Evaluating the MSP Program: Looking at Return on Investment

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MSP LNC Meeting

February 2013

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The Poster Session Challenge

An assignment for this evening:

Imagine: Congressional members come to the poster session

They want to know "what their money is buying"

What would they learn from the posters?

How well do the MSP projects conceptualize and communicate "return on investment" (ROI) ?

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Inverness Research:

We study investments made in the improvement of education

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Inverness and the MSPs

- Rapid City (PRIME) evaluators for ten years
- Appalachian Math Science Partnership (AMSP) evaluators for twelve years
- Maine (PSP) evaluators for three years
- MSP Collaboratory documentors for one year

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A Play in Three Acts

I) Some General Thoughts about Evaluation and Evaluating MSPs

II) Evaluating INVESTMENTS in Educational Improvement

III) The Improvement Infrastructure

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I) Some General Thoughts About Evaluation

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Evaluating improvement efforts:

The process of improving education is a different process than doing education … requiring a different set of skills, foci, and responsibilities

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The allegiance of the independent evaluator is to the investment, not the project or the Foundation

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Evaluation is fundamentally about understanding and describing what is actually happening

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Evaluation is NOT about assessing the degree to which stated goals have or have not been met

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Evaluation should generate insights as much or more than "proof".

It is often more important to help projects think insightfully about their work and the situations they face than to address their initial worries of garnering proof of effectiveness.

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Evaluation also involves coming to understand the value of something… where value is ultimately multi-dimensional contextualized and relative

Evaluation is evidence based but is not equivalent to measurement or the accumulation of data

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Thoughts about evaluating "impact"

impact
n [ˈɪmpækt]

1. the act of one body, object, etc., striking another; collision

2. the force with which one thing hits another or with which two objects collide

3. the impression made by an idea, cultural movement, social group, etc. the impact of the Renaissance on Medieval Europe

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The thinking, judgment and perspectives of the evaluator can be as important as the data collected

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Our Approach to evaluating NSF investments in education

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Four Functions of Evaluation

FUNCTION	AUDIENCE	PURPOSE
Document and Portray	Internal and External Audiences	To help both insiders and outsiders better understand nature and purpose of project
Formative Feedback	Project leaders and staff	To help the project learn about its design and impact and thereby revise its design and strategies
Summative Assessment	Funders	To help funders assess the ways in which and the extent to which the project is creating value… and to assess the return on their investment
Research	The "Field"	To generate knowledge and insights about the improvement of education

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The NSF Charter: Educational Mission of NSF

The Foundation is authorized and directed to initiate and support basic scientific research and programs to strengthen scientific research potential and science education programs at all levels in the mathematical, physical, medical, biological, engineering, social, and other sciences by making... arrangements to support such scientific and educational activities.

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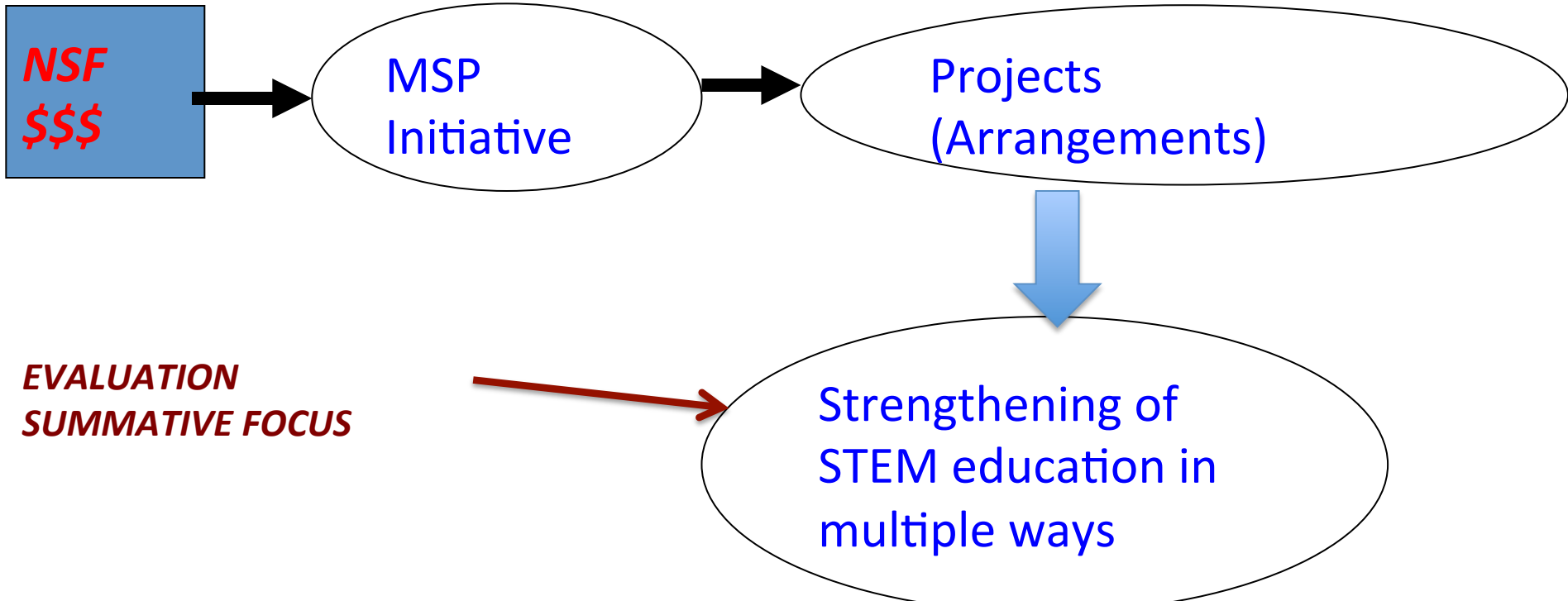
Evaluating NSF funding



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MSP Stated Goals – an incomplete set of things to look for

- Enhance schools' capacity to provide challenging curricula for all students and encourage more students to succeed in advanced courses in mathematics and the sciences;
- Increase the number, quality and diversity of mathematics and science teachers, especially in underserved areas;
- Engage and support scientists, mathematicians, and engineers at local universities and local industries to work with K–12 educators and students;
- Contribute to a greater understanding of how students effectively learn mathematics and science and how teacher preparation and professional development can be improved; and
- Promote institutional and organizational change in education systems — from kindergarten through graduate school — to sustain partnerships' promising practices and policies.

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Summary: An Assertion

- *Evaluation of MSPs (externally funded projects) should document and communicate to both internal and external audiences*

  1) what is actually happening
  2) the multiple contributions of the project which collectively comprise the total return on investment

- *This is different (much broader) than assessing distal contributions to target audiences*

- *Evaluators should work with the project and the funder to increase the total ROI*

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QUESTION:

To what extent does your evaluation approach reflect or differ from this description?

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II) Evaluating Investments in Educational Improvement

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Expenditure vs. Investment

- Expenditures are outlays for products and services

- Investments create capital that can be used in the future production of goods and services

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What is "Capital"?

- The accumulated wealth of an individual, company or community, used as a fund for carrying on fresh production
- Wealth in any form used to help in producing more wealth
- Accumulated goods devoted to the production of other goods
- Assets that yield income and other useful outputs over long periods of time.
- (Expenditures produce products and services; Investments yield capital and generate working assets)

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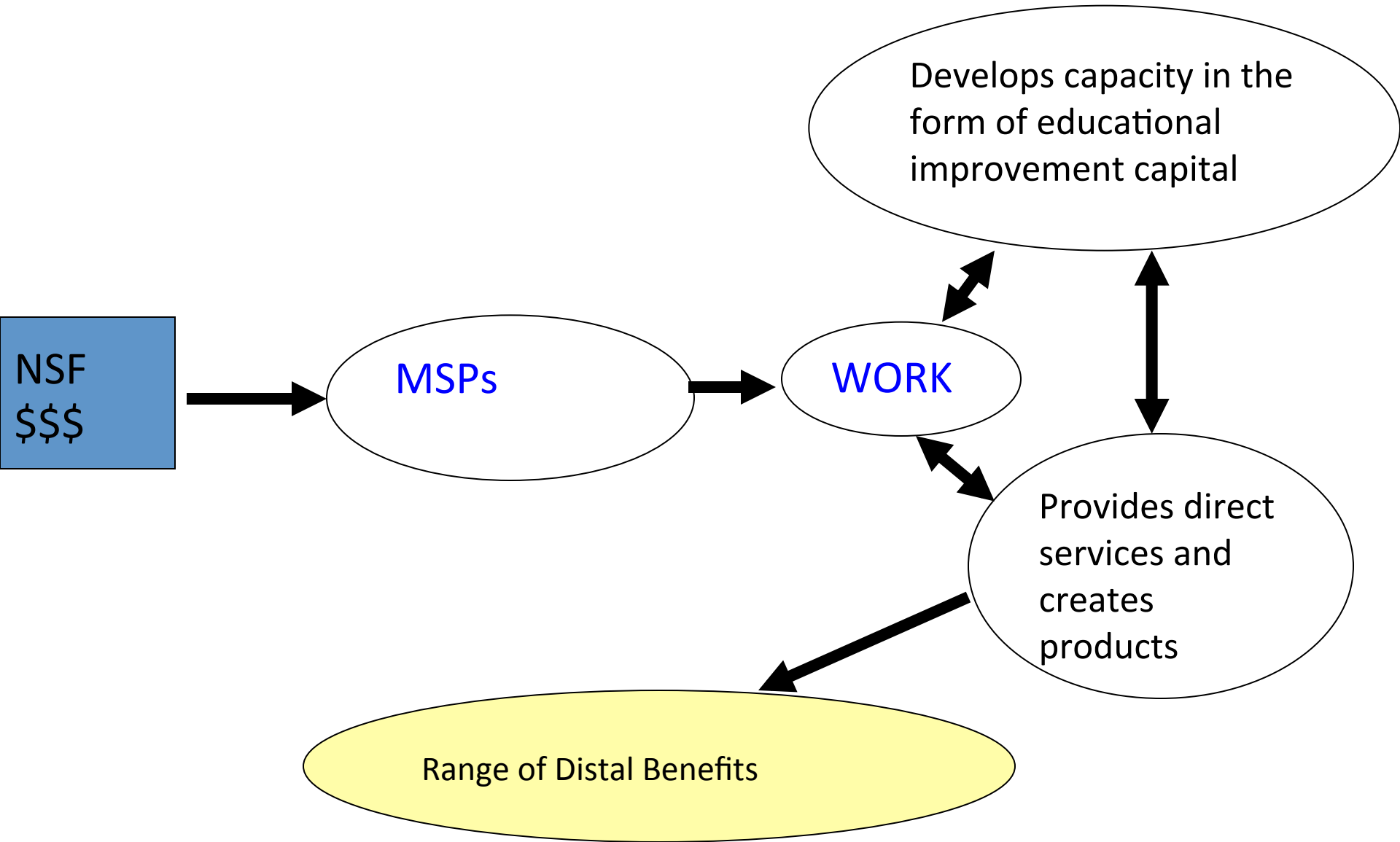
An Investment Perspective



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Improvement Capital developed through MSP funding

- ***Some Possible Forms of Improvement Capital***
  - **Human Capital (People)**
  - **Social Capital (Personal and institutional connections)**
  - **Knowledge Capital (Ideas, knowledge, sharing and dissemination)**
  - **Organizational Capital**
  - **Financial and political capital**

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Human Capital (People)

Human Capital refers to people who have the expertise, propensity and position to assume leadership roles and contribute to the improvement of education

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Human Capital Development

- *Science and mathematics faculty*
- *Department of Education faculty*
- *Teacher leaders*
- *Administrator champions*
- *Researchers*
- *Informal science educators*
- *….*

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Knowledge Capital

The asset that is represented by the capacity to generate, share and more broadly disseminate knowledge

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Examples of Knowledge Capital

- *Publications*
- *Curriculum materials*
- *Online courses and tools*
- *Website(s) and media*
- *Identification and sharing of "best practices"*
- *Informal "Craft knowledge"*
- *Project -- Design principles and knowledge*
- *Evaluation and research design knowledge*

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Social Capital

Social capital refers to the asset of connectivity and to the capacity that comes from the connections and relationships that are developed through the project

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Examples of Social Capital

- ***The personal relationships formed***
- ***The relationships created in the form of partnerships and collaborations***
- ***Development of local and regional communities and networks***
- ***Connections built across the field through websites and on-line communities***
- ***Relationships developed with associations and funding agencies (e.g. NOAA, NSF, NSTA, AAAS, NCTM…)***

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Organizational Capital

Organizational Capital refers to those institutional capacities and organizational structures that support STEM education and the improvement of STEM education.

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Examples of Organizational Capital

- ***New organizational structures which could include new centers, alliances, networks***
- ***New Institutions***
- ***New Centers***
- ***New Departments, Positions***
- ***New programs and courses***

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Political and Financial Capital

Political and Financial Capital refers to those assets that help create a supportive context for STEM Education

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Examples of Political and Financial Capital

- ***Supportive policymakers and policies***
- ***Supportive policy environment***
- ***Multiple funding sources***
  - National, state and local levels
- ***Capacity for raising funds***
- ***Capacity to shape policy and finances***

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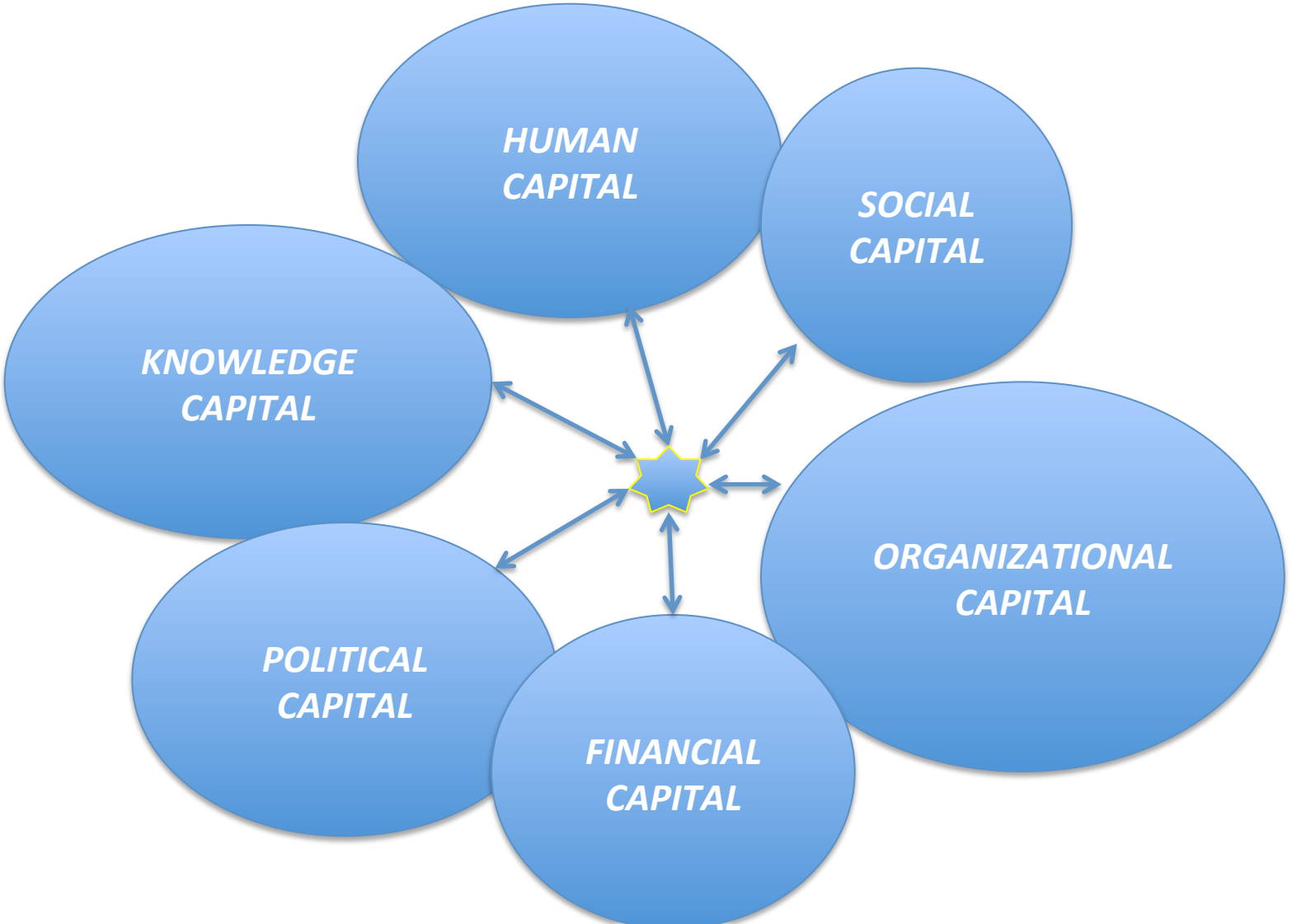
The Overlap and Mutualism of Different Forms of Capital



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QUESTION:

What forms of capital are being developed by your MSP?

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III) THE IMPROVEMENT INFRASTRUCTURE

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Infrastructure Investments

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Investments in Infrastructure

- Address an important need
- Empower a wide array of context-specific local activities
- Bridge critical disjunctures
- Provide for equitable access
- Assure consistently high-quality services
- Allow for cumulative growth and development of capacity (scale up or down as needed)
- Are cost-efficient, with multiple sources of funding
- Provides a vehicle for future efficient investments

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Doug Engelbart

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Doug Engelbart

Every organization has a "capability infrastructure"—what we use to do our jobs. (Jim Spillane)

Organizations also need an "improvement infrastructure"—what we use to get better at getting better.

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Key elements of an Improvement Infrastructure

- ***People*** *-- with expertise and mandate for improvement, linked in a community*
- ***Ideas*** *– about structures and processes of improvement*
- ***Tools*** *– resources, materials, processes for undertaking improvement.*

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The Improvement Infrastructure

The foundational structure that gives a system the capacity to design, implement and sustain a process of ongoing improvements in the functioning of the system

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The Improvement Infrastructure

Engelbart argues that we… are still focused around projects and task forces with short-term expectations and short-term lifecycles, and have been too much in love with chasing after the latest tools and technologies…The most important activity we can do is to develop the improvement infrastructure… and to encourage and fund cross-functional "improvement communities" whose members work on common challenges to explicitly improve improvement…. In essence, the human network, supported with a stable, sound technology network, is the way to get better at getting better.

– From the 21st Century Intranet, Jennifer Stone Gonzalez

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ENGLEBART: TARGETING THE "IMPROVEMENT COMMUNITIES"

Englebart's Levels A, B, C	Application to Farming	Application to Education
Level A -- people concerned with the process of doing work	Farmers growing crops	Teachers teaching students
Level B -- people concerned with the capabilities and conditions of Level A	Seed manufacturers, combine companies, irrigation people	Education infrastructure (Administrators, curriculum developers, textbook authors
Level C -- people concerned with improving the work of Level B people and ultimately Level A work.	**Seed researchers, combine developers, water engineers**	**Improvement infrastructure (Professional networks, R&D projects, developers of tools and resources)**

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Capital Assembled and Organized becomes an Improvement Infrastructure

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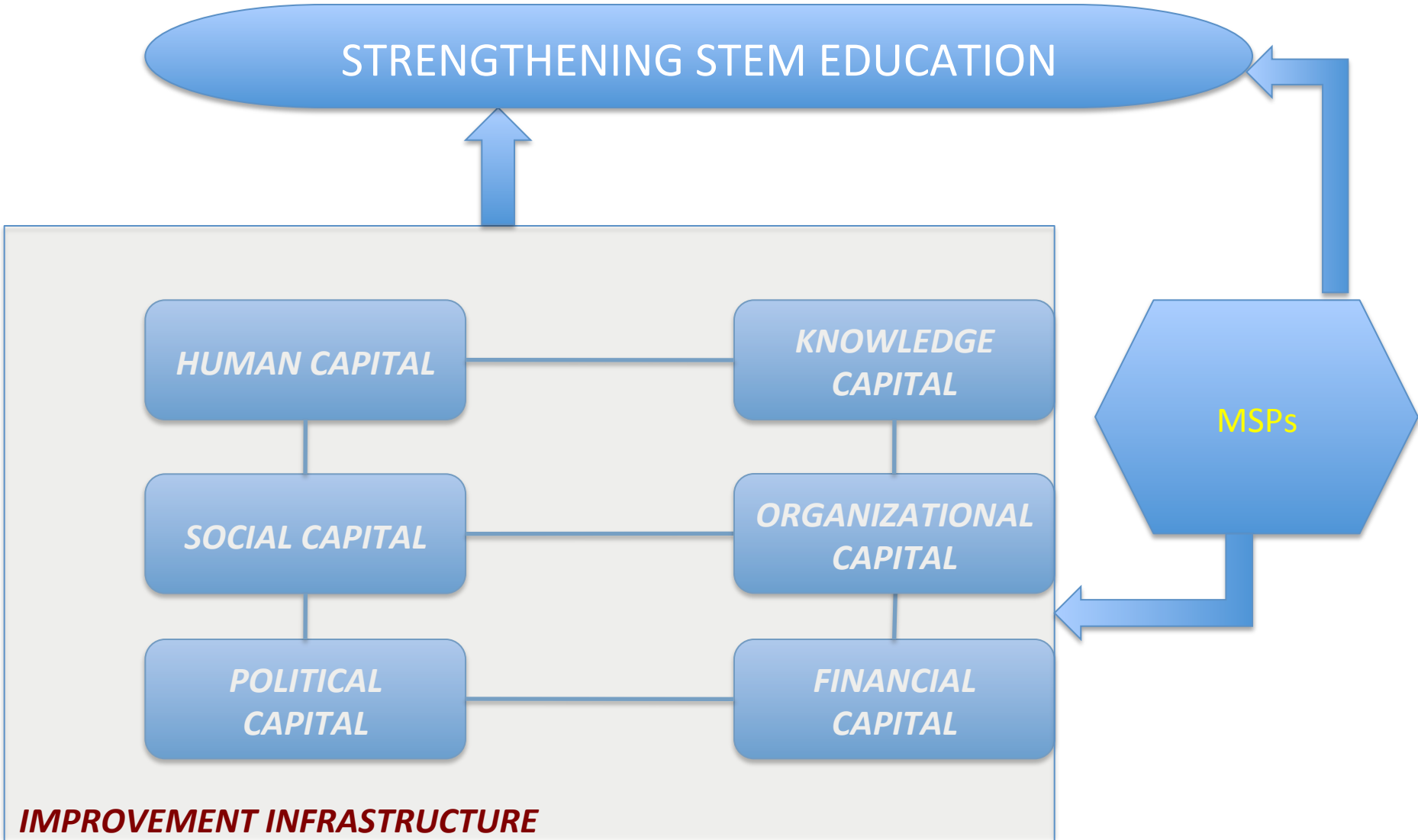
Assembling Capital To Create An "Improvement Infrastructure"



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Assertion

The primary educational mission of NSF is to strengthen the nation's improvement infrastructure for STEM education

NSF helps the nation get better at getting better

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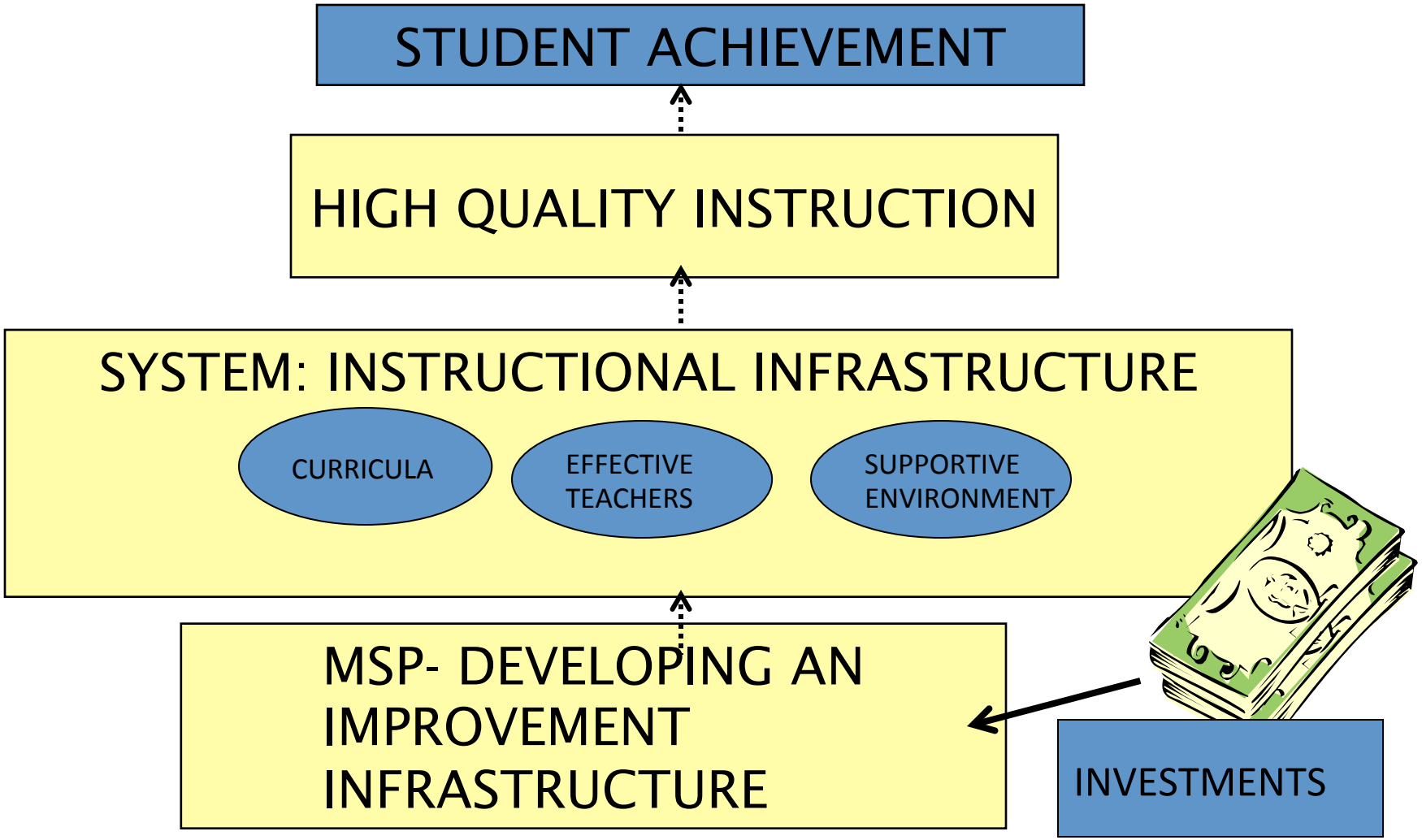
The Nature of Investments Made in Educational Improvement



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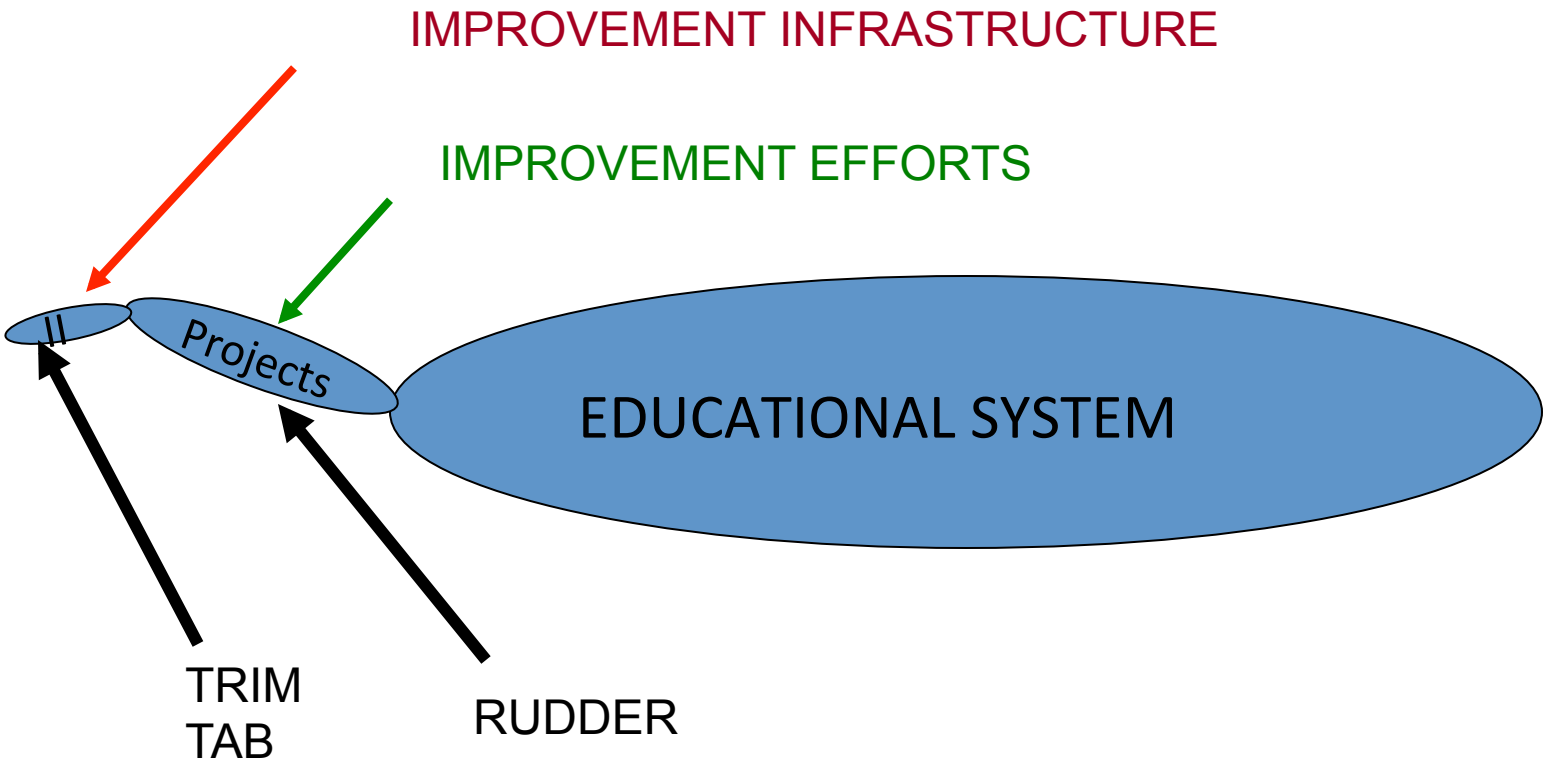
The dynamics and leverage of the improvement infrastructure



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NSF

Improvement community and activities for the improvement community

Improvement community and activities

ONGOING TEACHING ENTERPRISE

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Evaluating NSF investments using the lens of Educational Improvement Capital and The Improvement Infrastructure

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The key question

To what extent and in what ways does this project contribute to the capacity of the region to improve their STEM education and continue to improve it in the future?

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The Process of Developing Evaluation Approaches to Measuring Educational Capital

- Definition - Conceptualize the likely forms of educational capital to be generated
- Instantiation - Look for multiple examples - extensive documentation of generation of capital
- Connoisseurship and expert judgment
- "Counting" - Some estimates of quantities or degree of development of capital
- Measurement - more careful documentation of capacities developed

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Example - A District Capacity Framework

- *Leadership*
- *Instructional Improvement Capacities*
- *District Policies and Priorities*
- *Contextual Conditions That Influence The Development of a STEM Program*
- *Summary Judgments*

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Criteria for evaluating investments in infrastructure

- Empowering multiple functions
- Accessible and equitable usage
- Robustness, long term value
- Utilization
- Cost of usage
- Cumulative, growing
- Trust
- Multiple sources of funding

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Evaluating The National Writing Project

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Questions and Comments

end

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Educational Improvement Capital

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BUILDING – THE DEVELOPMENT OF CAPITAL AND THE IMPROVEMENT INFRASTRUCTURE

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Flesh out???

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How to evaluate investments in Infrastructure

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The NWP example

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How do you see using this perspective to improve the evaluation of the MSP initiative?

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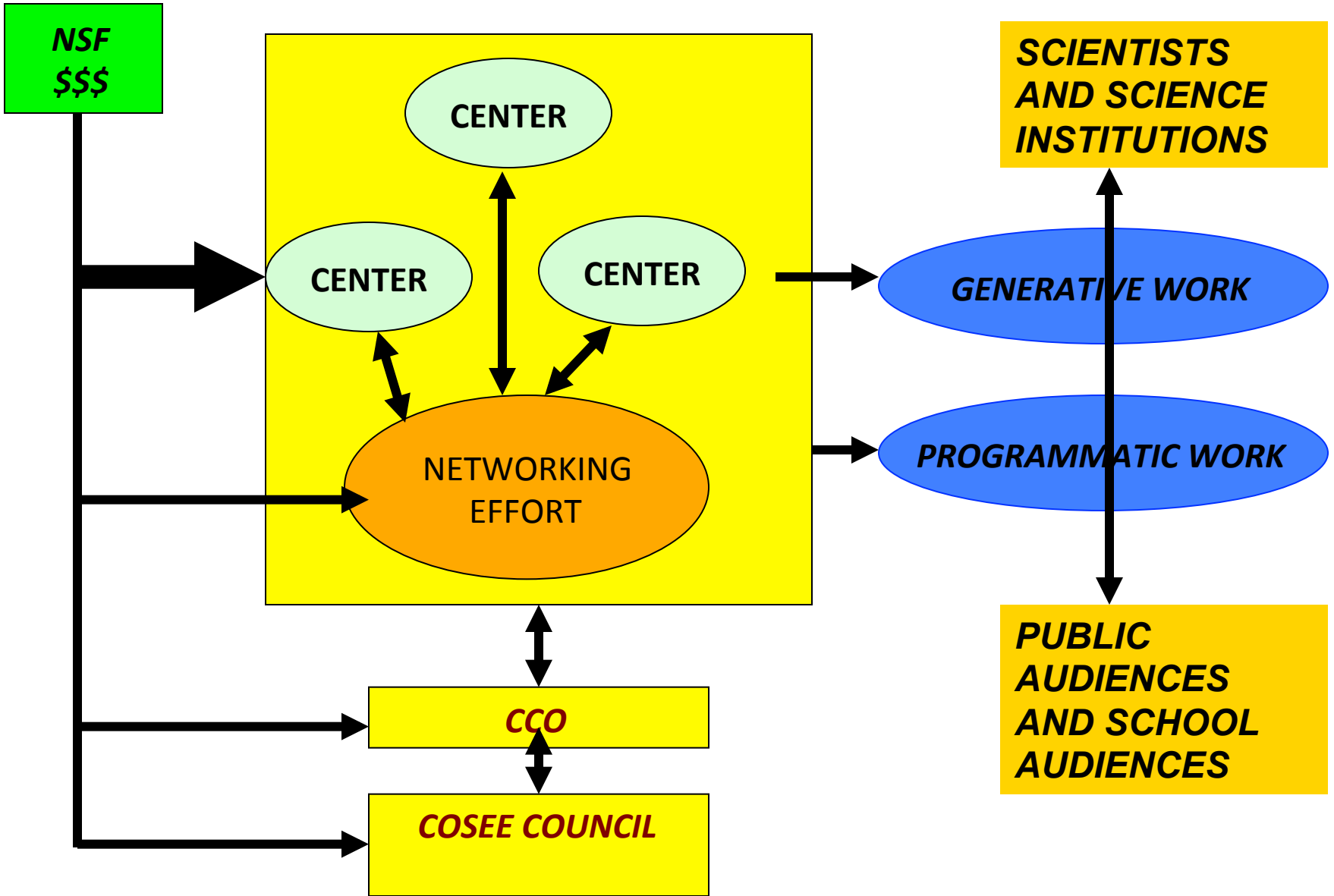
COSEE: Theory of Action



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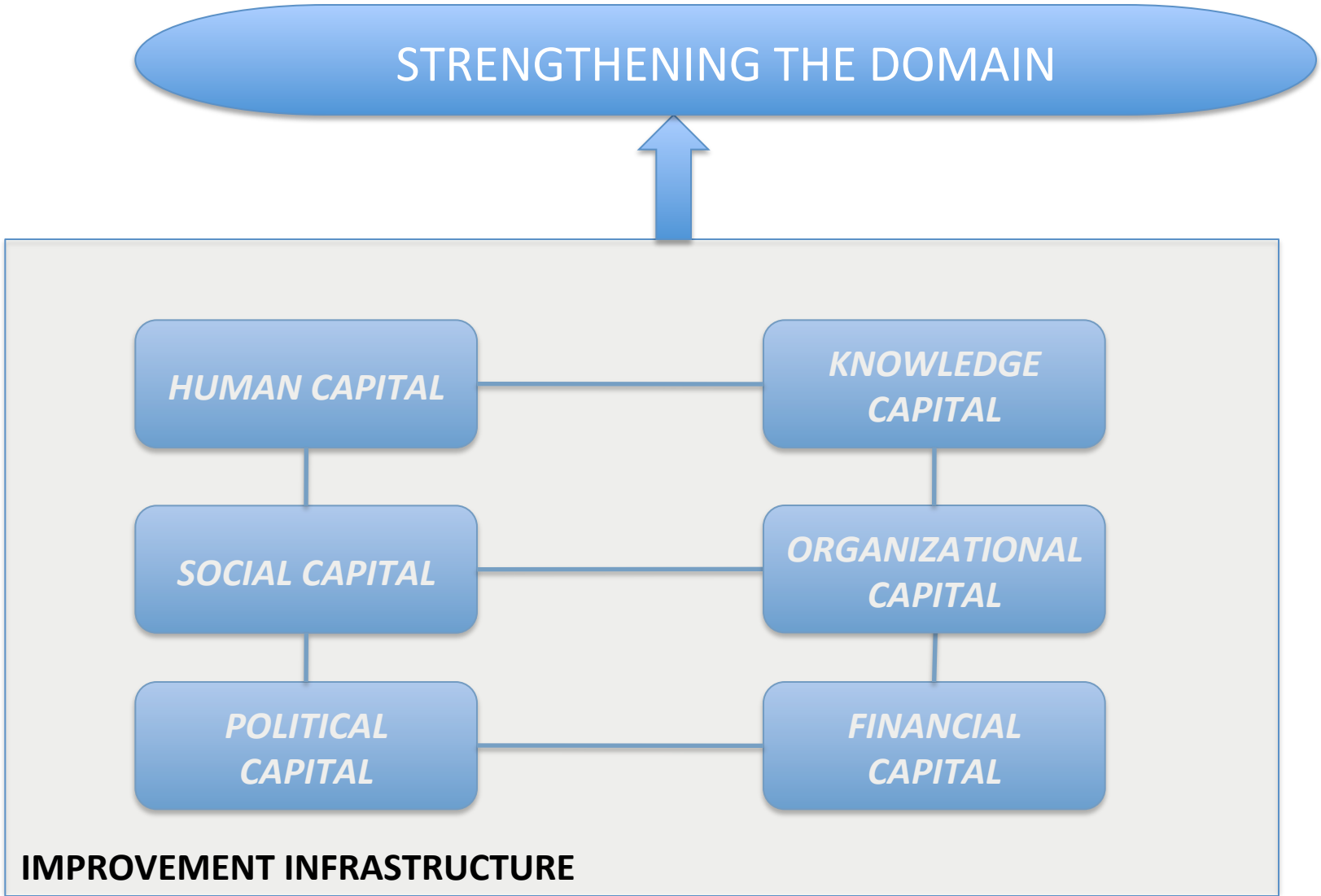
Assembling Capital To Create An "Improvement Infrastructure"



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Evaluation can be seen as a process of "groundtruthing"

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Groundtruthing involves the comparison of theory (mental models) and field realities

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Comparing Theory of Action and Field Realities