#CI4CompSciEd

COMMENCEMENT CEREMONY

60 MINUTES

Dr Caitlin Dooley and Khurram Hassan

9 March 2017

Georgia Department of Education

Collective Impact for Computer Science Education:
Start to Design Backbone Functions

Dr Caitlin Dooley and Khurram Hassan invite you to join them to celebrate the effort and achievement of participants in the Collective Impact for Computer Science Education digital course

Commencement Ceremony

CLICK HERE TO JOIN US

Date:
9 March 2017

Where:
Online

Time:
9 a.m. (Pacific)
11 a.m. (Central)
12 p.m. (Eastern)

Scholar ILLINOIS
THE GENEVA LEARNING FOUNDATION
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Agenda

1. **Commencement Address**
   Dr Caitlin Dooley and Khurram Hassan
2. **Course feedback**
   Summary of preliminary qualitative findings
   from post-course survey and weekly feedback surveys
3. **Final course projects**
4. **Participant presentations**
   Participant and project information
   Motivation statement
   Participant presentation

GaDOE

Georgia Department of Education

NSF

Learning leaders

Dr Caitlin Dooley

Khurram Hassan

StriveTogether

Jeff Edmondson

collectiveimpactforum.org

Jennifer Splansky Juster

Chris Allers, Ph.D. has led the design of collective impact strategies, including those focusing on improving high school education outcomes, early learning, and evacuee resettlement.

Dr Chris Allers

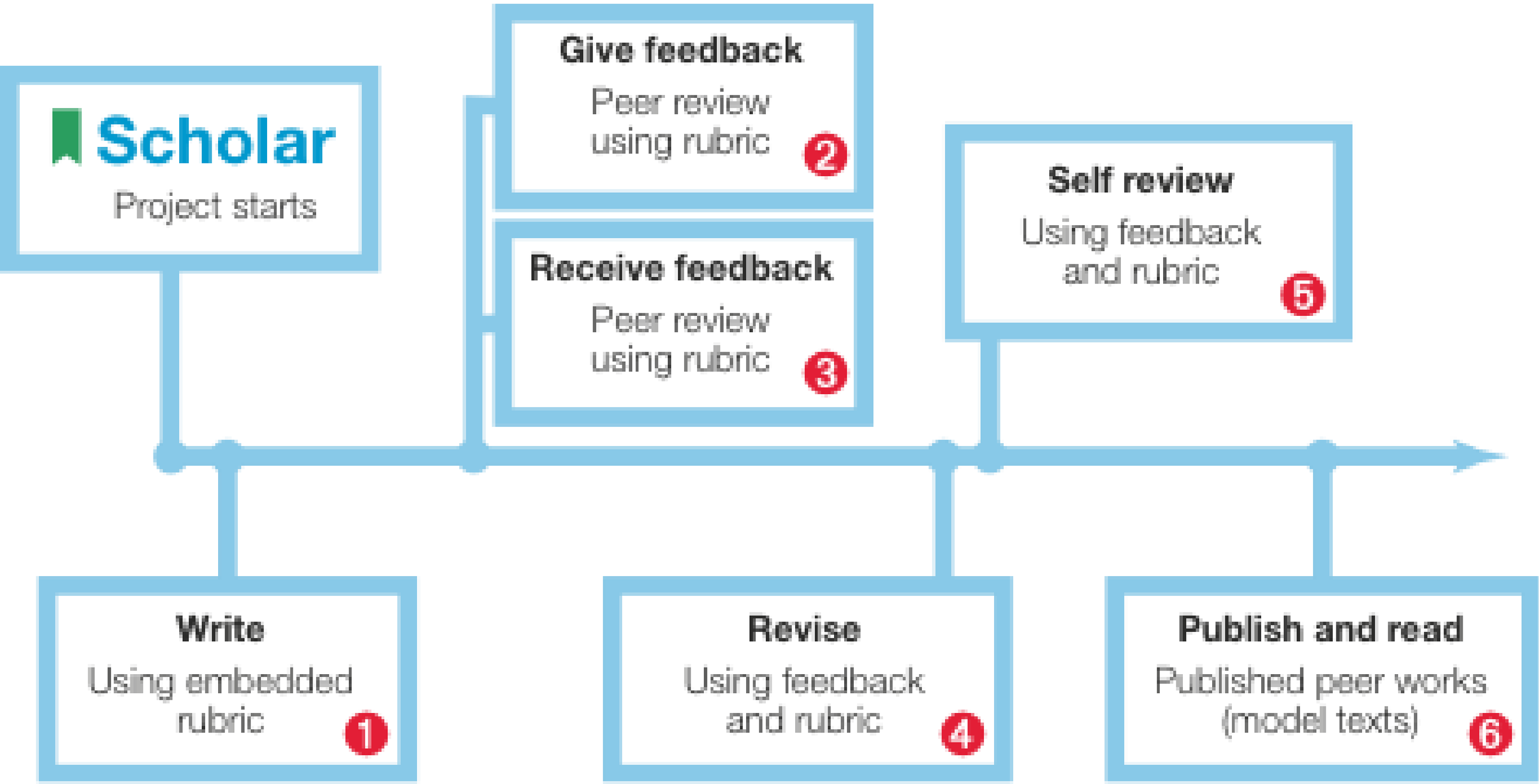
Dr Caitlin Dooley

Khurram Hassan

What we learned
What you learned

1. Completion rates
2. Struggle
3. Reactive feedback
4. Dialogue
5. Collaboration
6. Course team
7. Peer review
8. Outcomes
9. Applicability
10. Reflective practice

Write-Review-Revise



173

of people who applied to participate

110

of people who started the course

34

of draft projects submitted

19

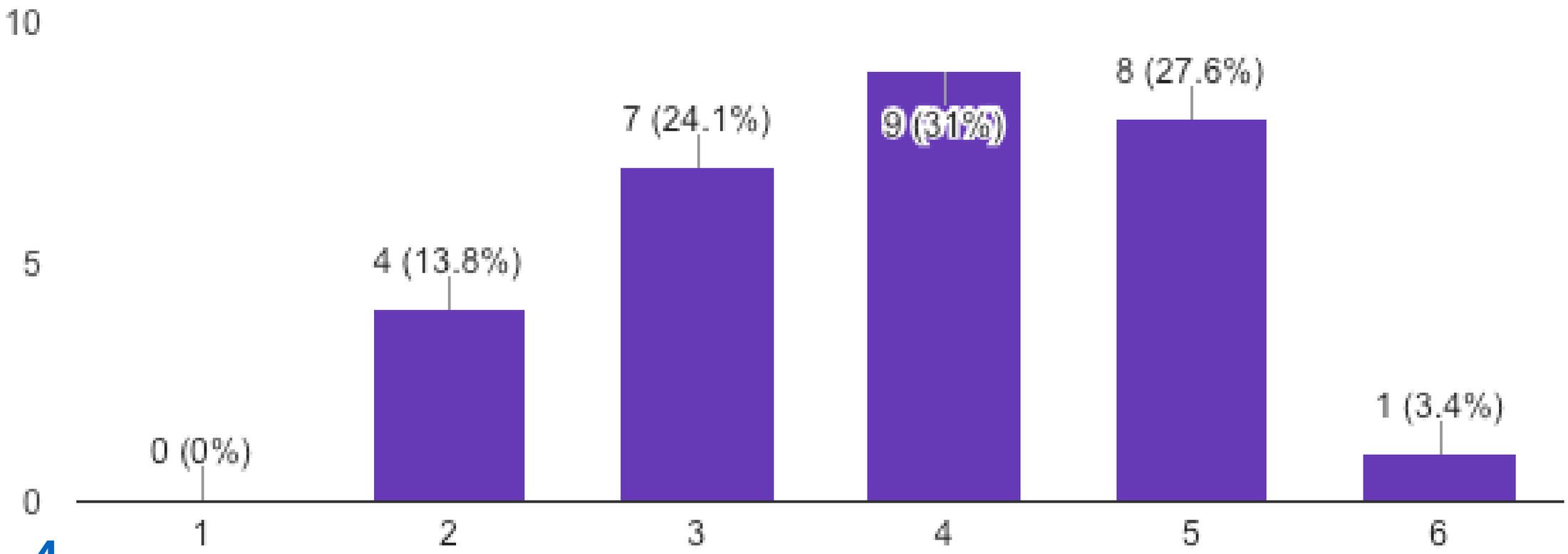
of final projects submitted

Struggle

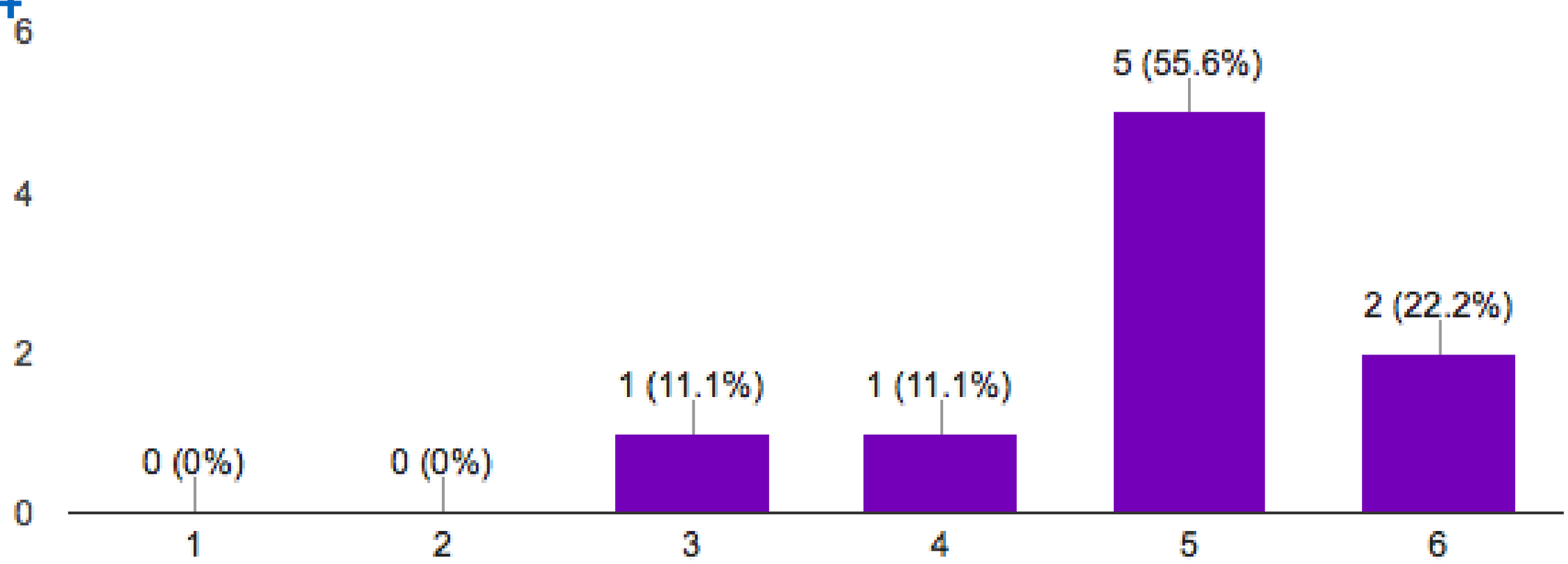
- “I’m struggling to keep up due to my travel schedule this week. Will be spending more time in Week 2.”
- “I find Week 1 overpacked with exercises and deliverables.”
- “I am yet to commence the course.”
- “I’m still overwhelmed – too many updates – hard to focus on what’s important as I have full work schedule”
- “Concentrating on the assignment helped me focus, but need to synthesize and focus more”
- “I look forward to going full throttle in week 2!”

You are comfortable with using Scholar. (29 responses)

Week 1



Week 4



Reactive

- “I am truly **enjoying** the course and **growing** in understanding every day.”
- “I **appreciate** your dedication to making the course **meaningful** for all of us.”
- “This continues to be a **very valuable** experience and I'm so **glad** to be a small part of it.”
- “I'm so **happy** that I **invested** the time to take this class.”
- “Great course, keep up the great effort.”
- “The course curriculum was well thought out.”

Dialogue

- “The discussions were excellent.”

Collaboration

- “Valuable partnerships, key collaborators, a vision, action plan and a sense of significant progress and best of all, hope.”
- “[My community’s project] has many good components of Collective Impact already. That is exciting for me and our team!”

Course team

- “Really appreciated the support and pedagogical leadership”

Peer review

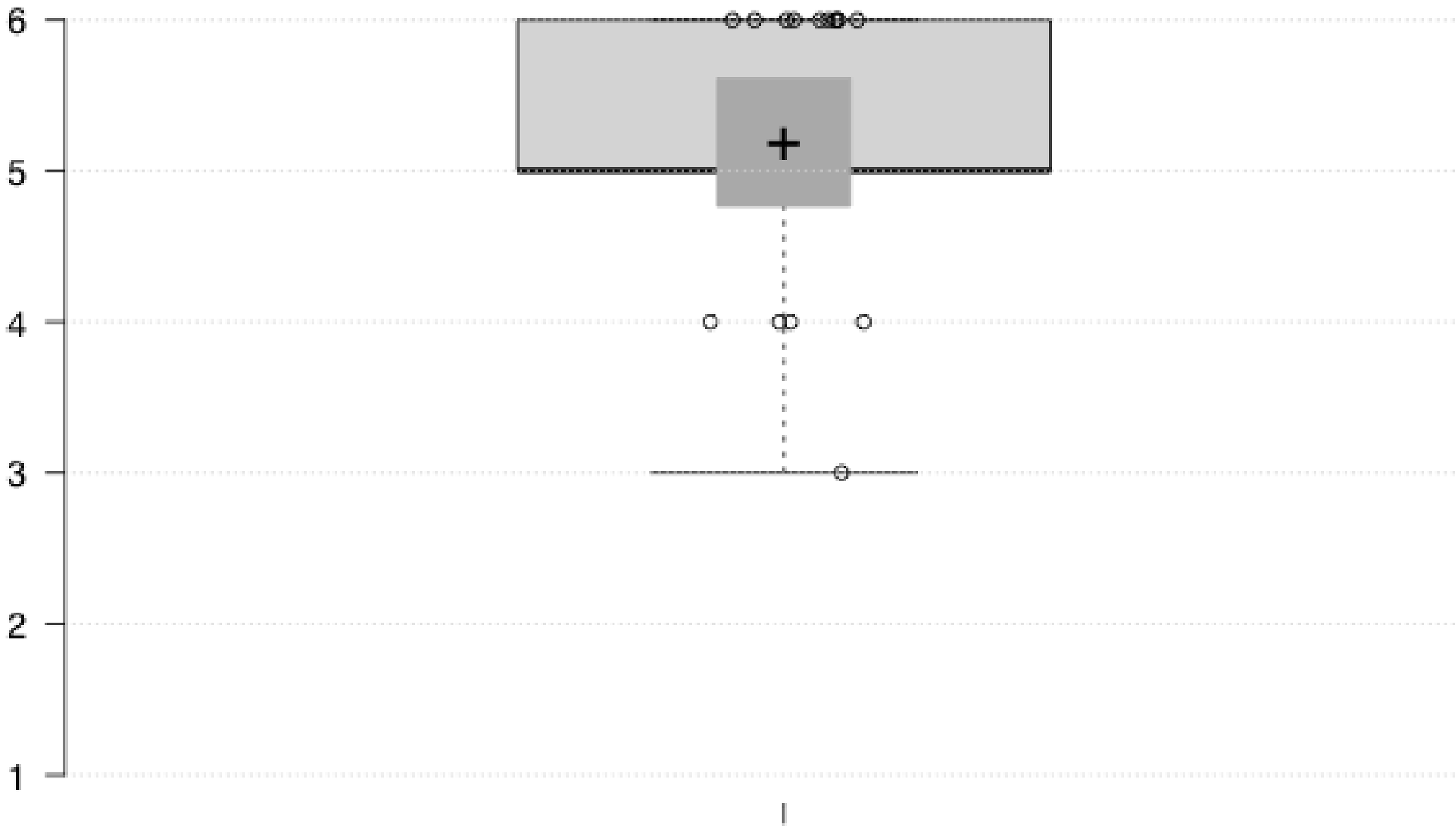
Giving and receiving feedback

- “I finished my first review last evening. I enjoy reading about the work being implemented in other states but unfortunately I don’t always have the time. Requiring peer review forces me to read and reflect on at least three other proposals. Thanks!”
- “The peer reviews others did on my work was extremely helpful.”

Outcomes

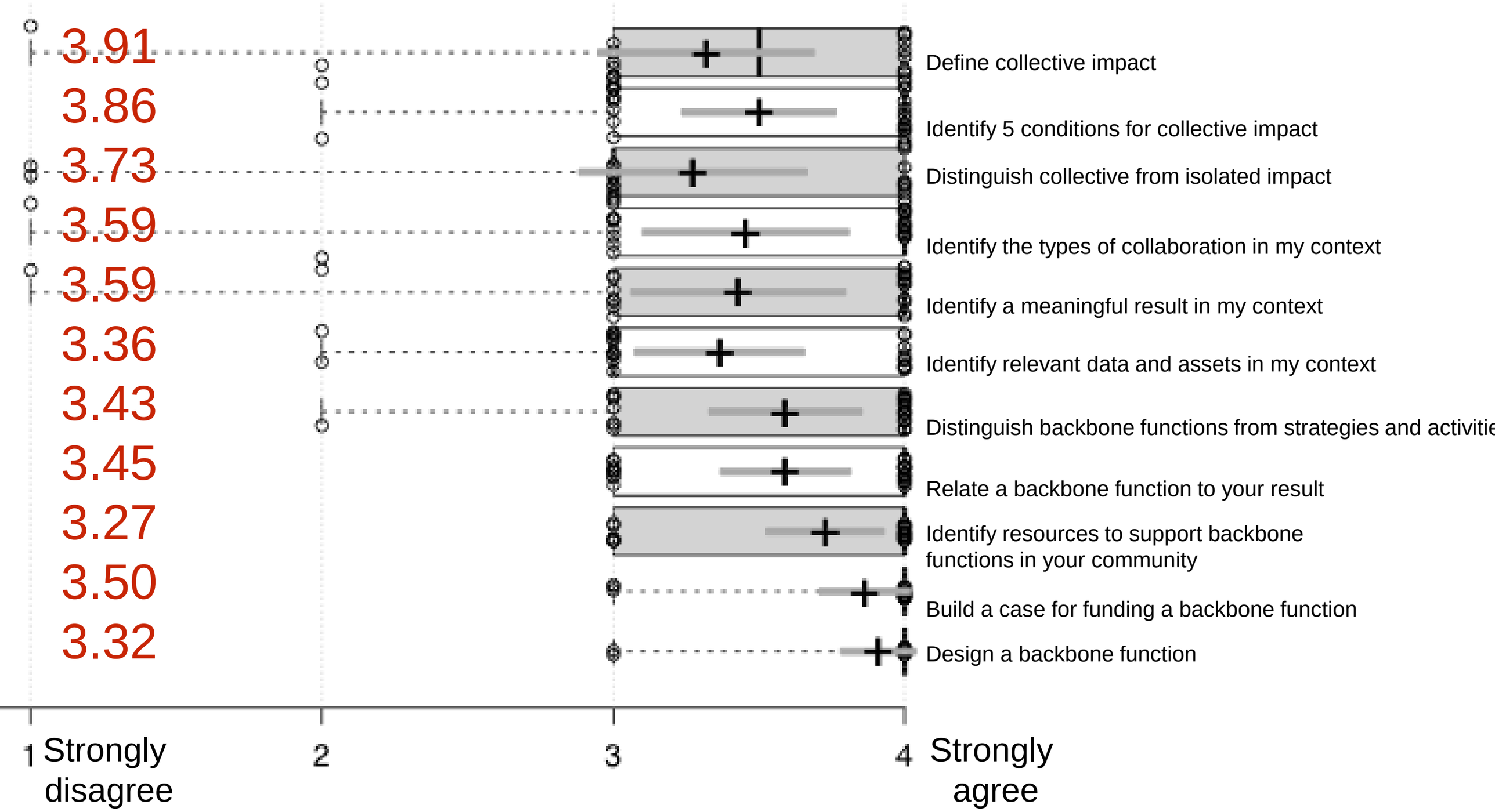
- “I learned so much about collective impact and witnessed a number of very successful strategies for adult professional learning.”
- “Great course. Really helped to clarify specific aspects of Collective Impact.”
- “It wasn't what I expected, but it was a good course.”
- “We signed up for the course because I wanted deadlines and peers to keep us motivated. It worked.”
- “Fully satisfied.”
- “I am quite satisfied with the course, as I have learned a great deal about Collective Impact and what can be accomplished with its use.”

“I learned a lot.”



Learning objectives

This course has helped me to achieve the following learning objectives.



Applicability

- “[The course] was immediately applicable to work that I am currently doing.”
- “The outlines for assignments DID help me write an NSF Includes pre-proposal”
- “This started as an artificial project but I am so excited by the preliminary data that I will present this to the numeracy team as a possibility for a team initiative.”

Reflective practice

- “Thanks, Ko. Your suggestions led me to **closely review my thinking**.
- “I gained a **deeper perspective** of the strengths, challenges and gaps that currently exist in K-12 CS throughout my organization.”
- “I **gained insight** into peer projects, formulation of peer projects, and amazing ideas that can infuse CS education into the K-12 setting.”
- “Required to **dig deeper** with my proposal and **clearly articulate** my ideas.”
- “I was able to **bring all of my ideas together** in two ways: to develop my backbone function and to review a peer's backbone function.”
- “**Really helping to get more clarity** into my thinking about how to develop collective impact and its application to STEM and Computer Science.”

Final course projects

Barbara Ann	**Brown**	Sumter, SC CI4Food&$
***Rosabel**	**Deloge**	Moving CS4NH to the Public Space
Timothy	**Gachanga**	Preserving heritagee by developing STEM education Backbone function
***John**	**Gifford**	Collective Impact Initiative for the Rotorua Eastside Community of Learning_STEM & Computer Science
***Carol**	**Giruiceo**	Providence, Rhode Island
J. Kemi	**Ladeji-Osias**	Early STEM Engagement for Minorities Backbone function
Lauren	**Margulieux**	Atlanta, GA Subgoal Backbone Function
***Patricia**	**Mikos**	CS Matters in Maryland Backbone functions
Craig	**Ogilvie**	Strengthening Community College Faculty Preparation Across the Nation Backbone function
***Rachelle**	**Robley**	Oakland, CA Support Aligned Activities
Maureen	**Ryan**	Building K-12 Computer Science Education in the Jasper County Charter System
***Paige**	**Sutcliff**	Statesboro, GA Planning for Computer Science Ed
***Marina**	**Theodotou**	CTA (Computer Teachers Association)
Felicia	**Tillman**	Atlanta, GA Coding Curriculum Implementation
Mary	**Tumlin**	The Power of STEAM
***Richard**	**Vines**	Social and cultural informatics as a cornerstone backbone function
Laura	**Wilson**	Orono, ME_ Development of a Follow a Researcher Network
Sandi	**Woodall**	GaDOE STEM_STEAM
***Cindy**	**Ziker**	Backbone Support for Early Engagement of Minority Males in STEM

Course projects presentations

10 presentations

1. Rachelle Robley
2. Richard Vines
3. Marina Thodotou
4. Paige Sutcliff
5. Cindy Ziker and Jumoke Ladeji-Osias
6. Carol M. Giuriceo
7. John Gifford
8. Patricia Mikos
9. Mary Tumlin
10. Rosabel Deloge

Rachelle Robley

- **Organization**: US2020
- **Project title**: Oakland, CA – Support Aligned Activities: STEM Mentoring in Silicon Valley
- **State**: CA California

Rachelle Robley

"Since my organization is hoping to act as a backbone organization in a coalition of diverse stakeholders, it'd be helpful for me to learn more about collective impact and the responsibilities in that role. Though I've done reading and research on my own, on the Collective Impact Forum website and articles in the *Stanford Social Innovation Review*, I'd like a more tangible learning experience. I'm working with my supervisor on my project, but generally on my own, so I'd appreciate having others to bounce ideas off of and hearing new perspectives. Innovation is only possible when people brainstorm together."

Oakland, CA – Support Aligned Activities: STEM Mentoring in Silicon Valley

- Backbone Organization
- Context
- Functions
- Result

Richard Vines

- **Organization**: Department of Economic Development, Jobs, Transport and Resources
- **Project title**: Social and cultural informatics as a cornerstone backbone function: A case study associated with Australian agricultural industry development
- **State**: Non US - Australia

Richard Vines

“For quite sometime, I have been interested in innovation systems thinking and the systematic design of learning spaces encompassed by models associated with communities of practice, communities of interest and learning network interactions. I have developed these ideas after collaborating with the eXtension Foundation in the period 2012-2015. This Foundation forms part of the US Cooperative Extension System that in turn forms part of the US network of Land Grant Universities. Beyond this, I have also been influenced by collaborations I have engaged with with Dr Bill Cope going back to the period 2000-2004. The Scholar application is a very interesting tool and I am keen, to learn more about how to harness its potential.”

Social and cultural informatics as a cornerstone backbone function: A case study associated with Australian agricultural industry development

- Backbone Organization
- Context
- Functions
- Result

Marina Theodotou

- **Organization**: Computer Science Teachers Association
- **Project title**: CTA (Computer Teachers Association): Building a Professional Development Pipeline for CS K12 teachers
- **State**: NY New York

Marina Theodotou

“I have a new role as Director of Professional Development at the Computer Science Teachers Association and this course would be a great opportunity to:

- learn more about collective impact
- understand the challenges and opportunities in CS Education
- network with K-12 .”

CTA (Computer Teachers Association): Building a Professional Development Pipeline for CS K12 teachers

- Backbone Organization
- Context
- Functions
- Result

Paige Sutcliff

- **Organization**: Statesboro High School
- **Project title**: Statesboro, GA – Planning for Computer Science Ed
- **State**: GA Georgia

Paige Sutcliff

“I am a high school math teacher and participated in STEM initiatives in our school through a research grant funded through our local university. One of the areas of interest for STEM is computer science and we are not currently offering a pathway for these courses. The GA DOE has been sending out information to public schools teachers to determine interest in teaching these courses as an additional math course. I’m not familiar with collective impact and thought this would be a good way to find out how our school can move into this area of course offerings for our students. My undergraduate degree is in statistics, I've taught AP Statistics and I'm very interested in courses that prepare our students for a data driven workplace.”

Statesboro, GA – Planning for Computer Science Ed

- Backbone Organization
- Context
- Functions
- Result

Cindy Ziker

- **Organization**: SRI International
- **Project title**: Backbone Support for Early Engagement of Minority Males in STEM
- **State**: CA California

Jumoke Ladeji-Osias

- **Organization**: Morgan State University
- **Project title**: Backbone Support for Early Engagement of Minority Males in STEM
- **State**: **MD Maryland**

Cindy Ziker

“I am responsible for the mini backbone support for an INCLUDES Launch Development project and would like to learn more about how to enhance this effort. Our project focuses on engaging minority youth in computer science education. We plan to develop an outline for our backbone support and implement it as part of our project.”

Jumoke Ladeji-Osias

“Our project is studying STEM achievement in African American and Hispanic males who are enrolled in middle or high schools located in low socioeconomic areas. Using collective impact-style approaches, project partners will address two common goals: 1) Broaden the participation of underrepresented minority males in science and engineering through educational experiences that prepare them for careers in STEM fields; and (2) Create a Network Improvement Community focused on STEM achievement in minority males. Participating in this course will provide me with tools to ensure project success.”

Early STEM Engagement for Minority Males (eSEM) through a Network of MSIs

Cindy Ziker (SRI International) and
Jumoke Ladeji-Osias (Morgan State University)

March 9, 2017

MORGAN STATE UNIVERSITY

KENTUCKY STATE UNIVERSITY

NORTH CAROLINA A&T STATE UNIVERSITY

JSU 1877 JACKSON STATE UNIVERSITY

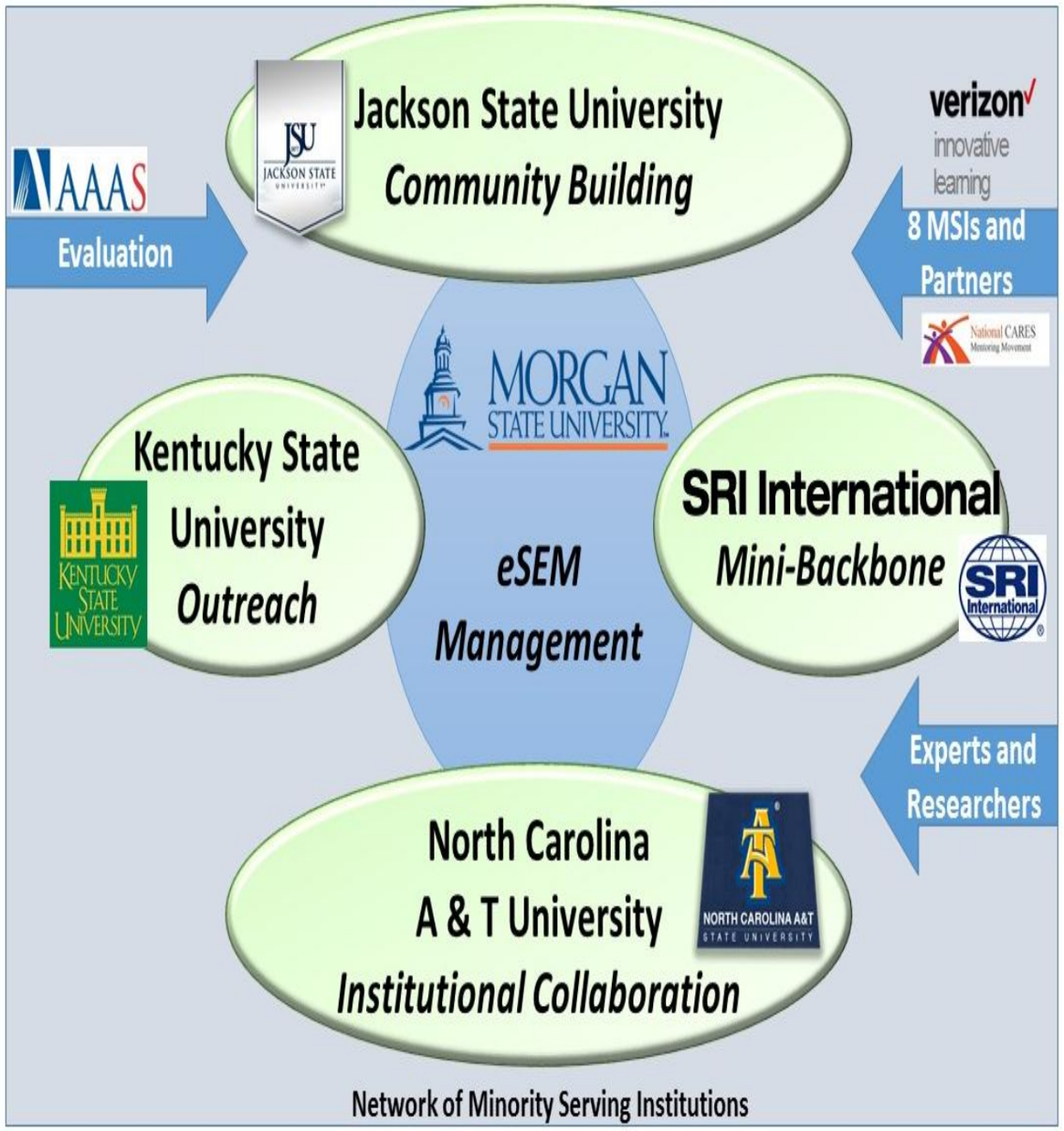
SRI International

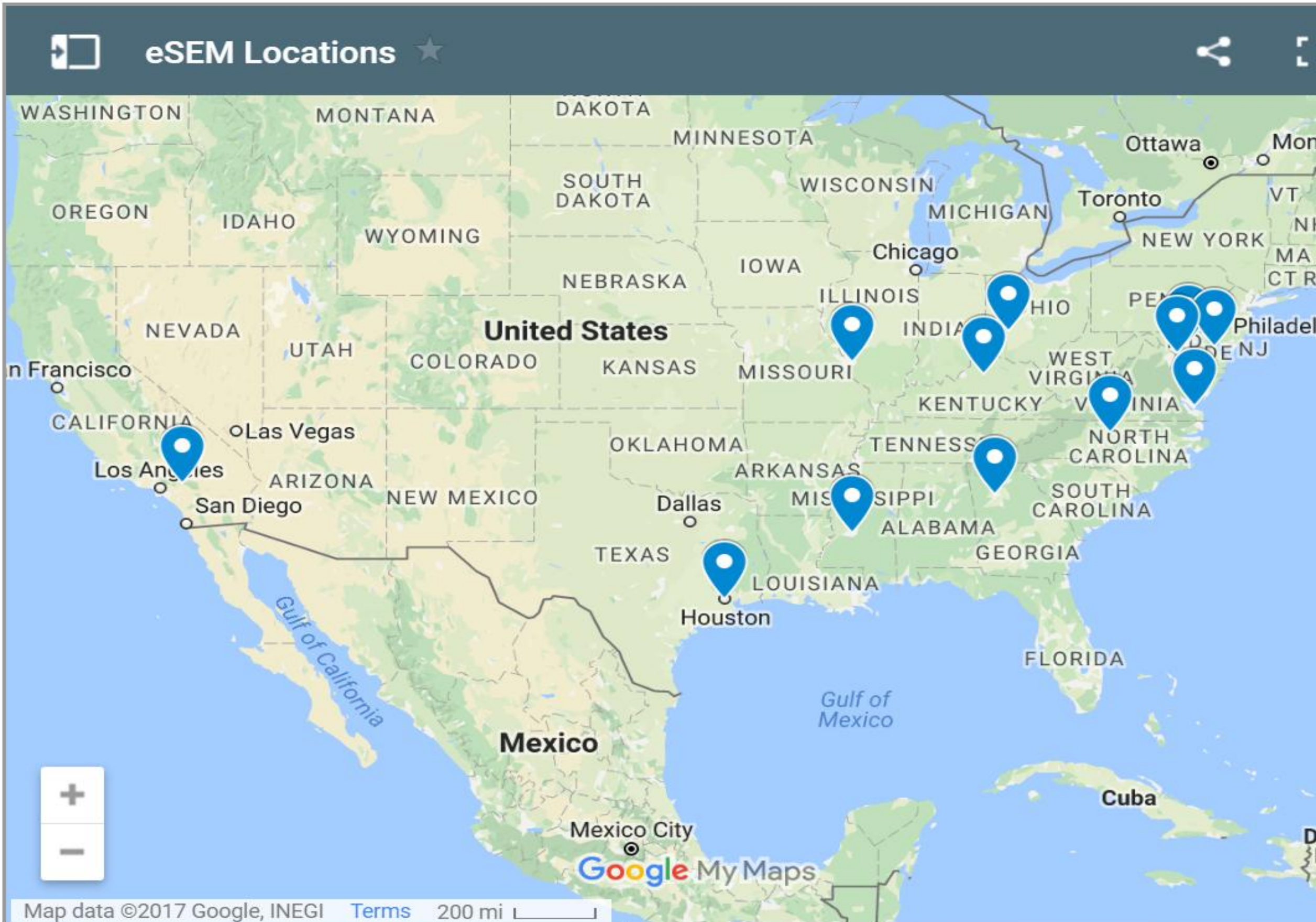
AAAS

Backbone Function: Promote Continuous Communication

AIM: to increase the number of low income, minority, male middle school students who have access to high quality STEM programs, role models and mentors in communities local to 16 minority serving institutions across the country (MSIs).

Backbone Function: SRI will serve as the backbone organization that will promote continuous communication among stakeholders.




eSEM Locations
WASHINGTON
MONTANA
DAKOTA
MINNESOTA
SOUTH DAKOTA
WISCONSIN
MICHIGAN
OREGON
IDAHO
WYOMING
NEBRASKA
IOWA
ILLINOIS
NEVADA
UTAH
COLORADO
KANSAS
MISSOURI
United States
CALIFORNIA
Las Vegas
Los Angeles
San Diego
ARIZONA
NEW MEXICO
OKLAHOMA
ARKANSAS
Dallas
TEXAS
LOUISIANA
Houston
KENTUCKY
TENNESSEE
ALABAMA
GEORGIA
SOUTH CAROLINA
NORTH CAROLINA
WEST VIRGINIA
FLORIDA
Chicago
Toronto
Ottawa
NEW YORK
Philadelphia
Gulf of California
Gulf of Mexico
Mexico
Mexico City
Cuba
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Strategies for Continuous Communication

Backbone strategies for continuous communication include:

- developing and maintaining a website;
- hosting webinars for sharing best practices;
- facilitating conference calls with team members, stakeholders, and funders;
- posting newsletters, and
- facilitating face to face events

http://esem-includes.org/

- The Backbone organization will design and develop this website with stakeholder input from site directors, parents, teachers and mentors.
- The purpose is to connect teachers, parents and students with needed resources, while building an online community that can work together to promote students' success in STEM.
- The website will include blogs and forums; access to professional development webinar recordings and resources in STEM content areas;
- A repository of evidence based models that have been found to accelerate minority male students' preparation in STEM will be included on the website.
- The website will be promoted through links with other relevant sites, email blasts to stakeholders and organizations with similar initiatives, and newsletters through schools and higher education institutions.
- To promote sustainability, a 'Donations' tab will be included on the website.

Budget

- The costs associated with this function include:
- 1. Salary for a Backbone Director ($180,000), and two support staff ($100,000 x 2 per year);
- 2. Salary for a part-time webmaster and web-designer ($50,000.00 per year);
- 3. Salary for a data analyst to summarize and report data ($100,000 per year);
- 4. Cost of software for collecting and posting dashboard data ($250.00 per month x 16 sites = $4000 per year);
- 5. Costs for webex services ($2000.00 per year);
- 6. Travel costs for face to face meetings (4 per year for 2 staff members = $10,000)

Conclusion

SRI will bring support continuous communication among stakeholders and promote awareness of relevant resources available to students, teachers, mentors, parents and community partners who are striving to support the success of minority males in STEM.

While a website alone cannot move people to action, the efforts of the backbone organization to promote continuous communication using these strategies can empower stakeholders to work together to attain the desired result for our students.

For more information go to: http://esem-includes.org/

Backbone Support for Early Engagement of Minority Males in STEM

- Backbone Organization
- Context
- Functions
- Result

Carol M. Giuriceo

- **Organization**: Rhode Island STEAM Center @ Rhode Island College
- **Project title**: Providence, Rhode Island : Public Outreach and Communication Program for Computer Science
- **State**:RI Rhode Island

Carol M. Giuriceo

“My responsibilities as director of the Rhode Island STEAM Center @ Rhode Island College include building partnerships with formal and informal educators, industry professionals, and government personnel with the shared goal of increasing STEAM - science, technology, engineering, arts + design, mathematics – literacy for all Rhode Islanders. I am also actively involved in the CS4RI statewide initiative. Learning about the Collective Impact framework will provide me with practices to help with collaboration across different sectors as we work to create sustainable structures and pathways.”

Providence, Rhode Island : Public Outreach and Communication Program for Computer Science

- Backbone Organization
- Context
- Functions
- Result

John Gifford

- **Organization**: Nga Pumanawa e Waru education and technology initiative
- **Project title**: Collective Impact Initiative for the Rotorua Eastside Community of Learning:STEM & Computer Science
- **State**: Rotorua, New Zealand

Collective Impact Initiative for the Rotorua Eastside Community of Learning

STEM & COMPUTER SCIENCE: Presented by John Gifford

Background

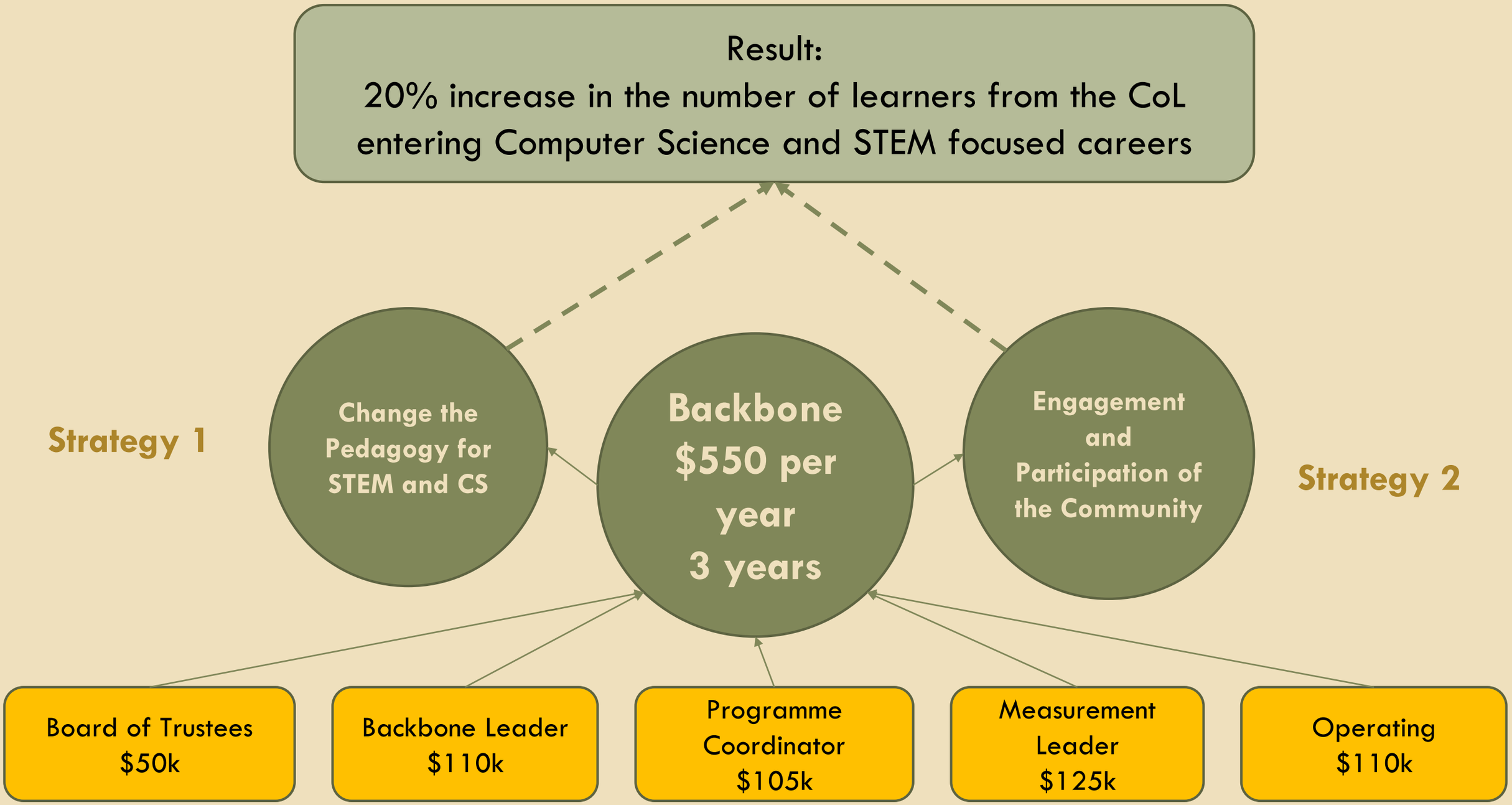
Community of learning

Collaborating and Empowering Maori Iwi

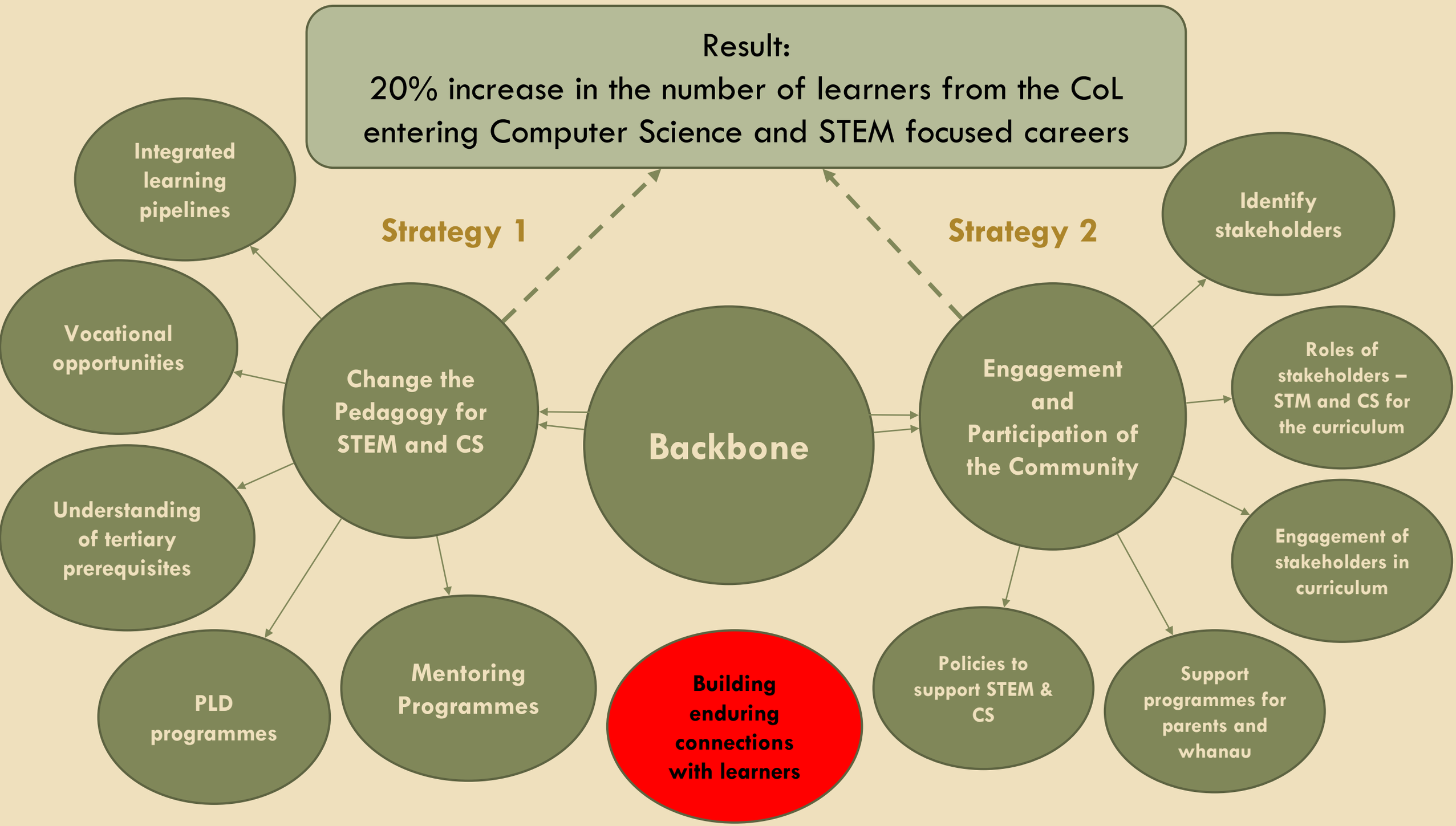
Collective Impact

STEM and Computer Science Capability in Schools

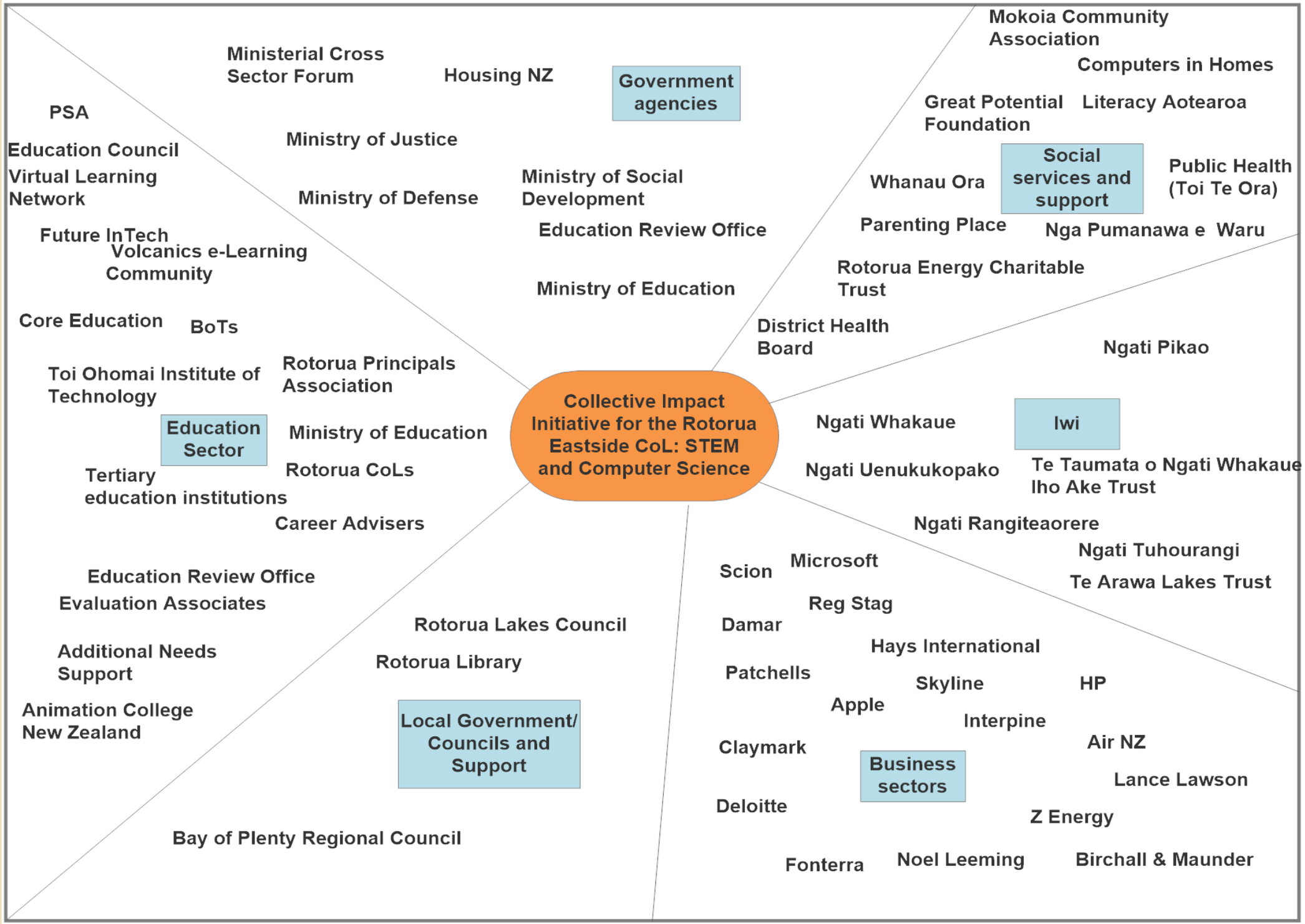
Result & Funding



Backbone Functions - Strategies and Activities



Actor Map: Critical Engagement With Multiple Sectors



Summary

- Funding - $500k/year – 3 years
- Build capability in schools and multi-sector engagement with the community
- Proven track record of collaboration
- Measurement framework (Student voice, community surveys, social network analyses)
- Evaluation framework for Backbone
  - Strategies, alignment, measurement, public will, policy & funding
- Governance structure

Thank You

Collective Impact Initiative for the Rotorua Eastside Community of Learning: STEM & Computer Science

- Backbone Organization
- Context
- Functions
- Result

Patricia Mikos

- **Organization**: Maryland State Department of Education
- **Project title**: CS Matters in Maryland – Backbone functions
- **State**:MD Maryland

Patricia Mikos

“As a K-12 administrator, I support the expansion of Computer Science and the development of new Career Technology Education (CTE) programs at the high school and community college level. I am working across several groups and IT/CS-related initiatives in Maryland. These initiatives have mixed results in terms of the degree of implementation and the impact on student achievement. I would like to learn about and use the collective impact model to inform the expansion of CS in Maryland.”

What's the Need? *Expanding CS in Maryland*

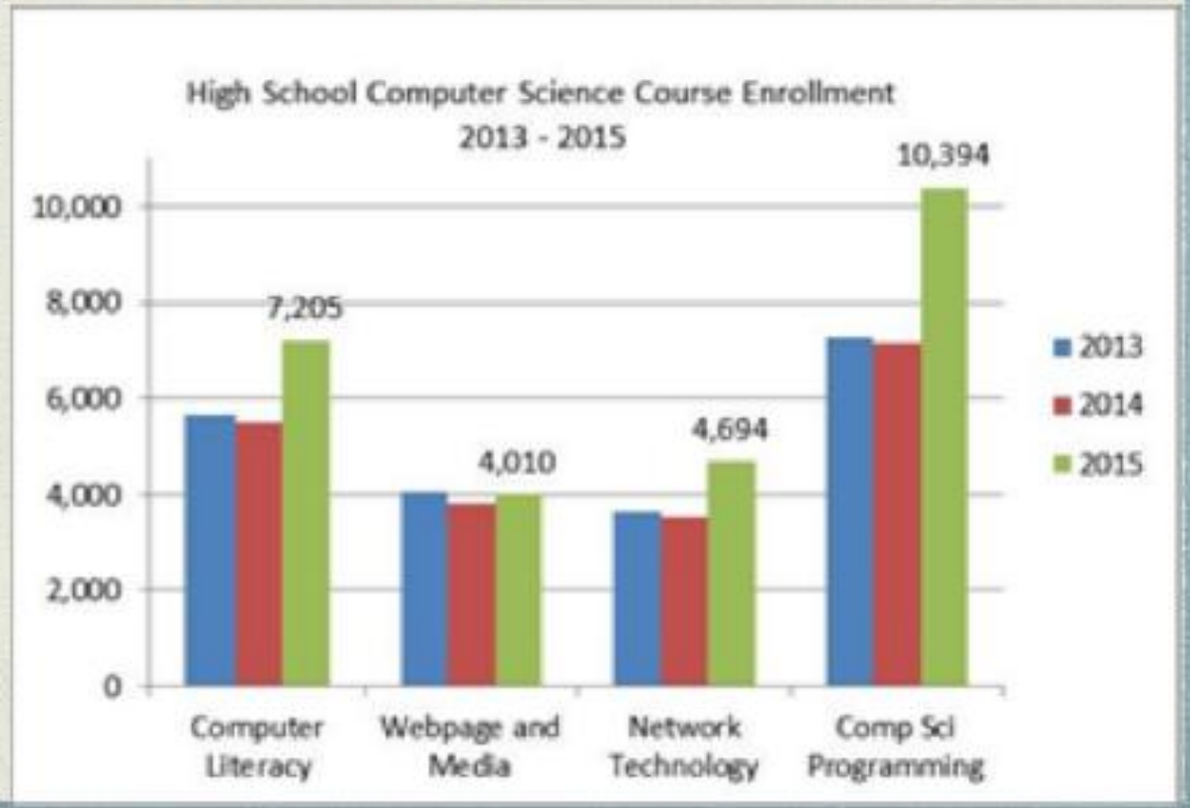
- The Bureau of Labor Statistics estimates 12% growth over the next ten years for computing graduates (50,000 ***new*** jobs per year nationally -- which doesn't account for retirements, turnover, and other openings)
- Only 50,000 U.S. students received computing bachelor's degrees in 2013
- In 2014, there were 20,884 open computing jobs in Maryland (with an average salary of $99,554), but only 2,383 CS graduates (only 21% of whom were female)
- Cybersecurity is a critical emerging need in the U.S. and Maryland
- Computing & technology are key industries that help to drive Maryland's economy

This is important for a broad stakeholder group

Sources: BLS, code.org, NSF WebCASPAR

Challenge is Limited Opportunity: K-12 CS in Maryland

- Fewer than one-third of the 280,000 high school students in Maryland are taking CS classes, but the numbers are growing (see chart)
- Maryland AP CS A test-takers has doubled since 2008:
  - Proportion of female students has grown from 15% to 25%
  - Proportion of African-Americans: from 8.3% to 11%
  - Proportion of Hispanics: from 3% to 7%
  - Troubling achievement gap (pass rates)



Challenge is Limited Supply of Teachers

- Schools are struggling to expand course offerings with few CS teachers
- Many schools are training other teachers (math, business) to teach the introductory level CS courses
- As more students access CS, they want to move into Advanced CS courses such as Cybersecurity…

	Number of Teacher Certifications						
Certification Description	2010	2011	2012	2013	2014	2015	2016
Computer Science	385	411	398	393	383	371	352
Math	5,287	5,863	5,977	6,179	6,245	6,329	6,158
Science	5,642	6,157	6,222	6,346	6,315	6,357	6,278
Technology/ Engineering	777	868	903	916	917	902	864
Total	**12,091**	**13,299**	**13,500**	**13,834**	**13,860**	**13,959**	**13,652**

Sources: MSDE

Comprehensive P-20W Approach: Build upon collaboration to deliver Backbone Functions

CS Matters in Maryland

- Partnership network:
  - Steering committee members (35+ from MSDE, school systems, universities, industry, and nonprofits)
  - Master teachers (dozens)
  - Maryland chapter of Computer Science Teachers Association (hundreds)
  - Summit and other event attendees (hundreds)
  - Students reached (thousands)
- National visibility through Expanding Computing Education Pathways Alliance, public presentations, published articles, upcoming national CS Education Summit in April 2017, press coverage, social media…
- Creation of the ***Maryland Center for Computing Education*** (MCCE)

MD Center for Computing Education

- ***Mission**: Expand access to high-quality K-12 computing education in Maryland for all students through teacher preparation, coalition building, and advocacy*

- 1. Expanding Access and Delivery of CS Content
- 2. Developing and Supporting Computer Science Teachers
- 3. Ensuring Equity and Success for Students

Maryland Center for Computing Education (MCCE)
"Growing and Sustaining CS for All in Maryland"

- Create a clearinghouse for professional development offerings and teacher preparation opportunities
- Continue to offer CS Matters AP CSP training workshops using flexible, scalable formats
- Create a credit-bearing online course on diversity in computing
- Grow and strengthen our partnership of diverse stakeholders

Maryland Center for Computing Education

A Partnership for Investing in the Future

University System of Maryland

CS Matters

Maryland State Department of Education
Preparing World Class Students

UMBC
An Honors University in Maryland

University of Maryland 1856

CS Matters in Maryland – Backbone functions

- Backbone Organization
- Context
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Mary Tumlin

- **Organization**: Jasper County Middle School
- **Project title**: The Power of STEAM: Jasper County Middle School CS Integration
- **State**: GA Georgia

Mary Tumlin

“I am interested in learning more about collective impact and how I can use it in my classroom. I want to create a backbone outline so that I can be a better contributor to the STEAM initiative at my school.”

The Power of STEAM:
Jasper County Middle School CS Integration

- Backbone Organization
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Rosabel Deloge

- **Organization**: CS4NH Coalition
- **Project title**: Moving CS4NH to the Public Space
- **State**: NH New Hampshire

Rosabel Deloge

“As a project manager for 2 NSF CS related grants in NH, I am part of a small group that is ready to develop and launch a steering committee and plan for CS4NH and this course has been recommended by my grant PI as a valuable experience for all of us on the team.”

Moving CS4NH to the Public Space

Business, Industry, Community and Education

Part I Context

- NH Computer Science Teacher Association
- Community College System with Businesses conducted small summit on to determine need for computing jobs
- Community College System implemented Pathways project connecting secondary and post secondary programs
- NH Charitable Foundation Study – Smarter Pathways-strengthening NH's STEM Pipeline
- UNH-Manchester 2 grants (NSF and Google) for teacher professional development

Part I Context, continued

- Governor's STEM Taskforce – recommendation to hire NH STEM Director (solid background in CS!)
- Joined ECEP Alliance (Expanding Computing Education Pathways) – received mini grant to conduct Landscape Study of CS in NH
- ECEP Summit Washington, DC – small team attended
- CS4NH Launch Event – 110 participants around the state
- Governors' for CS Conference – small team attended

Part I Context, result

- Resulted in small team that began to meet and formed CS4NH Coalition:
  - NH STEM Director
  - State Legislative Representative
  - NH Charitable Foundation representative
  - UNH-Manchester Professor, NSF/Google Grants
  - CTE Consultant, NSF Grants

Part III Backbone Function

- Collaborative Leadership Organization

  - New Hampshire High Technology Council which represents business and industry in the state. Current focus is on Workforce Development and Computer Science is a good fit.
  - Executive Director of NHHTC is now a member of our CS4NH Coalition Group.

Part II Result

- **Current NSF grant to develop a Deep Understanding of the NH Computing Education Landscape.**
  - Study includes high school data, community college data, 4 year college & university data, and business & industry data.
  - Preliminary indication is: 79.8% of all New Hampshire public high schools, Career & Technical Centers and other learning environments such as on-line classes are already offering some level of computer science courses.

- **Goal for CS4NH would be 75% of New Hampshire's 2019 high school graduates will have participated in high quality computer science educational opportunities at the high school level.**

Moving CS4NH to the Public Space

- Backbone Organization
- Context
- Functions
- Result