

Readings, Videos, Podcasts:



Week 1.

- [White Academia: Do Better](#)

Additional Resources:

- [#BlackInTheIvory](#) 
- [Some aspects and assumptions of white culture in the United States](#)
- [White Supremacy Culture](#)
- [What Black scientists want from their colleagues and their institutions](#)

Week 2.

- [Leading Courageous Conversations on Race Equity](#)
- [Anti-Racism Defined](#)
- [Understanding Structural Racism](#) 
- [Re-envisioning Diversity in High Education: From Raising Awareness to Building Critical Consciousness Among Faculty](#)
- [#BlackInTheIvory](#) 

Additional Resources:

- [Working in science was a brutal education. That's why I left.](#)


Week 3.

- [Open to What? A Critical Evaluation of OER Efficacy Studies](#)
- [UDL on Campus – Universal Design for Learning in Higher Education](#)
- [Changing our \(Dis\)Course: A Distinctive Social Justice Aligned Definition of Open Education Textbook Broke: Textbook Affordability as a Social Justice Issue](#)


Additional Resources:

- [Social Justice Standards: The Teaching Tolerance Anti-Bias Framework](#)

Week 4.

- [Embracing Open Pedagogy](#)
- [Whose Knowledge is Reliable?](#) 
- [Open Pedagogy Notebook](#)
- [Academia isn't a safe haven](#)

Additional Resources:

- [Centering a critical curriculum of care during crises](#)
- [Racial equity impact assessment toolkit](#)
- [The Key Podcast: Ep 13: Equity and Higher Education Policy](#) 
- [Open Pedagogy and Social Justice](#)

Week 5.

- [Why So Many Organizations Stay White](#)
- [What Black scientists want from their colleagues and their institutions](#)
- [White Academia: Do Better](#)

Additional Resources

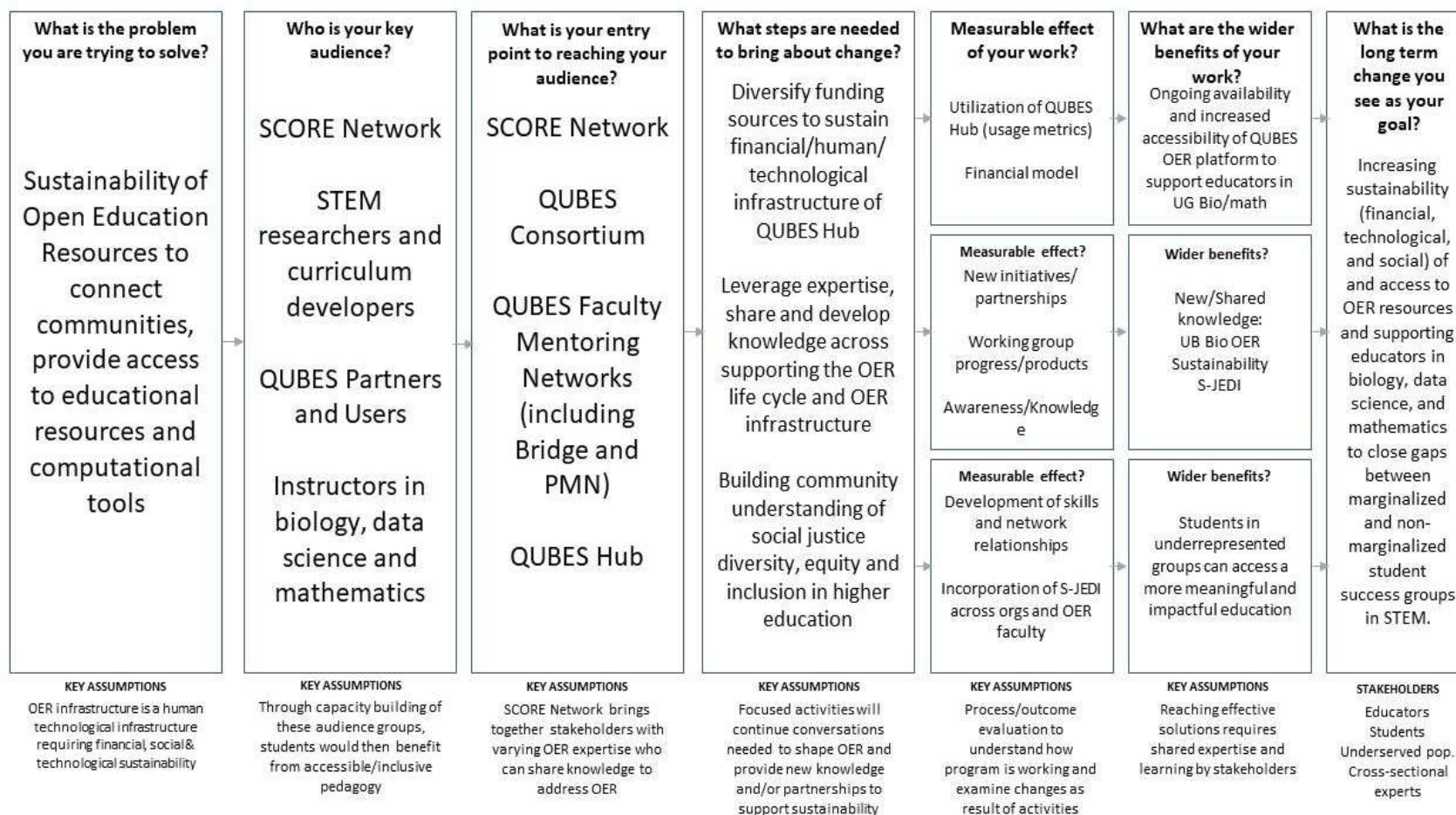
- [Where are All the Faculty in the Open Education Movement?](#)
- [10 Small Steps for Department Chairs to Foster Inclusion](#)

Week 6.

Additional Resources

- [Scaffolded anti-racism resources](#)
- [Lumina is setting aside \\$15 million over the next three years to help eradicate systemic racism](#)
- [American Association of University Professors \(AAUP\) Racial Justice Resource Page](#)
- [Building Organizational Capacity for Social Justice: Framework, Approach & Tools](#)

APPENDIX C: THEORY OF CHANGE


















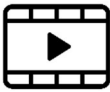



APPENDIX D: EVALUATION MATRIX

| OUTCOME | ACTIVITY | INDICATOR AND DATA SOURCE (The measures to assess progress to goals and data sources you will track) | BASELINE (Current level or status quo, and data source) | TARGET (Targeted level to reach by end of grant) | PROGRESS TO TARGET |
|---|---|--|--|--|--|
| (Your top 3-5 measurable outcomes) | (Grant activities associated with achieving those outcomes) | | | | |
| <u>Outcome #1:</u> Sustainability of QUBES Hub | Bridge funding to continue basic operations of QUBES Hub as additional funding streams are solidified | Utilization of QUBES Hub OER resources (e.g., curriculum accessed, computational software utilized, mentoring) Data source: Hub User metrics, User survey | QUBES Hub Usage metrics (During first 5 years) | New users Demonstrable usage of available OER | During 2020, QUBES had 4,337 new users and 1,381 returning users. During this past year, the QUBES leadership team has provided clarity to the services they offer, including: FMNs, Workshops and Meetings, Classrooms, Collaborative publishing, Project websites, and Private working groups. |
| | | Financial sustainability of QUBES Hub Data source: Funding revenue, Partnerships | Current partnership (contracts) revenue | Affordable services model - Continued free access for educators and students | A partner member indicated at the Partners@QUBES summit held in December 2020: “QUBES has provided important support and insight into building a community of practice – think of it as the human infrastructure in addition to the technological infrastructure. QUBES has also provided networking with other OER organizations and communities of practice, especially through our participation in the SCORE-UBE network.” |
| <u>Outcome #2:</u> Strengthened relationships and leveraged expertise of OER | Competitive mini-grants | Working group progress towards mini-grant goals Data source: Surveys, | Move from talk to action | New awareness and knowledge Have engaged in an active collaboration plan | The mini-grant program provided opportunities for six organizations to combine infrastructure and/or increase capabilities through partnerships which supported OER, OEP social |

| | | | | | |
|---|---|---|---|---|--|
| | | Program documentation | | | justice and equity. The program resulted in increased professional connections, opportunities to learn from other organizations and gain knowledge from their experience, enhanced financial sustainability by combining resources and sharing the QUBES Hub platform, and increased opportunities for future collaborations. |
| | | Products created Data source: Surveys, Program documentation | Distinct areas of expertise and strengths of participant organizations | Documentation of collaborative process created from combination of perspectives | |
| <p><u>Outcome #3:</u> Guidelines and principles for evidence-based pedagogy which promotes social justice, equity, diversity and inclusion in OER</p> | A. Faculty mentoring network Bridge program | Development of skills and network relationships Incorporation of S-JEDI across organizations and within OER Data source: Pre-and Post Bridge survey, Pre- and Post-FMN Surveys, attendance records, program documentation | Pre-mentoring network survey will create a baseline (based on an expectancy-value framework) Relevant program documentation (i.e., syllabi, lessons, and mission statements) | Growth and increase of faculty awareness, attitudes, adoption, and authorship of OER with S-JEDI Increase the number of organization and peer curriculum leaders with exposure to OER with S-JEDI. Increase the number of classroom instructors with exposure to OER with S-JEDI. | <p>The S-JEDI learning community provided timely dialogue for reflections of social justice, equity, diversity and inclusion. Participants indicated that the curated list of resources, supportive community and action-oriented approach of the community was beneficial. In addition, two participants provided follow-up examples for how participation informed discussions within their organizations and professional society memberships.</p> <p>Overall, SPLINE participants demonstrated positive gains in their efficacy and understanding of UDL, inclusive pedagogy and OEP. Participants also reported assimilating different components of the program within their work.</p> |
| | B. Peer mentoring network | | | | |

APPENDIX E: ICON ATTRIBUTION

| Icon | Attribution text | Icon | Attribution text |
|---|--|---|--|
|  | ISKME logo |  | SERC logo |
|  | SIMIODE logo |  | QUBES logo |
|  | CourseSource logo |  | MMHub logo |
|  | SGCI logo |  | HUBzero logo |
|  | Survey by Michael Thompson from the Noun Project |  | Stakeholder Evaluation by DesignBite from the Noun Project |
|  | Teamwork created by BomSymbols from Noun Project |  | Presentation by Jesus Puertas from the Noun Project |
|  | Documentation Folder by Strongicon.com from the Noun Project |  | Observation by Michael Rojas from the Noun Project |
|  | Analytics Created by Lakshisha from Noun Project |  | Twitter logo |
|  | Image by Kevin White from the Noun Project |  | Video by Graphik Designz from the Noun Project |
|  | Podcast by Larea from the Noun Project | | |

APPENDIX F: DATA COLLECTION INSTRUMENTS/PROTOCOLS

SPLINE Pre –Post Survey

Thank you for taking a moment to complete this survey. Your responses will be used to understand SPLINE. Information supplied on the survey will be confidential and only available to Dr. Robin Taylor, evaluator for the Hewlett Foundation grant aimed to support social justice and inclusion of OER. All results will be reported in the aggregate and no names will be identified in public-facing reports.

To track submission of survey submissions, the Zoho survey platform records e-mail addresses. This data is only accessible by Dr. Taylor and an alphanumeric study code will be used to replace unique identifiers in the data file. If you have any questions or concerns about the survey, please contact Robin [contact information removed for report]. You may choose to not complete any parts of the survey. Please indicate your willingness to participate in the survey:

I choose to:

- Not to complete this survey.
- Participate in this survey.

1. Indicate the statement that most closely identifies your role with developing and sharing instructional materials. [Pre]

- ☐ Curriculum developer/publisher (e.g. focused on creating and adapting materials for others to use)
- ☐ Affiliated with an organization (e.g., museum, library, etc.) devoted to informal education
- ☐ 2-year faculty member/instructor interested in adapting materials for my own teaching
- ☐ 4-year faculty member/instructor interested in adapting materials for my own teaching
- ☐ Other. Please specify: _____

The questions in this survey refer to how you consider and might include universal design for learning; inclusivity, and open education practices within your own work/career. Consider how each question fits with your work related to the development, modification and sharing of instructional materials (i.e., whether you do so for others or for yourself). [**Pre/Post**]

2. Indicate your level of agreement from 1 – *Strongly disagree* to 5 – *Strongly agree* for each of the following statements regarding Universal Design for Learning (UDL). [**pre/post**]

| | SD | Disagree | Neutral | Agree | SA |
|--|----|----------|---------|-------|----|
| I have the necessary skills to apply Universal Design for Learning best practices in my work. | | | | | |
| I know which principles of Universal Design for Learning I should apply across instructional settings or student groups. | | | | | |
| I can adequately assess my work's materials and practices for accessibility. | | | | | |
| My work's materials are accessible to all learners. | | | | | |
| I am prepared to adapt my instructional resources to incorporate principles of Universal Design for Learning. | | | | | |
| I am motivated to address UDL in all my instruction/curriculum work. | | | | | |
| I am motivated to ensure all work materials meet high standards for accessibility. | | | | | |
| I am motivated to learn more about Universal Design for Learning. | | | | | |
| Universal Design for Learning is about removing ALL barriers to student learning. | | | | | |
| Universal Design for Learning is about making media accessible for students. | | | | | |
| I feel my mindset around Universal Design for Learning has changed during SPLINE. [post] | | | | | |

3. Indicate your level of agreement from 1 – *Strongly disagree* to 5 – *Strongly agree* for each of the following statements regarding Inclusive Pedagogy. [pre/post]

| | SD | Disagree | Neutral | Agree | SA |
|---|----|----------|---------|-------|----|
| I am confident I can develop learning materials that meet the needs of a diversity of students. | | | | | |
| I have the necessary skills to apply Inclusive Pedagogy best practices in my work. | | | | | |
| I need more help to apply Inclusive Pedagogy best practices in my work. | | | | | |
| I know which principles of inclusive pedagogy I should apply across instructional settings or student groups. | | | | | |
| I can adequately assess my materials and practices for inclusion. | | | | | |
| Sometimes I don't know if my materials will draw in all learners. | | | | | |
| I am prepared to adapt my instructional resources to incorporate principles of inclusion. | | | | | |
| I am motivated to address inclusive instruction in my work. | | | | | |
| I am motivated to ensure all materials meet high standards for inclusion. | | | | | |
| I am motivated to learn more about inclusive pedagogy. | | | | | |
| True inclusive teaching requires me to better understand myself. | | | | | |
| Inclusive pedagogies lower academic standards. | | | | | |
| True inclusive teaching requires me to better understand my students. | | | | | |
| Genuine dialogue between instructor and student is at the heart of inclusive teaching. | | | | | |
| Universal Design for Learning and inclusive pedagogies share the same underlying goal. | | | | | |
| A student that feels they belong in a classroom and discipline, and identifies as a scientist, is most likely to succeed. | | | | | |
| I feel my mindset around inclusion, diversity, and equity has changed during SPLINE. [post] | | | | | |

4. Indicate your level of agreement from 1 – *Strongly disagree* to 5 – *Strongly agree* for each of the following statements regarding Open Education Practices. [pre/post]

| | SD | Disagree | Neutral | Agree | SA |
|--|----|----------|---------|-------|----|
| I have the necessary skills to make my products available as open educational resources. | | | | | |
| I need more help to make my products available as open educational resources. | | | | | |
| I am confident I can determine which instructional materials are worth sharing. | | | | | |
| I feel prepared to contribute my instructional resources as open educational resources. | | | | | |
| I am motivated to make products and processes I create (or adapt) openly available. | | | | | |
| I am motivated to ensure all work materials meet high standards for openness – that is, they are free, available for reuse or modification, and readily available to anyone. | | | | | |
| I am motivated to learn more about open education practices. | | | | | |
| Open educational practices are a mechanism for positive change in inclusive education. | | | | | |
| Engaging faculty with open educational resources can promote teaching as scholarship. | | | | | |
| I am willing to share my teaching materials in a public setting. | | | | | |
| Free instructional materials can never be as high quality or effective as those produced by publishing companies. | | | | | |
| I feel my mindset around Open Educational Practices has changed during SPLINE. [post] | | | | | |

5. Rate your level of satisfaction with the following: **[post]**

| | Very dissatisfied | Dissatisfied | Neither | Satisfied | Extremely satisfied |
|--|----------------------|--------------|---------|-----------|------------------------|
| Feedback provided on your instructional/curricular project ... | | | | | |
| Resources provided to demonstrate concepts of Universal Design for Learning | | | | | |
| Resources provided to demonstrate concepts of diversity, equity, and inclusivity | | | | | |
| Resources provided to demonstrate concepts of open education practices | | | | | |
| Weekly discussions | | | | | |
| Pace and timing of SPLINE activities | | | | | |
| Platform meeting space | | | | | |

6. a. Do you feel participating in the SPLINE program will impact how Universal Design for Learning will be utilized in your work? **[post]** ____ yes ____ no ____ maybePlease explain.
- b. Do you feel participating in the SPLINE program will impact how Inclusive Pedagogy will be utilized in your work? **[post]** ____ yes ____ no ____ maybePlease explain.
- c. Do you feel participating in the SPLINE program will impact how open education practices will be utilized in your work? **[post]** ____ yes ____ no ____ maybePlease explain.
7. Do you feel that the exchange of ideas that took place during SPLINE will influence your future work? yes/no
a. Please explain **[post]**
8. What do you feel was the most useful aspect of SPLINE? **[post]**
9. Would you change anything about the SPLINE? Please explain. **[post]**
10. Additional comments. **[pre/post]**

SPLINE Follow-Up Survey

Thank you for taking a moment to complete this survey. Your responses will be used to understand longitudinal impacts in your work due to participation in the SPLINE program this past summer (2020). Information supplied on the survey will be confidential and only available to Dr. Robin Taylor, evaluator for the Hewlett Foundation grant aimed to support social justice and inclusion of OER. All results will be reported in the aggregate and no names will be identified in public-facing reports.

To track submission of surveys, the Zoho survey platform records e-mail addresses. This data is only accessible by Dr. Taylor and an alphanumeric study code will be used to replace unique identifiers in the data file. If you have any questions or concerns about the survey, please contact Dr Taylor. You may choose to not complete any parts of the survey.

Please indicate your willingness to participate in the survey:

- ☐ I choose to complete the survey.
- ☐ I choose not to complete the survey.

1. Since participating in SPLINE have you used the mapping exercise to examine alignment of UDL guidelines to any additional resource(s)?
 - ☐ Yes
 - ☐ NoPlease Explain. _____
2. How has the action plan developed during the SPLINE program been utilized since the participating in the program?
 - ☐ Yes
 - ☐ NoPlease Explain. _____
3. Has participating in the SPLINE program impacted how you utilize Universal Design for Learning in your work?
 - ☐ Yes
 - ☐ NoPlease Explain. _____
4. Has participating in the SPLINE program impacted how you utilize inclusive pedagogy in your work?
 - ☐ Yes
 - ☐ NoPlease Explain. _____
5. Has participating in the SPLINE program impacted how you utilize open education practices in your work?
 - ☐ Yes
 - ☐ NoPlease Explain. _____

S-JEDI Learning Community Post Survey

Thank you for taking a moment to complete this brief survey. Your responses will be used to understand the perceived effectiveness of the S-JEDI Learning Community hosted by Bates College. Information supplied on the survey will be confidential and results will only be reported in the aggregate.

To help understand your responses, please provide a minimum of 2 sentences for all open-ended feedback.

1. The amount of readings provided weekly during the learning community were:
 - ☐ Too much.
 - ☐ Just right.
 - ☐ Too little.

2. Do you feel that the exchange of ideas that took place during the learning community meetings will influence your future work?
 - ☐ Yes.
 - ☐ No.

b. Please explain. (2 sentences or more)

3. What do you feel was (were) the most useful aspect(s) of the learning community? (2 sentences or more)

4. Indicate any suggestions you have for facilitating communication among participants of the learning community. (2 sentences or more)

5. Would you like to continue collaborations with other S-JEDI learning community members as you work on action plans for your OER organization(s)? If yes, your name will be provided to the leadership team so that they can contact you about your interest. Your responses to the other questions on the survey will not be identified when sharing your name for future collaboration.
 - ☐ Yes.
 - ☐ No.

SCORE Mini-Grant Semi-Structured Focus Group/Interview Script

| | |
|--------------------------|-------------------------------|
| Interviewee: | Place being conducted: |
| Position / Title: | Organization / School: |
| Interview date: | Interviewer : |
| Start/End Time: | Note taker: |

Introduce purpose of questions and how the information will be used within the final report to Bates College and Hewlett Foundation.

Ask permission to record zoom session?

1. Introductions. Describe the role project members from each partnership organization served with the mini-grant project.
2. Describe all project activities.
 - Project specific follow-up questions.
3. The SCORE Network identified four areas of focus identified by members at the SCORE summit and mini-grant applications asked applicants to indicate which of the components would be a focus of the project. For each component, please indicate if you feel the component was relevant to your project and why (or why not).
 - Balancing a commitment to freely available education resources and professional development with demands to stay relevant
 - Closing OER lifecycle
 - Bridging disciplinary conversations with institutional conversations
 - Ensuring financial sustainability
4. Has your involvement with SCORE or the Hewlett Foundation award influenced your work with OER/OEP? Please explain.

APPENDIX G: EVALUATION MEETING AGENDAS WITH MINI-GRANT PARTICIPANTS

November 13, 2020 2 pm – 3 pm ET

1. Reminder of grant timelines and deliverables
 - a. December 31, 2020 end date for all mini-grant projects.
 - b. Final grantee report due January 31, 2021
 - i. Progress made for SOW
 - ii. Description of funding
2. Outputs: White paper / Workflow diagrams / Implementation models
 - a. Collaboration within SCORE Network
 - i. Information gained/learned from working within the collaborative partnership
 - ii. Identify audience who might benefit from having access to this information
 - iii. Contribution to the SCORE network
 - b. Report format
 - i. Smaller scale (5 – 10 pages)
 - ii. Include background / context information (e.g., partner organizations, etc.)
 - iii. Written towards targeted audience
 - iv. Include information most useful to the audience (e.g., process, benefits of product, service or methodology, etc.)
 1. Best practices
 2. Lessons learned
 3. Outputs or outcomes resulting from mini-grant project
 - c. Submission to QUBES (SCORE group)
3. Partners@QUBES Summit – December 14, 2020, 1:30 to 3:30 PM ET
4. January meeting and Evaluation Interviews

September 22, 2020 12 pm – 1 pm ET

1. Overview of each grantee's progress (15 mins)
ISKME – SIMIODE – MMHub – CourseSource
2. What outcomes do you expect as a result of your mini-grant project? (Outcomes are the specific changes in behaviors, knowledge, skills, status and level of functioning).
3. What outputs (or direct products of program activities) will be produced as a result of your grant?
 - workflows for combining cyberinfrastructure across multiple projects and aligning metadata across projects?
 - production of additional OER undergraduate biology lessons? and/or
 - preliminary research data from new collaborations to be used for further grant applications?

Questions to consider:

What has been learned about implementation in general that would contribute to scholarly and policy research on implementation? **Or** What has been learned about implementation of this specific program that might inform similar efforts elsewhere?

August Mini-Grant Progress Reports

1. Please verify the list of project members. Provide a description (or review) for each member's role with respect to the project's mini-grant activities. Please add new members or indicate if any members listed should be deleted.
2. Please indicate any meetings which have occurred since the inception of the mini-grant award. The following information will be useful if available: a) Timeline of meetings, b) List of attendance, c) Type of meetings and communications across the project team (i.e., email communication, Zoom meetings, phone calls, other, etc.), and d) Attach meeting minutes or other program documentation created
3. What major activities have been completed to date?
4. What challenges or lessons learned has the mini-grant team encountered? How have these challenges been addressed?
5. What best practices or positive outcomes have been revealed with respect to your mini-grant project?

July 20, 2020 12 pm – 1 pm ET

1. Who are the stakeholders who are needed to implement your OEP/OER work successfully? What are their roles and how do they contribute to the success of your work?
2. Who are the stakeholders who benefit from your OEP/OER work? In what ways?
3. Who are the stakeholders who might have concerns or would be 'negatively' impacted by your OER work? How might you address these concerns or impacts?

June 24, 2020 2:15 pm – 3:00 pm ET

1. Introductions
2. Overview of evaluation
3. Project introductions

SIMIODE – CourseSource – ISKME – MMHub – Diverse Book Finder

APPENDIX H: OVERVIEW OF MEASUREMENT FINDINGS FOR SPLINE SURVEY SCALE(S)

Validity of a test or survey instrument is an ongoing process for examining evidence to support the interpretation of test or survey scores. The analyses included in this appendix are used to assess the reliability and validity of survey items to measure a construct related to the efficacy and understanding of UDL, Inclusive Pedagogy (indicated as DEI – diversity, equity, and inclusion – within tables to save space), and open education practices. Survey items used a Likert-type scale of 1 – strongly disagree to 5 – strongly agree. Correlational analysis and Cronbach’s alpha were used to explore the relationships across items on the survey.

Correlational analysis is used to measure the strength and direction of relationships between two numerical measures. Correlations ranges from -1 to +1, where values near 1 or -1 indicate that variables have a strong relationship with each other and values near 0 indicate a weak relationship between variables.

Cronbach’s alpha is a measure to assess the internal consistency or reliability of test or survey items to measure a concept. The reliability coefficient should range from 0 to 1 where higher values indicate strength in the consistency of the items to measure a concept and values near 0 indicate weakness in the items to measure a concept.

This analysis reveals relationships across survey items which can be combined into a composite score to measure the level of efficacy/understanding towards UDL, Inclusive Pedagogy, and OER. Each scale also included items that were flagged as incompatible with the other survey items and have been removed from the calculation of overall scores used in this study. Items removed include:

- UDL item 10
- Inclusive Pedagogy items 3, 6, 11, and 12. Note item 12 was reverse coded; however, the reverse coded item was also inconsistent with the pattern of other survey items and not included in the composite score for the scale.
- OEP item 2. Item 11 was reverse coded and the reverse coded item was included in the composite score for the scale.

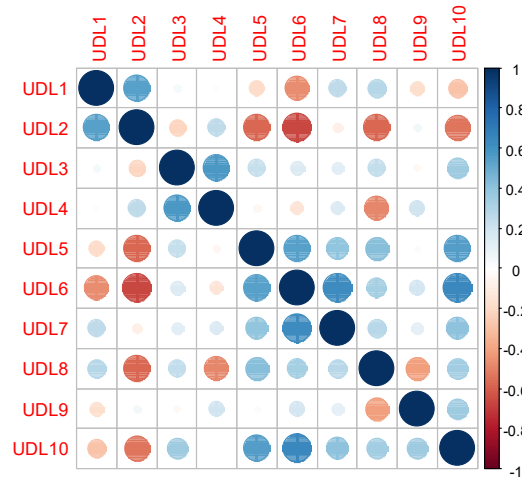
UDL

| | | Pre | | Post | |
|-------|--|-------------|-------------|-------------|-------------|
| | | Mean | SD | Mean | SD |
| UDL1 | I have the necessary skills to apply Universal Design for Learning best practices in my work. | 2.89 | 1.27 | 3.70 | 0.67 |
| UDL2 | I know which principles of Universal Design for Learning I should apply across instructional settings or student groups. | 3.11 | 1.45 | 3.80 | 0.63 |
| UDL3 | I can adequately assess my work's materials and practices for accessibility. | 2.67 | 1.00 | 3.80 | 1.03 |
| UDL4 | My work's materials are accessible to all learners. | 2.67 | 1.00 | 2.90 | 1.10 |
| UDL5 | I am prepared to adapt my instructional resources to incorporate principles of Universal Design for Learning. | 3.56 | 1.81 | 4.60 | 0.70 |
| UDL6 | I am motivated to address UDL in all my instruction/curriculum work. | 3.00 | 2.00 | 4.90 | 0.32 |
| UDL7 | I am motivated to ensure all work materials meet high standards for accessibility. | 3.89 | 1.76 | 4.80 | 0.42 |
| UDL8 | I am motivated to learn more about Universal Design for Learning. | 4.78 | 0.67 | 4.90 | 0.32 |
| UDL9 | Universal Design for Learning is about removing ALL barriers to student learning. | 2.44 | 1.33 | 3.60 | 1.51 |
| UDL10 | Universal Design for Learning is about making media accessible for students. | 3.00 | 1.73 | 4.00 | 1.15 |
| UDL11 | I feel my mindset around Universal Design for Learning has changed during SPLINE. [post] | --- | --- | 4.80 | 0.42 |
| | Composite Score (UDL efficacy) | 3.26 | 0.58 | 4.11 | 0.56 |

*Item 10 was **not** included in a composite score for a scale measuring the efficacy and understanding of UDL.

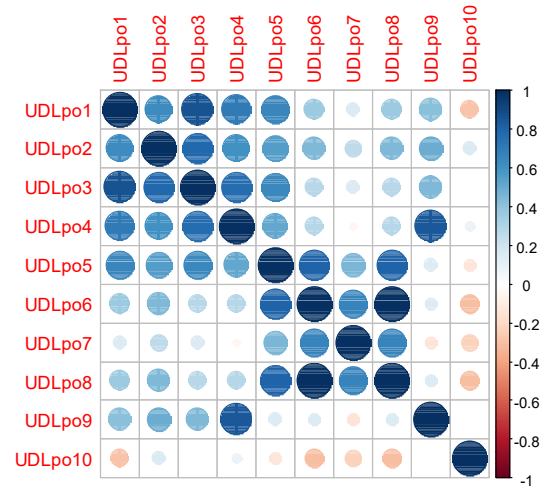
Correlational Analysis UDL Pre/Post

Pre



| UDL | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|-----|---|-----|------|-----|------|------|------|------|------|------|
| 1 | 1 | .54 | .04 | .02 | -.19 | -.46 | .25 | .29 | -.17 | -.28 |
| 2 | | 1 | -.21 | .26 | -.58 | -.66 | -.08 | -.57 | .05 | -.53 |
| 3 | | | 1 | .57 | .23 | .15 | .13 | .24 | -.03 | .35 |
| 4 | | | | 1 | -.05 | -.14 | .15 | -.48 | .20 | .00 |
| 5 | | | | | 1 | .55 | .40 | .42 | .02 | .56 |
| 6 | | | | | | 1 | .63 | .33 | .19 | .64 |
| 7 | | | | | | | 1 | .28 | .11 | .40 |
| 8 | | | | | | | | 1 | -.41 | .34 |
| 9 | | | | | | | | | 1 | .35 |
| 10 | | | | | | | | | | 1 |

Post



| UDL | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|-----|---|-----|-----|-----|-----|-----|------|------|------|------|
| 1 | 1 | .62 | .86 | .70 | .66 | .36 | .16 | .36 | .42 | -.29 |
| 2 | | 1 | .78 | .61 | .55 | .44 | .25 | .44 | .49 | .15 |
| 3 | | | 1 | .76 | .65 | .27 | .15 | .27 | .44 | .00 |
| 4 | | | | 1 | .52 | .29 | -.05 | .29 | .84 | .09 |
| 5 | | | | | 1 | .80 | .45 | .80 | .15 | -.14 |
| 6 | | | | | | 1 | .67 | 1.00 | .14 | -.30 |
| 7 | | | | | | | 1 | .67 | -.14 | -.23 |
| 8 | | | | | | | | 1 | .14 | -.30 |
| 9 | | | | | | | | | 1 | .00 |
| 10 | | | | | | | | | | 1 |

Reliability Analysis UDL Pre

| | raw_alpha | std.alpha | G6(smc) | average_r | S/N | ase | mean | sd | median_r |
|------------------------------------|-----------|-----------|---------|-----------|--------|-------|------|-------|----------|
| | 0.53 | 0.48 | 0.94 | 0.086 | 0.94 | 0.18 | 3.2 | 0.64 | 0.15 |
| 95% confidence boundaries | | | | | | | | | |
| lower | alpha | upper | | | | | | | |
| 0.18 | 0.53 | 0.87 | | | | | | | |
| Reliability if an item is dropped: | | | | | | | | | |
| | raw_alpha | std.alpha | G6(smc) | average_r | S/N | alpha | se | var.r | med.r |
| UDL1 | 0.56 | 0.52 | 0.90 | 0.106 | 1.06 | | 0.15 | 0.131 | 0.169 |
| UDL2 | 0.67 | 0.63 | 0.91 | 0.157 | 1.67 | | 0.12 | 0.089 | 0.193 |
| UDL3 | 0.48 | 0.39 | 0.88 | 0.066 | 0.63 | | 0.19 | 0.142 | 0.132 |
| UDL4 | 0.53 | 0.48 | 0.87 | 0.092 | 0.91 | | 0.17 | 0.136 | 0.169 |
| UDL5 | 0.42 | 0.40 | 0.95 | 0.069 | 0.66 | | 0.23 | 0.121 | 0.138 |
| UDL6 | 0.42 | 0.41 | 0.89 | 0.073 | 0.71 | | 0.23 | 0.104 | 0.120 |
| UDL7 | 0.33 | 0.29 | 0.87 | 0.044 | 0.42 | | 0.25 | 0.137 | 0.047 |
| UDL8 | 0.52 | 0.49 | 0.86 | 0.095 | 0.94 | | 0.19 | 0.117 | 0.120 |
| UDL9 | 0.53 | 0.50 | 0.92 | 0.098 | 0.98 | | 0.18 | 0.143 | 0.192 |
| UDL10 | 0.36 | 0.35 | 0.92 | 0.056 | 0.53 | | 0.25 | 0.116 | 0.120 |
| Item statistics | | | | | | | | | |
| | n | raw.r | std.r | r.cor | r.drop | mean | sd | | |
| UDL1 | 12 | 0.12 | 0.25 | 0.25 | -0.063 | 2.8 | 1.1 | | |
| UDL2 | 12 | -0.29 | -0.19 | -0.20 | -0.471 | 3.2 | 1.4 | | |
| UDL3 | 12 | 0.48 | 0.59 | 0.59 | 0.359 | 2.5 | 0.9 | | |
| UDL4 | 12 | 0.25 | 0.36 | 0.37 | 0.077 | 2.8 | 1.1 | | |
| UDL5 | 12 | 0.64 | 0.56 | 0.47 | 0.435 | 3.7 | 1.7 | | |
| UDL6 | 12 | 0.66 | 0.53 | 0.54 | 0.427 | 3.2 | 2.0 | | |
| UDL7 | 12 | 0.81 | 0.78 | 0.79 | 0.691 | 4.0 | 1.6 | | |
| UDL8 | 12 | 0.35 | 0.34 | 0.35 | 0.162 | 4.5 | 1.2 | | |
| UDL9 | 12 | 0.35 | 0.31 | 0.28 | 0.125 | 2.9 | 1.5 | | |
| UDL10 | 12 | 0.75 | 0.67 | 0.64 | 0.589 | 3.0 | 1.7 | | |

Reliability Analysis UDL Post

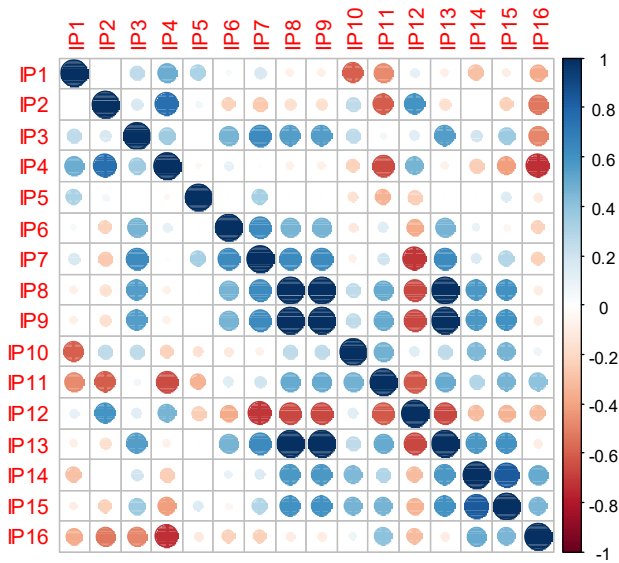
| | raw_alpha | std.alpha | G6(smc) | average_r | S/N | ase | mean | sd | median_r |
|------------------------------------|-----------|-----------|---------|-----------|--------|-------|-------|-------|----------|
| | 0.78 | 0.84 | 0.99 | 0.35 | 5.4 | 0.079 | 4.1 | 0.51 | 0.36 |
| 95% confidence boundaries | | | | | | | | | |
| lower | alpha | upper | | | | | | | |
| 0.63 | 0.78 | 0.93 | | | | | | | |
| Reliability if an item is dropped: | | | | | | | | | |
| | raw_alpha | std.alpha | G6(smc) | average_r | S/N | alpha | se | var.r | med.r |
| UDLpo1 | 0.74 | 0.82 | 0.98 | 0.33 | 4.5 | | 0.094 | 0.122 | 0.29 |
| UDLpo2 | 0.73 | 0.81 | 0.93 | 0.32 | 4.2 | | 0.095 | 0.137 | 0.29 |
| UDLpo3 | 0.71 | 0.81 | 0.93 | 0.32 | 4.3 | | 0.106 | 0.125 | 0.36 |
| UDLpo4 | 0.69 | 0.81 | 0.94 | 0.33 | 4.4 | | 0.119 | 0.126 | 0.36 |
| UDLpo5 | 0.75 | 0.81 | 0.98 | 0.32 | 4.2 | | 0.087 | 0.123 | 0.29 |
| UDLpo6 | 0.77 | 0.82 | 0.99 | 0.34 | 4.6 | | 0.082 | 0.116 | 0.39 |
| UDLpo7 | 0.79 | 0.85 | 0.98 | 0.39 | 5.7 | | 0.077 | 0.121 | 0.43 |
| UDLpo8 | 0.77 | 0.82 | 0.99 | 0.34 | 4.6 | | 0.082 | 0.116 | 0.39 |
| UDLpo9 | 0.77 | 0.84 | 0.96 | 0.37 | 5.3 | | 0.086 | 0.129 | 0.40 |
| UDLpo10 | 0.84 | 0.89 | 0.96 | 0.47 | 7.9 | | 0.056 | 0.075 | 0.45 |
| Item statistics | | | | | | | | | |
| | n | raw.r | std.r | r.cor | r.drop | mean | sd | | |
| UDLpo1 | 10 | 0.75 | 0.7536 | 0.7458 | 0.681 | 3.7 | 0.67 | | |
| UDLpo2 | 10 | 0.83 | 0.8287 | 0.8308 | 0.789 | 3.8 | 0.63 | | |
| UDLpo3 | 10 | 0.85 | 0.8046 | 0.8075 | 0.777 | 3.8 | 1.03 | | |
| UDLpo4 | 10 | 0.92 | 0.7828 | 0.7858 | 0.871 | 2.9 | 1.10 | | |
| UDLpo5 | 10 | 0.69 | 0.8443 | 0.8414 | 0.608 | 4.6 | 0.70 | | |
| UDLpo6 | 10 | 0.49 | 0.7244 | 0.7204 | 0.437 | 4.9 | 0.32 | | |
| UDLpo7 | 10 | 0.21 | 0.4538 | 0.4389 | 0.127 | 4.8 | 0.42 | | |
| UDLpo8 | 10 | 0.49 | 0.7244 | 0.7204 | 0.437 | 4.9 | 0.32 | | |
| UDLpo9 | 10 | 0.72 | 0.5395 | 0.5407 | 0.513 | 3.6 | 1.51 | | |
| UDLpo10 | 10 | 0.15 | -0.0031 | -0.0084 | -0.077 | 4.0 | 1.15 | | |

Inclusive Pedagogy

| | | Pre | | Post | |
|------|---|------|------|------|------|
| | | Mean | SD | Mean | SD |
| IP1 | I am confident I can develop learning materials that meet the needs of a diversity of students. | 2.67 | 1.22 | 3.80 | 0.63 |
| IP2 | I have the necessary skills to apply Inclusive Pedagogy best practices in my work. | 2.78 | 1.39 | 3.60 | 0.70 |
| IP3 | I need more help to apply Inclusive Pedagogy best practices in my work. | 4.56 | 1.33 | 4.30 | 0.95 |
| IP4 | I know which principles of inclusive pedagogy I should apply across instructional settings or student groups. | 3.11 | 1.54 | 3.50 | 0.71 |
| IP5 | I can adequately assess my materials and practices for inclusion. | 2.33 | 0.50 | 3.80 | 1.03 |
| IP6 | Sometimes I don't know if my materials will draw in all learners. | 3.00 | 2.00 | 4.30 | 0.67 |
| IP7 | I am prepared to adapt my instructional resources to incorporate principles of inclusion. | 4.00 | 1.58 | 4.50 | 0.71 |
| IP8 | I am motivated to address inclusive instruction in my work. | 4.11 | 1.76 | 4.90 | 0.32 |
| IP9 | I am motivated to ensure all materials meet high standards for inclusion. | 4.11 | 1.76 | 5.00 | 0.00 |
| IP10 | I am motivated to learn more about inclusive pedagogy. | 4.56 | 1.33 | 5.00 | 0.00 |
| IP11 | True inclusive teaching requires me to better understand myself. | 3.89 | 1.76 | 4.90 | 0.32 |
| IP12 | Inclusive pedagogies lower academic standards. | 1.33 | 1.00 | 1.10 | 0.32 |
| IP13 | True inclusive teaching requires me to better understand my students. | 4.11 | 1.76 | 5.00 | 0.00 |
| IP14 | Genuine dialogue between instructor and student is at the heart of inclusive teaching. | 2.78 | 2.11 | 4.80 | 0.42 |
| IP15 | Universal Design for Learning and inclusive pedagogies share the same underlying goal. | 2.56 | 1.67 | 4.50 | 0.71 |
| IP16 | A student that feels they belong in a classroom and discipline, and identifies as a scientist, is most likely to succeed. | 2.78 | 2.11 | 4.80 | 0.42 |
| IP17 | I feel my mindset around inclusion, diversity, and equity has changed during SPLINE. [post] | --- | --- | 4.80 | 0.63 |

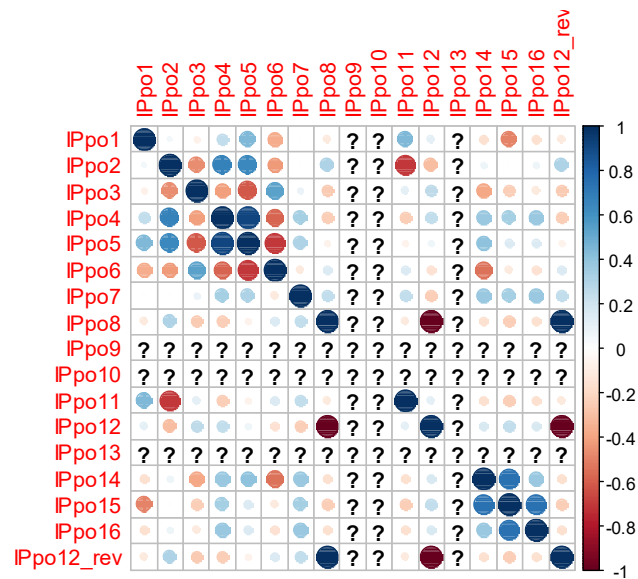
*Items 3, 6, 11, and 12 were **not** included in a composite score for a scale measuring the efficacy and understanding of inclusive pedagogy. Item 12 was reverse coded; however, the reverse coded item was also inconsistent with other items in the scale and was not included in the composite score.

Correlational analysis: Inclusive Pedagogy Pre



| DEI | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 12rev |
|-------|---|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|-------|
| 1 | 1 | .00 | .26 | .50 | .32 | .04 | .16 | -.09 | -.09 | -.60 | -.48 | .10 | -.09 | -.30 | -.09 | -.38 | -.10 |
| 2 | | 1 | .16 | .75 | .05 | -.23 | -.27 | -.16 | -.16 | .25 | -.60 | .60 | -.16 | .00 | -.24 | -.53 | -.60 |
| 3 | | | 1 | .36 | .00 | .47 | .64 | .56 | .56 | .26 | .06 | .12 | .56 | .19 | .36 | -.49 | -.12 |
| 4 | | | | 1 | -.04 | .10 | .02 | -.07 | -.07 | -.22 | -.66 | .46 | -.07 | -.25 | -.41 | -.73 | -.46 |
| 5 | | | | | 1 | .00 | .33 | .00 | .00 | -.16 | -.34 | -.25 | .00 | .00 | .15 | -.12 | .25 |
| 6 | | | | | | 1 | .64 | .47 | .47 | -.12 | .13 | -.38 | .47 | .09 | -.06 | -.23 | .38 |
| 7 | | | | | | | 1 | .64 | .64 | -.07 | .20 | -.71 | .64 | .16 | .30 | -.24 | .71 |
| 8 | | | | | | | | 1 | 1.00 | .26 | .50 | -.66 | 1.00 | .58 | .60 | -.10 | .66 |
| 9 | | | | | | | | | 1 | .26 | .50 | -.66 | 1.00 | .58 | .60 | -.10 | .66 |
| 10 | | | | | | | | | | 1 | .48 | .12 | .26 | .45 | .47 | .08 | -.12 |
| 11 | | | | | | | | | | | 1 | -.61 | .50 | .29 | .46 | .41 | .61 |
| 12 | | | | | | | | | | | | 1 | -.66 | -.32 | -.35 | -.32 | -1.00 |
| 13 | | | | | | | | | | | | | 1 | .58 | .60 | -.10 | .66 |
| 14 | | | | | | | | | | | | | | 1 | .83 | .51 | .32 |
| 15 | | | | | | | | | | | | | | | 1 | .46 | .35 |
| 16 | | | | | | | | | | | | | | | | 1 | .32 |
| 12rev | | | | | | | | | | | | | | | | | 1 |

Correlational Analysis: Inclusive Pedagogy Post



| DEI | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 12rev |
|-------|---|-----|------|------|------|------|------|------|----|----|------|-------|----|------|------|------|-------|
| 1 | 1 | .05 | -.07 | .25 | .44 | -.36 | .00 | -.11 | na | na | .44 | .11 | na | -.17 | -.50 | -.17 | -.11 |
| 2 | | 1 | -.47 | .67 | .65 | -.42 | .00 | .30 | na | na | -.70 | -.30 | na | .08 | .00 | .08 | .30 |
| 3 | | | 1 | -.41 | -.61 | .54 | .08 | -.26 | na | na | .11 | .26 | na | -.39 | -.25 | -.11 | -.26 |
| 4 | | | | 1 | .91 | -.58 | .33 | -.25 | na | na | -.25 | .25 | na | .37 | .33 | .37 | -.25 |
| 5 | | | | | 1 | -.70 | .30 | -.07 | na | na | -.07 | .07 | na | .41 | .15 | .15 | -.07 |
| 6 | | | | | | 1 | -.12 | .16 | na | na | .16 | -.16 | na | -.55 | -.12 | -.16 | .16 |
| 7 | | | | | | | 1 | .25 | na | na | .25 | -.25 | na | .37 | .33 | .37 | .25 |
| 8 | | | | | | | | 1 | na | na | -.11 | -1.00 | na | -.17 | -.25 | -.17 | 1.00 |
| 9 | | | | | | | | | 1 | na | na | na | na | na | na | na | na |
| 10 | | | | | | | | | | 1 | na | na | na | na | na | na | na |
| 11 | | | | | | | | | | | 1 | .11 | na | -.17 | -.25 | -.17 | -.11 |
| 12 | | | | | | | | | | | | 1 | na | .17 | .25 | .17 | -1.00 |
| 13 | | | | | | | | | | | | | 1 | na | na | na | na |
| 14 | | | | | | | | | | | | | | 1 | .75 | .38 | -.17 |
| 15 | | | | | | | | | | | | | | | 1 | .75 | -.25 |
| 16 | | | | | | | | | | | | | | | | 1 | -.17 |
| 12rev | | | | | | | | | | | | | | | | | 1 |

Reliability Analysis Inclusive Pedagogy Pre

(Items 3, 6, 11, 12 and 12 reversed excluded from scale)

| | raw_alpha | std.alpha | G6(smc) | average_r | S/N | ase | mean | sd | median_r |
|------------------------------------|-----------|-----------|---------|-----------|--------|-------|------|-------|----------|
| | 0.72 | 0.66 | 0.95 | 0.14 | 1.9 | 0.096 | 3.3 | 0.8 | 0 |
| 95% confidence boundaries | | | | | | | | | |
| lower | 0.53 | 0.72 | 0.9 | | | | | | |
| upper | | | | | | | | | |
| Reliability if an item is dropped: | | | | | | | | | |
| | raw_alpha | std.alpha | G6(smc) | average_r | S/N | alpha | se | var.r | med.r |
| IP1 | 0.75 | 0.70 | 0.86 | 0.177 | 2.4 | 0.086 | 0.16 | 0.050 | |
| IP2 | 0.75 | 0.70 | 0.85 | 0.174 | 2.3 | 0.084 | 0.16 | 0.076 | |
| IP4 | 0.76 | 0.70 | 0.86 | 0.176 | 2.4 | 0.080 | 0.15 | 0.076 | |
| IP5 | 0.72 | 0.67 | 0.90 | 0.156 | 2.0 | 0.096 | 0.18 | 0.020 | |
| IP7 | 0.69 | 0.61 | 0.87 | 0.124 | 1.6 | 0.105 | 0.17 | 0.000 | |
| IP8 | 0.62 | 0.55 | 0.97 | 0.099 | 1.2 | 0.134 | 0.14 | 0.000 | |
| IP9 | 0.62 | 0.55 | 0.97 | 0.099 | 1.2 | 0.134 | 0.14 | 0.000 | |
| IP10 | 0.71 | 0.66 | 0.93 | 0.148 | 1.9 | 0.099 | 0.17 | 0.000 | |
| IP13 | 0.62 | 0.55 | 0.97 | 0.099 | 1.2 | 0.134 | 0.14 | 0.000 | |
| IP14 | 0.63 | 0.57 | 0.93 | 0.108 | 1.3 | 0.127 | 0.16 | 0.000 | |
| IP15 | 0.64 | 0.57 | 0.83 | 0.106 | 1.3 | 0.123 | 0.15 | 0.000 | |
| IP16 | 0.78 | 0.72 | 0.89 | 0.188 | 2.5 | 0.079 | 0.15 | 0.050 | |
| Item statistics | | | | | | | | | |
| | n | raw.r | std.r | r.cor | r.drop | mean | sd | | |
| IP1 | 12 | -0.069 | 0.064 | 0.064 | -0.188 | 2.5 | 1.17 | | |
| IP2 | 12 | -0.010 | 0.098 | 0.100 | -0.137 | 2.7 | 1.23 | | |
| IP4 | 12 | -0.055 | 0.072 | 0.073 | -0.198 | 2.8 | 1.40 | | |
| IP5 | 12 | 0.122 | 0.278 | 0.277 | 0.071 | 2.3 | 0.49 | | |
| IP7 | 12 | 0.562 | 0.601 | 0.610 | 0.426 | 3.8 | 1.66 | | |
| IP8 | 12 | 0.887 | 0.847 | 0.796 | 0.834 | 4.0 | 1.81 | | |
| IP9 | 12 | 0.887 | 0.847 | 0.796 | 0.834 | 4.0 | 1.81 | | |
| IP10 | 12 | 0.411 | 0.358 | 0.341 | 0.262 | 4.3 | 1.56 | | |
| IP13 | 12 | 0.887 | 0.847 | 0.796 | 0.834 | 4.0 | 1.81 | | |
| IP14 | 12 | 0.827 | 0.752 | 0.759 | 0.735 | 3.0 | 2.09 | | |
| IP15 | 12 | 0.828 | 0.776 | 0.794 | 0.759 | 2.7 | 1.67 | | |
| IP16 | 12 | 0.094 | -0.045 | -0.052 | -0.121 | 3.3 | 2.06 | | |

Reliability Analysis Inclusive Pedagogy Post

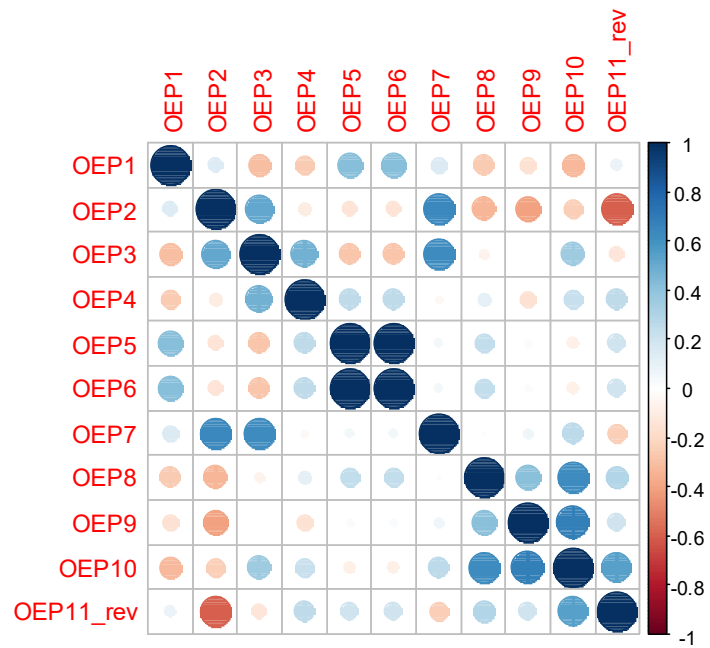
| | | | | | | | | | |
|---|-----------|-----------|-----------|-----------|--------|-------|-------|----------|-------|
| raw_alpha | std.alpha | G6(smc) | average_r | S/N | ase | mean | sd | median_r | |
| 0.73 | 0.69 | 0.87 | 0.2 | 2.3 | 0.097 | 4.4 | 0.28 | 0.25 | |
| lower alpha upper 95% confidence boundaries | | | | | | | | | |
| 0.54 | 0.73 | 0.92 | | | | | | | |
| Reliability if an item is dropped: | | | | | | | | | |
| | raw_alpha | std.alpha | G6(smc) | average_r | S/N | alpha | se | var.r | med.r |
| IPpo1 | 0.76 | 0.74 | 0.85 | 0.26 | 2.9 | 0.090 | 0.094 | 0.32 | |
| IPpo2 | 0.69 | 0.66 | 0.92 | 0.19 | 1.9 | 0.110 | 0.113 | 0.28 | |
| IPpo4 | 0.61 | 0.59 | 0.88 | 0.15 | 1.4 | 0.144 | 0.094 | 0.11 | |
| IPpo5 | 0.61 | 0.59 | 0.94 | 0.15 | 1.4 | 0.156 | 0.099 | 0.16 | |
| IPpo7 | 0.70 | 0.65 | 0.94 | 0.19 | 1.8 | 0.100 | 0.127 | 0.15 | |
| IPpo8 | 0.75 | 0.75 | 0.93 | 0.27 | 3.0 | 0.093 | 0.097 | 0.33 | |
| IPpo14 | 0.70 | 0.65 | 0.95 | 0.19 | 1.8 | 0.107 | 0.108 | 0.20 | |
| IPpo15 | 0.73 | 0.67 | 0.97 | 0.20 | 2.0 | 0.090 | 0.084 | 0.25 | |
| IPpo16 | 0.71 | 0.66 | 0.82 | 0.19 | 1.9 | 0.102 | 0.109 | 0.25 | |
| Item statistics | | | | | | | | | |
| | n | raw.r | std.r | r.cor | r.drop | mean | sd | | |
| IPpo1 | 10 | 0.232 | 0.17 | 0.1360 | 0.043 | 3.8 | 0.63 | | |
| IPpo2 | 10 | 0.611 | 0.58 | 0.5782 | 0.452 | 3.6 | 0.70 | | |
| IPpo4 | 10 | 0.897 | 0.83 | 0.6640 | 0.841 | 3.5 | 0.71 | | |
| IPpo5 | 10 | 0.886 | 0.82 | 0.8452 | 0.779 | 3.8 | 1.03 | | |
| IPpo7 | 10 | 0.567 | 0.61 | 0.5499 | 0.395 | 4.5 | 0.71 | | |
| IPpo8 | 10 | 0.021 | 0.11 | 0.0077 | -0.074 | 4.9 | 0.32 | | |
| IPpo14 | 10 | 0.586 | 0.62 | 0.6117 | 0.493 | 4.8 | 0.42 | | |
| IPpo15 | 10 | 0.472 | 0.53 | 0.5525 | 0.283 | 4.5 | 0.71 | | |
| IPpo16 | 10 | 0.507 | 0.57 | 0.5717 | 0.404 | 4.8 | 0.42 | | |

Open Educational Practices

| | | Pre | | Post | |
|-------|--|------|------|------|------|
| | | Mean | SD | Mean | SD |
| OEP1 | I have the necessary skills to make my products available as open educational resources. | 2.78 | 1.48 | 3.90 | 0.99 |
| OEP2 | I need more help to make my products available as open educational resources. | 3.67 | 1.66 | 3.70 | 1.34 |
| OEP3 | I am confident I can determine which instructional materials are worth sharing. | 2.22 | 0.97 | 3.50 | 0.85 |
| OEP4 | I feel prepared to contribute my instructional resources as open educational resources. | 2.56 | 1.59 | 3.90 | 0.99 |
| OEP5 | I am motivated to make products and processes I create (or adapt) openly available. | 3.89 | 1.76 | 4.60 | 0.52 |
| OEP6 | I am motivated to ensure all work materials meet high standards for openness – that is, they are free, available for reuse or modification, and readily available to anyone. | 3.89 | 1.76 | 4.70 | 0.48 |
| OEP7 | I am motivated to learn more about open education practices. | 4.78 | 0.67 | 4.80 | 0.42 |
| OEP8 | Open educational practices are a mechanism for positive change in inclusive education. | 4.11 | 1.76 | 4.70 | 0.48 |
| OEP9 | Engaging faculty with open educational resources can promote teaching as scholarship. | 2.78 | 2.11 | 4.50 | 0.71 |
| OEP10 | I am willing to share my teaching materials in a public setting. | 3.67 | 2.00 | 4.60 | 0.52 |
| OEP11 | Free instructional materials can never be as high quality or effective as those produced by publishing companies. | 2.11 | 1.69 | 1.50 | 0.71 |
| OEP12 | I feel my mindset around Open Educational Practices has changed during SPLINE. [post] | | | 4.10 | 0.99 |

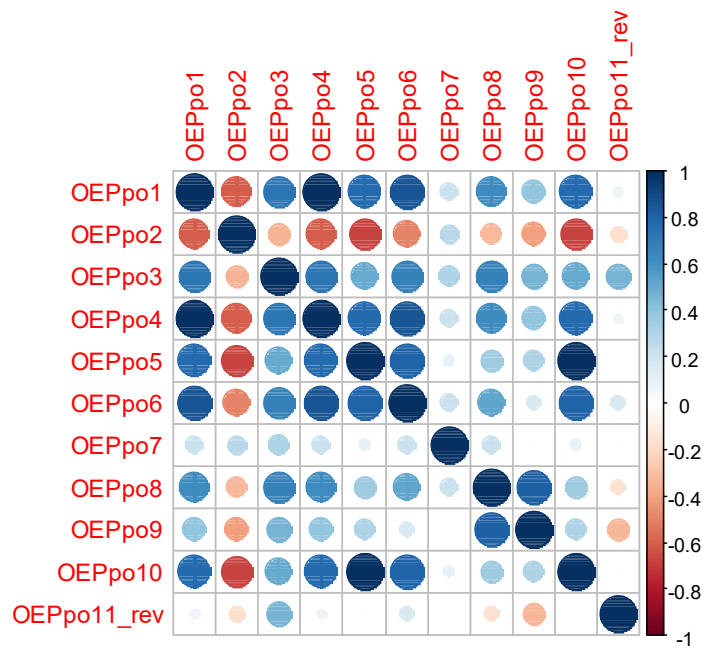
*Item 2 was **not** included in a composite score for a scale measuring the efficacy and understanding of OEP. Item 11 was reverse coded and the reverse coded item was included in the composite score for the scale.

Correlational Analysis OEP Pre



| OEP | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11rev |
|--------|---|------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 0.14 | -0.3 | -0.25 | 0.43 | 0.43 | 0.16 | -0.26 | -0.16 | -0.32 | 0.09 |
| 2 | | 1 | 0.51 | -0.11 | -0.15 | -0.15 | 0.64 | -0.34 | -0.41 | -0.24 | -0.59 |
| 3 | | | 1 | 0.47 | -0.28 | -0.28 | 0.62 | -0.07 | 0.01 | 0.35 | -0.14 |
| 4 | | | | 1 | 0.26 | 0.26 | -0.04 | 0.12 | -0.16 | 0.23 | 0.26 |
| 5 | | | | | 1 | 1 | 0.06 | 0.25 | 0.03 | -0.09 | 0.2 |
| 6 | | | | | | 1 | 0.06 | 0.25 | 0.03 | -0.09 | 0.2 |
| 7 | | | | | | | 1 | -0.01 | 0.07 | 0.27 | -0.25 |
| 8 | | | | | | | | 1 | 0.41 | 0.62 | 0.3 |
| 9 | | | | | | | | | 1 | 0.69 | 0.2 |
| 10 | | | | | | | | | | 1 | 0.54 |
| 11 rev | | | | | | | | | | | 1 |

Correlational Analysis OEP Post



| OEP | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11rev |
|-------|---|-------|-------|-------|-------|------|------|-------|-------|-------|-------|
| 1 | 1 | -0.61 | 0.72 | 1 | 0.78 | 0.86 | 0.21 | 0.62 | 0.4 | 0.78 | 0.08 |
| 2 | | 1 | -0.34 | -0.61 | -0.68 | -0.5 | 0.28 | -0.33 | -0.41 | -0.68 | -0.18 |
| 3 | | | 1 | 0.72 | 0.51 | 0.68 | 0.31 | 0.68 | 0.46 | 0.51 | 0.46 |
| 4 | | | | 1 | 0.78 | 0.86 | 0.21 | 0.62 | 0.4 | 0.78 | 0.08 |
| 5 | | | | | 1 | 0.8 | 0.1 | 0.36 | 0.3 | 1 | 0 |
| 6 | | | | | | 1 | 0.22 | 0.52 | 0.16 | 0.8 | 0.16 |
| 7 | | | | | | | 1 | 0.22 | 0 | 0.1 | 0 |
| 8 | | | | | | | | 1 | 0.81 | 0.36 | -0.16 |
| 9 | | | | | | | | | 1 | 0.3 | -0.33 |
| 10 | | | | | | | | | | 1 | 0 |
| 11rev | | | | | | | | | | | 1 |

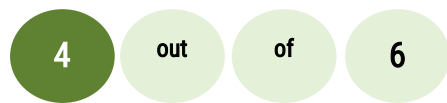
Reliability Analysis OEP Pre

| | raw_alpha | std.alpha | G6(smc) | average_r | S/N | ase | mean | sd | median_r |
|------------------------------------|-----------|-----------|---------|-----------|---------|-------|-------|-------|----------|
| | 0.65 | 0.62 | 0.86 | 0.14 | 1.7 | 0.14 | 3.3 | 0.82 | 0.12 |
| 95% confidence boundaries | | | | | | | | | |
| lower | alpha | upper | | | | | | | |
| 0.37 | 0.65 | 0.93 | | | | | | | |
| Reliability if an item is dropped: | | | | | | | | | |
| | raw_alpha | std.alpha | G6(smc) | average_r | S/N | alpha | se | var.r | med.r |
| OEP1 | 0.68 | 0.67 | 0.86 | 0.18 | 2.0 | 0.13 | 0.081 | 0.197 | |
| OEP3 | 0.66 | 0.64 | 0.81 | 0.17 | 1.8 | 0.14 | 0.079 | 0.178 | |
| OEP4 | 0.64 | 0.60 | 0.80 | 0.15 | 1.5 | 0.15 | 0.098 | 0.081 | |
| OEP5 | 0.60 | 0.57 | 0.90 | 0.13 | 1.3 | 0.16 | 0.079 | 0.107 | |
| OEP6 | 0.60 | 0.57 | 0.90 | 0.13 | 1.3 | 0.16 | 0.079 | 0.107 | |
| OEP7 | 0.65 | 0.61 | 0.80 | 0.15 | 1.6 | 0.14 | 0.100 | 0.197 | |
| OEP8 | 0.60 | 0.58 | 0.80 | 0.13 | 1.4 | 0.17 | 0.094 | 0.081 | |
| OEP9 | 0.64 | 0.61 | 0.80 | 0.15 | 1.5 | 0.15 | 0.093 | 0.178 | |
| OEP10 | 0.57 | 0.54 | 0.73 | 0.12 | 1.2 | 0.17 | 0.079 | 0.081 | |
| OEP11_rev | 0.61 | 0.58 | 0.82 | 0.13 | 1.4 | 0.16 | 0.100 | 0.062 | |
| Item statistics | | | | | | | | | |
| | n | raw.r | std.r | r.cor | r.drop | mean | sd | | |
| OEP1 | 12 | 0.18 | 0.17 | 0.081 | -0.0039 | 2.6 | 1.4 | | |
| OEP3 | 12 | 0.23 | 0.29 | 0.292 | 0.0759 | 2.1 | 1.0 | | |
| OEP4 | 12 | 0.38 | 0.45 | 0.456 | 0.2351 | 2.5 | 1.4 | | |
| OEP5 | 12 | 0.63 | 0.60 | 0.461 | 0.4512 | 3.6 | 1.8 | | |
| OEP6 | 12 | 0.63 | 0.60 | 0.461 | 0.4512 | 3.6 | 1.8 | | |
| OEP7 | 12 | 0.43 | 0.44 | 0.431 | 0.1889 | 4.2 | 1.6 | | |
| OEP8 | 12 | 0.57 | 0.55 | 0.535 | 0.4409 | 4.2 | 1.6 | | |
| OEP9 | 12 | 0.49 | 0.45 | 0.438 | 0.2885 | 2.8 | 2.0 | | |
| OEP10 | 12 | 0.66 | 0.67 | 0.714 | 0.5235 | 3.5 | 1.9 | | |
| OEP11_rev | 9 | 0.56 | 0.55 | 0.547 | 0.4132 | 3.9 | 1.7 | | |

Reliability Analysis OEP Post

| | raw_alpha | std.alpha | G6(smc) | average_r | S/N | ase | mean | sd | median_r |
|------------------------------------|-----------|-----------|---------|-----------|--------|-------|-------|-------|----------|
| | 0.88 | 0.88 | 0.93 | 0.43 | 7.5 | 0.039 | 4.4 | 0.48 | 0.4 |
| 95% confidence boundaries | | | | | | | | | |
| lower | alpha | upper | | | | | | | |
| 0.8 | 0.88 | 0.96 | | | | | | | |
| Reliability if an item is dropped: | | | | | | | | | |
| | raw_alpha | std.alpha | G6(smc) | average_r | S/N | alpha | se | var.r | med.r |
| OEPpo1 | 0.84 | 0.85 | 0.95 | 0.38 | 5.6 | 0.056 | 0.106 | 0.36 | |
| OEPpo3 | 0.85 | 0.85 | 0.89 | 0.39 | 5.8 | 0.049 | 0.128 | 0.33 | |
| OEPpo4 | 0.84 | 0.85 | 0.95 | 0.38 | 5.6 | 0.056 | 0.106 | 0.36 | |
| OEPpo5 | 0.86 | 0.86 | 0.94 | 0.41 | 6.1 | 0.045 | 0.108 | 0.40 | |
| OEPpo6 | 0.86 | 0.85 | 0.87 | 0.39 | 5.8 | 0.046 | 0.111 | 0.38 | |
| OEPpo7 | 0.89 | 0.90 | 0.94 | 0.50 | 8.9 | 0.038 | 0.111 | 0.52 | |
| OEPpo8 | 0.87 | 0.87 | 0.88 | 0.42 | 6.6 | 0.043 | 0.118 | 0.40 | |
| OEPpo9 | 0.88 | 0.89 | 0.88 | 0.46 | 7.8 | 0.037 | 0.108 | 0.51 | |
| OEPpo10 | 0.86 | 0.86 | 0.94 | 0.41 | 6.1 | 0.045 | 0.108 | 0.40 | |
| OEPpo11_rev | 0.91 | 0.91 | 0.93 | 0.53 | 10.0 | 0.030 | 0.077 | 0.52 | |
| Item statistics | | | | | | | | | |
| | n | raw.r | std.r | r.cor | r.drop | mean | sd | | |
| OEPpo1 | 10 | 0.94 | 0.93 | 0.85 | 0.909 | 3.9 | 0.99 | | |
| OEPpo3 | 10 | 0.88 | 0.87 | 0.89 | 0.828 | 3.5 | 0.85 | | |
| OEPpo4 | 10 | 0.94 | 0.93 | 0.85 | 0.909 | 3.9 | 0.99 | | |
| OEPpo5 | 10 | 0.79 | 0.81 | 0.78 | 0.747 | 4.6 | 0.52 | | |
| OEPpo6 | 10 | 0.86 | 0.87 | 0.89 | 0.832 | 4.7 | 0.48 | | |
| OEPpo7 | 10 | 0.29 | 0.34 | 0.27 | 0.212 | 4.8 | 0.42 | | |
| OEPpo8 | 10 | 0.72 | 0.72 | 0.74 | 0.665 | 4.7 | 0.48 | | |
| OEPpo9 | 10 | 0.50 | 0.50 | 0.51 | 0.383 | 4.5 | 0.71 | | |
| OEPpo10 | 10 | 0.79 | 0.81 | 0.78 | 0.747 | 4.6 | 0.52 | | |
| OEPpo11_rev | 10 | 0.21 | 0.18 | 0.16 | 0.066 | 4.5 | 0.71 | | |

APPENDIX I: SPLINE FOLLOW-UP FINDINGS



Fellows have used the mapping exercise to examine alignment of UDL guidelines to additional teaching resources.

“I find the UDL matrix to be a very useful tool, particularly for brainstorming new additions to materials, and continue to use it both for our SPLINE project as well as for my teaching.

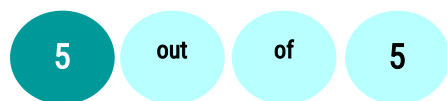
“The use of music in collegiate anatomy and physiology courses

“I have shared the mapping exercise with others and used it to assess existing resources.

“I had my team doing UDL mapping exercises for training. I think it was helpful for us in evaluating our own resources and sparking some ideas for future improvements.

“I have not had the opportunity to use this exercise just yet, but plan to use it soon.

“But, I have shared this resource and it will be included in a new project I just got funded



Fellows have used the action plan they developed during the SPLINE program.

“I'm incorporated some UDL principles into my spring course design

“I have transformed the action plan into several different initiatives for our project!

“I have identified more individuals to be part of my action plan.

“I have merged it into another project that I am working on. I think it was useful for me to develop the action plan during SPLINE so that I had a basis from which to work.

“I feel like it "has been internalized" and it will be incorporated into my new research project



Fellows indicated the SPLINE program impacted how they utilize UDL within their work.

“I am much more aware of the UDL principles and frequently use them as a starting point for new materials or new versions of existing materials.

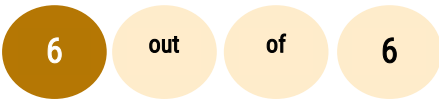
“I have used in my course design, publications about education, and to inform my colleagues

“It definitely has made me more aware of UDL, and has brought it to the forefront for me.

“Before SPLINE, I did not know very much about UDL. Now I feel more confident navigating and interpreting the guidelines and applying them to my own work.

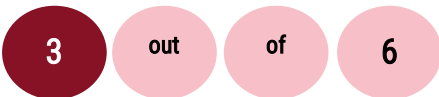
“I feel like it "has been internalized" and it will be incorporated into my new research project

“Currently, I do not have the opportunity to use UDL, but will be implementing it into the carrying out of my action plan.



Fellows indicated the SPLINE program impacted how they utilize inclusive pedagogy within their work.

- “I feel much more informed and prepared to address diversity and inclusion in our materials. I have also reached out to several colleagues with more expertise in this area who are now collaborating on our project with a specific goal of addressing DEI and inclusive pedagogy, in part by adding new materials and revising existing materials.
- “Its a new pedagogical framework that works well with my teaching and education research
- “Similarly, I am more aware now.
- “During my talks etc., I do my best to utilize the tools I learned in regards to inclusive pedagogy.
- “I feel like it "has been internalized" and it will be incorporated into my new research project
- “I would say "maybe." My organization has been moving toward more inclusive pedagogy in general, so it's hard for me to know how much I was impacted by SPLINE vs. other efforts at my organization. At the very least, I think SPLINE was helpful for expanding my understanding of DEI.



Fellows indicated the SPLINE program impacted how they utilize open education practices within their work.

- “It has been very helpful to utilize OER in my work.
- “I would say "maybe." My organization has also been doing a lot with OEP, so I'm not sure about the impact of SPLINE vs. my organization. At the very least, SPLINE helped find some useful resources and has made me a bigger advocate.
- “This element probably had the least impact for me personally just because I was the most aware of OER at the beginning of the network, but I learned more of the formal practices (different license options etc.) that have improved my use of OER in my work.
- “I use more OER due to COVID, but I promise to make anything I develop in the future OER
- “Open education practices seemed too burdensome, community standards too high, and institutional support too low
- “I don't think so just because we were already publishing all of our work as OERs already.

APPENDIX J: STEM INCLUSIVE TEACHING PRACTICES WEBINAR SERIES

Title: Episode One

<https://qubeshub.org/publications/1805/1>

Date: April 08, 2020

Abstract. A conversation with Bryan Dewsbury (University of Rhode Island) one of the authors of the CBE-LSE Inclusive Pedagogy guide moderated by Carrie Diaz Eaton. We talked with him about inclusive teaching practices, and he answered questions about implementation in the STEM classroom. We appreciate that all of our personal and professional lives have been disrupted by the pandemic, so we will also spend time talking about how to think about inclusion in the times of COVID-19.



Presenters

- Bryan Dewsbury, PhD. Gardner Institute Fellow and an Assistant Professor of Biology at the University of Rhode Island
- Carrie Diaz Eaton PhD., Associate Professor of Digital and Computational Studies

Title: Episode 2 – Universal Design for Learning

<https://qubeshub.org/publications/1862/1>

Date: May 13, 2020

Abstract: Episode Two introduces Universal Design for Learning (UDL), an educational framework originally developed by CAST that guides instructors in the design of learning environments and educational materials that are accessible, engaging, and challenging for all students. This episode will also offer attendees the opportunity to practice identifying and applying UDL principles to classroom activities. As this episode is designed to be interactive, please attend prepared to collaborate with others as we learn together.

Presenters

- Andrew Hasley, PhD, Universal Design for Learning project manager with BIOQUEST
- Hayley Orndorf is the Universal Design for Learning Project Manager at BioQUEST and the Project Coordinator at QUBES



Title: Episode Three: The Role of Educators in Dismantling Systemic Racism

<https://qubeshub.org/publications/1945/1>

Date: June 17, 2020

Abstract: This episode will build from Kelisa Wing's recent [blog post](#) calling for educators to hold themselves accountable for dismantling racial oppression. There is unmet potential for educators to teach tolerance, ensure representation, and disrupt the system of oppression for our students and colleagues. Kelisa will provide specific, actionable ways educators can make a difference in the lives of the students they serve.

Presenter: Kelisa Wing, Professional Development Specialist at Department of Defense Education Activity (DoDEA)



Title: Episode 4

<https://qubeshub.org/publications/2041/1>

Date: July 29, 2020

Abstract: Inclusive teaching means teaching in ways that do not exclude students, accidentally or intentionally, implicitly or explicitly, from opportunities to learn and thrive. For inclusive teaching to be authentic, effective, and transformative, it is necessary for educators to ensure that their perception of students' experience and expectations aligns with students' phenomenological reality.

This webinar will examine faculty perception of the purpose of STEM according to their students. Does their understanding align with their students'? Participants will explore concrete, evidence-informed strategies to (1) align what students expect from their education with what faculty think; (2) transform the classroom, virtual or in-person into a sanctuary where all students can explore life, the inner and the outer; (3) create a meaning-centered education which is grounded in love of knowledge and humanity.

Presenter:

- Mays Imad is a neuroscientist and professor of Pathophysiology and Biomedical ethics at Pima Community College, the founding coordinator of the Teaching and Learning Center, and a Gardner Institute Fellow.



Title: Socially Relevant Teaching in the Time of COVID-19

<https://qubeshub.org/publications/2263/1>

Date: February 4th, 2021 at 3:00pm ET

Abstract: We present various mathematical modeling and data science activities created around analyzing and interpreting COVID-19 data. Much of the instructional guidance provided for the activities and projects is easily adaptable to a remote learning environment. Additionally, these activities and projects address complex social issues related to COVID-19 such as inequality in testing, wealth distributions, or race/ethnicity issues.

Preliminary data suggest that COVID-19 disproportionately impacts minorities and low-income households. Some of the modules focus on using mathematics to better understand these inequities, which can help facilitate rich discussions. In addition, we share some of our experiences in teaching these activities across the curriculum.

Panelists:

Joanna Wares, University of Richmond

Marcella Torres, University of Richmond

Zeynep Teymuroglu, Rollins College

Grace Stadnyk, Furman University

Casey Hawthorne, Furman University

