

**THE ART & SCIENCE OF SOCIAL NETWORK ANALYSIS:
COMPUTATION AND VISUALIZATION FOR MULTI-INSTITUTIONAL
TEAM MANAGEMENT AND COLLABORATIVE RESEARCH**

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AUTHORIZATION TO SUBMIT THESIS

This thesis of Jocelyne Helbling, submitted for the degree of Master of Science with a Major in Integrated Architecture and Design and titled “The Art & Science of Social Network Analysis: Computation and Visualization for Multi-Institutional Team Management and Collaborative Research,” has been reviewed in final form. Permission, as indicated by the signatures and dates below, is now granted to submit final copies to the College of Graduate Studies for approval.

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ABSTRACT

Social Network Analysis (SNA) is a methodological approach that measures and assess relational patterns across a network of individuals or groups. This research demonstrates how SNA can reveal the structure of relational networks within intellectually diverse and geographically distant research teams, and how these network structures can influence team capacity and research outcomes. SNA is a powerful tool with which to quantitatively measure structural patterns of connection and disconnection across a network, as well as the potential influence individuals derive from their position within the network structure. Understanding how the structure of large research collaborations contribute to research outcomes is vital to generating feedback that informs integration processes and the resultant conversations surrounding scientific collaboration. These insights are critical to the success of interdisciplinary initiatives at the institutional, state, and national level, and arguably provide insight to multi-institutional initiatives at a global scale.

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DEDICATION

To one of my family's most influential nodes, my grandma, Teresa Knauss, for so often being the force that brought us all together and kept us connected. You are greatly missed.

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GLOSSARY

Adjacency Matrix: A square ($N \times N$) matrix used to represent interactions between actors in a network. Each actor is represented by a matrix row and column, and the presence of a relationship between two individuals is denoted as a non-zero value.

Adjacent Nodes: Two nodes which are directly connected to one another.

Asymmetric Network: Also referred to as directed network. A network in which interactions between nodes may or may not occur in both directions, and if edges are reciprocated each direction of the edge (node A to node B; node B to node A) may be of different edge weights.

Binary Network: A network in which binary values of 1 and 0 are used to denote either the presence or absence of a connection between two nodes with no differentiation of weight, or strength, among edges.

Centralization: A measure of the extent to which one node holds a more central position, than any other node in the network.

Confirmation Rate: A proportion describing the number of times descriptions of the same network relationship or edge (provided by each of the nodes connected by the edge) match or confirm one another over the number of possible relationships. Defined as $\#$ of matching edge descriptions $\times (n-1)$, where, n = the number of respondents (Stork & Richards, 1992).

Density: The proportion of edges present in the network over the total number of edges possible in the network: $\frac{\sum_{1 \leq i \leq j}^n a_{ij}}{n(n-1) \times w_{max}}$ (Wasserman & Faust, 1994).

Edge: A line in a network diagram that represents the existence of a relationship or interaction between two nodes.

Edge Weights: Non-zero values that are used to indicate a level of similarity or distance between two nodes. Edge weights may be used to apply greater computational weight to stronger connections.

E-I Index: A ratio of external and internal links between network subgroups. E-I Index is defined as: $(EL - IL)/(EL + IL)$, where EL is the number of external links between a given group and individuals of any other group, and IL is the number of internal links between members of the same group (Krackhardt & Stern, 1998).

Emergent Properties: Also called emergent behavior, characteristics of a network structure as a whole that results from behaviors at the localized level.

Executive Leadership Team (ELT): A designated group of MILES participants with managerial responsibility in the MILES project. The ELT includes both institutional and objective leads.

External Link (EL): Used to calculate E-I Index, external links are defined as network edges occurring between two nodes belonging to different subgroups.

Heterarchy: A network of entities or agencies which each have their own internal networks (i.e. a network of networks).

Idaho Social Ecological Exploratory Dynamics (ISEED): Seed funding provide through MILES to support innovative and collaborative social-ecological science.

Internal Link (IL): Used to calculate E-I Index, external links are defined as network edges occurring between two nodes belonging to different subgroups.

Managing Idaho's Landscapes for Ecosystem Services (MILES): A statewide social-ecological research project that aims to increase understanding of natural resource management practices, and inform sustainable policy.

McCall Outdoor Science School (MOSS): A K-12 education program, located in McCall Idaho, which emphasizes experiential education through its Adventure Learning program.

MILES Undergraduate Research and Internships (MURI): A MILES educational outreach program, which involves undergraduates in MILES research through internship positions.

Network: A group of individuals or entities which are related to one another in some manner, usually through a shared organization or common interest.

Network Diagram: A visualization of the actors and connections within a network, in which actors are represented as nodes—points or dots within a network graph—and relationships or interactions, between nodes are represented by edges—lines connecting two nodes.

Nodes: Points or vertices within a network diagram, which represent actors within the network—individuals, organizations or other entities.

Pathway: Also called a path or walk, a series of adjacent nodes which connect two non-adjacent nodes to each other. For example, if nodes A and B are adjacent, and nodes A and C are adjacent then the pathway B—A—C connect nodes B and C to each other.

Reciprocity: The percentage of relationships in a network which occur in two directions, $a_{ij} > 0 < a_{ji}$, over the total number of relationships present in the network. If node A is connected to node B, the edge is only considered reciprocated if node B is also connected to node A. (Wasserman & Faust, 1994).

Size, or Network Size: The number of nodes in a network.

Social Network Analysis (SNA): A methodological approach that measures and assess relational patterns across a network of individuals or groups.

Symmetric Network: Also referred to as undirected or bidirected networks. A network in which all interactions between nodes occur equally in both directions (i.e. all edges are reciprocated, and edge weights between two nodes are the same value). In other words, the connection between node A to node B is equal to the connection of node B to node A.

Weighted Network: A network in which edge values are used to describe the strength of connection between two nodes.

ACRONYMS

BSU: Boise State University

EL: External Link

ELT: Executive Leadership Team

EPSCoR: Experimental Program to Stimulate Competitive Research

ID: Idaho

IL: Internal Link

ISEED: Idaho Social Ecological Exploratory Dynamics

ISU: Idaho State University

IWG: Innovation Working Group

MILES: Managing Idaho's Landscapes for Ecosystem Services

MOSS: McCall Outdoor Science School

MURI: MILES Undergraduate Research and Internships

NSF: National Science Foundation

SNA: Social Network Analysis

UI: University of Idaho

SECTION 1. INTRODUCTION

Collaboration and integration are increasingly imperative within the scientific community as many diverse research teams form around multivariate issues. The scope of research related to these issues often result in large, multi-institutional teams with expansive project management needs. Concepts such as “integration” and “collaboration” are often ambiguous in definition and diverse in connotation making it difficult for research teams to establish goals and metrics for cooperative efforts (Tress, Tress & Fry, 2006). While equivocal, the underlying intent of these terms is clear: to describe relationships between individuals that contribute to collective outcomes greater than the sum of their parts. Social Network Analysis (SNA) is a methodological approach that measures and assesses relational patterns across a group of actors, and the resulting emergent properties of these behaviors. This research demonstrates how SNA can reveal the structure of relational networks, within intellectually diverse and geographically distant research teams, influential to team capacity and research outcomes.

A social network is a group of individuals, organizations or other entities related to one another in some manner—usually through a shared organization or common interest (Wasserman & Faust, 1994). Figure 1 shows a simple network diagram, in which actors are represented as nodes—points or vertices within a network—and relationships or interactions, between nodes are represented by edges—lines connecting two nodes. SNA theory is based on the fundamental principle that the structure of a network, determined by the arrangement of edges between nodes, affects how the network behaves (Borgatti, Mehra, Brass, & Labianca, 2009). For example, in Figure 2 each network is comprised of the exact same set of nodes, but differences in the arrangement of edges between nodes result in the emergence of different network structures. How each network behaves (e.g. how quickly communication can be disseminated) varies based on how the behaviors of individual nodes (i.e. who maintains connection with whom) have influenced the overarching network structure. Concurrently, an individual’s opportunities and outcomes are influenced by the network structure. Individual access to information and resources, and the potential to influence

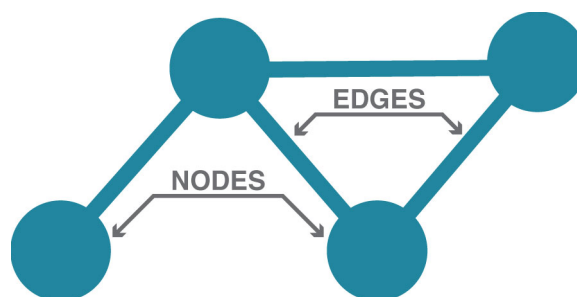


Figure 1: Example of a Network Visualization. Nodes, also referred to as points or vertices, represent network actors. Edges, also referred to as links or ties, represent relationships or transactions between actors.

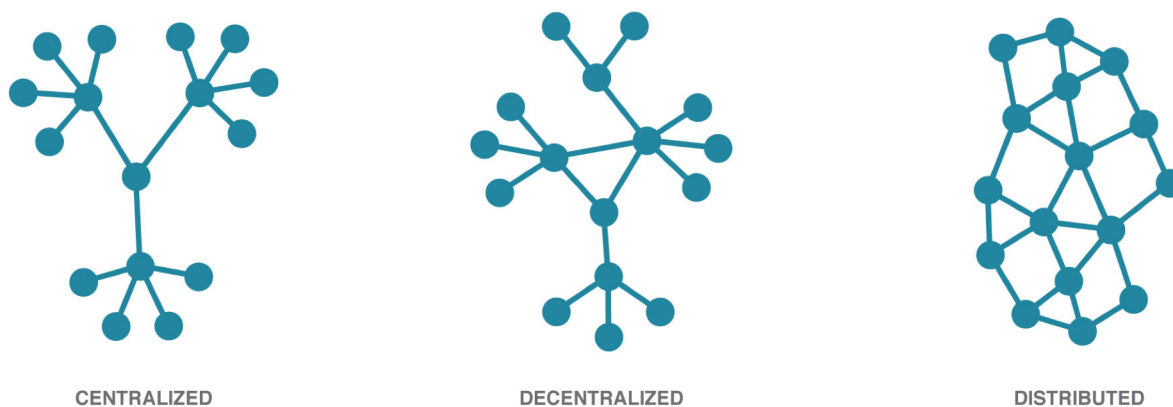


Figure 2: Examples of Different Network Structures. Each network contains the same set of nodes connected by different sets of edges. Network behavior such as how quickly, and through which nodes, information will disseminate varies by network.

other nodes varies based on a node's position within the network. Unlike traditional social research which considers the outcomes or characteristics of an individual as the result of other attributes (e.g. income characteristics resulting from education characteristics) SNA considers the individual's outcomes to be the result of their network position due to the influence they can exert on other nodes, or their potential to be influenced by other's behaviors (Borgatti, Mehra, Brass, & Labianca, 2009). Influential power, and the opportunities it affords an individual (e.g. access to resources), are viewed as a result of *how* the node is connected within the network, rather than with *whom* the node is connected.

In multi-institutional collaborations, the network of institutions—not just the network of individuals—must be understood. Understanding heterarchies—networks of institutions, each with their own internal network (Stephenson, 2014)—is key to developing sustainable capacity within regional, national, and global initiatives. Research communities are dynamic entities in which the roster of active participants fluctuates as project objectives and personal career goals evolve over time. Reliance on any one individual to maintain connectivity with other institutions creates a single point of failure for these enterprises. This fluctuation on the individual level requires a greater understanding of the emergent structure of heterarchical connectivity—how the interactions of individuals result in overarching patterns of inter-institutional interaction, and the role individual behaviors play in creating connectivity opportunities and vulnerabilities. Heterarchies function as the backbone of dynamic research teams. Understanding how a heterarchy's underlying networks function as catalysts or obstacles to collective outcomes is paramount to successful initiatives.

SECTION 2. METHODOLOGY

2.1. STUDY POPULATION

The Managing Idaho's Landscapes for Ecosystem Services (MILES) project is a National Science Foundation (NSF) funded statewide social-ecological research initiative that aims to increase understanding of natural resource management practices, and inform sustainable policy (ID EPSCoR MILES, 2014). MILES includes participants from Idaho's major universities, community colleges, local municipalities, tribal sovereignties, and government agencies at both the state and federal level. The project encompasses multiple research objectives across geographically distant research sites (Figure 3), as well as several outreach objectives, such as stakeholder engagement, STEM (Science Technology Engineering and Math) education programs and workforce development initiatives. Project administration is coordinated by NSF's Idaho Experimental Program to Stimulate Competitive Research (ID EPSCoR) office and the MILES Executive Leadership Team (ELT) (ID EPSCoR MILES, 2014). MILES aims to leverage the broader insights and implications of localized research efforts to develop and implement various statewide initiatives (e.g. early warning detection systems) with sustainable impacts across the region. Thus, inter-institutional collaboration is considered critical to the project's success (ID EPSCoR MILES, 2015).

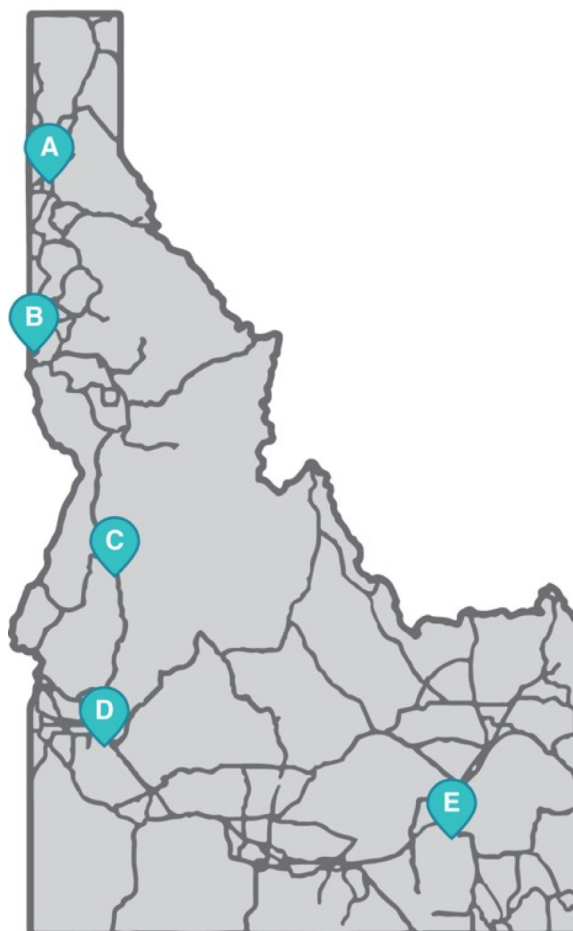


Figure 3: Geographic Locations of MILES. Research at the Coeur d'Alene/Fernan Lake research site (A), led by UI (B), focuses on the social and biophysical effects of nutrient loading on lake-based recreational ecosystems. The Boise-Treasure Valley research site (D) focuses on the ecological impacts of urban development and/or decline, and is led by BSU (D). ISU and the Portneuf Watershed research site (E), focuses on ecosystem management in conjunction with mid-size city urban development. The McCall Outdoor Science School (C) is a K-12 educational outreach program. Most Idaho EPSCoR administrative offices are located in at UI (B).

2.2. DATA COLLECTION

The MILES SNA data was collected through online surveys in October 2015 and May 2016. Surveys gathered relational data pertaining to interactions between MILES participants, as well as participant demographics such as gender, institutional affiliation, academic discipline and other details pertaining to participants' professions and involvement in the MILES project (Appendices 2.1; 2.3). Survey respondents were asked to select individuals, from a provided roster of MILES participants (Stork & Richards, 1992), with whom they regularly interact. Each survey included five social network questions, based on the Quantum Theory of Trust developed by Karen Stephenson (Kleiner, 2003). This theory views social trust as the conduit for influential connections, much like particles interacting over a quantum field. Each SNA question aimed to elicit responses pertaining to different types of communication interactions pertinent to organization function and structure:

- **SNA Question #1 (Work Network):** *With which of the following individuals do you exchange work-related information or materials to get your job done?* The work network question targets routinized working behavior as they occur in practice, regardless of hierarchical structures, or protocols, prescribed by the organization.
- **SNA Question #2 (Informal Network):** *Which of the following individuals do you spend time with when you want to find out what's going on in the organization for either social/informal or work-related reasons?* The informal network question targets social interactions that occur outside purely work-related communication, such as who people turn to for moral, managerial and/or political guidance.
- **SNA Question #3 (Innovation Network):** *With which of the following individuals do you brainstorm, share or explore new ideas?* The innovation network question aims to identify trust relationships developed as a result of idea sharing between individuals. Innovative or novel ideas are often marginalized or dismissed within institutional structures as they often represent a threat to established procedures. For this reason, it requires a greater level of trust to share information concerning new or untested ideas.
- **SNA Question #4 (Expertise Network):** *From which of the following individuals do you seek expert knowledge or advice?* The expertise network question is targeted at understanding to what extent experts communicate with one another. Expertise

sharing reveals another level of trust since development of these relationships require that individuals be considered reliable and knowledgeable sources of information.

- **SNA Question #5 (Improvement Network):** *Which of the following individuals do you consider to be an effective implementer, someone who actively participates to achieve group goals and/or accomplish difficult tasks?* The improvement network question targets interactions which contribute to organizational change. These interactions require a high level of trust since implementers take on greater organizational risk by stepping out of prescribed boundaries to change or improve established procedures or processes.

Following each SNA question, participants were asked to identify how frequently they interacted with a selected individual based on a five-point scale ranging from “Very Rarely” to “Very Often.” In 2015, the survey response rate was 46.0%, and breakouts by institution were relatively similar, although the Idaho State University (ISU) response rate was somewhat higher than those at Boise State University (BSU) and University of Idaho (UI). A higher response rate was achieved in 2016, 65.6% and was even more consistent across institutions (Figure 4; Table A2.1.1). The increased response rate may be due to survey timing—the 2015 survey was conducted in the middle of the Fall semester and concurrent with a MILES Annual Meeting which may have been placing additional demands on participants’ time, while the 2016 survey was conducted at the end of the Spring semester (S. Benner, D. Rodgers, & J. Anderson, personal communication, July 2016). Additionally, presentation of the 2015 results provided participants with a better understanding of how SNA might provide meaningful insights, and project leaders at each institution made greater efforts to encourage participants to complete the SNA survey in 2016 (S. Benner, D. Rodgers, & J. Anderson, personal communication, July 2016).

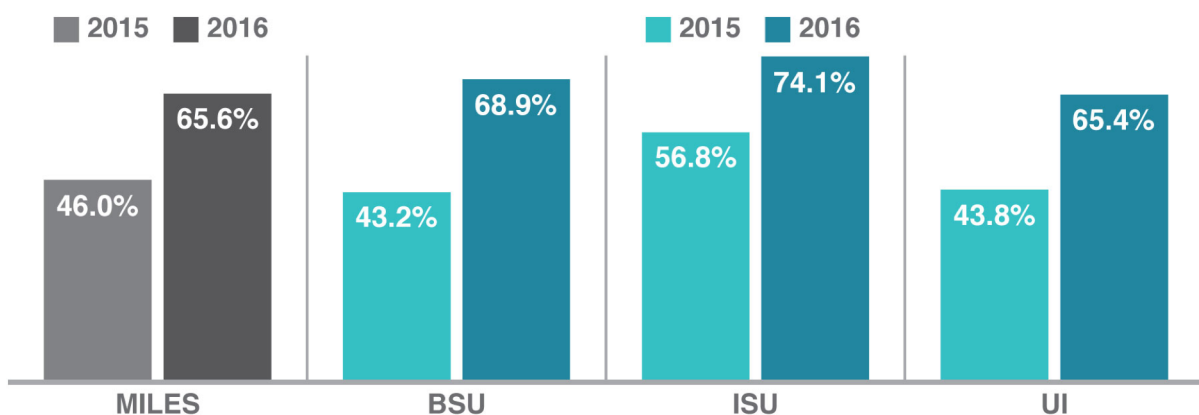


Figure 4: MILES SNA Survey Response Rate by Institution and Year. (Table A2.1.1).

2.3. DATA HANDLING

In network analysis a square ($N \times N$) adjacency matrix is used to represent interactions between nodes and calculate network metrics (Figure 5). Each relationship within an adjacency matrix is described twice, (i.e. node A's description of their relationship to node B, and B's description of their relationship to A). Descriptions may be quantified using either binary or weighted values. In a binary network matrix values of 1 indicate the presence of a connection between two nodes, while values of 0 indicate the absence of a connection. In a weighted network matrix non-zero values are used to indicate a level of similarity or distance between two nodes; allowing greater computational weight to be applied to stronger connections. The MILES SNA matrices were populated using the communication frequency values survey respondents provided as edge weights, with interactions occurring at greater frequencies being given greater computational weight. Collected data provided complete descriptions (relationships described by both individuals) of all possible relationships between survey respondents (20.9% of all possible network edges for 2015, and 42.9% of all possible edges for 2016) and partial descriptions (relationships described by only one individual) of relationships between survey respondents and nonrespondents (50.0% of all possible edges for 2015, and 45.3% of all possible edges for 2016) (Appendix 2.5). Confirmation rate, defined by Diana Stork and William Richards (1992), is the number of relationships in which individuals' descriptions match—or confirm—one another, over the number of possible relationships between all survey respondents. Confirmation rates were high across all networks in both years. On average, survey respondents' descriptions of relationships were confirmed 91.0% of the time in 2015, and 96.9% of the time in 2016

	A	B	C	D	E	F	G
A		1	2				
B	1		5		2		
C	2	5		3	2		
D			3				
E		2	2			3	1
F					3		
G					1		

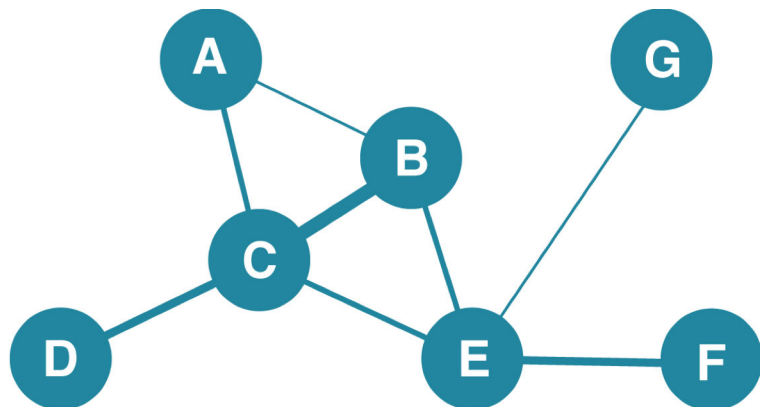


Figure 5: Network Adjacency Matrix. In network matrices, each node is represented by a row and column, and the presence of a relationship between two nodes is denoted by a non-zero value. The above matrix represents a symmetric, or undirected, network in which interactions between two nodes flow equally in both directions.

(Appendix 2.5). Additionally, statistical analysis revealed no significant ($p < 0.05$) difference between survey respondents and nonrespondents by known attributes: gender and institutional affiliation (Appendix 2.6). As suggested by Stork and Richards (1992), the high confirmation rate, and the demographic similarity between survey respondents and nonrespondents were deemed sufficient to justify reconstruction of the missing halves of partially described relationships by applying the value provided by the sole survey respondent to both descriptions. For confirmed relationships in which survey respondents provided different descriptions the frequency of their interactions, the provided values were averaged. This process was used to create a symmetric adjacency matrix for each of the five SNA questions using ORA NetScenes Software (Carley, Pfeffer, Reminga, Storricks, & Columbus, 2013). Network visualizations were created using Cytoscape 3.0 (Shannon, et al., 2003).

The remaining missing data in the final matrices, relationships between nonrespondents, accounted for 29.1% of all possible relationships in 2015, and 11.8% of all possible network relationships in 2016, indicating greater accuracy for the 2016 dataset. While the portion of missing data in 2015 is large, research by Elizabeth Costenbader and Thomas Valente (2003) indicates a possibility that nonrespondents represent a smaller portion of network edges, as nonrespondents may be more likely to be individuals less involved in the project and thus maintain fewer network connections. Nonetheless, analysis findings and conclusions primarily utilize 2016 results as a more reliable data source.

Metrics used to quantify and describe network structure include: density, E-I index, and reciprocity. Network density is the proportion of the sum of all network edges over the total number of edges possible for the network: $\frac{\sum_{1 \leq i \leq j} a_{ij}}{n(n-1) * w_{max}}$ (Wasserman & Faust, 1994).

Krackhardt's E-I Index was used to calculate the ratio of external to internal links between network subgroups, and is defined as: $(EL - IL)/(EL + IL)$, where, EL is the number of links between members of a given subgroup and members of other subgroups, and IL is the number of links between members of the same subgroup (Krackhardt & Stern, 1998). E-I indices for each of the MILES SNA networks, were defined using a subgroups based on node demographic attributes (i.e. institutional affiliation and primary MILES activity). Index values can range from -1.0 to 1.0, with negative values indicating internal link dominance, positive values indicating external link dominance, and values approaching 0 indicating an equal ratio of internal and external links (Krackhardt & Stern, 1998). E-I indices for the MILES networks were computed

using NodeXL (Smith, et al., 2010). Reciprocity is the percentage of relationships in a network which occur in two directions, $a_{ij} > 0 < a_{ji}$, over the total number of relationships present in the network (Wasserman & Faust, 1994). Reciprocity was calculated using the asymmetrical network matrices derived prior to network reconstruction and symmetrization. Reciprocity in communication networks provides further indication of trust levels as reciprocated links often reveal collaborative pathways of mutual trust between two individuals. Conversely, unreciprocated links generally represent transactional interactions, where exchanges are contractual in nature, having little uncertainty or perceived risk (Stephenson, 2004).

SECTION 3. MILES SNA FINDINGS

3.1. INSTITUTIONAL NETWORKS

To better understand how localized behaviors at the institutional level contribute to overarching patterns in the MILES hierarchy, individual network analyses of each major institutions were conducted. Communication pathways between participants of different activity types are strong overall, although different structural trends emerge across the three universities. For example, social capital at both ISU and BSU is concentrated in each institution's research component, with smaller administration and outreach units, while most of UI's social capital is dispersed between outreach and research (Figure 6; Appendix 4). E-I indices for institutional level network were calculated by defining internal links as interactions between institution affiliates who reported being involved in the same activity, and external links as interactions between affiliates primarily involved in different activities. Following preliminary results of the 2016 SNA, interviews with each institution's ELT member were conducted to further contextualize observed patterns in each institution's network.

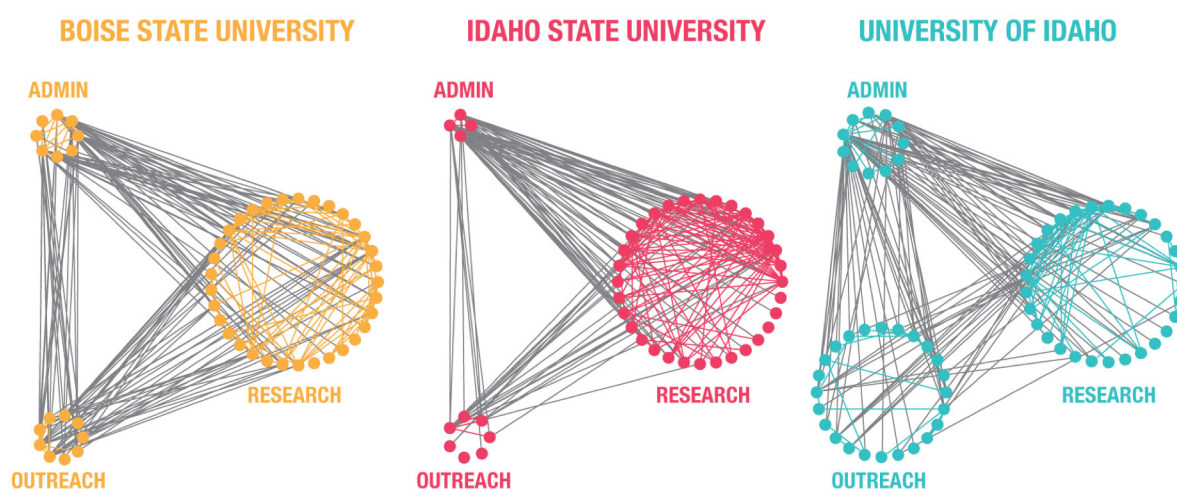


Figure 6: 2016 Institutional Work Networks by Activity Type. Each institution's participants are arranged in groups by primary MILES activity. Orange, red and blue lines indicate interactions occurring between institutional affiliates in the same activity group.

3.1.1. BOISE STATE UNIVERSITY

Except for the innovation network E-I index, which was nearly zero indicating an equal ratio of both internal and external links, all BSU network E-I indices were positive (Figure 7; Table A3.2.6), indicating a ratio dominated by interactions between, rather than within, different activities. BSU's does not incorporate a formally designated institutional outreach component;



Figure 7: BSU 2016 E-I Indices by Network. Internal/external links defined by groups based on participants' primarily activity.

rather all researchers are required to participate in common statewide outreach objectives (S. Benner, D. Rodgers, & J. Anderson, personal communication, July 2016). However, 44.4% of BSU's 2016 survey respondents who self-identified as being primarily involved in outreach do not indicate research activities as an accompanying part of their MILES involvement (Table A2.4.22).

The near zero E-I index in the innovation network may signify that new ideas are initially brainstormed within working groups of participants engaged in similar activities, before being shared with and vetted by the institution as a whole. Discrepancies between administrative and participant perspectives may explain the lack of self-identified research activities among respondents reporting outreach as their primary activity as some participants may be administratively viewed as researchers, but introspectively identify outreach as the primary objective of their work. This may also be indicative of a naturally occurring division of labor among BSU teammates, resulting in a self-appointed group acting to coordinate outreach efforts with project researchers and administration. This self-identified outreach component maintains relatively strong connectivity both among themselves, and with their fellow institutional affiliates involved in other MILES activities (Figure 8; Appendix 4.3.1; Table A3.1.12; Table A3.2.6).

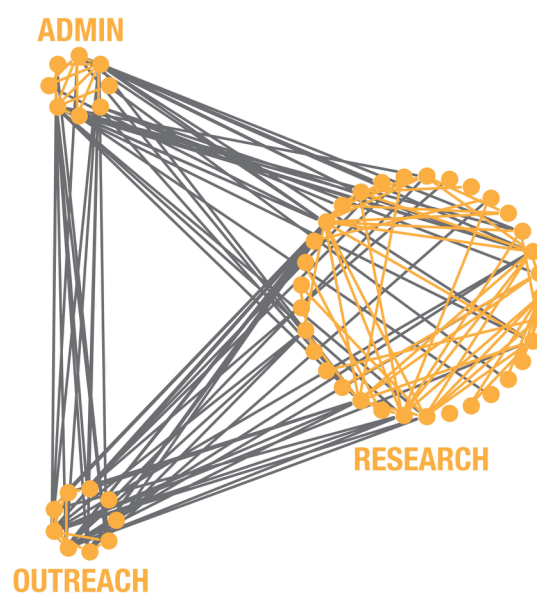


Figure 8: BSU 2016 Innovation Network by Activity. Orange lines indicate interactions between BSU affiliates involved in the same activity.

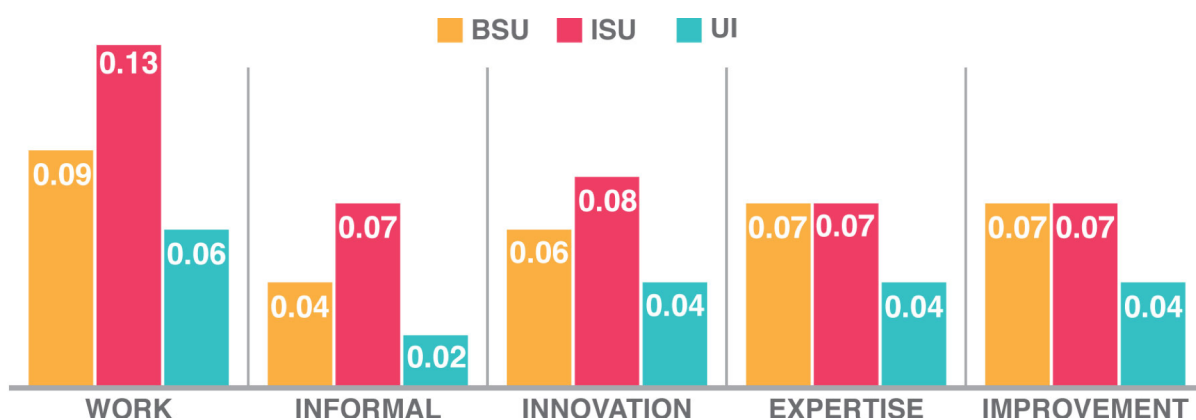


Figure 9: 2016 Institutional Network Densities. (Tables A3.1.3, A3.1.4 and A3.1.5)

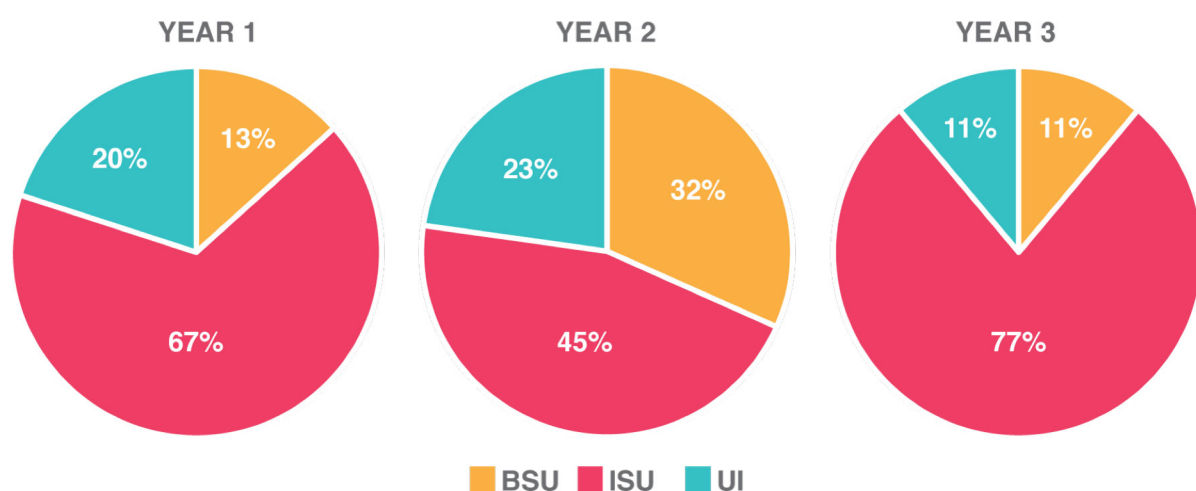


Figure 10: ISEED Participants by Institution and Year. ISEEDs are internal grants available to MILES participants. Funding requirements have changed over time. In year two, each proposal was required to include participants from at least two institutions; in year three that proposals include participants from all three major institutions (Benner, Rodgers, & Anderson, 2016).

	BSU		ISU		UI		Total	
	Authors	Grants	Authors	Grants	Authors	Grants	Authors	Grants
Year 1	2	2	10	6	3	2	15	10
Year 2	7	3	10	3	3	5	22	3
Year 3	1	2	7	2	1	2	9	2
Total	10	7	19	11	7	6	36	17

Totals indicate the total number of unique participants or proposals for a given year and institution. Multiple institutions may be included on one proposal and participants may be involved on multiple proposals and/or in multiple years, therefore totals do not necessarily equal the sum of institutional participants or grants.

3.1.2. IDAHO STATE UNIVERSITY

ISU has one of the highest institutional network densities across all networks (Figure 9; Table A3.1.4). ISU has also had the largest number of participants in the Idaho Social Ecological Exploratory Dynamics (ISEED) program—internal funding opportunities available to MILES participants (Figure 10; Table 1). (ID EPSCoR MILES, 2014). ISU is predominantly organized around a densely connected group of research participants, with smaller administrative and outreach components.

While many ties occur between ISU's outreach and research participants, within the outreach component these connections are largely centralized to one individual (Figure 11, Appendix 4.3.2). Additionally, few ties between the outreach and research components are reciprocated (Figure 12; Appendix 4.3.2;

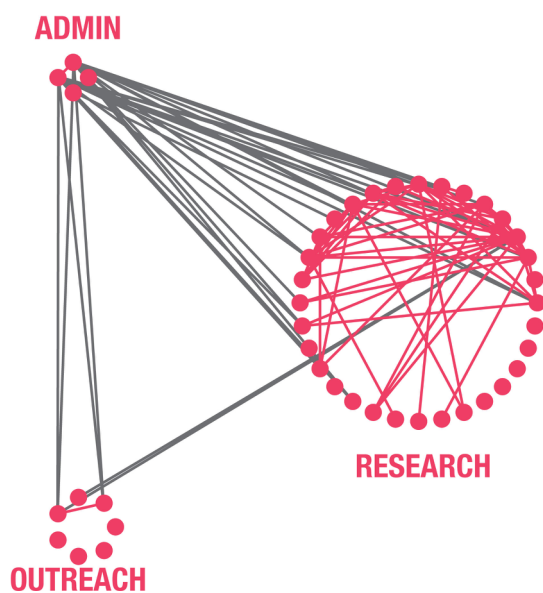


Figure 12. ISU 2016 Reciprocated Edges Work Network. Nodes are grouped by activity; red edges indicate interactions between ISU participants engaged in the same activity.

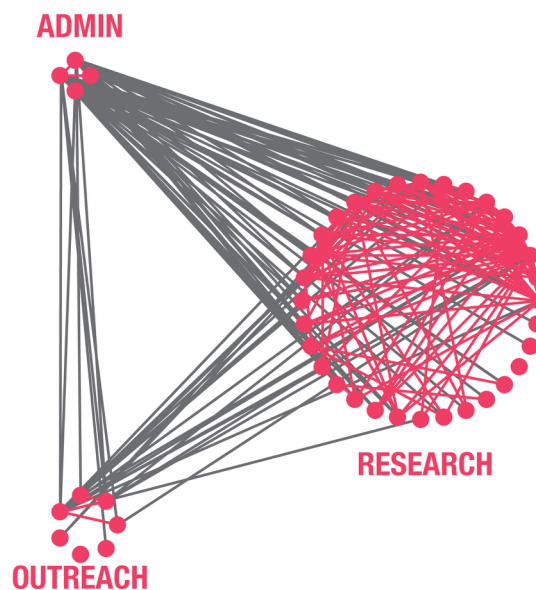


Figure 11: ISU 2016 Work Network by Activity. Nodes are grouped by activity; red edges indicate interactions between ISU participants primarily engaged in the same activity.

reciprocated (Figure 12; Appendix 4.3.2; Table A3.3.3). E-I indices, based on activity components, are negative in the innovation, expertise and improvement networks. However, in the work and informal networks E-I indices indicate nearly equal ratios of internal and external interactions (Figure 13; Table A3.2.7).

Physical proximity has likely contributed to ISU's high network densities, as it is estimated that at least half of the ISU MILES faculty live within five blocks of one another, resulting in increased social and professional connectivity among these participants (S. Benner, D. Rodgers, & J.

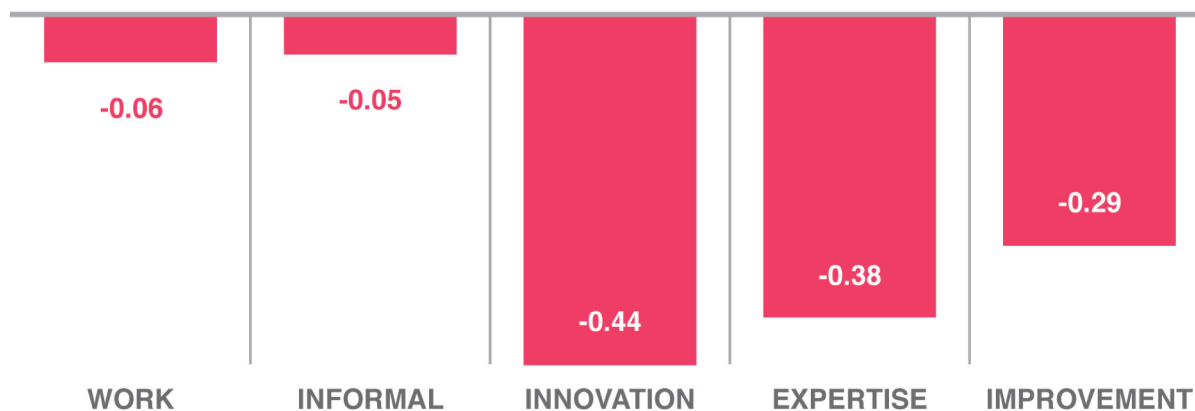


Figure 13: ISU 2016 E-I Indices by Network. Internal/external links defined by groups based on participants' primarily activity.

Anderson, personal communication, July 2016). Consequently, many of the relationships observed among the ISU team may have existed prior to commencement of the MILES project. The high rate of involvement in ISEED projects among ISU participants may also have contributed to increased institutional communication as a by-product of engaging in a larger number of research objectives (S. Benner, D. Rodgers, & J. Anderson, personal communication, July 2016). E-I indices, based on activity components within ISU, indicate that while routine work and social interactions occur between participants engaged in all activities, idea and expertise sharing and improvement efforts are primarily contained within the activity subgroups. Based on the relative sizes and patterns of connectivity between ISU activity components (Table A2.4.20; Appendix 4.2.2), it is likely that research objectives are the dominant focus of ISU's involvement in MILES, with outreach and administrative components primarily functioning as project support structures. Additionally, interaction between outreach and research participants within the institution primarily occur at a transactional level as indicated by the low occurrence of reciprocal links between these components (Figure 12; Appendix 4.3.2). This is likely a product of researchers' time contribution to the McCall Outdoor Science School's (MOSS) Adventure Learning program—an educational outreach program aimed at middle and high school teachers that emphasizes hands-on learning—occurring as a transactional exchange. Centralization of institutional communication with the outreach component to one highly connected node potentially creates a single point of failure for coordination of outreach objectives should this individual leave the institution or divert time spent on the MILES project to other endeavors.

3.1.3. UNIVERSITY OF IDAHO

UI has a relatively large outreach component, almost equal in size to their research component, and much larger than those at BSU and ISU (Table A2.4.20; Appendix 4.3). Although there are several ties between research and outreach, most external links occur with the administrative component (Figure 14; Appendix 4.3.3). While reciprocated ties exist between all components, interaction between administration and research is frequently centralized to a few administrative individuals (Figure 15; Appendix 4.3.3; Table A3.3.4).

Additionally, no reciprocated ties are present

between the outreach and research components in the improvement network (Appendix 4.3.3).

New participants, those who have been involved in the MILES project for less than one year,

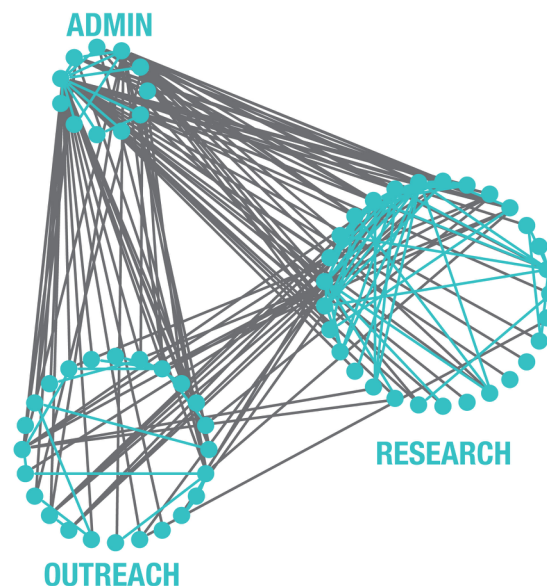


Figure 14: UI 2016 Work Network by Activity. Nodes grouped by activity; blue edges indicate interactions between UI participants engaged in the same activity.

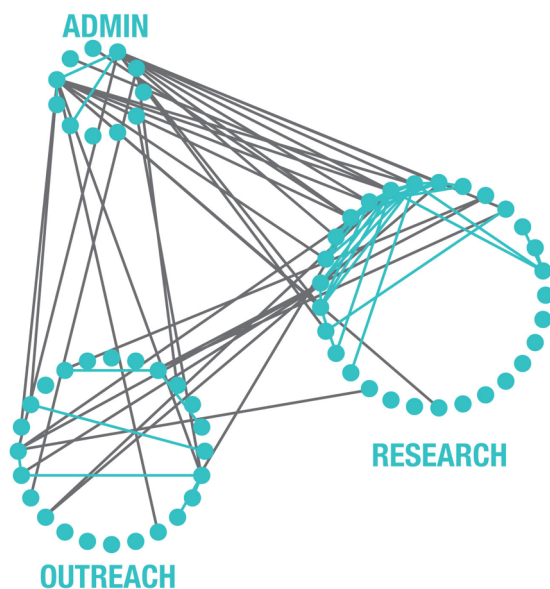


Figure 15: UI 2016 Reciprocated Edges Work Network by Activity. Nodes grouped by activity; blue edges indicate interactions between UI affiliates engaged in the same activity.

account for over a third of UI members, compared to approximately one-fourth of participants at BSU and ISU (Figure 16). In addition to new participants, UI has had a high rate of turnover among leadership personnel over the course of the MILES project. To date, UI has had three different MILES institutional leads, one for each year the project has been active (S. Benner, D. Rodgers, & J. Anderson, personal communication, July 2016).

Strong connectivity between administration and other components, and fewer direct connections between outreach and research likely indicates that these

components function relatively independent of one another, with coordination of efforts primarily facilitated by the administration component. However, these interactions are frequently centralized to a few individuals (Appendix 4.3.3). Much like the centralization of ISU's outreach connectivity, reliance on a single individual may represent a potential point of failure in the event of changes in personnel, a frequent occurrence at UI. Additionally, maintaining a high volume of direct network connections requires a significant investment of time and energy, often forcing these nodes to juggle relationships, constantly shifting time and resources from one interaction to another, making this network position somewhat unstable (Stephenson, 2011). Centralization of administrative connectivity may overwhelm one individual's capacity, and potentially diminish moral. The observed administrative centralization may be a result of a high rate of turnover among UI administration participants over the course of the MILES project. The greater rate of participant growth and leadership turnover, as well as the geographic distance between research participants located on the UI campus in Moscow, Idaho, and outreach participants, many of whom are located in McCall, Idaho (approximately 200 miles away from UI's main campus) has

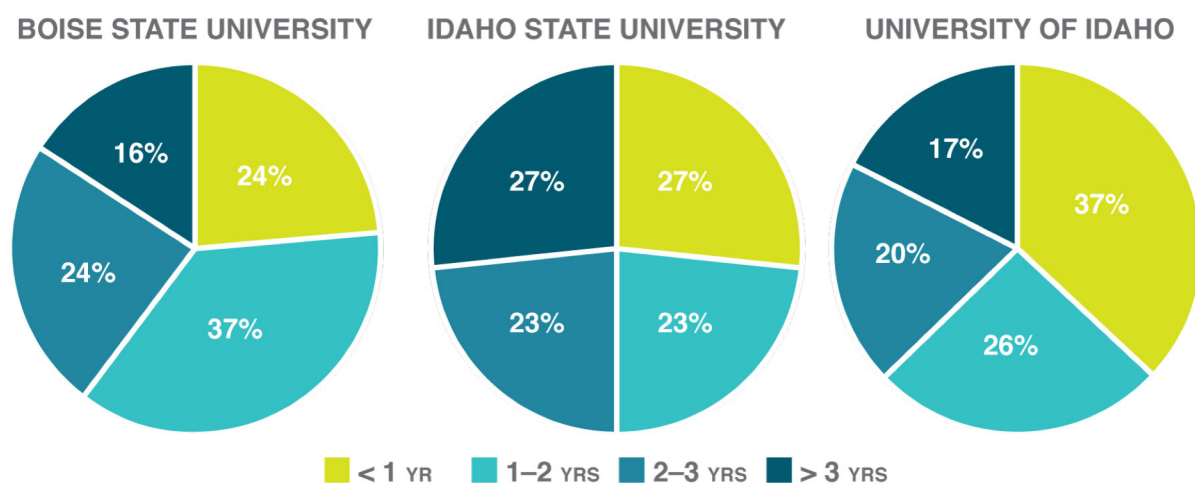


Figure 16: 2016 Survey Respondents by Length of MILES Involvement and Institution.

	BSU		ISU		UI		MILES	
< 1 Year	9	23.7%	8	26.7%	17	37.0%	37	29.4%
1 – 2 Years	14	36.8%	7	23.3%	12	26.1%	38	30.2%
2 – 3 Years	9	23.7%	7	23.3%	9	19.6%	28	22.2%
> 3 Years	6	15.8%	8	26.7%	8	17.4%	23	18.3%

Table not including undergraduates or respondents who indicated they were no longer active in the MILES project. For counts and percentage of all respondents by length of involvement in MILES see Appendix 2.4.

likely contributed to UI consistently having the lowest intra-institutional network density of the three major institutions (Figure 9; Table A3.1.5), and may contribute to low reciprocity, particularly in the improvement network (Appendix 4.3.3).

3.2. STATEWIDE NETWORKS

Figure 17 shows connections in the MILES work network for all institutions by year. An increase in the volume of interactions is clearly observable when comparing both networks. However, work network density—the proportion of links present in the network—decreased by 50% between 2015 and 2016 (Figure 18; Tables A3.1.1, A3.1.2). This is interesting to note, particularly considering the higher response rate for the 2016 survey (Figure 4; Table A2.1.1), and is likely due to a number of new participants in the project. The MILES network grew considerably in size, from 163 nodes in 2015 to 282 nodes in 2016. This increase may be exaggerated due to the accumulative nature of the MILES project. Participants may only be formally active in MILES for short periods of time, but remain in contact with current participants as continuing sources of expertise, or sounding boards for novel ideas, despite not being officially active. 14.7% of the 2016 survey respondents indicated that they had formerly been involved in MILES, but were no longer actively engaged in the project. However, excluding undergraduate and formerly involved participants, new participants (those who have been involved for less than 1 year) still account for 29.4% of the MILES network (Figure 19).

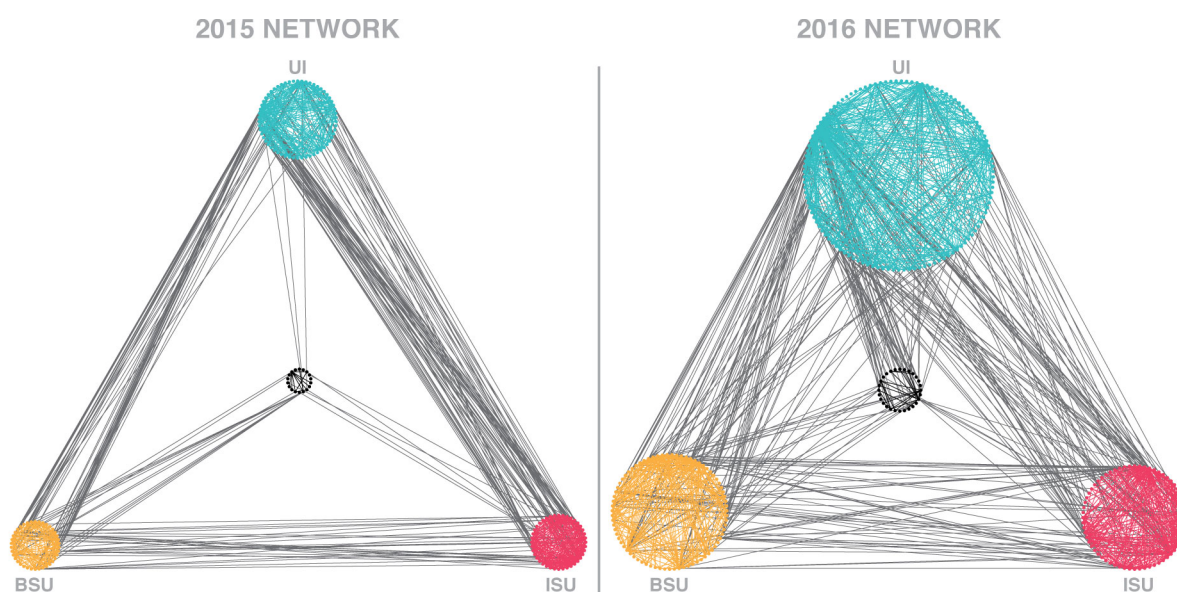


Figure 17: MILES All Participants Network by Institution and Year. Nodes grouped by institutional affiliation. Interactions between affiliates of the same institution are represented by red, blue and orange edge colors.

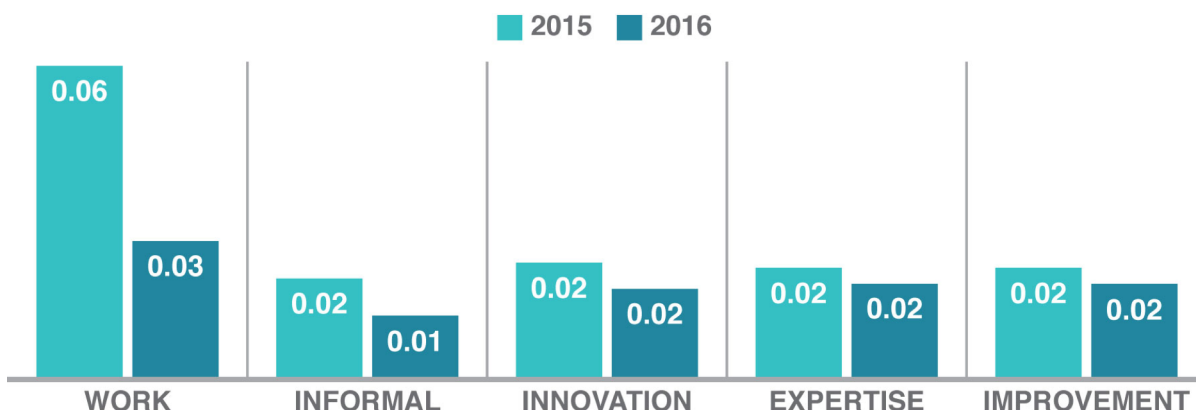


Figure 18: MILES Network Densities by Network and Year. (Tables A3.1.1 and A3.1.2)

New participants generally have fewer connections than participants who have been active in the project for longer periods of time (Figure 20), thus a large number of new participants is likely to decrease overall network density.

On average MILES participants maintain a consistent number of inter-institutional links over the first three years of project involvement, while the number of intra-institutional connections begin increasing after one year (Figure 20). This may indicate that while current platforms for developing inter-institutional interaction have had little influence on statewide interaction, they have contributed to growing institutional networks.

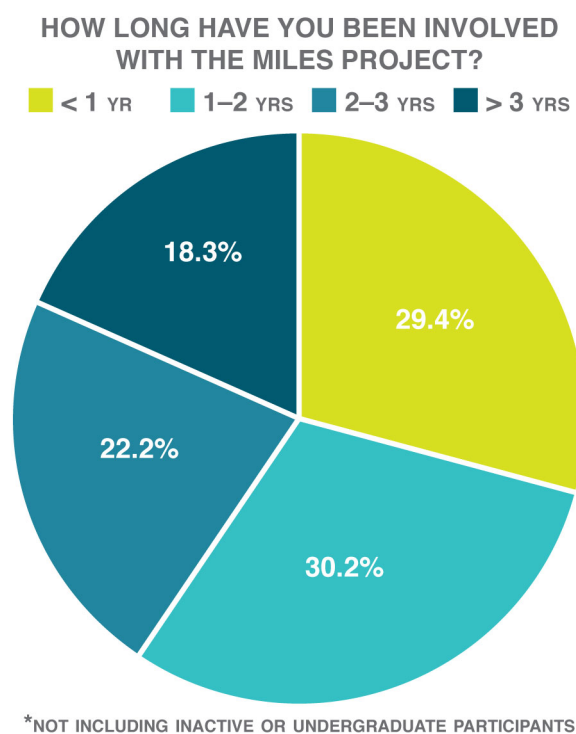


Figure 19: 2016 Survey Respondents by Length of MILES Involvement. Table A2.4.2 for all respondents

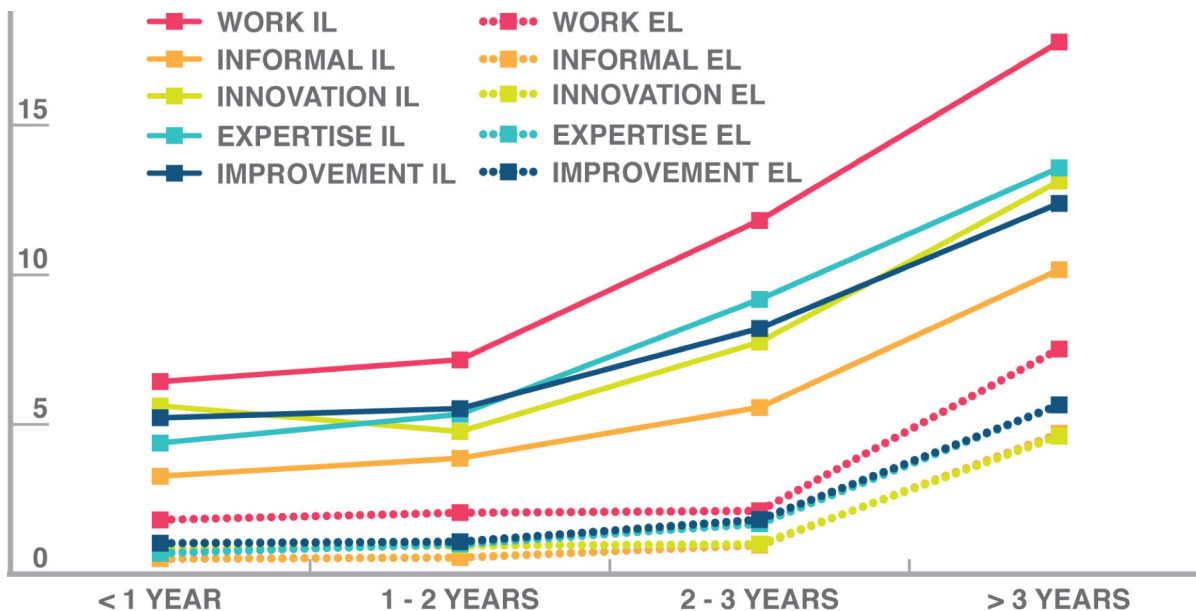


Figure 20: Average Number of Links (E/I) Per Participant by Length of Involvement.

3.2.1. RESEARCH CONNECTIVITY

To further understand the characteristics contributing to statewide connectivity, subnetworks of survey respondents by their reported primary MILES activity were also analyzed. Figure 21 shows MILES work communication between 2016 survey respondents who indicated research as their primary MILES activity. While connectivity between BSU and ISU research participants is strong, there is relatively low interaction between researchers at these institutions and those at UI. Additionally, there are few reciprocated links between UI and BSU (Figure 22; Table A3.3.7), and edges are often centralized to a few individual nodes across the network (Appendix 4.2.1).

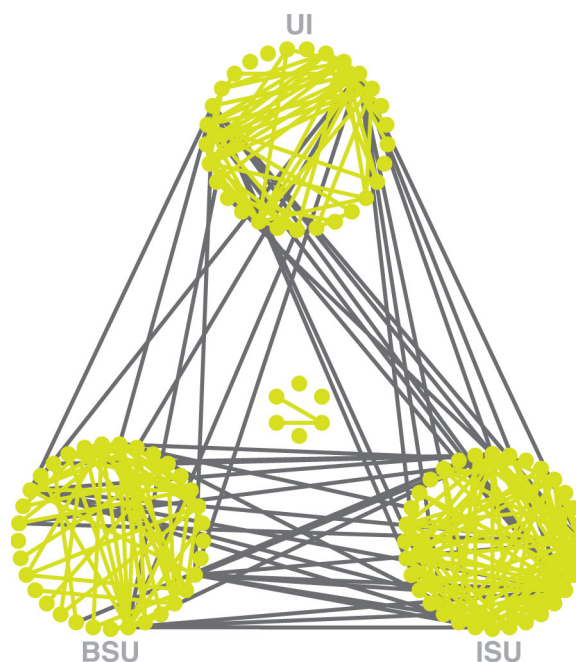


Figure 21: 2016 Research Work Network by Institution. Nodes grouped by institutional affiliation. Green edges represent interactions between affiliates of the same institution.

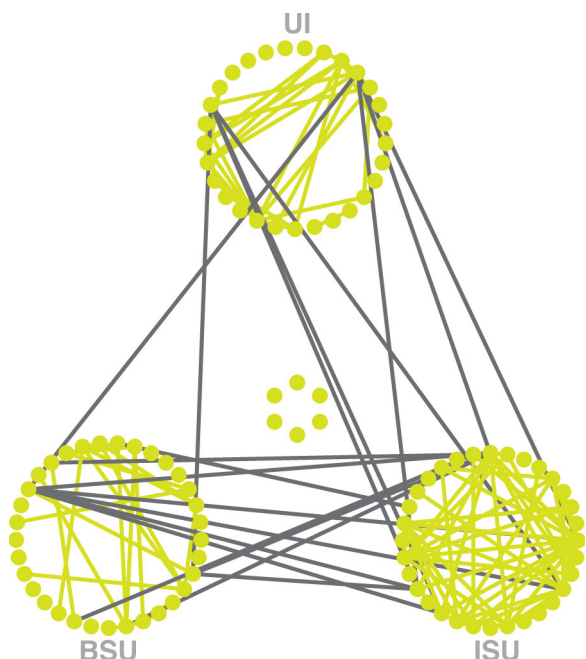


Figure 22: 2016 Research Reciprocated Edges Work Network by Institution. Nodes grouped by institutional affiliation. Green edges represent interactions between affiliates of the same institution.

Low levels of reciprocity between researchers at different institutions indicates that interactions that do occur between these two groups of researcher are transactional exchanges (Stephenson, 2004). Similarity and differences in research topics is a likely the driver of these trends in inter-institutional research interaction. Both the Boise-Treasure Valley (lead by BSU) and the Portneuf Watershed (lead by ISU) research sites primarily focus on the effects of agriculture and urbanization on social-ecological systems, while the Coeur d'Alene site (lead by UI) is a lake ecosystem study focused on the legacy effects of mining on natural resources services

such as timber and recreational ecosystem services (S. Benner, D. Rodgers, & J. Anderson, personal communication, July 2016; ID EPSCoR MILES, 2014). Geographic proximity may contribute to BSU and ISU research interaction. However, a history of collaboration established during partnerships on past NSF grants, has likely contributed to creating a foundation of inter-institutional interaction between ISU and BSU that is now being leveraged by the MILES project. (S. Benner, D. Rodgers, & J. Anderson, personal communication, July 2016). This history of collaboration may have resulted from BSU and ISU receiving fewer research funds compared to UI. Thus, creating a reliance on collaboration with one another in order to remain competitive within the state (National Science Foundation, 2015). Centralization of inter-institutional interaction between research institutions creates potential points of failure, in the event that one of these individuals were to leave the project, statewide connectivity between researchers could become significantly hindered if not severed entirely due to the lack of redundant pathways through which information may be shared.

3.2.2. OUTREACH CONNECTIVITY

Figure 23 shows statewide work interactions among MILES participants who indicated outreach as their primary activity. The majority of inter-institutional interaction occurs between UI and BSU or between UI and ISU with very few ties occurring between BSU and ISU's outreach participants. This trend is observed across all five social networks (Appendix 4.2.2). Reciprocated links among the outreach participants are few with little to no inter-institutional reciprocated links between the three major institutions (Figure 24; Table A3.3.6; Appendix 4.2.2).

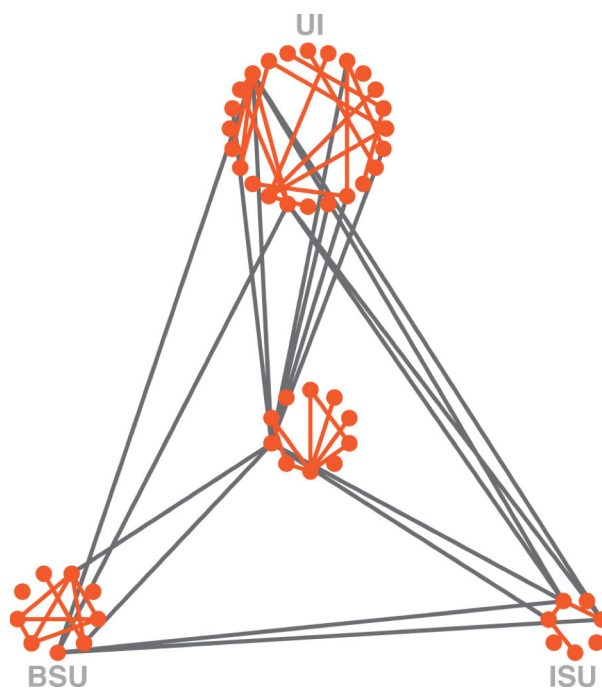


Figure 23: 2016 Outreach Work Network by Institution. Nodes are grouped by institutional affiliation. Orange edges represent interactions between affiliates of the same institution.

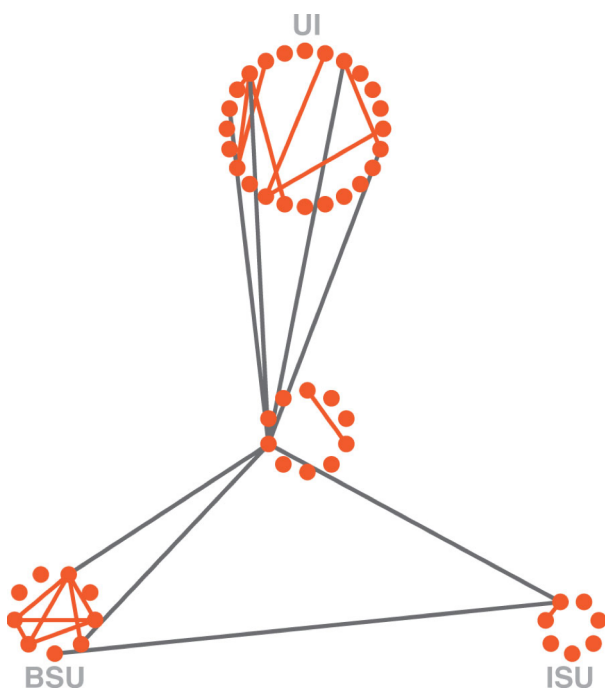


Figure 24: 2016 Outreach Reciprocated Edges Work Network by Institution. Nodes are grouped by institutional affiliation. Orange edges represent interactions between affiliates of the same institution.

These findings may indicate very limited sharing of “best practices” among MILES outreach participants and lack of a cohesive statewide component capable of developing regional initiatives, beyond those already established, such as the MOSS Adventure Learning Program. UI’s relatively large outreach component, represents a wide dispersal of outreach resources across the state, and may place a particular imperative on inter-institutional collaboration in order for the MILES network as a whole to access the social capital needed to meet both their research and outreach objectives across the state.

3.2.3. ADMINISTRATIVE CONNECTIVITY

Figure 25, shows statewide interaction among administration participants and the ID EPSCoR office. Many inter-institutional interactions occur between the Idaho EPSCoR's statewide administration office, and the three major institutions, respectively. Idaho EPSCoR's staff is primarily located in Northern Idaho with offices housed on the University of Idaho campus. Despite increased proximity to UI, interaction with the Idaho EPSCoR administration is distributed relatively equally across the major universities. However, interactions occurring directly between university administration are few, particularly in the innovation, expertise and improvement networks (Appendix 4.2.3).

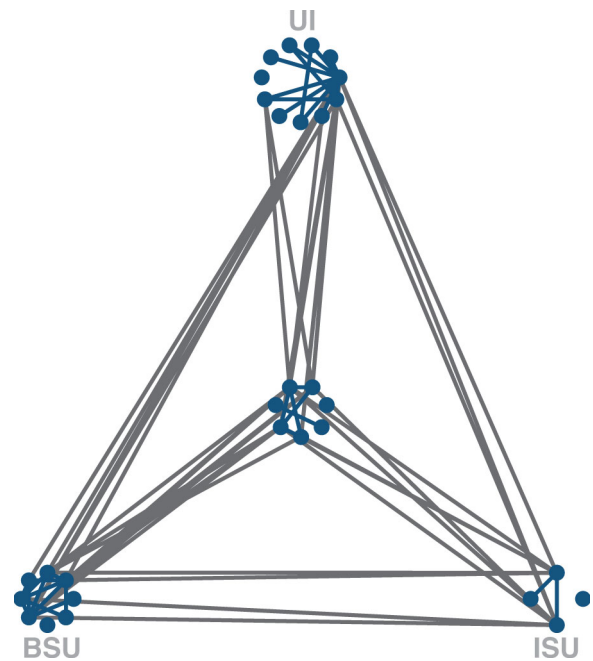


Figure 25: 2016 Administration Work Network by Institution. Nodes are grouped by institutional affiliation. Blue edges represent interactions between affiliates of the same institution.

The MILES administrative network is illustrative of the role of Idaho EPSCoR as a boundary institution—an institution which serves as an interface between other institutions (Crona & Parker, 2012). Further research is needed to better understand the sustainability of this statewide connectivity, and potential indicators of future collaboration once the MILES project has reached its conclusion, at which time the ID EPSCoR offices will no longer act as an administrative interface between participants.

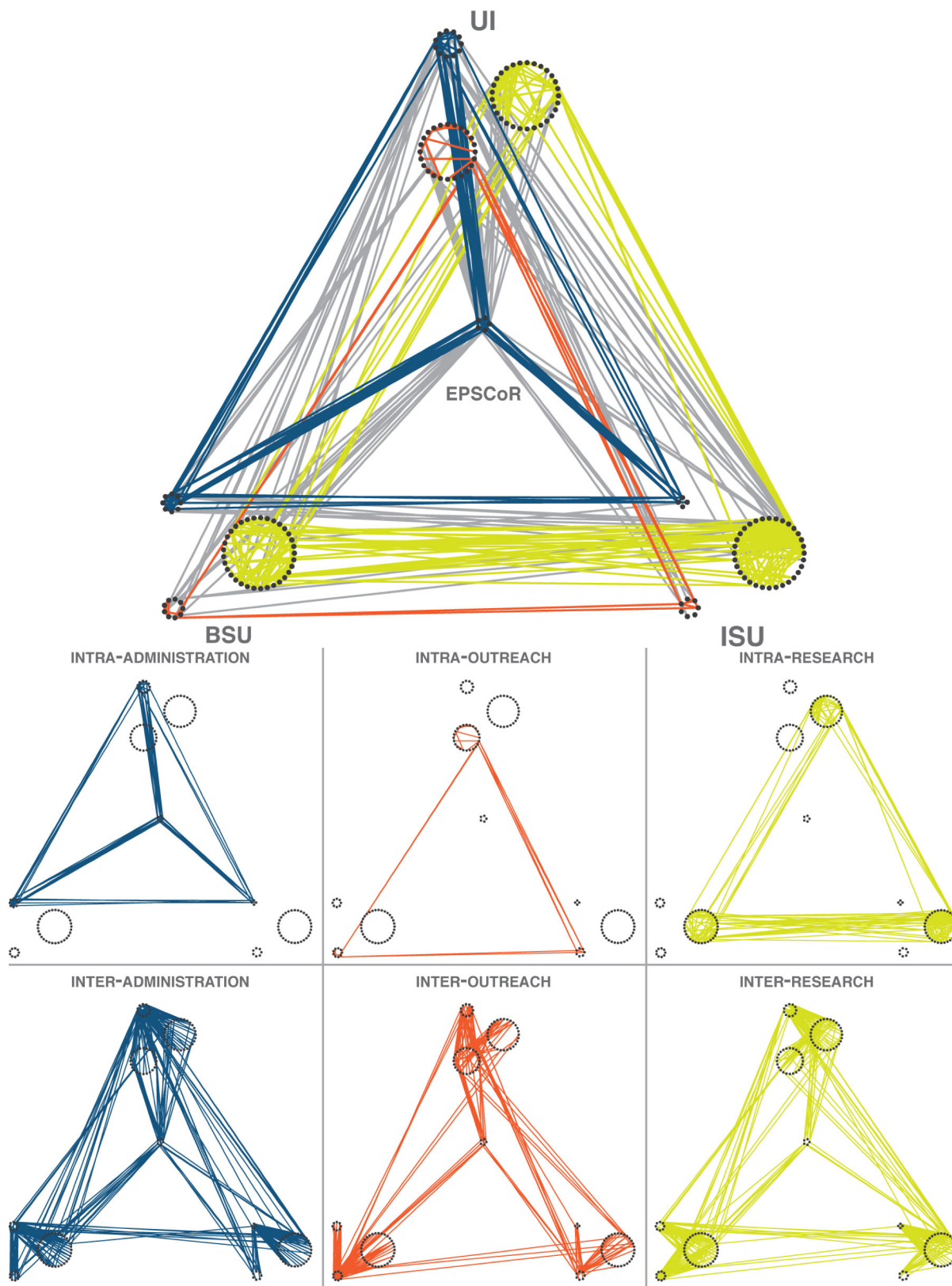


Figure 26: MILES 2016 Work Network by Institution and Activity Type. Nodes are grouped first by institutional affiliation, and then by primary activity. Blue edges indicate interactions between participants primarily involved in administration activities; orange edges indicate interactions between outreach participants, and green edges indicate interactions between participants primarily involved in research activities.

3.3. INTEGRATIVE HETERARCHY

Figure 26 shows how localized behaviors, within institutional and activity networks, contribute to the overall structure of the MILES heterarchy. Additional emergent properties of the MILES heterarchy can be seen by comparing interactions concurrent to different communication networks. Figure 27 shows the three trust networks—innovation, expertise and improvement—for 2015 and highlights relationships that are present in two or more of the networks. Clear similarities can be seen across the three networks. Concurrent links are primarily contained within institutions, while inter-institutional links synchronized across the trust networks are few, and almost entirely centralized around a single individual.

The innovation, expertise and improvement networks reveal interactions that often require a higher trust level than the routine behaviors of the work and informal networks (see Section 1.1). Structural similarity between these three trust networks is instrumental in implementing organizational wide changes, and integrative initiatives (Krebs & Holley, 2006; Stephenson, 2005). Within many organizations, innovation, though often necessary to success, is easily dismissed or perceived as a threat to established protocol—particularly among procedural experts. Therefore, in order to bring pioneering ideas to the forefront, and gain expert buy-in on innovative concepts—there by progressing ideas from concept to implementation—effective improvement networks require structural similarities with both the innovation and expertise networks (Stephenson, 2005). Centralization of concurrent ties in the 2015 networks create a single point of failure for the organization’s statewide implementation capacity. The time and energy resources of one individual are neither sufficient nor sustainable to maintain the communication pathways across institutions necessary for implementing statewide initiatives.

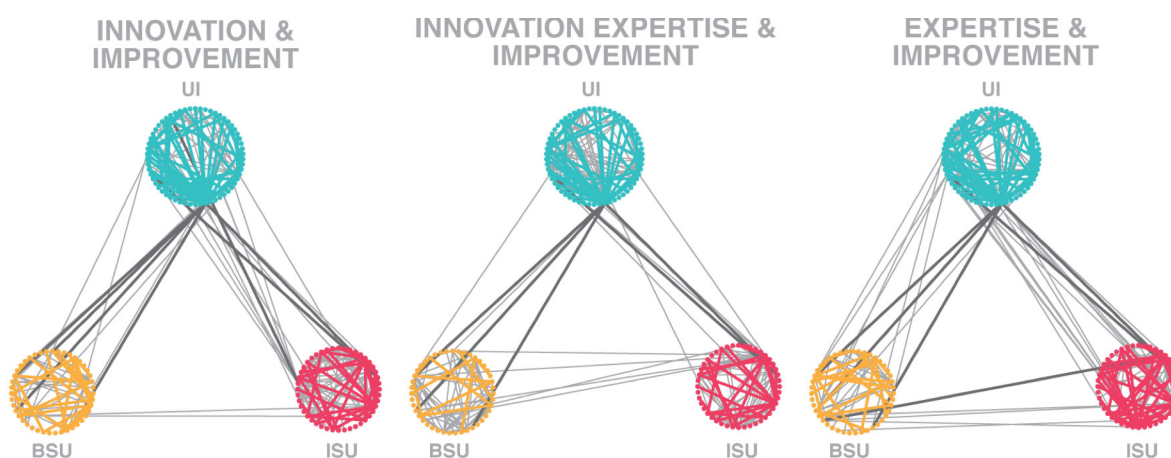


Figure 27: MILES 2015 Implementation Capacity Network. Bold lines indicate edges concurrently to the specified networks.

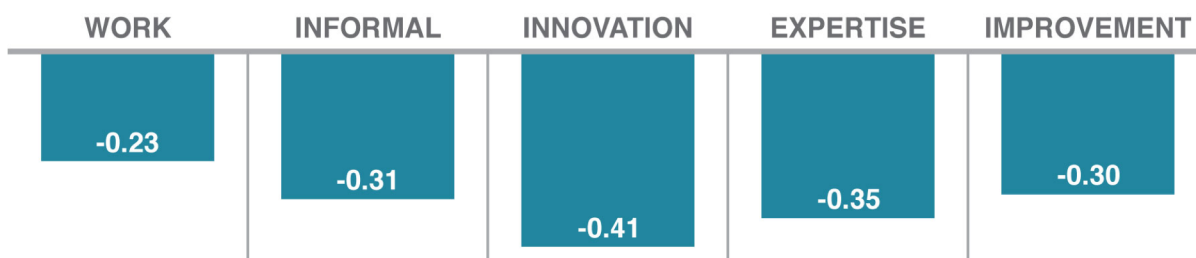


Figure 28: MILES 2016 E-I Indices by Network. E-I Indices calculated using institutional subgroups, with interactions between participants from the same organization characterized as internal links, and interactions between participants from different organizations being characterized as external links.

Should this individual leave, ties between institutions that are common to more than one trust network would effectively be severed. These results likely indicate that in 2015 network capacity for implementing innovative ideas, and utilizing expert resources to achieving group goals may have existed at the institutional level. However, the capacity for statewide objectives or initiatives requiring diverse inter-institutional connections—in order to gain input and consensus from all three major institutions—was not present in the MILES network.

In 2016, E-I indices by institution subgroups were negative for all networks, and the innovation network was particularly low (Figure 28; Table A3.2.1). Additionally, the innovation network has one of the highest reciprocity rates, nearly that of the work network, and much higher than that of the expertise and improvement networks despite having a density comparable to these two other trust networks (Figure 29; Table A3.3.1). The low E-I index and reciprocity levels in the 2016 innovation network likely indicates that brainstorming and idea sharing are largely being contained within institutions among subgroups of trusted colleagues. However, concurrent trust interactions are less centralized in 2016 than the 2015 networks (Figure 30). Indicating a meaningful, if incremental, expansion of the team’s statewide implementation capacity.

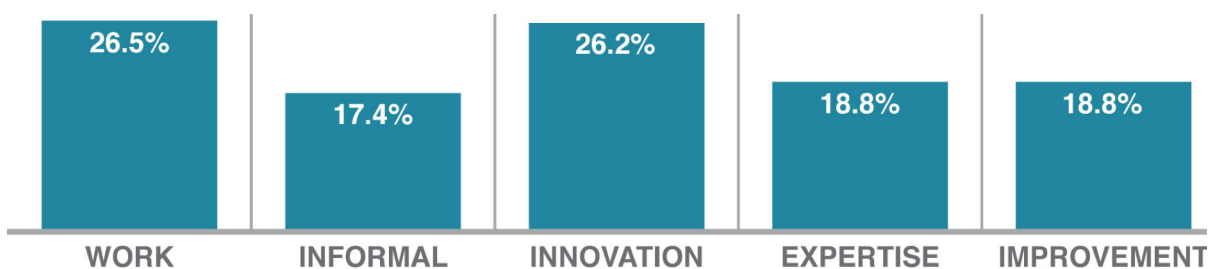


Figure 29: MILES 2016 Reciprocity Rate by Network.

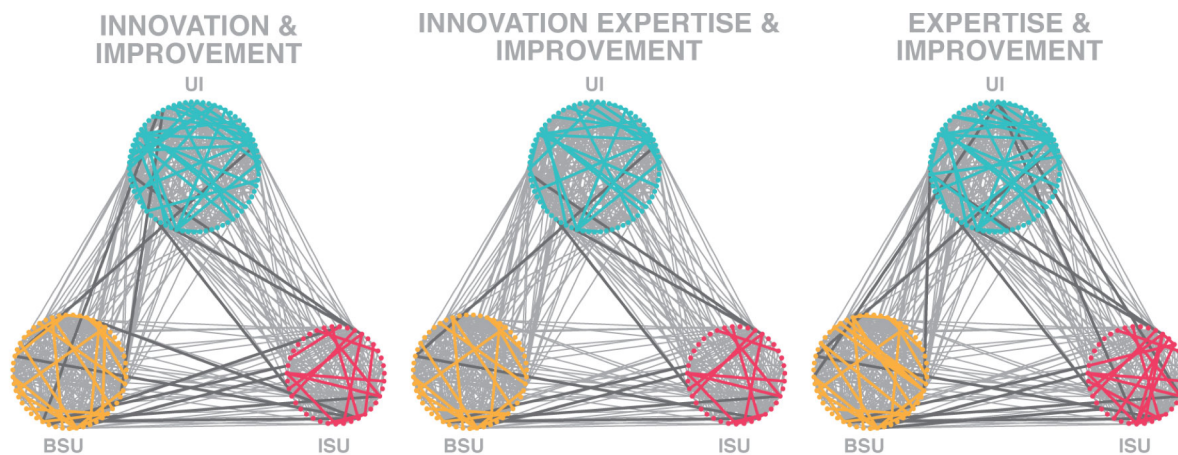


Figure 30: MILES 2016 Implementation Capacity Network. Bold lines indicate edges that occur concurrently across the specified networks.

3.4. GENDER DIVERSITY

Diversity plays an important role in shaping research and innovation by providing a breadth of perspectives from which to form research questions and conclusions. Gender diversity from the perspective of network connectivity was examined for both the MILES heterarchy and each major university. In both 2015 and 2016, the MILES population was nearly half male and half female, and density of connections between participants of the same gender were similar (Table A3.1.6; Appendix 4.4.1). However, variation emerges at the institutional level (Figure 31). In comparing intra-gender network densities within each institution, connections among female participants at BSU and particularly at ISU are generally denser (Table A3.1.7; Appendix 4.4.2; Table A3.1.8; Appendix 4.4.3). Both institutions generally consider this trend to

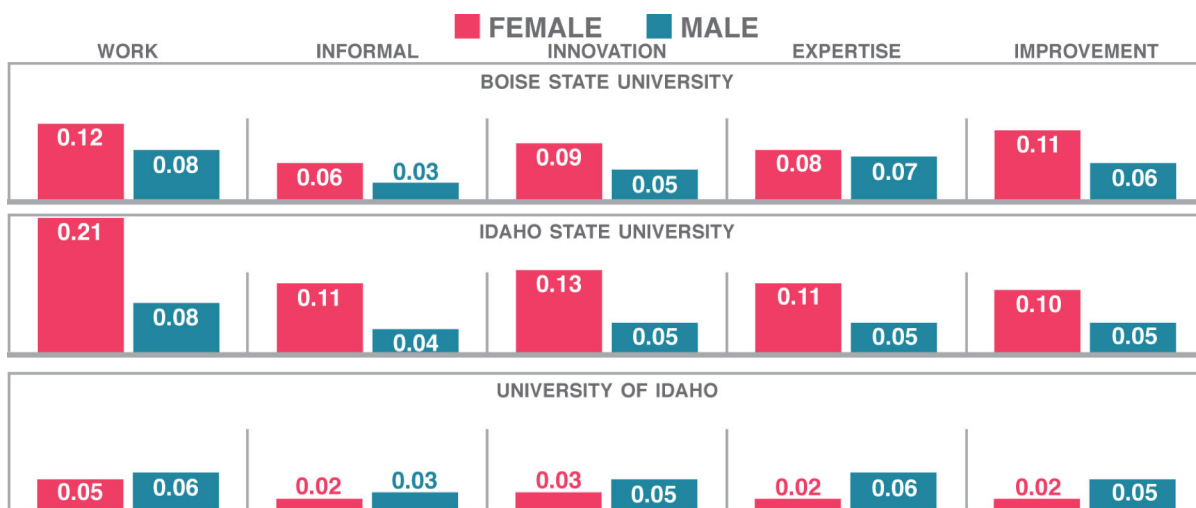


Figure 31: 2016 Gender Subnetwork Densities by Institution. (Tables A3.1.7, A3.1.8 and A3.1.9)

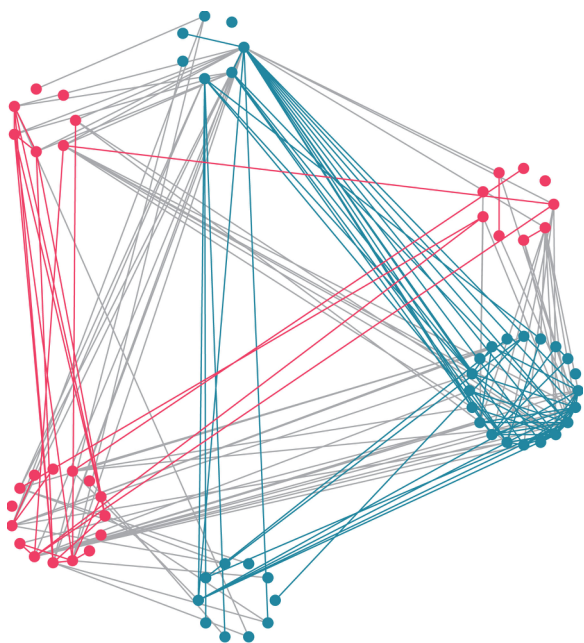


Figure 32: UI 2016 Work Network by Activity and Gender. Nodes are grouped first by activity, and then by gender. Red edges indicate interactions between female participants; blue edges indicate interaction between male participants.

be the product of established gender equality due to good hiring practices resulting in high caliber participants of both genders who work well together (S. Benner, D. Rodgers, & J. Anderson, personal communication, July 2016). Conversely, at UI intra-male network density is higher than that of intra-female network density (Table 3.1.8; Appendix 4.4.4), although network density within UI is lower overall (Table A3.1.5). Further nuance in the dynamic between males and females at UI is revealed in variations in intra-gender interaction by activity type. Figure 32 shows a relative level of isolation occurring among female researchers, who have little to no

interaction with one another, while also being less connected to participants primarily involved in other activities. This trend is further contextualized by examining differences in institutional roles among UI’s MILE participants by gender. Compared to male participants, a larger portion of females hold undergraduate and graduate student positions, and fewer female participants hold any kind of faculty position (Figure 33; Table A2.6.6). These findings may indicate that the dynamic between males and females at UI is authoritative, rather than collaborative, in nature, with a lack of a collective voice among female UI researchers.

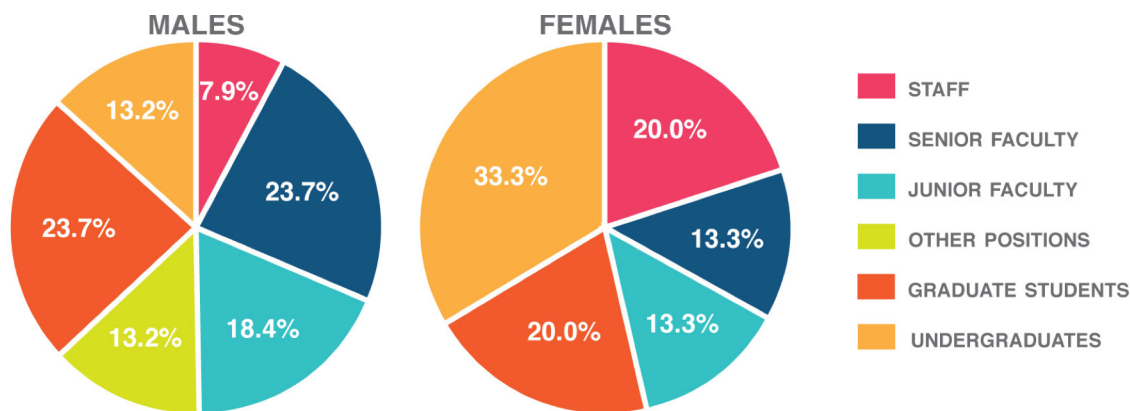


Figure 33: 2016 UI Survey Respondents by Gender and Institutional Role.

SECTION 4. DISCUSSION

The MILES 2015-2016 SNA reveals a composite of network patterns contributing to statewide interaction within a research heterarchy. The Idaho EPSCoR office functions as a central point of communication for project administration and influence in the coordination of statewide managerial direction. Although outreach participants represent 27.9% of MILES participants (Table A2.4.4), statewide connectivity in this objective is not nearly as robust as other components (Appendix 4.2.2), and based on reciprocity rates is often transactional in nature (Table A3.3.6). At both BSU and ISU, researchers' contributions to MILES outreach initiatives are primarily centered around participation in the Adventure Learning program. Many MILES researchers, from across the state, make day trips to the Adventure Learning program to contribute time as guest educators (S. Benner, D. Rodgers, & J. Anderson, personal communication, July 2016). Geographic distance between research and outreach components may contribute to challenges in outreach connectivity (Figure 3). Conversely, close geographic proximity, as well as a shared history of collaboration has likely contributed to increased connectivity between BSU and ISU, particularly among researchers (S. Benner, D. Rodgers, & J. Anderson, personal communication, July 2016). This may indicate that establishment of a statewide research network, as a legacy of the MILES project, is likely to contribute to a foundational collaboration network for future initiatives. However, if unmitigated, the lack of UI research connectivity across the state (Appendix 4.2.1), and the lack of reciprocal links between institution administration (Appendix 4.2.3), possibly a result of high turnover rates among UI participants and leadership, may limit the breadth and sustainability of built network capacity.

Average number of inter-institutional connections per participant are largely unaffected by the duration of a participant's involvement in the MILES project, with the exception of a step function change observed among participants who have been involved in the project for over three years, and maintain a higher number of inter-institutional connections than participants who are relatively newer to the project (Figure 20). This may indicate that current platforms for facilitating the development of inter-institutional interaction, such as annual all participant meetings, Innovation Working Groups (IWG), and ISEED grants have been insufficient in increasing statewide connectivity among MILES participants, although these activities may have contributed to connectivity at the institutional level. This may be because these opportunities have not been equally sought by all three of the major institutions (Table 1), with ISU participants accounting for a majority of ISEED participants (Figure 10). Considering that the

MILES project was just reaching the end of its third year, at the time of the 2016 survey, it is also possible that participants who indicated they have been involved in the project for over 3 years are those who feel their involvement began, not with the installation of grant funding, but with the conception of the grant proposal, and as such feel greater personal buy-in, or responsibility, to statewide collaboration as proposed in the project's strategic plan. Additional analyses in years 4 and 5 of the MILES project are needed to determine whether the step function increase in external links is the product of a three-year involvement benchmark, or characteristic of a subgroup of long-term participants.

Analysis of gender based subgroups reveal similar network densities between subnetworks of male and female participants across MILES (Table A3.1.6; Appendix 4.4.1). However, emergent patterns in the UI networks indicating a more authoritative role among males, and lack of a collective female voice within the institution, particularly among researchers (Table 3.1.9; Figure 28). While recent attempts have been made to increase the proportion of female researcher at UI through new hires, these efforts have not yet been successful (S. Benner, D. Rodgers, & J. Anderson, personal communication, July 2016). It is possible that, at this point in time, the gender bias within the UI MILES group has entered a reinforcing loop in which potential female participants perceive the UI MILES team as a high risk professional environment in which establishment and advancement of their careers will require that they not only excel at professional accomplishments, but personally overcome an institutional gender bias against them that may threaten both job security and job satisfaction among this demographic. Without sufficiently competitive incentive to mitigate these risks female participants may be unlikely to engage with the UI MILES team. Without equitable engagement of female participants, the UI MILES gender bias is likely to reinforce the perception of a high risk professional environment and further discourage active female participation. The importance of gender and ethnic diversity should not be overlooked. Diversity plays an important role in innovation within an organization, by providing individuals with new ideas and information and preventing an organization from continuously prescribing to a predetermined course of action (Krebs and Holley, 2002). Valdis Krebs and June Holley (2006) further argue that a lack of diversity can be harmful to the sustainability of the network as homogeneous clustering can make it difficult for a community to adapt to new information or circumstances. Better engagement of UI female researchers at the institutional level may also contribute to increased research connectivity within the MILES heterarchy as a whole.

In addition to potential vulnerabilities, the 2016 MILES SNA reveals several opportunities for strategic intervention, which may increase the overall strength and resilience of the heterarchy. For example, opportunities may exist to strengthen the sustainability of the outreach network, and ties between research and outreach participants, furthering the development and capacity of a robust statewide implementation network. While there is no formal outreach group identified at BSU, a clear component subgroup emerges in the institutional networks (Appendix 4.3.1). It is possible that administrative empowerment of this group to formally pursue outreach objectives, as well as inter-institutional engagement with other established outreach components, represent opportunities to expand both the outputs of the MILES outreach network, as well as overall statewide connectivity, thus increasing the sustainability of MILES implementation capacity.

It is worth noting that 41.2% of the MILES 2016 survey respondents indicated that they were involved in MILES on a part-time basis, and 16.0% reported being involved in an unofficial capacity (Table A2.4.1). This may indicate that the MILES network is connected to other regional activities, as these participants are likely involved in other projects, even if only peripherally, yet still maintain positions of influence in the MILES network.

As Krebs and Holley describe it in their 2002 publication. *Building Smart Communities through Network Weaving*:

The periphery allows us to reach ideas and information not currently in our network. The core allows us to act on those ideas and information. The periphery is the open, porous boundary of the community network. It is where new members/ideas come and go. The periphery monitors the environment, while the core implements what is discovered and deemed useful (Krebs & Holley, 2006)

The large percentage of part-time and unofficial participants (57.2% in total), as well as the sizeable portion of new participants (Table A2.4.2) further emphasizes the need for a deeper understanding of research heterarchies since individual participants' involvement in the project is likely fluid, changing as need and availability evolves, placing greater importance on strong connectivity at an institutional, rather than individual level.

While E-I indices between 2016 institution subgroups in the MILES heterarchy are all negative, positive or near zero indices between activity components consisting of participants primarily involved in the same activity type are observed within institutional networks,

particularly BSU (Table A3.2.5) and UI (table A3.2.9). In their 1977 research, Krackhardt and Stern, stress the importance of positive E-I Indices, as critical to an organization's capacity to respond to organizational crisis—simply defined as a situation which requires an organization to engage in new or untested behaviors, while under time constraints, to achieve group goals (Krackhardt & Stern, 1998). The nature of large multi-institutional research initiatives bears a striking similarity to this definition. Large research teams are charged with the challenging task of innovating through collaborative research to achieve conceptually extensive objectives with broad impacts. These challenges, require participants to engage in new, integrative behaviors, while likely facing time and funding constraints. While potentially insightful, further research is needed to understand if an ideal heterarchical structure (measured by E-I index or other metrics) applicable to multi-organizational research heterarchies exists.

The MILES SNA is an example of the potential for the methodology of SNA to provide insight for enhancing research team management. This research contributes to a growing body of research concerning what network components are most essential to building and maintaining heterarchical connectivity, critical for EPSCoR and other multi-institutional collaborative efforts.

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APPENDIX 1. INTERNAL REVIEW BOARD EXEMPTION

From: Traci Craig, Ph.D.,
 Chair, University of Idaho Institutional Review Board
 University Research Office, Moscow, ID 83844-3010

Date: 4/30/2014 10:05:01 AM

Project: 14-201: MILES Social Network Analysis

Certified: Certified as exempt under category 2 at 45 CFR 46.101(b)(2).

This study may be conducted according to the protocol described in the Application without further review by the IRB. As specific instruments are developed, each should be forwarded to the ORA, in order to allow the IRB to maintain current records. Every effort should be made to ensure that the project is conducted in a manner consistent with the three fundamental principles identified in the Belmont Report: respect for persons; beneficence; and justice.

It is important to note that certification of exemption is NOT approval by the IRB. Do not include the statement that the UI IRB has reviewed and approved the study for human subject participation. Remove all statements of IRB Approval and IRB contact information from study materials that will be disseminated to participants. Instead please indicate, 'The University of Idaho Institutional Review Board has Certified this project as Exempt.'

Certification of exemption is not to be construed as authorization to recruit participants or conduct research in schools or other institutions, including on Native Reserved lands or within Native Institutions, which have their own policies that require approvals before Human Subjects Research Projects can begin. This authorization must be obtained from the appropriate Tribal Government (or equivalent) and/or Institutional Administration. This may include independent review by a tribal or institutional IRB or equivalent. It is the investigator's responsibility to obtain all such necessary approvals and provide copies of these approvals to ORA, in order to allow the IRB to maintain current records.

This certification is valid only for the study protocol as it was submitted to the ORA. Studies certified as Exempt are not subject to continuing review (this Certification does not expire). If any changes are made to the study protocol, you must submit an amendment for determination that the study remains Exempt before implementing the changes.

APPENDIX 2. MILES SNA SURVEYS

In the 2015 survey respondents were provided an initial roster of participant names associated with the institution respondents reported as their primary affiliate. After selecting names from this institutional list, respondents were given the option to view additional lists of names from other institutions. This survey design created an additional step for reporting inter-institutional interactions, which may have contributed to lower rates of reporting for these interaction types. Furthermore, this process of viewing multiple rosters was repeated for each SNA questions which, and may have contributed to survey fatigue. Revisions to the 2016 survey were made to correct these flaws, and reduce the amount of time required to complete the survey. In 2016 respondents were provided a roster of all MILES participants, organized into collapsible lists by institution. This user interface design allowed all participant names to be accessible on one survey page, while still being organized in a logical manner. Participants then created a custom roster by selected the names of individuals with whom they interact for *any* reason. These selections were then used to generate an individualized list from which respondents could answer the five SNA questions. Average length of time to complete the SNA survey in 2015 was 15 minutes (maximum presumed continuous length of time was 59 minutes, and the shortest survey duration was 3 minutes). Average length of time in 2016 was 17.5 minutes (maximum presumed continuous duration was 2 hours and 12 minutes, and the shortest was again 3 minutes). The 2015 survey included a roster of 135 individuals, while the 2016 survey included a roster of 273. Additionally, the 2016 survey included a wide range of demographic questions. Average survey duration time indicates that changes to the survey interface allowed respondents to complete a survey containing twice the number of potential questions with only 17% increase in the amount of time required to complete the survey.

TABLE A2.1.1 RESPONSE RATES BY INSTITUTION AND YEAR							
2015 SNA Survey							
MILES (135)		BSU (37)		ISU (37)		UI (48)	
46.0%	62	43.2%	16	56.8%	21	43.8%	21
2016 SNA Survey							
MILES (273)		BSU (74)		ISU (58)		UI (107)	
65.6%	179	68.9%	51	74.1%	43	65.4%	70
*total population of each institution during each year is provided in parenthesis.							

A2.1. 2015 INSTRUMENT

Thank you for participating in our survey. To help us better understand the MILES research and collaboration process, please take a few minutes to think about your interactions with MILES participants and complete the following survey. Your answers will be compiled and presented in a manner that preserves the confidentiality of all respondents.

Q1: Please provide your full name:

This information is required to ensure your answers are correctly compiled with answers by other MILES respondents. All answers will be kept confidential.

Q2: Email:

Q3: Gender:

- Male
- Female
- Prefer not to Answer

Q4: Primary Institution:

- Boise State University
- Idaho State University
- University of Idaho
- Other (please specify):

Q5: College and/or Department:

Q6: What best describes your role within your primary institution?

- Faculty
- Staff
- Administration
- Graduate Student
- Post-Doctorate
- Other

{IF Q6 INSTITUTION ROLE: GRADUATE STUDENT OR POST-DOCTORATE IS SELECTED,
THEN SHOW QUESTION Q7 ACADEMIC ADVISER}

Q7: Who is your primary academic adviser?

Q8: With which of the following MILES activities are you currently involved? (choose all that apply)

- CDA/Fernan Research Site
- Portneuf Watershed Research Site
- Treasure Valley Research Site
- Educational Outreach
- Workforce Development
- Project Management & Support*

*Project management and support tasks include leadership, sustainability and assessment efforts, data managements, grant writing and other project supporting activities.

Q9: With which of the following individuals do you exchange work-related information or materials to get your job done?

{IF Q4: PRIMARY INSTITUTION BOISE STATE UNIVERSITY IS SELECTED,
THEN SHOW ROSTER OF BOISE STATE UNIVERSITY PARTICIPANTS,
AND IF Q4: PRIMARY INSTITUTION IDAHO STATE UNIVERSITY IS SELECTED,
THEN SHOW ROSTER OF IDAHO STATE UNIVERSITY PARTICIPANTS,
AND IF Q4: PRIMARY INSTITUTION UNIVERSITY OF IDAHO IS SELECTED,
THEN SHOW ROSTER OF UNIVERSITY OF IDAHO PARTICIPANTS,
AND IF Q4: PRIMARY INSTITUTION OTHER INSTITUTION IS SELECTED,
THEN SHOW ROSTER OF OTHER INSTITUTION PARTICIPANTS}

Q10: Are there any other MILES participants with whom you exchange work-related information or materials to get your job done? If so, please enter their name(s) below or select one or more of the institutions listed at the bottom of the page to see an additional list of participants associated with those institutions:

Q11: To see a list of additional participants, select one or more of the institutions listed below:

- Boise State University
- Idaho State University
- University of Idaho
- All Other Institutions
- None (don't wish to see additional lists at this time)

{IF Q11 ADDITIONAL PARTICIPANTS: BOISE STATE UNIVERSITY IS SELECTED,
THEN SHOW ROSTER OF BOISE STATE UNIVERSITY PARTICIPANTS,
AND IF Q11 ADDITIONAL PARTICIPANTS: IDAHO STATE UNIVERSITY IS SELECTED,
THEN SHOW ROSTER OF IDAHO STATE UNIVERSITY PARTICIPANTS,
AND IF Q11 ADDITIONAL PARTICIPANTS: UNIVERSITY OF IDAHO IS SELECTED,
THEN THEN ROSTER OF UNIVERSITY OF IDAHO PARTICIPANTS,
AND IF Q11 ADDITIONAL PARTICIPANTS: OTHER INSTITUTION IS SELECTED,
THEN SHOW ROSTER OF OTHER PARTICIPANTS}

To better understand the workflow and processes that occur in large multi-institutional research teams we'd like to ask a few additional questions about MILES work-related communications.

{IF Q8 MILES ACTIVITIES: CDA/FERNAN RESEARCH SITE, OR PORTNEUF WATERSHED RESEARCH SITE,
OR TREASURE VALLEY RESEARCH SITE IS SELECTED
THEN SHOW Q12 RESEARCH PROCESSES}

Q12: Which, if any, of the following MILES research processes do you discuss with {LOOP SELECTED NAMES FROM Q9 Q10 AND Q11} for work-related purposes? (choose all that apply; if not applicable, leave blank)

- Stakeholder Engagement
- SES Characterization
- Scenario Development
- Modeling and/or Analysis
- Visualization/Virtualization
- Other (please specify):

{IF Q8 MILES ACTIVITIES: EDUCATIONAL OUTREACH, WORKFORCE DEVELOPMENT OR PROJECT MANAGEMENT IS SELECTED
THEN SHOW Q13 CAPACITY BUILDING PROCESSES}

Q13: Which, if any, of the following MILES capacity building activities do you discuss with {LOOP SELECTED NAMES FROM Q9, Q10 AND Q11} for work-related purposes? (choose all that apply; if not applicable, leave blank)

- Educational Outreach
- Workforce Development
- Project Management and/or Support
- Other (please specify):

Q14: How frequently do you communicate with {LOOP SELECTED NAMES FROM Q9 Q10 AND Q11} for work-related purposes?

- Very Rarely (less than once a month)
- Rarely (about once a month)
- Occasionally (2-3 times a month)
- Often (about once a week)
- Very Often (2 or more times a week)

Thank you for taking the time to complete the MILES Workflow portion of this survey. The remainder of the survey consists of additional questions about communication within the MILES project. However, these questions are not as detailed and should not take as much time as the previous section.

Q15: Which of the following individuals do you spend time with when you want to find out what's going on within the MILES project for either social/informal or work-related reasons?

{IF Q4: PRIMARY INSTITUTION BOISE STATE UNIVERSITY IS SELECTED,
THEN SHOW ROSTER OF BOISE STATE UNIVERSITY PARTICIPANTS,
AND IF Q4: PRIMARY INSTITUTION IDAHO STATE UNIVERSITY IS SELECTED,
THEN SHOW ROSTER OF IDAHO STATE UNIVERSITY PARTICIPANTS,
AND IF Q4: PRIMARY INSTITUTION UNIVERSITY OF IDAHO IS SELECTED,
THEN SHOW ROSTER OF UNIVERSITY OF IDAHO PARTICIPANTS,
AND IF Q4: PRIMARY INSTITUTION OTHER INSTITUTION IS SELECTED,
THEN SHOW ROSTER OF OTHER INSTITUTION PARTICIPANTS}

Q16: Are there any other MILES participants with whom you spend time when you want to find out what's going on within the MILES project? If so, please enter their name(s) below or select one or more of the institutions listed at the bottom of the page to see an additional list of participants associated with those institutions:

Q17: To see a list of additional participants, select one or more of the institutions listed below:

- Boise State University
- Idaho State University
- University of Idaho
- All Other Institutions
- None (don't wish to see additional lists at this time)

{IF Q17 ADDITIONAL PARTICIPANTS: BOISE STATE UNIVERSITY IS SELECTED,

THEN SHOW ROSTER OF BOISE STATE UNIVERSITY PARTICIPANTS,
 AND IF Q17 ADDITIONAL PARTICIPANTS: IDAHO STATE UNIVERSITY IS SELECTED,
 THEN SHOW ROSTER OF IDAHO STATE UNIVERSITY PARTICIPANTS,
 AND IF Q17 ADDITIONAL PARTICIPANTS: UNIVERSITY OF IDAHO IS SELECTED,
 THEN THEN ROSTER OF UNIVERSITY OF IDAHO PARTICIPANTS,
 AND IF Q17 ADDITIONAL PARTICIPANTS: OTHER INSTITUTION IS SELECTED,
 THEN SHOW ROSTER OF OTHER PARTICIPANTS}

Q18: How frequently do you socially or informally communicate with {LOOP SELECTED NAMES FROM Q15 Q16 AND Q17}?

- Very Rarely (less than once a month)
- Rarely (about once a month)
- Occasionally (2-3 times a month)
- Often (about once a week)
- Very Often (2 or more times a week)

Q19: With which of the following individuals do you brainstorm, share or explore new ideas?

{IF Q4: PRIMARY INSTITUTION BOISE STATE UNIVERSITY IS SELECTED,
 THEN SHOW ROSTER OF BOISE STATE UNIVERSITY PARTICIPANTS,
 AND IF Q4: PRIMARY INSTITUTION IDAHO STATE UNIVERSITY IS SELECTED,
 THEN SHOW ROSTER OF IDAHO STATE UNIVERSITY PARTICIPANTS,
 AND IF Q4: PRIMARY INSTITUTION UNIVERSITY OF IDAHO IS SELECTED,
 THEN SHOW ROSTER OF UNIVERSITY OF IDAHO PARTICIPANTS,
 AND IF Q4: PRIMARY INSTITUTION OTHER INSTITUTION IS SELECTED,
 THEN SHOW ROSTER OF OTHER INSTITUTION PARTICIPANTS}

Q20: Are there any other MILES participants with whom you brainstorm, share or explore new ideas? If so, please enter their name(s) below or select one or more of the institutions listed at the bottom of the page to see an additional list of participants associated with those institutions:

Q21: To see a list of additional participants, select one or more of the institutions listed below:

- Boise State University
- Idaho State University
- University of Idaho
- All Other Institutions
- None (don't wish to see additional lists at this time)

{IF Q21 ADDITIONAL PARTICIPANTS: BOISE STATE UNIVERSITY IS SELECTED,
 THEN SHOW ROSTER OF BOISE STATE UNIVERSITY PARTICIPANTS,
 AND IF Q21 ADDITIONAL PARTICIPANTS: IDAHO STATE UNIVERSITY IS SELECTED,
 THEN SHOW ROSTER OF IDAHO STATE UNIVERSITY PARTICIPANTS,
 AND IF Q21 ADDITIONAL PARTICIPANTS: UNIVERSITY OF IDAHO IS SELECTED,
 THEN THEN ROSTER OF UNIVERSITY OF IDAHO PARTICIPANTS,
 AND IF Q21 ADDITIONAL PARTICIPANTS: OTHER INSTITUTION IS SELECTED,
 THEN SHOW ROSTER OF OTHER PARTICIPANTS}

Q22: How frequently do you communicate with {LOOP SELECTED NAMES FROM Q19 Q20 AND Q21} about new ideas or novel concepts?

- Very Rarely(less than once a month)
- Rarely(about once a month)
- Occasionally(2-3 times a month)

- Often (about once a week)
- Very Often (2 or more times a week)

Q23: From which, or with which, of the following individuals do you seek or share expert knowledge or advice?

{IF Q4: PRIMARY INSTITUTION BOISE STATE UNIVERSITY IS SELECTED,
THEN SHOW ROSTER OF BOISE STATE UNIVERSITY PARTICIPANTS,
AND IF Q4: PRIMARY INSTITUTION IDAHO STATE UNIVERSITY IS SELECTED,
THEN SHOW ROSTER OF IDAHO STATE UNIVERSITY PARTICIPANTS,
AND IF Q4: PRIMARY INSTITUTION UNIVERSITY OF IDAHO IS SELECTED,
THEN SHOW ROSTER OF UNIVERSITY OF IDAHO PARTICIPANTS,
AND IF Q4: PRIMARY INSTITUTION OTHER INSTITUTION IS SELECTED,
THEN SHOW ROSTER OF OTHER INSTITUTION PARTICIPANTS}

Q24: Are there any other MILES participants from whom, or with whom you seek or share expert knowledge? If so, please enter their name(s) below or select one or more of the institutions listed at the bottom of the page to see an additional list of participants associated with those institutions:

Q25: To see a list of additional participants, select one or more of the institutions listed below:

- Boise State University
- Idaho State University
- University of Idaho
- All Other Institutions
- None (don't wish to see additional lists at this time)

{IF Q25 ADDITIONAL PARTICIPANTS: BOISE STATE UNIVERSITY IS SELECTED,
THEN SHOW ROSTER OF BOISE STATE UNIVERSITY PARTICIPANTS,
AND IF Q25 ADDITIONAL PARTICIPANTS: IDAHO STATE UNIVERSITY IS SELECTED,
THEN SHOW ROSTER OF IDAHO STATE UNIVERSITY PARTICIPANTS,
AND IF Q25 ADDITIONAL PARTICIPANTS: UNIVERSITY OF IDAHO IS SELECTED,
THEN THEN ROSTER OF UNIVERSITY OF IDAHO PARTICIPANTS,
AND IF Q25 ADDITIONAL PARTICIPANTS: OTHER INSTITUTION IS SELECTED,
THEN SHOW ROSTER OF OTHER PARTICIPANTS}

Q26: How frequently do you communicate with {LOOP SELECTED NAMES FROM Q23 Q24 AND Q25} about expert knowledge or advise?

- Very Rarely (less than once a month)
- Rarely (about once a month)
- Occasionally (2-3 times a month)
- Often (about once a week)
- Very Often (2 or more times a week)

Q27: Which of the following individuals do you consider to be an effective implementer, someone who actively participants to achieve group goals or accomplish difficult tasks?

{IF Q4: PRIMARY INSTITUTION BOISE STATE UNIVERSITY IS SELECTED,
THEN SHOW ROSTER OF BOISE STATE UNIVERSITY PARTICIPANTS,
AND IF Q4: PRIMARY INSTITUTION IDAHO STATE UNIVERSITY IS SELECTED,
THEN SHOW ROSTER OF IDAHO STATE UNIVERSITY PARTICIPANTS,
AND IF Q4: PRIMARY INSTITUTION UNIVERSITY OF IDAHO IS SELECTED,
THEN SHOW ROSTER OF UNIVERSITY OF IDAHO PARTICIPANTS,
AND IF Q4: PRIMARY INSTITUTION OTHER INSTITUTION IS SELECTED,
THEN SHOW ROSTER OF OTHER INSTITUTION PARTICIPANTS}

Q28: Are there any other MILES participants whom you consider to be effective implementers? If so, please enter their name(s) below or select one or more of the institutions listed at the bottom of the page to see an additional list of participants associated with those institutions:

Q29: To see a list of additional participants, select one or more of the institutions listed below:

- Boise State University
- Idaho State University
- University of Idaho
- All Other Institutions
- None (don't wish to see additional lists at this time)

{IF Q29 ADDITIONAL PARTICIPANTS: BOISE STATE UNIVERSITY IS SELECTED,
THEN SHOW ROSTER OF BOISE STATE UNIVERSITY PARTICIPANTS,
AND IF Q29 ADDITIONAL PARTICIPANTS: IDAHO STATE UNIVERSITY IS SELECTED,
THEN SHOW ROSTER OF IDAHO STATE UNIVERSITY PARTICIPANTS,
AND IF Q29 ADDITIONAL PARTICIPANTS: UNIVERSITY OF IDAHO IS SELECTED,
THEN THEN ROSTER OF UNIVERSITY OF IDAHO PARTICIPANTS,
AND IF Q29 ADDITIONAL PARTICIPANTS: OTHER INSTITUTION IS SELECTED,
THEN SHOW ROSTER OF OTHER PARTICIPANTS}

Q30: How frequently do you communicate with {LOOP SELECTED NAMES FROM Q27 Q28 AND Q29} about implementing project goals?

- Very Rarely (less than once a month)
- Rarely (about once a month)
- Occasionally (2-3 times a month)
- Often (about once a week)
- Very Often (2 or more times a week)

Thank you for completing the 2015 MILES Social Network Analysis Survey. Your responses have been recorded.

A2.2. 2015 SURVEY RESULTS

	Percentage	Count
Male	45.07%	32
Female	54.93%	39
Prefer not to Answer	0.00%	0
Total	100%	71

	Percentage	Count
Boise State University	28.17%	20
Idaho State University	35.21%	25
University of Idaho	30.99%	22
Other (please specify)	5.63%	4
Total	100%	71

	Percentage	Count
Faculty	52.11%	37
Staff	14.08%	10
Administration	4.23%	3
Graduate Student	21.13%	15
Post-Doctorate	8.45%	6
Other	0.00%	0
Total	100%	71

	Percentage	Count
CDA/Fernan Research Site	25.35%	18
Portneuf Watershed Research Site	29.58%	21
Treasure Valley Research Site	32.39%	23
Educational Outreach	28.17%	20
Workforce Development	21.13%	15
Project Management & Support	26.76%	19
Total	100%	71

	BSU	ISU	UI	Other	Total
Male	11	10	10	1	32
	34.38%	31.25%	31.25%	3.13%	100.00%
	55.00%	40.00%	45.45%	25.00%	45.07%
Female	9	15	12	3	39
	23.08%	38.46%	30.77%	7.69%	100.00%
	45.00%	60.00%	54.55%	75.00%	54.93%
Total	20	25	22	4	71
	28.17%	35.21%	30.99%	5.63%	100.00%
	100.00%	100.00%	100.00%	100.00%	100.00%

	BSU	ISU	UI	Other	Total
Faculty	12	12	10	3	37
	32.43%	32.43%	27.03%	8.11%	100.00%
	60.00%	48.00%	45.45%	75.00%	52.11%
Staff	3	2	4	1	10
	30.00%	20.00%	40.00%	10.00%	100.00%
	15.00%	8.00%	18.18%	25.00%	14.08%
Administration	1	1	1	0	3
	33.33%	33.33%	33.33%	0.00%	100.00%
	5.00%	4.00%	4.55%	0.00%	4.23%
Graduate Student	3	7	5	0	15
	20.00%	46.67%	33.33%	0.00%	100.00%
	15.00%	28.00%	22.73%	0.00%	21.13%
Post-Doctorate	1	3	2	0	6
	16.67%	50.00%	33.33%	0.00%	100.00%
	5.00%	12.00%	9.09%	0.00%	8.45%

Total	20 28.17% 100.00%	25 35.21% 100.00%	22 30.99% 100.00%	4 5.63% 100.00%	71 100.00% 100.00%
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TABLE A2.2.7 MILES ACTIVITY (Q8) BY INSTITUTION (Q4)					
	BSU	ISU	UI	Other	Total
CDA/Fernan Research Site	2 11.10% 10.00%	2 11.10% 8.00%	14 77.80% 63.60%	0 0.00% 0.00%	18 100.00% 25.40%
Portneuf Research Site	2 9.50% 10.00%	19 90.50% 76.00%	0 0.00% 0.00%	0 0.00% 0.00%	21 100.00% 29.60%
Treasure Valley Research Site	18 78.30% 90.00%	3 13.00% 12.00%	1 4.30% 4.50%	1 4.30% 25.00%	23 100.00% 32.40%
Educational Outreach	3 15.00% 15.00%	6 30.00% 24.00%	7 35.00% 31.80%	4 20.00% 100.00%	20 100.00% 28.20%
Workforce Development	2 13.30% 10.00%	7 46.70% 28.00%	5 33.30% 22.70%	1 6.70% 25.00%	15 100.00% 21.10%
Project Management & Support	6 31.60% 30.00%	6 31.60% 24.00%	7 36.80% 31.80%	0 0.00% 0.00%	19 100.00% 26.80%
Total	20 28.20% 100.00%	25 35.20% 100.00%	22 31.00% 100.00%	4 5.60% 100.00%	71 100.00% 100.00%

TABLE A2.2.8 INSTITUTIONAL ROLE (Q6) BY GENDER (Q3)			
	Male	Female	Total
Faculty	19 51.35% 59.38%	18 48.65% 46.15%	37 100.00% 52.11%
Staff	1 10.00% 3.13%	9 90.00% 23.08%	10 100.00% 14.08%
Administration	2 66.67% 6.25%	1 33.33% 2.56%	3 100.00% 4.23%
Graduate Student	5 33.33% 15.63%	10 66.67% 25.64%	15 100.00% 21.13%
Post-Doctorate	5 83.33% 15.63%	1 16.67% 2.56%	6 100.00% 8.45%
Total	32 45.07% 100.00%	39 54.93% 100.00%	71 100.00% 100.00%

	Male	Female	Total
CDA/Fernan Research Site	12	6	18
	66.67%	33.33%	100.00%
	37.50%	15.38%	25.35%
Portneuf Watershed Research Site	9	12	21
	42.86%	57.14%	100.00%
	28.13%	30.77%	29.58%
Treasure Valley Research Site	14	9	23
	60.87%	39.13%	100.00%
	43.75%	23.08%	32.39%
Educational Outreach	6	14	20
	30.00%	70.00%	100.00%
	18.75%	35.90%	28.17%
Workforce Development	5	10	15
	33.33%	66.67%	100.00%
	15.63%	25.64%	21.13%
Project Management & Support	7	12	19
	36.84%	63.16%	100.00%
	21.88%	30.77%	26.76%
Total	32	39	71
	45.07%	54.93%	100.00%
	100.00%	100.00%	100.00%

	Male	Female	Total
Faculty	7	5	12
	58.33%	41.67%	100.00%
	63.64%	55.56%	60.00%
Staff	1	2	3
	33.33%	66.67%	100.00%
	9.09%	22.22%	15.00%
Administration	0	1	1
	0.00%	100.00%	100.00%
	0.00%	11.11%	5.00%
Graduate Student	2	1	3
	66.67%	33.33%	100.00%
	18.18%	11.11%	15.00%
Post-Doctorate	1	0	1
	100.00%	0.00%	100.00%
	9.09%	0.00%	5.00%
Total	11	9	20
	55.00%	45.00%	100.00%
	100.00%	100.00%	100.00%

	Male	Female	Total
CDA/Fernan Research Site	1	1	2
	50.00%	50.00%	100.00%
	9.09%	11.11%	10.00%

Portneuf Watershed Research Site	1	1	2
	50.00%	50.00%	100.00%
Treasure Valley Research Site	11	7	18
	61.11%	38.89%	100.00%
Educational Outreach	1	2	3
	33.33%	66.67%	100.00%
Workforce Development	0	2	2
	0.00%	100.00%	100.00%
Project Management & Support	1	5	6
	16.67%	83.33%	100.00%
Total	11	9	20
	55.00%	45.00%	100.00%
	100.00%	100.00%	100.00%

TABLE A2.2.12 ISU (Q4) INSTITUTIONAL ROLE (Q6) BY GENDER (Q3)

	Male	Female	Total
Faculty	5	7	12
	41.67%	58.33%	100.00%
Staff	0	2	2
	0.00%	100.00%	100.00%
Administration	1	0	1
	100.00%	0.00%	100.00%
Graduate Student	2	5	7
	28.57%	71.43%	100.00%
Post-Doctorate	2	1	3
	66.67%	33.33%	100.00%
Total	10	15	25
	40.00%	60.00%	100.00%
	100.00%	100.00%	100.00%

TABLE A2.2.13 ISU (Q4) MILES ACTIVITY (Q8) BY GENDER (Q3)

	Male	Female	Total
CDA/Fernan Research Site	2	0	2
	100.00%	0.00%	100.00%
Portneuf Watershed Research Site	8	11	19
	42.11%	57.89%	100.00%
Treasure Valley Research Site	2	1	3
	66.67%	33.33%	100.00%
	20.00%	6.67%	12.00%

Educational Outreach	2	4	6
	33.33%	66.67%	100.00%
Workforce Development	3	4	7
	42.86%	57.14%	100.00%
Project Management & Support	3	3	6
	50.00%	50.00%	100.00%
Total	10	15	25
	40.00%	60.00%	100.00%
	100.00%	100.00%	100.00%

TABLE A2.2.14 UI (Q4) INSTITUTIONAL ROLE (Q6) BY GENDER (Q3)

	Male	Female	Total
Faculty	6	4	10
	60.00%	40.00%	100.00%
	60.00%	33.33%	45.45%
Staff	0	4	4
	0.00%	100.00%	100.00%
	0.00%	33.33%	18.18%
Administration	1	0	1
	100.00%	0.00%	100.00%
	10.00%	0.00%	4.55%
Graduate Student	1	4	5
	20.00%	80.00%	100.00%
	10.00%	33.33%	22.73%
Post-Doctorate	2	0	2
	100.00%	0.00%	100.00%
	20.00%	0.00%	9.09%
Other	0	0	0
	0.00%	0.00%	100.00%
	0.00%	0.00%	0.00%
Total	10	12	22
	45.45%	54.55%	100.00%
	100.00%	100.00%	100.00%

TABLE A2.2.15 UI (Q4) MILES ACTIVITY (Q8) BY GENDER (Q3)

	Male	Female	Total
CDA/Fernan Research Site	9	5	14
	64.29%	35.71%	100.00%
	90.00%	41.67%	63.64%
Portneuf Watershed Research Site	0	0	0
	0.00%	0.00%	100.00%
	0.00%	0.00%	0.00%
Treasure Valley Research Site	1	0	1
	100.00%	0.00%	100.00%
	10.00%	0.00%	4.55%
Educational Outreach	2	5	7
	28.57%	71.43%	100.00%
	20.00%	41.67%	31.82%

Workforce Development	2	3	5
	40.00%	60.00%	100.00%
Project Management & Support	20.00%	25.00%	22.73%
	3	4	7
Project Management & Support	42.86%	57.14%	100.00%
	30.00%	33.33%	31.82%
Total	10	12	22
	45.45%	54.55%	100.00%
	100.00%	100.00%	100.00%

A2.3. 2016 INSTRUMENT

Thank you for participating in the MILES Social Network Analysis survey! This survey helps us better understand the MILES research and collaboration process. In the first part of the survey you will be asked to provide some general information about yourself. In the second part of the survey you will be asked to answer a series of questions about who you interact with for various purposes related to the MILES project. Your answers will be compiled and presented in a manner that preserves the confidentiality of all respondents.

Q1: Please provide your full name:*

*This information is required to ensure your answers are correctly compiled with answers provided by other MILES participants. All answers will be kept confidential.

Q2: Which of the following statements best describe your current level of involvement with the MILES project?

- A significant portion of my time is devoted to activities related to the MILES project.
- I am involved with the MILES project on a part-time or irregular basis.
- I am not officially involved with the MILES project, but I spend time working with MILES participants and/or contributing to MILES objectives in some way.
- I was involved with the MILES project in the past 6 months, but I am no longer an active participant.

Q3: How long have you been involved with the MILES project? (If no longer actively involved, how long were you previously involved?)

- Less than 1 year (1)
- 1 – 2 years (2)
- 2 – 3 years (3)
- More than 3 years (4)

Q4: With which of the following MILES activities are/were you most actively involved?

- CDA/Fernan Lake Research Site
- Educational Outreach
- Portneuf Watershed Research Site
- Project Administration & Support
- Project Leadership
- Stakeholder Engagement

- Treasure Valley Research Site
- Workforce Development

Q5: With which of the following MILES activities are/were you involved, in any capacity?
(choose all that apply)

- CDA/Fernan Lake Research Site
- Educational Outreach
- Portneuf Watershed Research Site
- Project Administration & Support
- Project Leadership
- Stakeholder Engagement
- Treasure Valley Research Site
- Workforce Development

Q6: Which of the following best describes your gender?

- Male
- Female

Q7: Which of the following best describes your race or ethnicity?

- Non-Hispanic White or Caucasian
- Black or African American
- Hispanic or Latino
- Native American
- Asian or Pacific Islander
- Middle Eastern
- Other (please specify):
- Prefer not to answer

Q8: With which institution are you primarily affiliated?

- Boise State University
- Idaho State University
- University of Idaho
- Other (please specify)

Q9: How long have you been affiliated with this institution?

- Less than 1 year
- 1 – 3 years
- 3 – 5 years
- 5 – 10 years
- Over 10 years

Q10: Which of the following best describes your role within your institution?

- Administration
- Faculty
- Graduate Student
- Post-Doctorate
- Staff

- Other (please specify):
 {IF Q10 INSTITUTION ROLE: FACULTY IS SELECTED, THEN SHOW Q11}

Q11: Which of the following best describes your faculty position?

- Professor
 Associate Professor
 Assistant Professor
 Research Associate
 Adjunct Professor
 Other (please specify):

Q12: Which of the following best described your academic discipline?

- Agricultural Sciences
 Art and Design
 Biological Sciences
 Chemistry
 Computer Science
 Education
 Engineering
 Geosciences
 Mathematics
 Natural Resource Sciences
 Physical Sciences
 Social Science
 Technology
 Other (please specify):

Q13: What is your primary field of interest, expertise or research?:

If you have taken the MILES Social Network Analysis Survey before, the survey format has changed slightly, please read the following carefully: In the questions below you will be asked to identify individuals with whom you interact for any reason pertaining to the MILES project (for example, these individuals may be co-workers, social connections with whom you discuss work-related ideas and activities, sources of expert knowledge, etc.) Your answers will then be used to provide a customized list of individuals from which to answer a series of five questions related to different types of activities and tasks. If, at any point in the survey, other people come to mind that were not originally included on your customized list, additional fields will be available throughout the survey for you add these individuals. Please take a few minutes to think about your interactions with MILES participants over the last six months, and complete the following questions.

Q14: With which of the following individuals do you regularly communicate? Click on any of the institution names below to see a list of MILES participants from that institution. Click the institution name again to collapse the list, or scroll down to select another institution.

- Boise State University
 {IF ACTIVE, THEN UNHIDE LIST OF BOISE STATE UNIVERSITY PARTICIPANTS,
 ELSE COLLAPSE LIST}

- Idaho State University
{IF ACTIVE THEN UNHIDE LIST OF IDAHO STATE UNIVERSITY PARTICIPANTS,
ELSE COLLAPSE LIST}
- University of Idaho
{IF ACTIVE THEN UNHIDE LIST OF UNIVERSITY OF IDAHO PARTICIPANTS,
ELSE COLLAPSE LIST}
- Other Institutions
{IF ACTIVE THEN UNHIDE LIST OF OTHER PARTICIPANTS,
ELSE COLLAPSE LIST}

Q15: If you can't find a name in the above list, feel free to use the fields below to add individuals (please provide the person's full name and affiliated institution, if known):

Q16: With which of the following individuals do you exchange work-related information or materials to get your job done?

{RETURN LIST OF SELECTED NAMES FROM Q14 AND Q15}

Q17: Are there any other individuals, within the MILES project, with whom you exchange work-related information or materials to get your job done? (please provide the person's full name and affiliated institution, if known):

Q18: How frequently do you communicate with {LOOP SELECTED NAMES FROM Q16 AND Q17} for work-related purposes?

- Very Rarely (less than once a month)
- Rarely (about once a month)
- Occasionally (2 – 3 times a month)
- Often (about once a week)
- Very Often (twice a week or more)

Q19: Which of the following individuals do you spend time with when you want to find out what's going on within the MILES project for either social/informal or work-related reasons?

{RETURN LIST OF SELECTED NAMES FROM Q14 Q15 AND Q17}

Q20: Are there any other individuals whom you spend time with when you want to find out what's going on within the MILES project for either social/informal or work-related reasons? (please provide the person's full name and affiliated institution, if known):

Q21: How frequently do you socially or informally communicate with {LOOP SELECTED NAMES FROM Q24 AND Q25}?

- Very Rarely (less than once a month)
- Rarely (about once a month)
- Occasionally (2 – 3 times a month)
- Often (about once a week)
- Very Often (twice a week or more)

Q22: With which of the following individuals do you brainstorm, share or explore new ideas?

{RETURN LIST OF SELECTED NAMES FROM Q14 Q15 Q17 AND Q20}

Q23: Are there any other individuals whom you brainstorm, share or explore new ideas? (please provide the person's full name and affiliated institution, if known):

Q24: How frequently do you communicate with {LOOP SELECTED NAMES FROM Q22 AND Q23} about new ideas or concepts?

- Very Rarely (less than once a month)
- Rarely (about once a month)
- Occasionally (2 – 3 times a month)
- Often (about once a week)
- Very Often (twice a week or more)

Q25: From which, or with which, of the following individuals do you seek or share expert knowledge or advice?

{RETURN LIST OF SELECTED NAMES FROM Q14 Q15 Q17 Q20 AND Q23}

Q26: Are there any other individuals with whom you exchange expert knowledge or advice? (please provide the person's full name and affiliated institution, if known):

Q27: How frequently do you communicate with {LOOP SELECTED NAMES FROM Q25 AND Q26} about expert knowledge or advice?

- Very Rarely (less than once a month)
- Rarely (about once a month)
- Occasionally (2 – 3 times a month)
- Often (about once a week)
- Very Often (twice a week or more)

Q28: Which of the following individuals do you consider to be an effective implementer, someone who actively participates to achieve group goals or accomplish difficult tasks?

{RETURN LIST OF SELECTED NAMES FROM Q14 Q15 Q17 Q20 Q23 AND Q26}

Q29: Are there any other individuals you consider to be an effective implementer? (please provide the person's full name and affiliated institution, if known):

Q30: How frequently do you communicate with {LOOP SELECTED NAMES FROM Q33 AND Q29} about implementing project goals?

- Very Rarely (less than once a month)
- Rarely (about once a month)
- Occasionally (2 – 3 times a month)
- Often (about once a week)
- Very Often (twice a week or more)

Thank you for completing the 2016 MILES Social Network Analysis Survey. Your Answers have been recorded.

A2.4. 2016 SURVEY RESULTS

	Percentage	Count
A significant portion of my time is devoted to	27.27%	51
I am involved with the MILES project on a part-	41.18%	77
I am not officially involved with the MILES	16.04%	30
I was involved with the MILES project in the past 6	15.51%	29
Total	100%	187

	Percentage	Count
Less than 1 year	45.74%	86
1 – 2 years	26.06%	49
2 – 3 years	14.89%	28
More than 3 years	13.30%	25
Total	100%	188

	Percentage	Count
CDA/Fernan Lake Research Site	12.02%	22
Educational Outreach	15.30%	28
Portneuf Watershed Research Site	15.85%	29
Project Administration & Support	9.29%	17
Project Leadership	6.56%	12
Stakeholder Engagement	5.46%	10
State-Wide/Cross Site Research	7.65%	14
Treasure Valley Research Site	20.77%	38
Workforce Development	7.10%	13
Total	100%	183

	Percentage	Count
Administration	15.85%	29
Outreach	27.87%	51
Research	56.28%	103
Total	100%	183

Administration = (Project Administration; Leadership); Outreach = (Education; Stakeholder Engagement, Workforce Development); Research = (CDA/Fernan Lake, Portneuf Watershed, Statewide/Cross Site, Treasure Valley).

	Percentage of	Count
CDA/Fernan Lake Research Site	19.21%	34
Educational Outreach	36.16%	64
Portneuf Watershed Research Site	19.21%	34
Project Administration & Support	14.12%	25
Project Leadership	14.12%	25
Stakeholder Engagement	22.60%	40
Statewide/Cross Site Research	28.81%	51
Treasure Valley Research Site	22.03%	39
Workforce Development	7.34%	13

	Percentage of Administration	Count
CDA/Fernan Lake Research Site	7.14%	2
Educational Outreach	32.14%	9
Portneuf Watershed Research Site	10.71%	3
Project Administration & Support	53.57%	15
Project Leadership	46.43%	13
Stakeholder Engagement	17.86%	5
Statewide/Cross Site Research	10.71%	3
Treasure Valley Research Site	25.00%	7
Workforce Development	21.43%	6

	Percentage of Outreach	Count
CDA/Fernan Lake Research Site	8.16%	4
Educational Outreach	63.27%	31
Portneuf Watershed Research Site	8.16%	4
Project Administration & Support	8.16%	4
Project Leadership	6.12%	3
Stakeholder Engagement	24.49%	12
Statewide/Cross Site Research	4.08%	2
Treasure Valley Research Site	14.29%	7
Workforce Development	48.98%	24

	Percentage of Respondents	Count
CDA/Fernan Lake Research Site	29.17%	28
Educational Outreach	25.00%	24
Portneuf Watershed Research Site	28.13%	27
Project Administration & Support	6.25%	6
Project Leadership	9.38%	9
Stakeholder Engagement	23.96%	23
Statewide/Cross Site Research	22.92%	22
Treasure Valley Research Site	39.58%	38
Workforce Development	8.33%	8

	Percentage	Count
Male	51.61%	96
Female	48.39%	90
Total	100%	186

	Percentage	Count
Non-Hispanic White or Caucasian	75.27%	140
Black or African American	0.54%	1
Hispanic or Latino	8.60%	16
Native American	1.61%	3
Asian or Pacific Islander	5.38%	10
Middle Eastern	0.54%	1
Other (please specify)	2.69%	5
Prefer not to answer	5.38%	10
Total	100%	186

	Percentage	Count
Boise State University	27.96%	52
Idaho State University	23.12%	43
University of Idaho	38.17%	71
Other (please specify)	10.75%	20
Total	100%	186

	Percentage	Count
Less than 1 year	11.89%	22
1 – 3 years	28.65%	53
3 – 5 years	22.70%	42
5 – 10 years	16.22%	30
Over 10 years	20.54%	38
Total	100%	185

	Percentage	Count
Administration	4.32%	8
Faculty	38.38%	71
Graduate Student	19.46%	36
Post-Doctorate	2.70%	5
Staff	10.81%	20
Other (please specify)	24.32%	45
Total	100%	185

	Percentage	Count
Professor	29.58%	21
Associate Professor	25.35%	18
Assistant Professor	36.62%	26
Research Associate	0.00%	0
Adjunct Professor	2.82%	2
Other (please specify)	5.63%	4
Total	100%	71

	Percentage	Count
Agricultural Sciences	2.76%	5
Art and Design	1.10%	2
Biological Sciences	17.68%	32
Chemistry	0.55%	1
Computer Science	3.31%	6
Education	3.31%	6
Engineering	4.42%	8
Geosciences	20.99%	38
Mathematics	0.00%	0
Natural Resource Sciences	18.78%	34
Physical Sciences	2.21%	4
Social Science	18.78%	34
Technology	1.10%	2
Other (please specify)	4.97%	9
Total	100%	181

A2.4.1. RESPONSES BY INSTITUTION

	BSU	ISU	UI	Other	Total
A significant portion of my time is devoted to activities related to the MILES project.	16	18	14	2	50
	32.00%	36.00%	28.00%	4.00%	100.00%
	30.77%	41.86%	20.00%	10.00%	27.03%
I am involved with the MILES project on a part-time or irregular basis.	20	17	27	13	77
	25.97%	22.08%	35.06%	16.88%	100.00%
	38.46%	39.53%	38.57%	65.00%	41.62%
MILES project, but I spend time contributing to MILES objectives in some way.	9	2	16	3	30
	30.00%	6.67%	53.33%	10.00%	100.00%
	17.31%	4.65%	22.86%	15.00%	16.22%
I was involved with the MILES project in the past 6 months, but I am no longer an active participant.	7	6	13	2	28
	25.00%	21.43%	46.43%	7.14%	100.00%
	13.46%	13.95%	18.57%	10.00%	15.14%
Total	52	43	70	20	185
	28.11%	23.24%	37.84%	10.81%	100.0%
	100.0%	100.0%	100.0%	100.0%	100.0%

	BSU	ISU	UI	Other	Total
Less than 1 year	18	17	40	9	84
	21.43%	20.24%	47.62%	10.71%	100.00%
	34.62%	39.53%	56.34%	45.00%	45.16%
1 – 2 years	19	11	13	6	49
	38.78%	22.45%	26.53%	12.24%	100.00%
	36.54%	25.58%	18.31%	30.00%	26.34%
2 – 3 years	9	7	9	3	28
	32.14%	25.00%	32.14%	10.71%	100.00%
	17.31%	16.28%	12.68%	15.00%	15.05%
More than 3 years	6	8	9	2	25
	24.00%	32.00%	36.00%	8.00%	100.00%

	11.54%	18.60%	12.68%	10.00%	13.44%
Total	52 27.96% 100.00%	43 23.12% 100.00%	71 38.17% 100.00%	20 10.75% 100.00%	186 100.00% 100.00%

TABLE A2.4.18 PRIMARY MILES ACTIVITY (Q4) BY INSTITUTION (Q8)

	BSU	ISU	UI	Other	Total
CDA/Fernan Research Site	1 4.55% 1.96%	0 0.00% 0.00%	21 95.45% 30.43%	0 0.00% 0.00%	22 100.00% 12.09%
Educational Outreach	3 10.71% 5.88%	4 14.29% 9.52%	15 53.57% 21.74%	6 21.43% 30.00%	28 100.00% 15.38%
Portneuf Research Site	0 0.00% 0.00%	27 93.10% 64.29%	1 3.45% 1.45%	1 3.45% 5.00%	29 100.00% 15.93%
Project Administration & Support	6 35.29% 11.76%	3 17.65% 7.14%	7 41.18% 10.14%	1 5.88% 5.00%	17 100.00% 9.34%
Project Leadership	2 16.67% 3.92%	1 8.33% 2.38%	7 58.33% 10.14%	2 16.67% 10.00%	12 100.00% 6.59%
Stakeholder Engagement	5 55.56% 9.80%	2 22.22% 4.76%	1 11.11% 1.45%	1 11.11% 5.00%	9 100.00% 4.95%
Treasure Valley Research Site	32 84.21% 62.75%	1 2.63% 2.38%	1 2.63% 1.45%	4 10.53% 20.00%	38 100.00% 20.88%
Workforce Development	1 7.69% 1.96%	1 7.69% 2.38%	9 69.23% 13.04%	2 15.38% 10.00%	13 100.00% 7.14%
Statewide/Multiple Site Research	1 7.14% 1.96%	3 21.43% 7.14%	7 50.00% 10.14%	3 21.43% 15.00%	14 100.00% 7.69%
Total	51 28.02% 100.00%	42 23.08% 100.00%	69 37.91% 100.00%	20 10.99% 100.00%	182 100.00% 100.00%

TABLE A2.4.19 AGGREGATE MILES ACTIVITY (Q4) BY INSTITUTION (Q8)

	BSU	ISU	UI	Other	Total
Administration	8 27.59% 15.69%	4 13.79% 9.52%	14 48.28% 20.29%	3 10.34% 15.00%	29 100.00% 15.93%
Outreach	9 18.00% 17.65%	7 14.00% 16.67%	25 50.00% 36.23%	9 18.00% 45.00%	50 100.00% 27.47%
Research	34 33.01% 66.67%	31 30.10% 73.81%	30 29.13% 43.48%	8 7.77% 40.00%	103 100.00% 56.59%
Total	51 28.02%	42 23.08%	69 37.91%	20 10.99%	182 100.00%

	100.00%	100.00%	100.00%	100.00%	100.00%
Administration=(Project Administration; Leadership); Outreach=(Education; Stakeholder Engagement, Workforce Development); Research=(CDA/Fernan Lake, Portneuf Watershed, Statewide/Cross Site, Treasure Valley).					

TABLE A2.4.20 BSU (Q8) SUPPLEMENTARY MILES ACTIVITY (Q5)

	Percentage of BSU	Count
CDA/Fernan Lake Research Site	2.00%	1
Educational Outreach	24.00%	12
Portneuf Watershed Research Site	2.00%	1
Project Administration & Support	14.00%	7
Project Leadership	8.00%	4
Stakeholder Engagement	24.00%	12
Statewide/Cross Site Research	8.00%	4
Treasure Valley Research Site	78.00%	39
Workforce Development	12.00%	6

TABLE A2.4.21 BSU (Q8) ADMINISTRATION (Q4) SUPPLEMENTARY MILES ACTIVITY (Q5)

	Percentage of BSU Administration	Count
CDA/Fernan Lake Research Site	3.03%	1
Educational Outreach	15.15%	5
Portneuf Watershed Research Site	3.03%	1
Project Administration & Support	3.03%	1
Project Leadership	6.06%	2
Stakeholder Engagement	15.15%	5
Statewide/Cross Site Research	9.09%	3
Treasure Valley Research Site	90.91%	30
Workforce Development	9.09%	3

TABLE A2.4.22 BSU (Q8) OUTREACH (Q4) SUPPLEMENTARY MILES ACTIVITY (Q5)

	Percentage of BSU Outreach	Count
CDA/Fernan Lake Research Site	0.00%	0
Educational Outreach	44.44%	4
Portneuf Watershed Research Site	0.00%	0
Project Administration & Support	0.00%	0
Project Leadership	11.11%	1
Stakeholder Engagement	66.67%	6
Statewide/Cross Site Research	0.00%	0
Treasure Valley Research Site	55.56%	5
Workforce Development	22.22%	2

TABLE A2.4.23 BSU (Q8) RESEARCH (Q4) SUPPLEMENTARY MILES ACTIVITY (Q5)

	Percentage of BSU Research	Count
CDA/Fernan Lake Research Site	0.00%	0
Educational Outreach	37.50%	3
Portneuf Watershed Research Site	0.00%	0
Project Administration & Support	75.00%	6

Project Leadership	12.50%	1
Stakeholder Engagement	12.50%	1
Statewide/Cross Site Research	12.50%	1
Treasure Valley Research Site	50.00%	4
Workforce Development	12.50%	1

TABLE A2.4.24 ISU (Q8) SUPPLEMENTARY MILES ACTIVITY (Q5)		
	Percentage of ISU	Count
CDA/Fernan Lake Research Site	7.89%	3
Educational Outreach	39.47%	15
Portneuf Watershed Research Site	73.68%	28
Project Administration & Support	7.89%	3
Project Leadership	15.79%	6
Stakeholder Engagement	34.21%	13
Statewide/Cross Site Research	26.32%	10
Treasure Valley Research Site	10.53%	4
Workforce Development	18.42%	7

TABLE A2.4.25 ISU (Q8) ADMINISTRATION (Q4) SUPPLEMENTARY MILES ACTIVITY (Q5)		
	Percentage of ISU Administration	Count
CDA/Fernan Lake Research Site	0.00%	0
Educational Outreach	25.00%	1
Portneuf Watershed Research Site	75.00%	3
Project Administration & Support	25.00%	1
Project Leadership	75.00%	3
Stakeholder Engagement	50.00%	2
Statewide/Cross Site Research	0.00%	0
Treasure Valley Research Site	0.00%	0
Workforce Development	50.00%	2

TABLE A2.4.26 ISU (Q8) OUTREACH (Q4) SUPPLEMENTARY MILES ACTIVITY (Q5)		
	Percentage of ISU Outreach	Count
CDA/Fernan Lake Research Site	0.00%	0
Educational Outreach	42.86%	3
Portneuf Watershed Research Site	28.57%	2
Project Administration & Support	0.00%	0
Project Leadership	0.00%	0
Stakeholder Engagement	14.29%	1
Statewide/Cross Site Research	14.29%	1
Treasure Valley Research Site	14.29%	1
Workforce Development	28.57%	2

	Percentage of ISU Research	Count
CDA/Fernan Lake Research Site	0.00%	0
Educational Outreach	25.00%	1
Portneuf Watershed Research Site	75.00%	3
Project Administration & Support	25.00%	1
Project Leadership	75.00%	3
Stakeholder Engagement	50.00%	2
Statewide/Cross Site Research	0.00%	0
Treasure Valley Research Site	0.00%	0
Workforce Development	50.00%	2

	Percentage of UI	Count
CDA/Fernan Lake Research Site	16.95%	30
Educational Outreach	15.25%	27
Portneuf Watershed Research Site	1.69%	3
Project Administration & Support	7.91%	14
Project Leadership	7.34%	13
Stakeholder Engagement	5.08%	9
Statewide/Cross Site Research	4.52%	8
Treasure Valley Research Site	2.26%	4
Workforce Development	18.42%	7

	Percentage of UI Administration	Count
CDA/Fernan Lake Research Site	7.14%	2
Educational Outreach	14.29%	4
Portneuf Watershed Research Site	0.00%	0
Project Administration & Support	28.57%	8
Project Leadership	25.00%	7
Stakeholder Engagement	7.14%	2
Statewide/Cross Site Research	3.57%	1
Treasure Valley Research Site	3.57%	1
Workforce Development	10.71%	3

	Percentage of UI Outreach	Count
CDA/Fernan Lake Research Site	8.16%	4
Educational Outreach	34.69%	17
Portneuf Watershed Research Site	2.04%	1
Project Administration & Support	6.12%	3
Project Leadership	4.08%	2
Stakeholder Engagement	2.04%	1
Statewide/Cross Site Research	2.04%	1

Treasure Valley Research Site	2.04%	1
Workforce Development	30.61%	15

TABLE A2.4.31 UI (Q8) RESEARCH SUPPLEMENTARY MILES ACTIVITY (Q5)

	Percentage of UI Research	Count
CDA/Fernan Lake Research Site	25.00%	24
Educational Outreach	6.25%	6
Portneuf Watershed Research Site	2.08%	2
Project Administration & Support	3.13%	3
Project Leadership	4.17%	4
Stakeholder Engagement	6.25%	6
Statewide/Cross Site Research	6.25%	6
Treasure Valley Research Site	2.08%	2
Workforce Development	1.04%	1

TABLE A2.4.32 GENDER (Q6) BY INSTITUTION (Q8)

	BSU	ISU	UI	Other	Total
Male	27	20	38	11	96
	28.13%	20.83%	39.58%	11.46%	100.00%
	51.92%	46.51%	53.52%	55.00%	51.61%
Female	25	23	33	9	90
	27.78%	25.56%	36.67%	10.00%	100.00%
	48.08%	53.49%	46.48%	45.00%	48.39%
Total	52	43	71	20	186
	27.96%	23.12%	38.17%	10.75%	100.00%
	100.00%	100.00%	100.00%	100.00%	100.00%

TABLE A2.4.33 LENGTH OF INSTITUTIONAL AFFILIATION (Q9) BY INSTITUTION (Q8)

	BSU	ISU	UI	Other	Total
Less than 1 year	4	8	8	2	22
	18.18%	36.36%	36.36%	9.09%	100.00%
	7.69%	18.60%	11.27%	10.53%	11.89%
1 – 3 years	19	9	22	3	53
	35.85%	16.98%	41.51%	5.66%	100.00%
	36.54%	20.93%	30.99%	15.79%	28.65%
3 – 5 years	16	7	14	5	42
	38.10%	16.67%	33.33%	11.90%	100.00%
	30.77%	16.28%	19.72%	26.32%	22.70%
5 – 10 years	6	7	11	6	30
	20.00%	23.33%	36.67%	20.00%	100.00%
	11.54%	16.28%	15.49%	31.58%	16.22%
Over 10 years	7	12	16	3	38
	18.42%	31.58%	42.11%	7.89%	100.00%
	13.46%	27.91%	22.54%	15.79%	20.54%
Total	52	43	71	19	185
	28.11%	23.24%	38.38%	10.27%	100.00%
	100.00%	100.00%	100.00%	100.00%	100.00%

	BSU	ISU	UI	Other	Total
Administration	3	3	1	1	8
	37.50%	37.50%	12.50%	12.50%	100.00%
	5.77%	6.98%	1.43%	5.00%	4.32%
Faculty	18	19	25	9	71
	25.35%	26.76%	35.21%	12.68%	100.00%
	34.62%	44.19%	35.71%	45.00%	38.38%
Graduate Student	9	11	14	2	36
	25.00%	30.56%	38.89%	5.56%	100.00%
	17.31%	25.58%	20.00%	10.00%	19.46%
Post-Doctorate	2	1	2	0	5
	40.00%	20.00%	40.00%	0.00%	100.00%
	3.85%	2.33%	2.86%	0.00%	2.70%
Staff	6	4	10	0	20
	30.00%	20.00%	50.00%	0.00%	100.00%
	11.54%	9.30%	14.29%	0.00%	10.81%
Other (please specify)	14	5	18	8	45
	31.11%	11.11%	40.00%	17.78%	100.00%
	26.92%	11.63%	25.71%	40.00%	24.32%
Total	52	43	70	20	185
	28.11%	23.24%	37.84%	10.81%	100.00%
	100.00%	100.00%	100.00%	100.00%	100.00%

	BSU	ISU	UI	Other	Total
Professor	4	6	7	4	21
	19.05%	28.57%	33.33%	19.05%	100.00%
	22.22%	31.58%	28.00%	44.44%	29.58%
Associate Professor	6	5	6	1	18
	33.33%	27.78%	33.33%	5.56%	100.00%
	33.33%	26.32%	24.00%	11.11%	25.35%
Assistant Professor	7	6	10	3	26
	26.92%	23.08%	38.46%	11.54%	100.00%
	38.89%	31.58%	40.00%	33.33%	36.62%
Research Associate	0	0	0	0	0
	0.00%	0.00%	0.00%	0.00%	100.00%
	0.00%	0.00%	0.00%	0.00%	0.00%
Adjunct Professor	0	1	0	1	2
	0.00%	50.00%	0.00%	50.00%	100.00%
	0.00%	5.26%	0.00%	11.11%	2.82%
Other (please specify)	1	1	2	0	4
	25.00%	25.00%	50.00%	0.00%	100.00%
	5.56%	5.26%	8.00%	0.00%	5.63%
Total	18	19	25	9	71
	25.35%	26.76%	35.21%	12.68%	100.00%
	100.00%	100.00%	100.00%	100.00%	100.00%

TABLE A2.4.36 DISCIPLINE (Q12) BY INSTITUTION (Q8)					
	BSU	ISU	UI	Other	Total
Agricultural Sciences	0	0	5	0	5
	0.00%	0.00%	100.00%	0.00%	100.00%
	0.00%	0.00%	7.25%	0.00%	2.76%
Art and Design	0	0	2	0	2
	0.00%	0.00%	100.00%	0.00%	100.00%
	0.00%	0.00%	2.90%	0.00%	1.10%
Biological Sciences	11	12	3	6	32
	34.38%	37.50%	9.38%	18.75%	100.00%
	22.00%	28.57%	4.35%	30.00%	17.68%
Chemistry	0	0	0	1	1
	0.00%	0.00%	0.00%	100.00%	100.00%
	0.00%	0.00%	0.00%	5.00%	0.55%
Computer Science	3	2	1	0	6
	50.00%	33.33%	16.67%	0.00%	100.00%
	6.00%	4.76%	1.45%	0.00%	3.31%
Education	2	1	2	1	6
	33.33%	16.67%	33.33%	16.67%	100.00%
	4.00%	2.38%	2.90%	5.00%	3.31%
Geosciences	10	12	10	6	38
	26.32%	31.58%	26.32%	15.79%	100.00%
	20.00%	28.57%	14.49%	30.00%	20.99%
Mathematics	0	0	0	0	0
	0.00%	0.00%	0.00%	0.00%	100.00%
	0.00%	0.00%	0.00%	0.00%	0.00%
Natural Resource Sciences	2	2	28	2	34
	5.88%	5.88%	82.35%	5.88%	100.00%
	4.00%	4.76%	40.58%	10.00%	18.78%
Physical Sciences	0	0	2	2	4
	0.00%	0.00%	50.00%	50.00%	100.00%
	0.00%	0.00%	2.90%	10.00%	2.21%
Social Science	16	9	8	1	34
	47.06%	26.47%	23.53%	2.94%	100.00%
	32.00%	21.43%	11.59%	5.00%	18.78%
Technology	0	1	1	0	2
	0.00%	50.00%	50.00%	0.00%	100.00%
	0.00%	2.38%	1.45%	0.00%	1.10%
Engineering	3	1	3	1	8
	37.50%	12.50%	37.50%	12.50%	100.00%
	6.00%	2.38%	4.35%	5.00%	4.42%
Other (please specify)	3	2	4	0	9
	33.33%	22.22%	44.44%	0.00%	100.00%
	6.00%	4.76%	5.80%	0.00%	4.97%
Total	50	42	69	20	181
	27.62%	23.20%	38.12%	11.05%	100.00%
	100.00%	100.00%	100.00%	100.00%	100.00%

A2.4.2. RESPONSES BY GENDER

	Male	Female	Total
A significant portion of my time is devoted to MILES activities related to the MILES project.	28	22	50
	56.00%	44.00%	100.00%
	29.17%	24.72%	27.03%
I am involved with the MILES project on a part-time or irregular basis.	36	41	77
	46.75%	53.25%	100.00%
	37.50%	46.07%	41.62%
I am not officially involved with the MILES project, but I spend time contributing to MILES objectives.	19	11	30
	63.33%	36.67%	100.00%
	19.79%	12.36%	16.22%
I was involved with the MILES project in the past 6 months, but I am no longer an active participant.	13	15	28
	46.43%	53.57%	100.00%
	13.54%	16.85%	15.14%
Total	96	89	185
	51.89%	48.11%	100.00%
	100.00%	100.00%	100.00%

	Male	Female	Total
Less than 1 year	43	41	84
	51.19%	48.81%	100.00%
	44.79%	45.56%	45.16%
1 – 2 years	24	25	49
	48.98%	51.02%	100.00%
	25.00%	27.78%	26.34%
2 – 3 years	16	12	28
	57.14%	42.86%	100.00%
	16.67%	13.33%	15.05%
More than 3 years	13	12	25
	52.00%	48.00%	100.00%
	13.54%	13.33%	13.44%
Total	96	90	186
	51.61%	48.39%	100.00%
	100.00%	100.00%	100.00%

	Male	Female	Total
CDA/Fernan Research Site	15	7	22
	68.18%	31.82%	100.00%
	15.79%	8.05%	12.09%
Educational Outreach	12	16	28
	42.86%	57.14%	100.00%
	12.63%	18.39%	15.38%
Portneuf Research Site	16	13	29
	55.17%	44.83%	100.00%
	16.84%	14.94%	15.93%
Project Administration & Support	5	12	17
	29.41%	70.59%	100.00%

	5.26%	13.79%	9.34%
Project Leadership	9	3	12
	75.00%	25.00%	100.00%
	9.47%	3.45%	6.59%
Stakeholder Engagement	3	6	9
	33.33%	66.67%	100.00%
	3.16%	6.90%	4.95%
Treasure Valley Research Site	21	17	38
	55.26%	44.74%	100.00%
	22.11%	19.54%	20.88%
Workforce Development	3	10	13
	23.08%	76.92%	100.00%
	3.16%	11.49%	7.14%
State-Wide/Multiple Site Research	11	3	14
	78.57%	21.43%	100.00%
	11.58%	3.45%	7.69%
Total	95	87	182
	52.20%	47.80%	100.00%
	100.00%	100.00%	100.00%

TABLE A2.4.40 AGGREGATE MILES ACTIVITY (Q4) BY GENDER (Q6)

	Male	Female	Total
Administration	14	15	29
	48.28%	51.72%	100.00%
	14.74%	17.24%	12.09%
Outreach	18	32	50
	36.00%	64.00%	100.00%
	18.95%	36.78%	15.38%
Research	63	40	103
	61.17%	38.83%	100.00%
	66.32%	45.98%	15.93%
Total	95	87	182
	52.20%	47.80%	100.00%
	100.00%	100.00%	100.00%

TABLE A2.4.41 LENGTH OF INSTITUTIONAL AFFILIATION (Q9) BY GENDER (Q6)

	Male	Female	Total
Less than 1 year	8	14	22
	36.36%	63.64%	100.00%
	8.33%	15.73%	11.89%
1 – 3 years	27	26	53
	50.94%	49.06%	100.00%
	28.13%	29.21%	28.65%
3 – 5 years	22	20	42
	52.38%	47.62%	100.00%
	22.92%	22.47%	22.70%
5 – 10 years	15	15	30
	50.00%	50.00%	100.00%
	15.63%	16.85%	16.22%
Over 10 years	24	14	38
	63.16%	36.84%	100.00%

	25.00%	15.73%	20.54%
Total	96 51.89% 100.00%	89 48.11% 100.00%	185 100.00% 100.00%

	Male	Female	Total
Administration	5 62.50% 5.21%	3 37.50% 3.37%	8 100.00% 4.32%
Faculty	42 59.15% 43.75%	29 40.85% 32.58%	71 100.00% 38.38%
Graduate Student	18 50.00% 18.75%	18 50.00% 20.22%	36 100.00% 19.46%
Post-Doctorate	5 100.00% 5.21%	0 0.00% 0.00%	5 100.00% 2.70%
Staff	7 35.00% 7.29%	13 65.00% 14.61%	20 100.00% 10.81%
Other (please specify)	19 42.22% 19.79%	26 57.78% 29.21%	45 100.00% 24.32%
Total	96 51.89% 100.00%	89 48.11% 100.00%	185 100.00% 100.00%

	Male	Female	Total
Professor	14 66.67% 33.33%	7 33.33% 24.14%	21 100.00% 29.58%
Associate Professor	10 55.56% 23.81%	8 44.44% 27.59%	18 100.00% 25.35%
Assistant Professor	13 50.00% 30.95%	13 50.00% 44.83%	26 100.00% 36.62%
Research Associate	0 0.00% 0.00%	0 0.00% 0.00%	0 100.00% 0.00%
Adjunct Professor	2 100.00% 4.76%	0 0.00% 0.00%	2 100.00% 2.82%
Other (please specify)	3 75.00% 7.14%	1 25.00% 3.45%	4 100.00% 5.63%
Total	42 59.15%	29 40.85%	71 100.00%

	100.00%	100.00%	100.00%
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TABLE A2.4.44 DISCIPLINE (Q12) BY GENDER (Q6)			
	Male	Female	Total
Agricultural Sciences	2 40.00% 2.11%	3 60.00% 3.49%	5 100.00% 2.76%
Art and Design	2 100.00% 2.11%	0 0.00% 0.00%	2 100.00% 1.10%
Biological Sciences	17 53.13% 17.89%	15 46.88% 17.44%	32 100.00% 17.68%
Chemistry	0 0.00% 0.00%	1 100.00% 1.16%	1 100.00% 0.55%
Computer Science	5 83.33% 5.26%	1 16.67% 1.16%	6 100.00% 3.31%
Education	1 16.67% 1.05%	5 83.33% 5.81%	6 100.00% 3.31%
Geosciences	19 50.00% 20.00%	19 50.00% 22.09%	38 100.00% 20.99%
Mathematics	0 0.00% 0.00%	0 0.00% 0.00%	0 100.00% 0.00%
Natural Resource Sciences	15 44.12% 15.79%	19 55.88% 22.09%	34 100.00% 18.78%
Physical Sciences	4 100.00% 4.21%	0 0.00% 0.00%	4 100.00% 2.21%
Social Science	18 52.94% 18.95%	16 47.06% 18.60%	34 100.00% 18.78%
Technology	2 100.00% 2.11%	0 0.00% 0.00%	2 100.00% 1.10%
Engineering	6 75.00% 6.32%	2 25.00% 2.33%	8 100.00% 4.42%
Other (please specify)	4 44.44% 4.21%	5 55.56% 5.81%	9 100.00% 4.97%
Total	95 52.49% 100.00%	86 47.51% 100.00%	181 100.00% 100.00%

A2.4.3. RESPONSES BY INSTITUTION AND GENDER

	Male	Female	Total
A significant portion of my time is devoted to activities related to the MILES project.	8	8	16
	50.00%	50.00%	100.00%
	29.63%	32.00%	30.77%
I am involved with the MILES project on a part-time or irregular basis.	11	9	20
	55.00%	45.00%	100.00%
	40.74%	36.00%	38.46%
I am not officially involved with the MILES project, but I spend contributing to MILES objectives in some way.	4	5	9
	44.44%	55.56%	100.00%
	14.81%	20.00%	17.31%
I was involved with the MILES project in the past 6 months, but I am no longer an active participant.	4	3	7
	57.14%	42.86%	100.00%
	14.81%	12.00%	13.46%
Total	27	25	52
	51.92%	48.08%	100.00%
	100.00%	100.00%	100.00%

	Male	Female	Total
Less than 1 year	10	8	18
	55.56%	44.44%	100.00%
	37.04%	32.00%	34.62%
1 – 2 years	7	12	19
	36.84%	63.16%	100.00%
	25.93%	48.00%	36.54%
2 – 3 years	5	4	9
	55.56%	44.44%	100.00%
	18.52%	16.00%	17.31%
More than 3 years	5	1	6
	83.33%	16.67%	100.00%
	18.52%	4.00%	11.54%
Total	27	25	52
	51.92%	48.08%	100.00%
	100.00%	100.00%	100.00%

	Male	Female	Total
CDA/Fernan Research Site	1	0	1
	100.00%	0.00%	100.00%
	3.70%	0.00%	1.96%
Educational Outreach	1	2	3
	33.33%	66.67%	100.00%
	3.70%	8.33%	5.88%
Portneuf Research Site	0	0	0
	0.00%	0.00%	100.00%
	0.00%	0.00%	0.00%
Project Administration & Support	2	4	6
	33.33%	66.67%	100.00%

	7.41%	16.67%	11.76%
Project Leadership	1 50.00% 3.70%	1 50.00% 4.17%	2 100.00% 3.92%
Stakeholder Engagement	2 40.00% 7.41%	3 60.00% 12.50%	5 100.00% 9.80%
Treasure Valley Research Site	19 59.38% 70.37%	13 40.63% 54.17%	32 100.00% 62.75%
Workforce Development	0 0.00% 0.00%	1 100.00% 4.17%	1 100.00% 1.96%
State-Wide/Multiple Site Research	1 100.00% 3.70%	0 0.00% 0.00%	1 100.00% 1.96%
Total	27 52.94% 100.00%	24 47.06% 100.00%	51 100.00% 100.00%

TABLE A2.4.48 BSU (Q8) AGGREGATE MILES ACTIVITY (Q4) BY GENDER (Q6)

	Male	Female	Total
Administration	3 10.34% 3.16%	5 17.24% 5.75%	8 100.00% 12.09%
Outreach	3 6.00% 3.16%	6 12.00% 6.90%	9 100.00% 15.38%
Research	21 20.39% 22.11%	13 12.62% 14.94%	34 100.00% 15.93%
Total	27 14.84% 100.00%	24 13.19% 100.00%	51 100.00% 100.00%

TABLE A2.4.49 BSU (Q8) LENGTH OF INSTITUTIONAL AFFILIATION (Q9) BY GENDER (Q6)

	Male	Female	Total
Less than 1 year	1 25.00% 3.70%	3 75.00% 12.00%	4 100.00% 7.69%
1 – 3 years	8 42.11% 29.63%	11 57.89% 44.00%	19 100.00% 36.54%
3 – 5 years	10 62.50% 37.04%	6 37.50% 24.00%	16 100.00% 30.77%
5 – 10 years	4 66.67% 14.81%	2 33.33% 8.00%	6 100.00% 11.54%
Over 10 years	4 57.14%	3 42.86%	7 100.00%

	14.81%	12.00%	13.46%
	27	25	52
Total	51.92%	48.08%	100.00%
	100.00%	100.00%	100.00%

TABLE A2.4.50 BSU (Q8) INSTITUTIONAL ROLE (Q10) BY GENDER (Q6)			
	Male	Female	Total
	1	2	3
Administration	33.33%	66.67%	100.00%
	3.70%	8.00%	5.77%
	8	10	18
Faculty	44.44%	55.56%	100.00%
	29.63%	40.00%	34.62%
	5	4	9
Graduate Student	55.56%	44.44%	100.00%
	18.52%	16.00%	17.31%
	2	0	2
Post-Doctorate	100.00%	0.00%	100.00%
	7.41%	0.00%	3.85%
	3	3	6
Staff	50.00%	50.00%	100.00%
	11.11%	12.00%	11.54%
	8	6	14
Other (please specify)	57.14%	42.86%	100.00%
	29.63%	24.00%	26.92%
Total	27	25	52
	51.92%	48.08%	100.00%
	100.00%	100.00%	100.00%

TABLE A2.4.51 BSU (Q8) FACULTY POSITION (Q11) BY GENDER (Q6)			
	Male	Female	Total
	2	2	4
Professor	50.00%	50.00%	100.00%
	25.00%	20.00%	22.22%
	3	3	6
Associate Professor	50.00%	50.00%	100.00%
	37.50%	30.00%	33.33%
	2	5	7
Assistant Professor	28.57%	71.43%	100.00%
	25.00%	50.00%	38.89%
	0	0	0
Research Associate	0.00%	0.00%	100.00%
	0.00%	0.00%	0.00%
	0	0	0
Adjunct Professor	0.00%	0.00%	100.00%
	0.00%	0.00%	0.00%
	1	0	1
Other (please specify)	100.00%	0.00%	100.00%
	12.50%	0.00%	5.56%
Total	8	10	18
	44.44%	55.56%	100.00%

	100.00%	100.00%	100.00%
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TABLE A2.4.52 BSU (Q8) DISCIPLINE (Q12) BY GENDER (Q6)			
	Male	Female	Total
Agricultural Sciences	0 0.00% 0.00%	0 0.00% 0.00%	0 100.00% 0.00%
Art and Design	0 0.00% 0.00%	0 0.00% 0.00%	0 100.00% 0.00%
Biological Sciences	9 81.82% 33.33%	2 18.18% 8.70%	11 100.00% 22.00%
Chemistry	0 0.00% 0.00%	0 0.00% 0.00%	0 100.00% 0.00%
Computer Science	2 66.67% 7.41%	1 33.33% 4.35%	3 100.00% 6.00%
Education	0 0.00% 0.00%	2 100.00% 8.70%	2 100.00% 4.00%
Geosciences	5 50.00% 18.52%	5 50.00% 21.74%	10 100.00% 20.00%
Mathematics	0 0.00% 0.00%	0 0.00% 0.00%	0 100.00% 0.00%
Natural Resource Sciences	0 0.00% 0.00%	2 100.00% 8.70%	2 100.00% 4.00%
Physical Sciences	0 0.00% 0.00%	0 0.00% 0.00%	0 100.00% 0.00%
Social Science	7 43.75% 25.93%	9 56.25% 39.13%	16 100.00% 32.00%
Technology	0 0.00% 0.00%	0 0.00% 0.00%	0 100.00% 0.00%
Engineering	2 66.67% 7.41%	1 33.33% 4.35%	3 100.00% 6.00%
Other (please specify)	2 66.67% 7.41%	1 33.33% 4.35%	3 100.00% 6.00%
Total	27 54.00% 100.00%	23 46.00% 100.00%	50 100.00% 100.00%

	Male	Female	Total
A significant portion of my time is devoted to activities related to the MILES project.	8	10	18
	44.44%	55.56%	100.00%
	40.00%	43.48%	41.86%
I am involved with the MILES project on a part-time or irregular basis.	7	10	17
	41.18%	58.82%	100.00%
	35.00%	43.48%	39.53%
I am not officially involved with the MILES project, but I spend time contributing to MILES objectives in some way.	2	0	2
	100.00%	0.00%	100.00%
	10.00%	0.00%	4.65%
I was involved with the MILES project in the past 6 months, but I am no longer an active participant.	3	3	6
	50.00%	50.00%	100.00%
	15.00%	13.04%	13.95%
Total	20	23	43
	46.51%	53.49%	100.00%
	100.00%	100.00%	100.00%

	Male	Female	Total
Less than 1 year	9	8	17
	52.94%	47.06%	100.00%
	45.00%	34.78%	39.53%
1 – 2 years	6	5	11
	54.55%	45.45%	100.00%
	30.00%	21.74%	25.58%
2 – 3 years	4	3	7
	57.14%	42.86%	100.00%
	20.00%	13.04%	16.28%
More than 3 years	1	7	8
	12.50%	87.50%	100.00%
	5.00%	30.43%	18.60%
Total	20	23	43
	46.51%	53.49%	100.00%
	100.00%	100.00%	100.00%

	Male	Female	Total
CDA/Fernan Research Site	0	0	0
	0.00%	0.00%	100.00%
	0.00%	0.00%	0.00%
Educational Outreach	1	3	4
	25.00%	75.00%	100.00%
	5.00%	13.64%	9.52%
Portneuf Research Site	14	13	27
	51.85%	48.15%	100.00%
	70.00%	59.09%	64.29%
Project Administration & Support	0	3	3
	0.00%	100.00%	100.00%
	0.00%	13.64%	7.14%
Project Leadership	1	0	1

	100.00%	0.00%	100.00%
	5.00%	0.00%	2.38%
Stakeholder Engagement	1	1	2
	50.00%	50.00%	100.00%
	5.00%	4.55%	4.76%
Treasure Valley Research Site	0	1	1
	0.00%	100.00%	100.00%
	0.00%	4.55%	2.38%
Workforce Development	0	1	1
	0.00%	100.00%	100.00%
	0.00%	4.55%	2.38%
State-Wide/Multiple Site Research	3	0	3
	100.00%	0.00%	100.00%
	15.00%	0.00%	7.14%
Total	20	22	42
	47.62%	52.38%	100.00%
	100.00%	100.00%	100.00%

TABLE A2.4.56 ISU (Q8) AGGREGATE MILES ACTIVITY (Q4) BY GENDER (Q6)

	Male	Female	Total
Administration	1	3	4
	3.45%	10.34%	100.00%
	1.05%	3.45%	12.09%
Outreach	2	5	7
	4.00%	10.00%	100.00%
	2.11%	5.75%	15.38%
Research	17	14	31
	16.50%	13.59%	100.00%
	17.89%	16.09%	15.93%
Total	20	22	42
	10.99%	12.09%	100.00%
	100.00%	100.00%	100.00%

TABLE A2.4.57 ISU (Q8) LENGTH OF INSTITUTIONAL AFFILIATION (Q9) BY GENDER (Q6)

	Male	Female	Total
Less than 1 year	3	5	8
	37.50%	62.50%	100.00%
	15.00%	21.74%	18.60%
1 – 3 years	4	5	9
	44.44%	55.56%	100.00%
	20.00%	21.74%	20.93%
3 – 5 years	2	5	7
	28.57%	71.43%	100.00%
	10.00%	21.74%	16.28%
5 – 10 years	3	4	7
	42.86%	57.14%	100.00%
	15.00%	17.39%	16.28%
Over 10 years	8	4	12
	66.67%	33.33%	100.00%
	40.00%	17.39%	27.91%
Total	20	23	43

	46.51%	53.49%	100.00%
	100.00%	100.00%	100.00%

TABLE A2.4.58 ISU (Q8) INSTITUTIONAL ROLE (Q10) BY GENDER (Q6)

	Male	Female	Total
	2	1	3
Administration	66.67%	33.33%	100.00%
	10.00%	4.35%	6.98%
	10	9	19
Faculty	52.63%	47.37%	100.00%
	50.00%	39.13%	44.19%
	4	7	11
Graduate Student	36.36%	63.64%	100.00%
	20.00%	30.43%	25.58%
	1	0	1
Post-Doctorate	100.00%	0.00%	100.00%
	5.00%	0.00%	2.33%
	1	3	4
Staff	25.00%	75.00%	100.00%
	5.00%	13.04%	9.30%
	2	3	5
Other (please specify)	40.00%	60.00%	100.00%
	10.00%	13.04%	11.63%
Total	20	23	43
	46.51%	53.49%	100.00%
	100.00%	100.00%	100.00%

TABLE A2.4.59 ISU (Q8) FACULTY POSITION (Q11) BY GENDER (Q6)

	Male	Female	Total
	4	2	6
Professor	66.67%	33.33%	100.00%
	40.00%	22.22%	31.58%
	3	2	5
Associate Professor	60.00%	40.00%	100.00%
	30.00%	22.22%	26.32%
	2	4	6
Assistant Professor	33.33%	66.67%	100.00%
	20.00%	44.44%	31.58%
	0	0	0
Research Associate	0.00%	0.00%	100.00%
	0.00%	0.00%	0.00%
	1	0	1
Adjunct Professor	100.00%	0.00%	100.00%
	10.00%	0.00%	5.26%
	0	1	1
Other (please specify)	0.00%	100.00%	100.00%
	0.00%	11.11%	5.26%
Total	10	9	19
	52.63%	47.37%	100.00%
	100.00%	100.00%	100.00%

TABLE A2.4.60 ISU (Q8) DISCIPLINE (Q12) BY GENDER (Q6)			
	Male	Female	Total
Agricultural Sciences	0 0.00% 0.00%	0 0.00% 0.00%	0 100.00% 0.00%
Art and Design	0 0.00% 0.00%	0 0.00% 0.00%	0 100.00% 0.00%
Biological Sciences	4 33.33% 20.00%	8 66.67% 36.36%	12 100.00% 28.57%
Chemistry	0 0.00% 0.00%	0 0.00% 0.00%	0 100.00% 0.00%
Computer Science	2 100.00% 10.00%	0 0.00% 0.00%	2 100.00% 4.76%
Education	0 0.00% 0.00%	1 100.00% 4.55%	1 100.00% 2.38%
Geosciences	6 50.00% 30.00%	6 50.00% 27.27%	12 100.00% 28.57%
Mathematics	0 0.00% 0.00%	0 0.00% 0.00%	0 100.00% 0.00%
Natural Resource Sciences	1 50.00% 5.00%	1 50.00% 4.55%	2 100.00% 4.76%
Physical Sciences	0 0.00% 0.00%	0 0.00% 0.00%	0 100.00% 0.00%
Social Science	4 44.44% 20.00%	5 55.56% 22.73%	9 100.00% 21.43%
Technology	1 100.00% 5.00%	0 0.00% 0.00%	1 100.00% 2.38%
Engineering	1 100.00% 5.00%	0 0.00% 0.00%	1 100.00% 2.38%
Other (please specify)	1 50.00% 5.00%	1 50.00% 4.55%	2 100.00% 4.76%
Total	20 47.62% 100.00%	22 52.38% 100.00%	42 100.00% 100.00%

	Male	Female	Total
A significant portion of my time is devoted to activities related to the MILES project.	10	4	14
	71.43%	28.57%	100.00%
	26.32%	12.50%	20.00%
I am involved with the MILES project on a part-time or irregular basis.	12	15	27
	44.44%	55.56%	100.00%
	31.58%	46.88%	38.57%
I am not officially involved with the MILES project, but I spend contributing to MILES objectives in some way.	11	5	16
	68.75%	31.25%	100.00%
	28.95%	15.63%	22.86%
I was involved with the MILES project in the past 6 months, but I am no longer an active participant.	5	8	13
	38.46%	61.54%	100.00%
	13.16%	25.00%	18.57%
Total	38	32	70
	54.29%	45.71%	100.00%
	100.00%	100.00%	100.00%

	Male	Female	Total
Less than 1 year	20	20	40
	50.00%	50.00%	100.00%
	52.63%	60.61%	56.34%
1 – 2 years	8	5	13
	61.54%	38.46%	100.00%
	21.05%	15.15%	18.31%
2 – 3 years	4	5	9
	44.44%	55.56%	100.00%
	10.53%	15.15%	12.68%
More than 3 years	6	3	9
	66.67%	33.33%	100.00%
	15.79%	9.09%	12.68%
Total	38	33	71
	53.52%	46.48%	100.00%
	100.00%	100.00%	100.00%

	Male	Female	Total
CDA/Fernan Lake Research Site	14	7	21
	66.67%	33.33%	100.00%
	37.84%	21.88%	30.43%
Educational Outreach	8	7	15
	53.33%	46.67%	100.00%
	21.62%	21.88%	21.74%
Portneuf Watershed Research Site	1	0	1
	100.00%	0.00%	100.00%
	2.70%	0.00%	1.45%
Project Administration & Support	2	5	7
	28.57%	71.43%	100.00%
	5.41%	15.63%	10.14%

Project Leadership	5	2	7
	71.43%	28.57%	100.00%
	13.51%	6.25%	10.14%
Stakeholder Engagement	0	1	1
	0.00%	100.00%	100.00%
	0.00%	3.13%	1.45%
Treasure Valley Research Site	0	1	1
	0.00%	100.00%	100.00%
	0.00%	3.13%	1.45%
Workforce Development	2	7	9
	22.22%	77.78%	100.00%
	5.41%	21.88%	13.04%
State-Wide/Cross Site Research	5	2	7
	71.43%	28.57%	100.00%
	13.51%	6.25%	10.14%
Total	37	32	69
	53.62%	46.38%	100.00%
	100.00%	100.00%	100.00%

TABLE A2.4.64 UI (Q8) AGGREGATE MILES ACTIVITY (Q4) BY GENDER (Q6)

	Male	Female	Total
Administration	7	7	14
	24.14%	24.14%	100.00%
	7.37%	8.05%	12.09%
Outreach	10	15	25
	20.00%	30.00%	100.00%
	10.53%	17.24%	15.38%
Research	20	10	30
	19.42%	9.71%	100.00%
	21.05%	11.49%	15.93%
Total	37	32	69
	20.33%	17.58%	100.00%
	100.00%	100.00%	100.00%

TABLE A2.4.65 UI (Q8) LENGTH OF INSTITUTIONAL AFFILIATION (Q9) BY GENDER (Q6)

	Male	Female	Total
Less than 1 year	2	6	8
	25.00%	75.00%	100.00%
	5.26%	18.18%	11.27%
1 – 3 years	14	8	22
	63.64%	36.36%	100.00%
	36.84%	24.24%	30.99%
3 – 5 years	7	7	14
	50.00%	50.00%	100.00%
	18.42%	21.21%	19.72%
5 – 10 years	6	5	11
	54.55%	45.45%	100.00%
	15.79%	15.15%	15.49%
Over 10 years	9	7	16
	56.25%	43.75%	100.00%
	23.68%	21.21%	22.54%

Total	38 53.52% 100.00%	33 46.48% 100.00%	71 100.00% 100.00%
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TABLE A2.4.66 UI (Q8) INSTITUTIONAL ROLE (Q10) BY GENDER (Q6)			
	Male	Female	Total
Administration	1 100.00% 2.63%	0 0.00% 0.00%	1 100.00% 1.43%
Faculty	18 72.00% 47.37%	7 28.00% 21.88%	25 100.00% 35.71%
Graduate Student	8 57.14% 21.05%	6 42.86% 18.75%	14 100.00% 20.00%
Post-Doctorate	2 100.00% 5.26%	0 0.00% 0.00%	2 100.00% 2.86%
Staff	3 30.00% 7.89%	7 70.00% 21.88%	10 100.00% 14.29%
Other (please specify)	6 33.33% 15.79%	12 66.67% 37.50%	18 100.00% 25.71%
Total	38 54.29% 100.00%	32 45.71% 100.00%	70 100.00% 100.00%

TABLE A2.4.67 UI (Q8) FACULTY POSITION (Q11) BY GENDER (Q6)			
	Male	Female	Total
Professor	5 71.43% 27.78%	2 28.57% 28.57%	7 100.00% 28.00%
Associate Professor	4 66.67% 22.22%	2 33.33% 28.57%	6 100.00% 24.00%
Assistant Professor	7 70.00% 38.89%	3 30.00% 42.86%	10 100.00% 40.00%
Research Associate	0 0.00% 0.00%	0 0.00% 0.00%	0 100.00% 0.00%
Adjunct Professor	0 0.00% 0.00%	0 0.00% 0.00%	0 100.00% 0.00%
Other (please specify)	2 100.00% 11.11%	0 0.00% 0.00%	2 100.00% 8.00%
Total	18 72.00% 100.00%	7 28.00% 100.00%	25 100.00% 100.00%

TABLE A2.4.68 UI (Q8) DISCIPLINE (Q12) BY GENDER (Q6)			
	Male	Female	Total
Agricultural Sciences	2 40.00% 5.41%	3 60.00% 9.38%	5 100.00% 7.25%
Art and Design	2 100.00% 5.41%	0 0.00% 0.00%	2 100.00% 2.90%
Biological Sciences	1 33.33% 2.70%	2 66.67% 6.25%	3 100.00% 4.35%
Chemistry	0 0.00% 0.00%	0 0.00% 0.00%	0 100.00% 0.00%
Computer Science	1 100.00% 2.70%	0 0.00% 0.00%	1 100.00% 1.45%
Education	0 0.00% 0.00%	2 100.00% 6.25%	2 100.00% 2.90%
Geosciences	5 50.00% 13.51%	5 50.00% 15.63%	10 100.00% 14.49%
Mathematics	0 0.00% 0.00%	0 0.00% 0.00%	0 100.00% 0.00%
Natural Resource Sciences	13 46.43% 35.14%	15 53.57% 46.88%	28 100.00% 40.58%
Physical Sciences	2 100.00% 5.41%	0 0.00% 0.00%	2 100.00% 2.90%
Social Science	6 75.00% 16.22%	2 25.00% 6.25%	8 100.00% 11.59%
Technology	1 100.00% 2.70%	0 0.00% 0.00%	1 100.00% 1.45%
Engineering	3 100.00% 8.11%	0 0.00% 0.00%	3 100.00% 4.35%
Other (please specify)	1 25.00% 2.70%	3 75.00% 9.38%	4 100.00% 5.80%
Total	37 53.62% 100.00%	32 46.38% 100.00%	69 100.00% 100.00%

A2.5. CONFIRMATION RATES

TABLE A2.5.1 2015 EDGE DESCRIPTION BY SURVEY RESPONDENTS (R) AND NONRESPONDENTS (N)				
	R x R	R x N	N x N	Total
Present Edge Descriptions	62 x (62-1)	62 x 73	NA	
	= 3,782	= 4,526		8,308 (45.9%)
Missing Edge Descriptions	NA	73 x 62	73 x (73-1)	
		= 4,526	= 5,256	9,782 (54.1%)
Total	3,782 (20.9%)	9,052 (50.0%)	5,256 (29.1%)	18,090 (100%)

TABLE A2.5.2 2015 EDGE CONFIRMATION RATES BY NETWORK		
	Count of Confirmed Edges	Percentage of All Possible Edges Between Respondents
Work Network	1,614	85.4%
Informal Network	1,747	92.4%
Innovation Network	1,782	93.2%
Expertise Network	1,757	92.9%
Improvement Network	1,721	91.0%
Average Confirmation Rate for All Networks		91.0%
Total possible edges between respondents is $(62*(62-1))/2 = 1,891$		

TABLE A2.5.3 2016 EDGE DESCRIPTION BY SURVEY RESPONDENTS (R) AND NONRESPONDENTS (N)				
	R x R	R x N	N x N	Total
Present Edge Descriptions	179 x (179-1)	179 x 94	NA	
	= 31,862	= 16,826		48,688 (65.6%)
Missing Edge Descriptions	NA	94 x 179	94 x (94-1)	
		= 16,826	= 8,743	25,568 (34.4%)
Total	31,862 (42.9%)	33,652 (45.3%)	8,743 (11.8%)	74,256 (100%)

TABLE A2.5.4 2016 EDGE CONFIRMATION RATES BY NETWORK		
	Count of Confirmed Edges	Percentage of All Possible Edges Between Respondents
Work Network	15,359	96.4%
Informal Network	15,551	97.6%
Innovation Network	15,476	97.1%
Expertise Network	15,414	96.8%
Improvement Network	15,420	96.8%
Average Confirmation Rate for All Networks		96.9%
Total possible edges between respondents is $(179*(179-1))/2 = 15,931$		

A2.6. RESPONDENT AND NONRESPONDENT DEMOGRAPHICS

TABLE A2.6.1 2015 PARTICIPANTS BY SURVEY STATUS AND INSTITUTION							
			Institution				Total
			BSU	ISU	UI	Other	
2015 Survey Status	Respondent	Count	20	22	24	4	70
		% within Survey	28.6%	31.4%	34.3%	5.7%	100.0%
		% within Institution	45.5%	53.7%	39.3%	25.0%	43.2%
	Nonrespondent	Count	24	19	37	12	92
		% within Survey	26.1%	20.7%	40.2%	13.0%	100.0%
		% within Institution	54.5%	46.3%	60.7%	75.0%	56.8%
Total	Count	44	41	61	16	162	
	% within Survey	27.2%	25.3%	37.7%	9.9%	100.0%	
	% within Institution	100.0%	100.0%	100.0%	100.0%	100.0%	

TABLE A2.6.2 2015 PARTICIPANTS BY SURVEY STATUS AND GENDER					
			Gender		Total
			Male	Female	
2015 Survey Status	Respondent	Count	32	38	70
		% within Survey	45.7%	54.3%	100.0%
		% within Gender	36.0%	51.4%	42.9%
	Nonrespondent	Count	57	36	93
		% within Survey	61.3%	38.7%	100.0%
		% within Gender	64.0%	48.6%	57.1%
Total	Count	89	74	163	
	% within Survey	54.6%	45.4%	100.0%	
	% within Gender	100.0%	100.0%	100.0%	

			Institution				Total
			BSU	ISU	UI	Other	
2016 Survey Status	Respondent	Count	51	39	69	18	177
		% within Survey	28.8%	22.0%	39.0%	10.2%	100.0%
		% within Institution	68.0%	61.9%	61.1%	62.1%	63.2%
	Nonrespondent	Count	24	24	44	11	103
		% within Survey	23.3%	23.3%	42.7%	10.7%	100.0%
		% within Institution	32.0%	38.1%	38.9%	37.9%	36.8%
Total	Count	75	63	113	29	280	
	% within Survey	26.8%	22.5%	40.4%	10.4%	100.0%	
	% within Institution	100.0%	100.0%	100.0%	100.0%	100.0%	
Chi-Square Tests							
			Value	df	Asymptotic Significance (2-sided)		
Pearson Chi-Square			1.027 ^a	3	0.795		
Likelihood Ratio			1.040	3	0.792		
Linear-by-Linear Association			0.707	1	0.401		
N of Valid Cases			280				
^a 0 cells (0.0%) have expected count less than 5. The minimum expected count is 10.67							

TABLE A2.6.4 2016 PARTICIPANTS BY SURVEY STATUS AND GENDER					
			Gender		Total
			Male	Female	
2016 Survey Status	Respondent	Count	92	85	177
		% within Survey	52.0%	48.0%	100.0%
		% within Gender	56.8%	63.9%	60%
	Nonrespondent	Count	70	48	118
		% within Survey	59.3%	40.7%	100.0%
		% within Gender	43.2%	36.1%	40.0%
Total	Count	162	133	295	
	% within Survey	54.9%	45.1%	100.0%	
	% within Gender	100.0%	100.0%	100.0%	
Chi-Square Tests					
			Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square			1.543 ^a	1	0.214
Continuity Correction ^b			1.260	1	0.262
Likelihood Ratio			1.547	1	0.214
Linear-by-Linear Association			1.537	1	0.215
N of Valid Cases			295		
^a 0 cells (0.0%) have expected count less than 5. The minimum expected count is 53.20. ^b Computed only for a 2x2 table					

APPENDIX 3. NETWORK METRICS

A3.1. DENSITIES

	Nodes (#)	Edges (#)	Density
Work Network	163	778	0.06
Informal Network	163	231	0.02
Innovation Network	163	287	0.02
Expert Network	163	281	0.02
Improve Network	163	305	0.02

	Nodes (#)	Edges (#)	Density
Work Network	282	1177	0.03
Informal Network	282	545	0.01
Innovation Network	282	751	0.02
Expert Network	282	787	0.02
Improve Network	282	780	0.02

	Nodes (#)	Edges (#)	Density
Work Network	75	245	0.09
Informal Network	75	115	0.04
Innovation Network	75	178	0.06
Expert Network	75	188	0.07
Improve Network	75	204	0.07

	Nodes (#)	Edges (#)	Density
Work Network	64	260	0.13
Informal Network	64	144	0.07
Innovation Network	64	157	0.08
Expert Network	64	151	0.07
Improve Network	64	143	0.07

	Nodes (#)	Edges (#)	Density
Work Network	113	357	0.06
Informal Network	113	152	0.02
Innovation Network	113	250	0.04
Expert Network	113	258	0.04
Improve Network	113	236	0.04

	Male			Female		
	Nodes	Edges	Density	Nodes	Edges	Density
Work Network	151	292	0.03	126	271	0.03
Informal Network	151	141	0.01	126	113	0.01
Innovation Network	151	218	0.02	126	158	0.02

Expert Network	151	236	0.02	126	138	0.02
Improve Network	151	230	0.02	126	154	0.02

TABLE A3.1.7 BSU 2016 NETWORK DENSITIES BY GENDER SUBNETWORKS

	Male			Female		
	Nodes	Edges	Density	Nodes	Edges	Density
Work Network	42	68	0.08	32	58	0.12
Informal Network	42	26	0.03	32	28	0.06
Innovation Network	42	47	0.05	32	45	0.09
Expert Network	42	56	0.07	32	38	0.08
Improve Network	42	48	0.06	32	54	0.11

TABLE A3.1.8 ISU 2016 NETWORK DENSITIES BY GENDER SUBNETWORKS

	Male			Female		
	Nodes	Edges	Density	Nodes	Edges	Density
Work Network	34	47	0.08	29	84	0.21
Informal Network	34	25	0.04	29	45	0.11
Innovation Network	34	27	0.05	29	52	0.13
Expert Network	34	26	0.05	29	46	0.11
Improve Network	34	28	0.05	29	40	0.10

TABLE A3.1.9 UI 2016 NETWORK DENSITIES BY GENDER SUBNETWORKS

	Male			Female		
	Nodes	Edges	Density	Nodes	Edges	Density
Work Network	59	109	0.06	54	72	0.05
Informal Network	59	57	0.03	54	22	0.02
Innovation Network	59	89	0.05	54	36	0.03
Expert Network	59	101	0.06	54	34	0.02
Improve Network	59	94	0.05	54	33	0.02

TABLE A3.1.10 2016 ADMINISTRATION NETWORK DENSITIES

	Nodes	Edges	Density
Work Network	30	70	0.16
Informal Network	30	55	0.13
Innovation Network	30	43	0.10
Expert Network	30	49	0.11
Improve Network	30	52	0.12

TABLE A3.1.11 2016 RESEARCH NETWORK DENSITIES

	Nodes	Edges	Density
Work Network	100	263	0.05
Informal Network	100	126	0.03
Innovation Network	100	216	0.04
Expert Network	100	218	0.04
Improve Network	100	198	0.04

TABLE A3.1.12 2016 OUTREACH NETWORK DENSITIES

	Nodes	Edges	Density
Work Network	50	54	0.04
Informal Network	50	37	0.03
Innovation Network	50	58	0.05

Expert Network	50	40	0.03
Improve Network	50	49	0.04

TABLE A3.1.13 BSU ACTIVITY SUBGROUP NETWORK DENSITIES

		Nodes	Edges	Density
Admin	Work Network	8	12	0.43
	Informal Network	8	12	0.43
	Innovation Network	8	12	0.43
	Expertise Network	8	10	0.36
	Improvement Network	8	10	0.36
Outreach	Work Network	9	8	0.22
	Informal Network	9	5	0.14
	Innovation Network	9	10	0.28
	Expertise Network	9	6	0.17
	Improvement Network	9	10	0.28
Research	Work Network	33	64	0.12
	Informal Network	33	26	0.05
	Innovation Network	33	52	0.10
	Expertise Network	33	60	0.11
	Improvement Network	33	51	0.10

TABLE A3.1.14 ISU ACTIVITY SUBGROUP NETWORK DENSITIES

		Nodes	Edges	Density
Admin	Work Network	4	2	0.33
	Informal Network	4	2	0.33
	Innovation Network	4	1	0.17
	Expertise Network	4	0	0.00
	Improvement Network	4	1	0.17
Outreach	Work Network	7	3	0.14
	Informal Network	7	3	0.14
	Innovation Network	7	3	0.14
	Expertise Network	7	3	0.14
	Improvement Network	7	3	0.14
Research	Work Network	32	97	0.20
	Informal Network	32	59	0.12
	Innovation Network	32	84	0.17
	Expertise Network	32	78	0.16
	Improvement Network	32	72	0.15

TABLE A3.1.15 UI ACTIVITY SUBGROUP NETWORK DENSITIES

		Nodes	Edges	Density
Admin	Work Network	11	12	0.22
	Informal Network	11	4	0.07
	Innovation Network	11	3	0.05
	Expertise Network	11	5	0.09
	Improvement Network	11	4	0.07

Outreach	Work Network	24	17	0.06
	Informal Network	24	12	0.04
	Innovation Network	24	26	0.09
	Expertise Network	24	13	0.05
	Improvement Network	24	15	0.05
Research	Work Network	29	54	0.13
	Informal Network	29	29	0.07
	Innovation Network	29	46	0.11
	Expertise Network	29	52	0.13
	Improvement Network	29	47	0.12

A3.2. E-I INDICES

	External Links (EL)	Internal Links (IL)	E-I Index
Work Network	1104	1756	-0.228
Informal Network	448	850	-0.310
Innovation Network	500	1208	-0.415
Expert Network	592	1234	-0.352
Improve Network	644	1202	-0.302

	BSU			ISU			UI		
	EL	IL	E-I Index	EL	IL	E-I Index	EL	IL	E-I Index
Work Network	268	490	-0.293	274	508	-0.299	404	714	-0.277
Informal Network	120	230	-0.314	100	288	-0.485	172	304	-0.277
Innovation Network	146	356	-0.418	142	314	-0.377	180	500	-0.471
Expert Network	166	376	-0.387	144	306	-0.360	220	516	-0.402
Improve Network	200	408	-0.342	144	286	-0.330	232	472	-0.341

	External Links (EL)	Internal Links (IL)	E-I Index
Work Network	868	774	0.057
Informal Network	80	116	-0.184
Innovation Network	140	178	-0.119
Expert Network	166	168	-0.006
Improve Network	134	160	-0.088

	Administration			Research			Outreach		
	EL	IL	E-I Index	EL	IL	E-I Index	EL	IL	E-I Index
Work Network	646	124	0.678	640	526	0.098	450	124	0.568
Informal Network	62	28	0.378	52	58	-0.055	46	30	0.211
Innovation Network	96	24	0.600	92	92	0.000	92	62	0.195
Expert Network	108	30	0.565	114	104	0.046	110	34	0.528
Improve Network	96	26	0.574	84	94	-0.056	88	40	0.375

	External Links (EL)	Internal Links (IL)	E-I Index
Work Network	232	168	0.160
Informal Network	130	86	0.204
Innovation Network	144	148	-0.014
Expert Network	158	152	0.019
Improve Network	200	142	0.170

	Administration			Research			Outreach		
	EL	IL	E-I Index	EL	IL	E-I Index	EL	IL	E-I Index
Work Network	152	24	0.727	188	128	0.190	124	16	0.771
Informal Network	100	24	0.613	102	52	0.325	58	10	0.706
Innovation Network	82	24	0.547	118	104	0.063	88	20	0.630
Expert Network	90	20	0.636	130	120	0.040	96	12	0.778
Improve Network	124	20	0.722	156	102	0.209	120	20	0.714

	External Links (EL)	Internal Links (IL)	E-I Index
Work Network	172	194	-0.060
Informal Network	116	128	-0.049
Innovation Network	68	176	-0.443
Expert Network	72	162	-0.385
Improve Network	84	152	-0.288

	Administration			Research			Outreach		
	EL	IL	E-I Index	EL	IL	E-I Index	EL	IL	E-I Index
Work Network	134	4	0.942	158	184	-0.076	52	6	0.793
Informal Network	98	4	0.922	106	118	-0.054	28	6	0.647
Innovation Network	44	2	0.913	60	168	-0.474	32	6	0.684
Expert Network	42	0	1.000	66	156	-0.405	36	6	0.714
Improve Network	52	2	0.926	74	144	-0.321	42	6	0.750

	External Links (EL)	Internal Links (IL)	E-I Index
Work Network	254	196	0.129
Informal Network	80	116	-0.184
Innovation Network	140	178	-0.119
Expert Network	166	168	-0.006
Improve Network	134	160	-0.088

	Administration			Research			Outreach		
	EL	IL	E-I Index	EL	IL	E-I Index	EL	IL	E-I Index
Work Network	206	42	0.661	160	108	0.194	142	46	0.511
Informal Network	62	28	0.378	52	58	-0.055	46	30	0.211
Innovation Network	96	24	0.600	92	92	0.000	92	62	0.195

Expert Network	108	30	0.565	114	104	0.046	110	34	0.528
Improve Network	96	26	0.574	84	94	-0.056	88	40	0.375

A3.3. RECIPROCITY

	Edges	Reciprocated	Reciprocity
Work Network	1177	312	26.5%
Informal Network	545	95	17.4%
Innovation Network	751	197	26.2%
Expertise Network	787	148	18.8%
Improvement Network	780	146	18.7%

	Edges	Reciprocated	Reciprocity
Work Network	245	82	33.5%
Informal Network	115	23	20.0%
Innovation Network	178	60	33.7%
Expertise Network	188	49	26.1%
Improvement Network	204	45	22.1%

	Edges	Reciprocated	Reciprocity
Work Network	260	84	32.3%
Informal Network	144	36	25.0%
Innovation Network	157	44	28.0%
Expertise Network	151	36	23.8%
Improvement Network	143	38	26.6%

	Edges	Reciprocated	Reciprocity
Work Network	357	89	24.9%
Informal Network	152	20	13.2%
Innovation Network	250	64	25.6%
Expertise Network	258	41	15.9%
Improvement Network	236	41	17.4%

	Edges	Reciprocated	Reciprocity
Work Network	70	28	40.0%
Informal Network	55	22	40.0%
Innovation Network	43	20	46.5%
Expertise Network	49	15	30.6%
Improvement Network	52	17	32.7%

	Edges	Reciprocated	Reciprocity
Work Network	54	24	44.4%
Informal Network	37	3	8.1%
Innovation Network	58	20	34.5%

Expertise Network	40	6	15.0%
Improvement Network	49	12	24.5%

TABLE A3.3.7 RESEARCH 2016 RECIPROCITY BY NETWORK

	Edges	Reciprocated	Reciprocity
Work Network	263	124	47.1%
Informal Network	126	18	14.3%
Innovation Network	216	87	40.3%
Expertise Network	218	75	34.4%
Improvement Network	198	62	31.3%

TABLE A3.3.8 BSU ACTIVITY SUBGROUP RECIPROCITY RATES

		Edges	Reciprocated	Reciprocity
Admin	Work Network	12	8	66.7%
	Informal Network	12	8	66.7%
	Innovation Network	12	7	58.3%
	Expertise Network	10	6	60.0%
	Improvement Network	10	4	40.0%
Outreach	Work Network	8	7	87.5%
	Informal Network	5	1	20.0%
	Innovation Network	10	5	50.0%
	Expertise Network	6	1	16.7%
	Improvement Network	10	4	40.0%
Research	Work Network	64	25	39.1%
	Informal Network	26	1	3.8%
	Innovation Network	52	26	50.0%
	Expertise Network	60	21	35.0%
	Improvement Network	51	13	25.5%

TABLE A3.3.9 ISU ACTIVITY SUBGROUP RECIPROCITY RATES

		Edges	Reciprocated	Reciprocity
Admin	Work Network	2	1	50.0%
	Informal Network	2	2	100.0%
	Innovation Network	1	0	0.0%
	Expertise Network	0	0	0.0%
	Improvement Network	1	0	0.0%
Outreach	Work Network	3	1	33.3%
	Informal Network	3	0	0.0%
	Innovation Network	3	2	66.7%
	Expertise Network	3	0	0.0%
	Improvement Network	3	0	0.0%
Research	Work Network	97	52	53.6%
	Informal Network	59	15	25.4%
	Innovation Network	84	36	42.9%
	Expertise Network	78	32	41.0%
	Improvement Network	72	29	40.3%

		Edges	Reciprocated	Reciprocity
Admin	Work Network	12	3	25.0%
	Informal Network	4	0	0.0%
	Innovation Network	3	1	33.3%
	Expertise Network	5	0	0.0%
	Improvement Network	4	1	25.0%
Outreach	Work Network	17	7	41.2%
	Informal Network	12	1	8.3%
	Innovation Network	26	9	34.6%
	Expertise Network	13	3	23.1%
	Improvement Network	15	4	26.7%
Research	Work Network	54	28	51.9%
	Informal Network	29	0	0.0%
	Innovation Network	46	21	45.7%
	Expertise Network	52	16	30.8%
	Improvement Network	47	15	31.9%

	Male			Female		
	Edges	Reciprocated	Reciprocity	Edges	Reciprocated	Reciprocity
Work Network	292	76	26.0%	271	81	29.9%
Informal Network	141	34	24.1%	113	21	18.6%
Innovation Network	218	62	28.4%	158	47	29.7%
Expert Network	236	44	18.6%	138	28	20.3%
Improve Network	230	41	17.8%	154	33	21.4%

	Male			Female		
	Edges	Reciprocated	Reciprocity	Edges	Reciprocated	Reciprocity
Work Network	68	17	25.0%	58	22	37.9%
Informal Network	26	6	23.1%	28	4	14.3%
Innovation Network	47	11	23.4%	45	17	37.8%
Expert Network	56	9	16.1%	38	10	26.3%
Improve Network	48	9	18.8%	54	10	18.5%

	Male			Female		
	Edges	Reciprocated	Reciprocity	Edges	Reciprocated	Reciprocity
Work Network	47	10	21.3%	84	29	34.5%
Informal Network	25	8	32.0%	45	7	15.6%
Innovation Network	27	7	25.9%	52	14	26.9%
Expert Network	26	7	26.9%	46	8	17.4%
Improve Network	28	5	17.9%	40	14	35.0%

	Male			Female		
	Edges	Reciprocated	Reciprocity	Edges	Reciprocated	Reciprocity
Work Network	109	32	29.4%	72	19	26.4%
Informal Network	57	10	17.5%	22	7	31.8%
Innovation Network	89	30	33.7%	36	13	36.1%
Expert Network	101	23	22.8%	34	6	17.6%
Improve Network	94	19	20.2%	33	6	18.2%

APPENDIX 4. MILES NETWORK VISUALIZATIONS

A4.1. 2016 STATEWIDE NETWORKS

The following visualizations show the network of interactions among all MILES participants identified during the 2016 social network analysis. Nodes are arranged by groups based on institutional affiliation. Orange, Red and Blue edges indicate interactions between participants affiliated with the same institution. Visualizations in the top row include all reported interactions, regardless of whether they were reported by one or both interacting participants. Figures on the bottom row show only those interacts which were reciprocated.

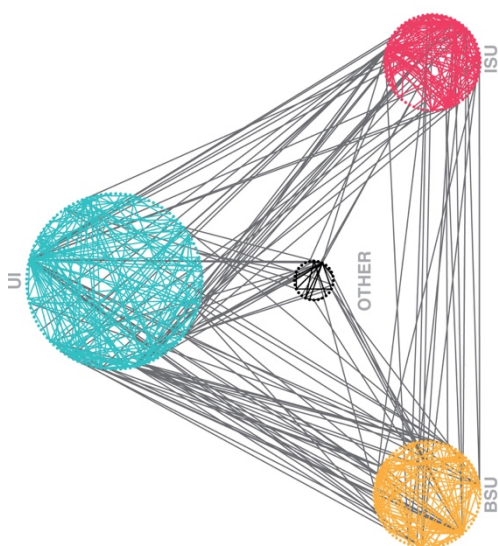


Fig.A.1. 2016 Informal Network

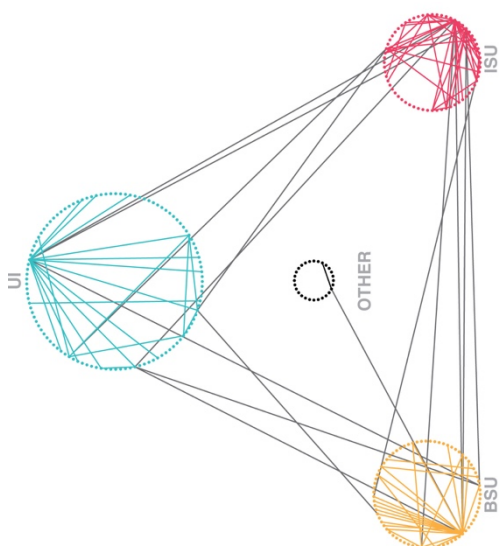


Fig.A.2. 2016 Inofrmal Reciprocated

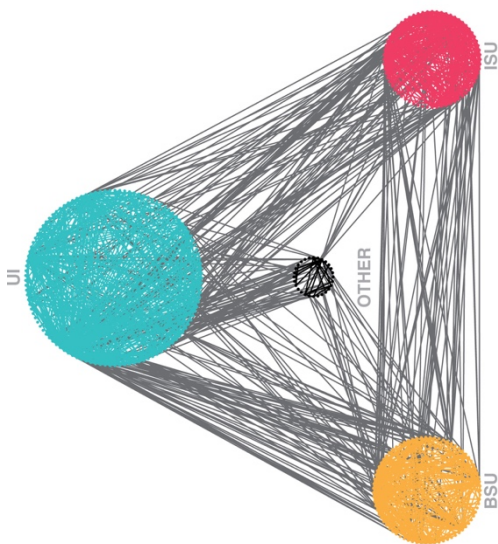


Fig.A.3. 2016 Work Network

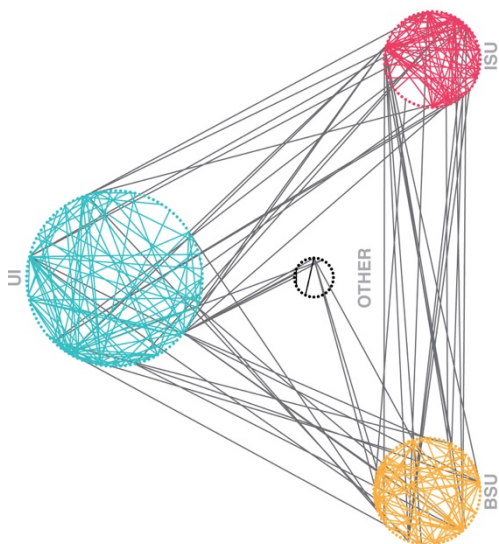


Fig.A.4. 2016 Work Reciprocated

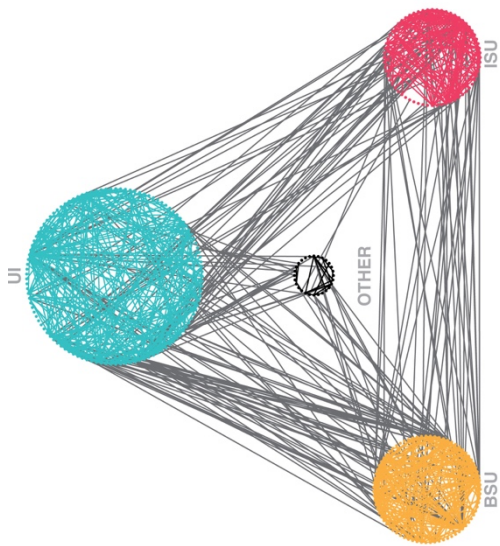


Fig.A.5. 2016 Improvement Network

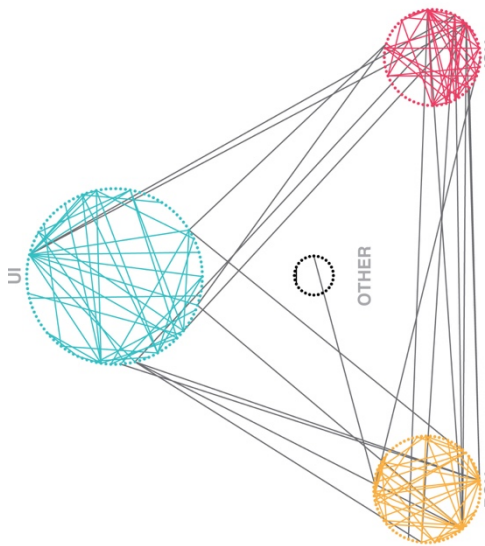


Fig.A.6. 2016 Improvement Reciprocated

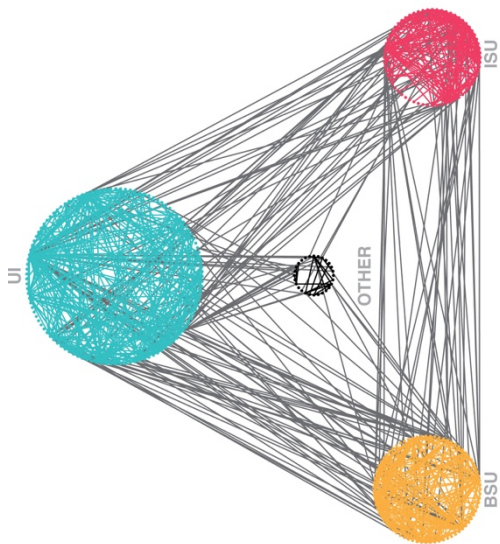


Fig.A.7. 2016 Expertise Network

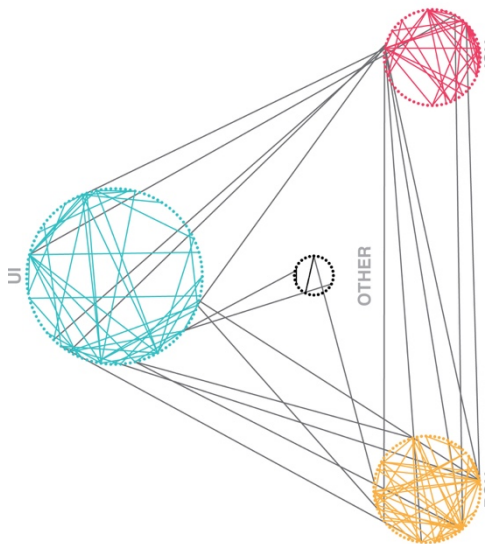


Fig.A.8. 2016 Expertise Reciprocated

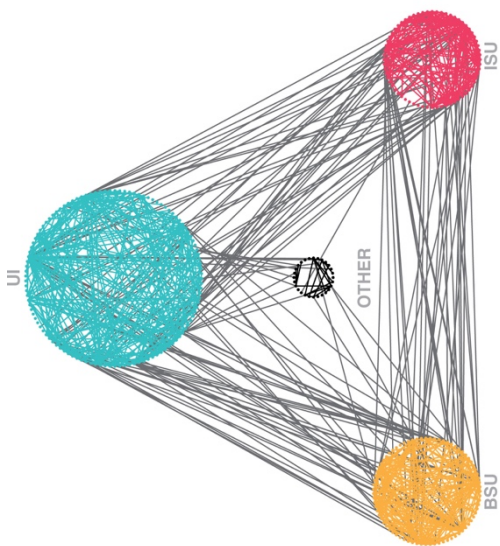


Fig.A.9. 2016 Innovation Network

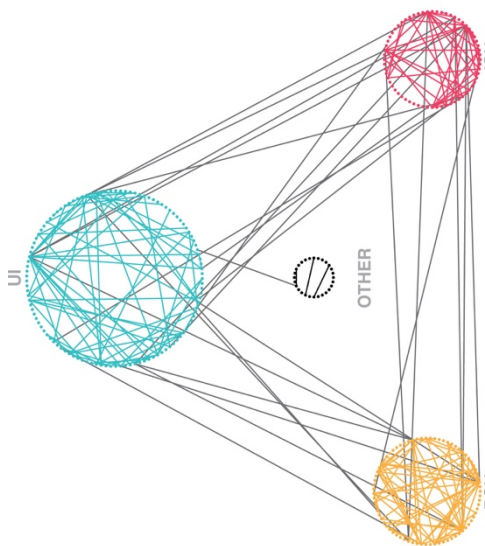


Fig.A.10. 2016 Innovation Reciprocated

A4.2. ACTIVITY SUBNETWORKS

A4.2.1. RESEARCH PARTICIPANT NETWORKS

The following visualizations show the network of interactions among all 2016 survey respondents who indicated research as their primary MILES activity. Nodes are arranged by institutional affiliation. Green edges indicate interactions between participants affiliated with the same institution. Visualizations in the top row include all reported interactions, regardless of whether they were reported by one or both interacting participants. Figures on the bottom row show only those interacts which were reciprocated.

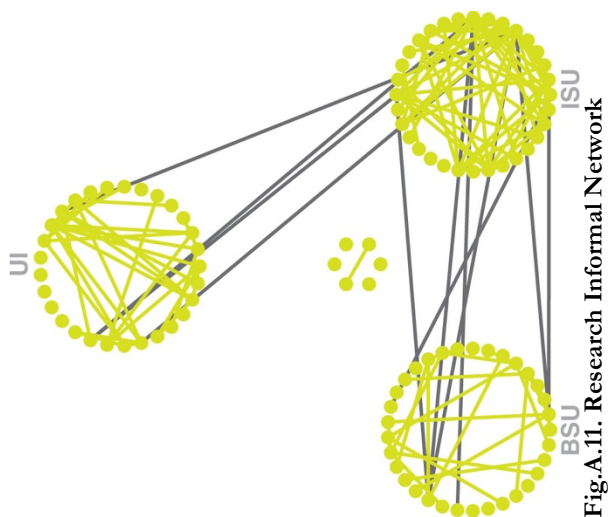


Fig.A.11. Research Informal Network

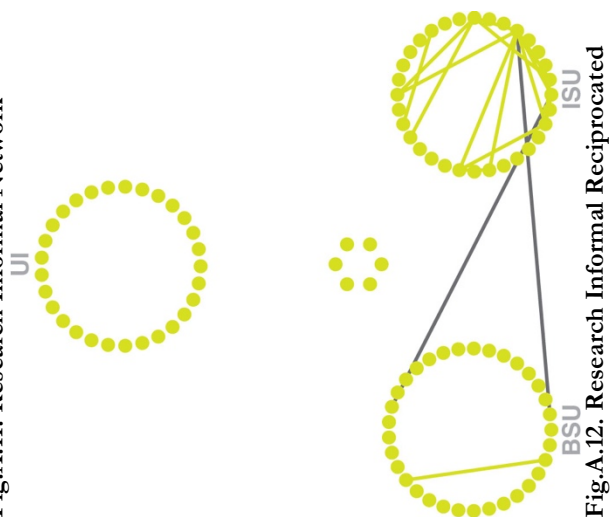


Fig.A.12. Research Informal Reciprocated

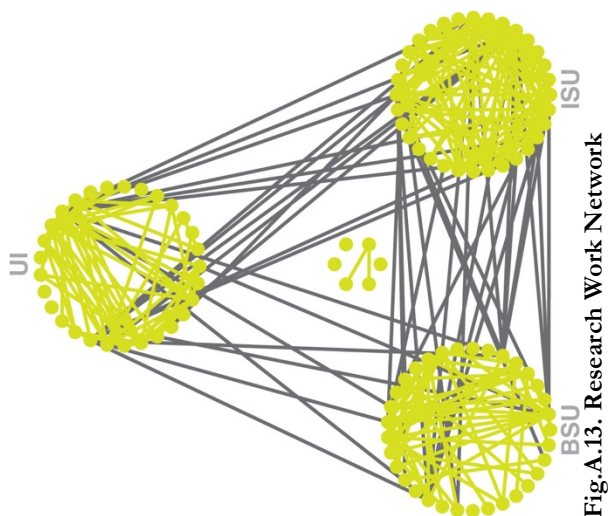


Fig.A.13. Research Work Network

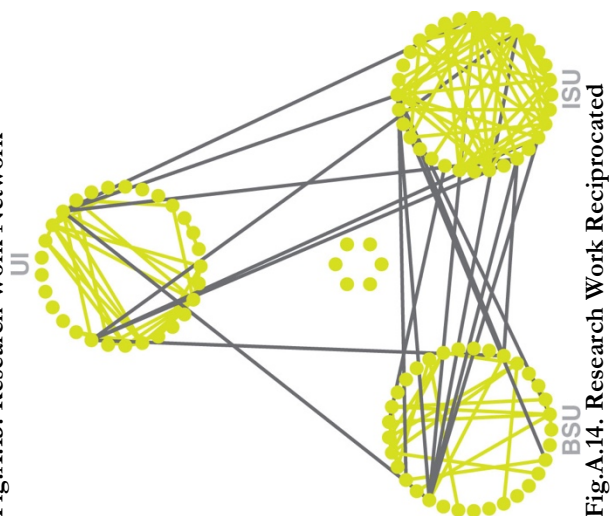


Fig.A.14. Research Work Reciprocated

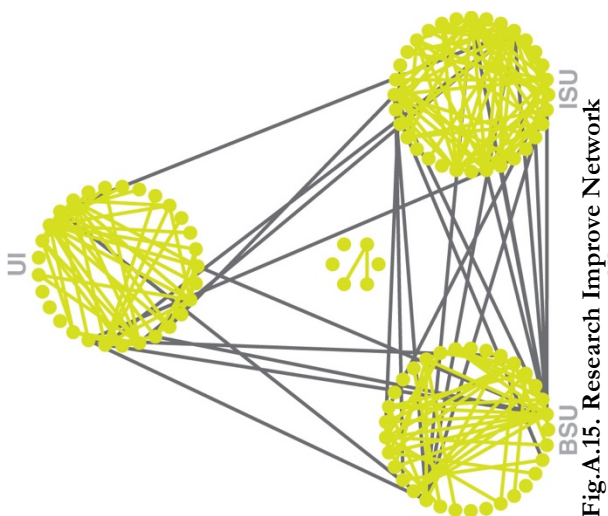


Fig.A.15. Research Improve Network

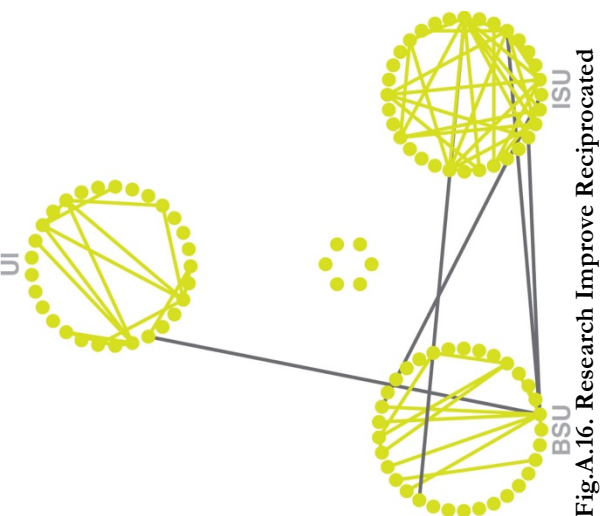


Fig.A.16. Research Improve Reciprocated

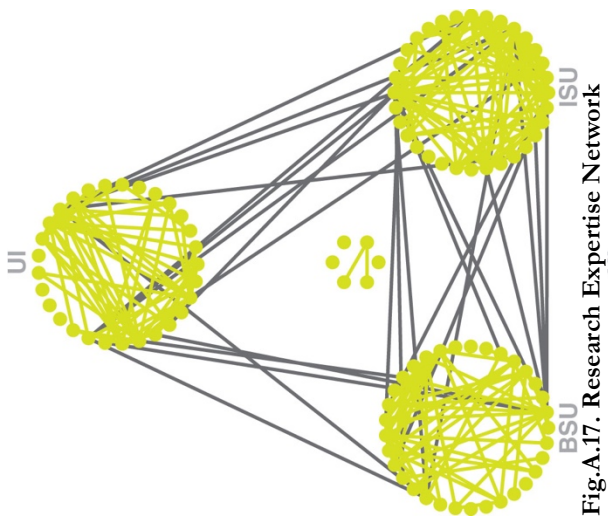


Fig.A.17. Research Expertise Network

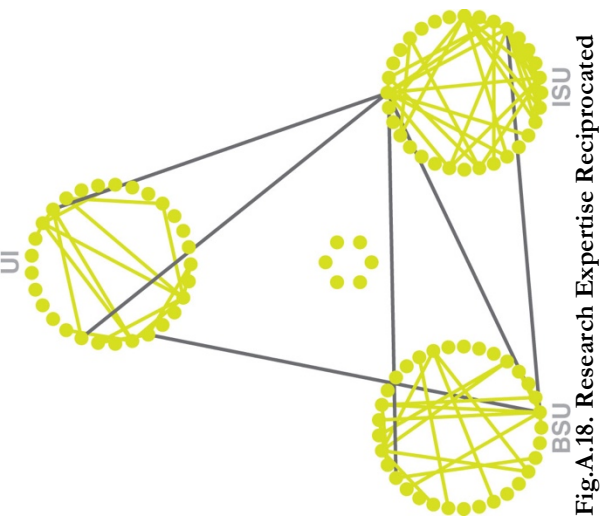


Fig.A.18. Research Expertise Reciprocated

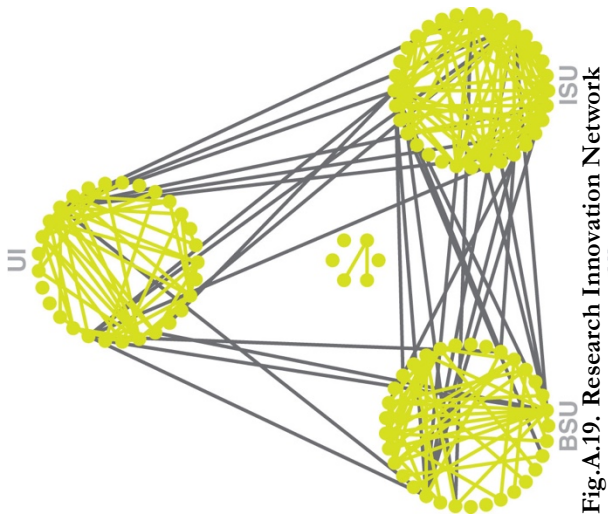


Fig.A.19. Research Innovation Network

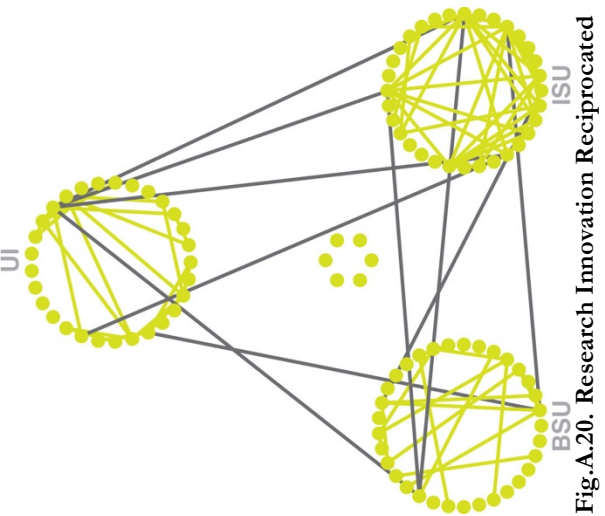


Fig.A.20. Research Innovation Reciprocated

A4.2.2. OUTREACH PARTICIPANT NETWORKS

The following visualizations show the network of interactions among all 2016 survey respondents who indicated outreach as their primary MILES activity. Nodes are arranged by institutional affiliation. Orange edges indicate interactions between participants affiliated with the same institution. Visualizations in the top row include all reported interactions, regardless of whether they were reported by one or both interacting participants. Figures on the bottom row show only those interacts which were reciprocated.

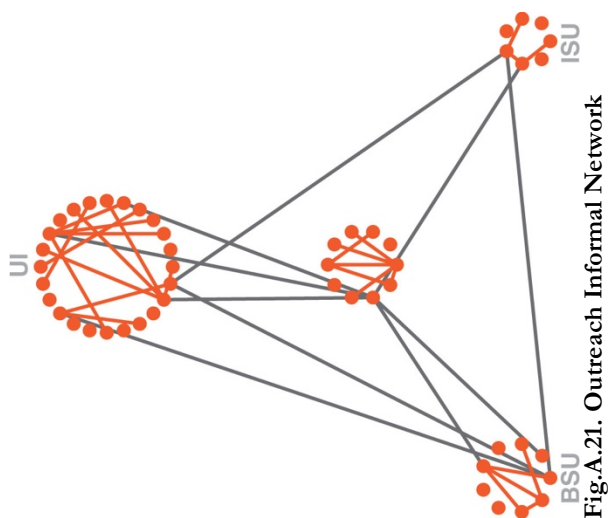


Fig.A.21. Outreach Informal Network

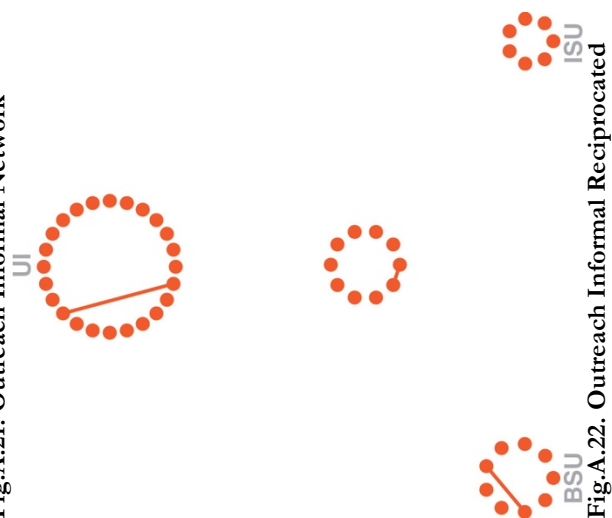


Fig.A.22. Outreach Informal Reciprocated

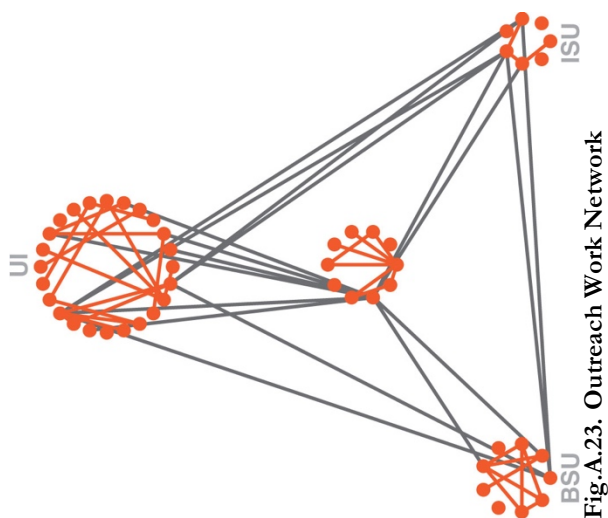


Fig.A.23. Outreach Work Network

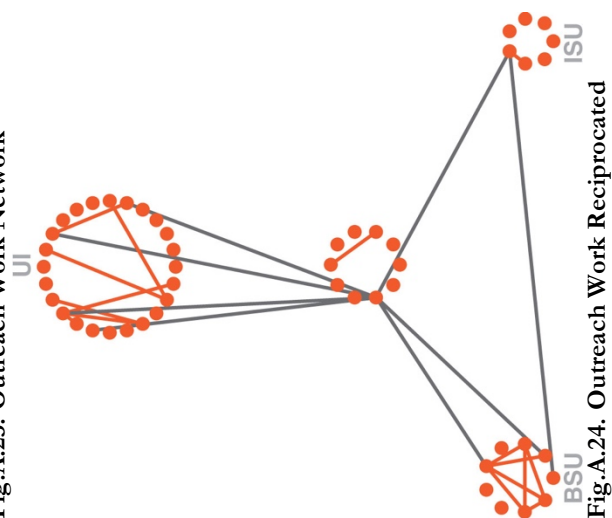


Fig.A.24. Outreach Work Reciprocated

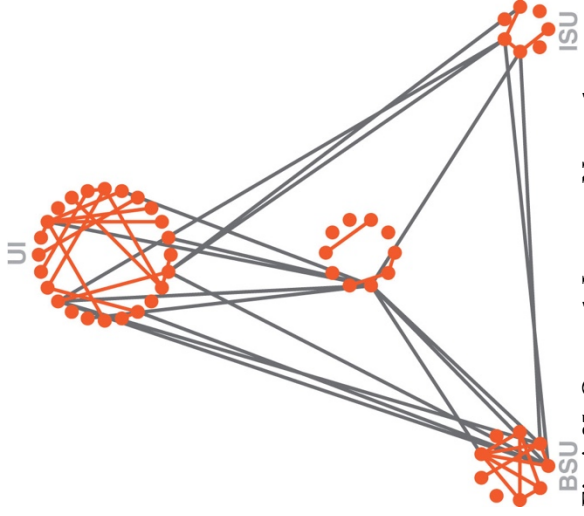


Fig.A.25. Outreach Improve Network

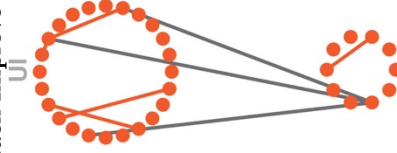


Fig.A.26. Outreach Improve Reciprocated

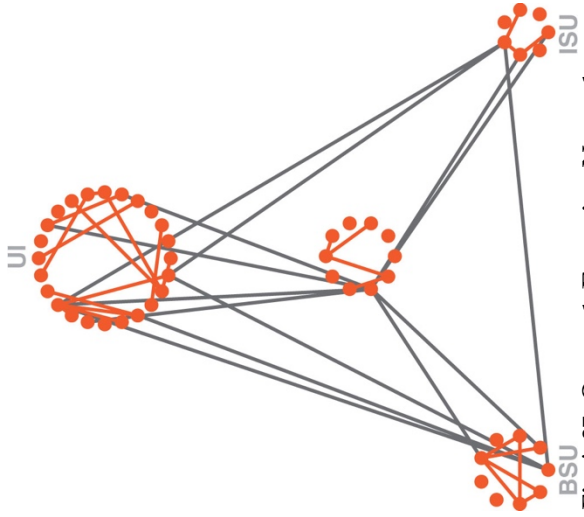


Fig.A.27. Outreach Expertise Network



Fig.A.28. Outreach Expertise Reciprocated

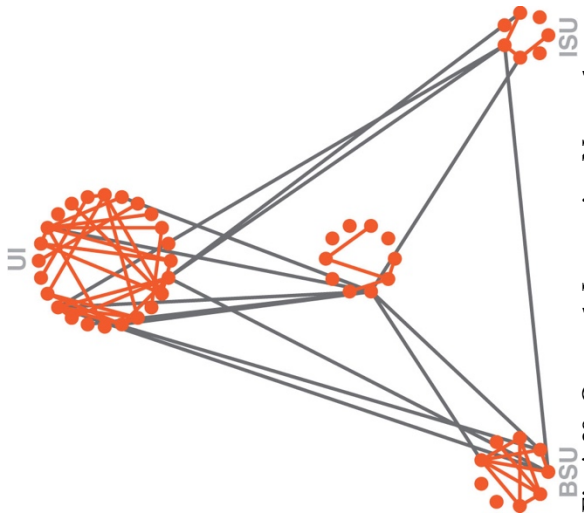


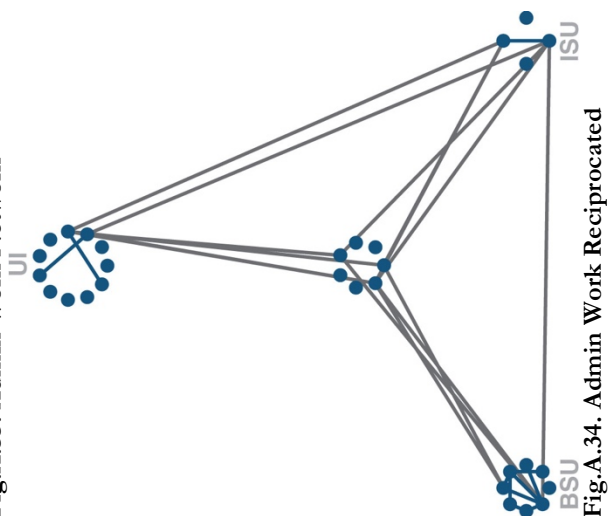
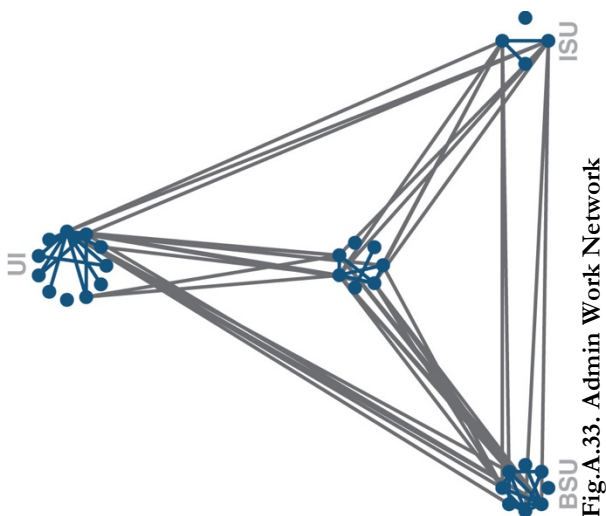
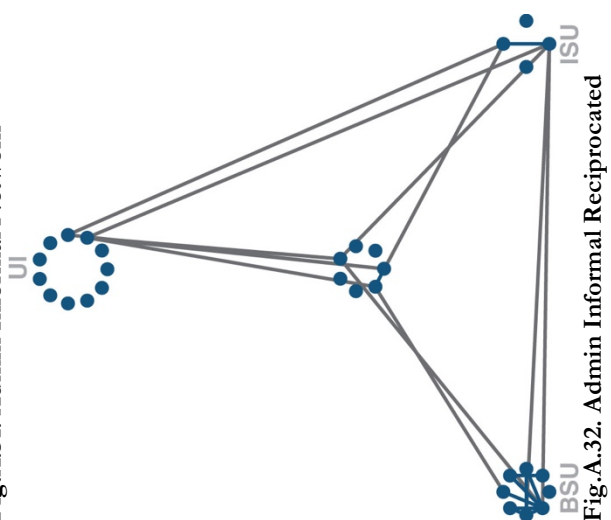
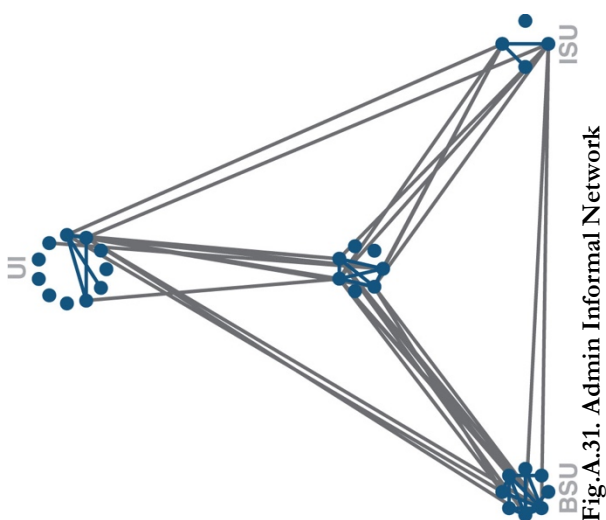
Fig.A.29. Outreach Innovation Network



Fig.A.30. Outreach Innovation Reciprocated

A4.2.3. ADMINISTRATION PARTICIPANT NETWORKS

The following visualizations show the network of interactions among all 2016 survey respondents who indicated administration or project management as their primary MILES activity. Nodes are arranged by institutional affiliation. Blue edges indicate interactions between participants affiliated with the same institution. Nodes grouped in the center of the visualizations are an aggregate of participants from other institutions, the majority of which are affiliated with the Idaho EPSCoR Office. Visualizations in the top row include all reported interactions, regardless of whether they were reported by one or both interacting participants. Figures on the bottom row show only those interacts which were reciprocated.



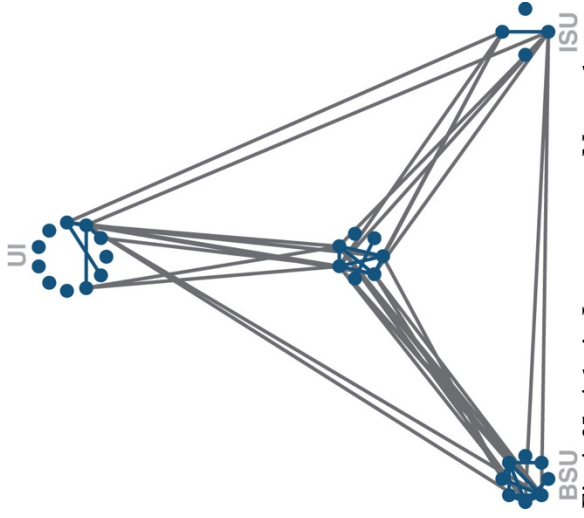


Fig.A.35. Admin Improvement Network

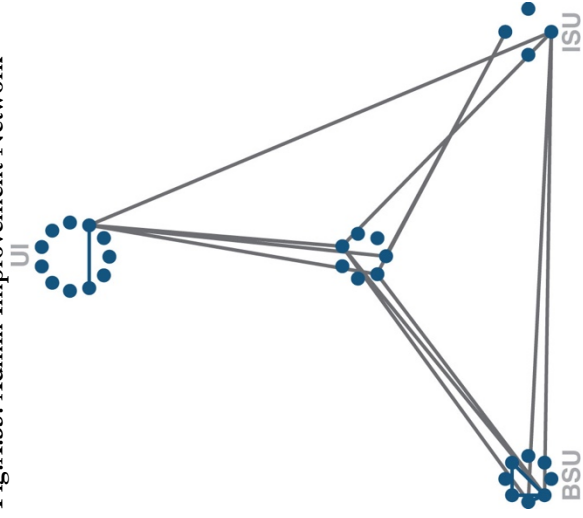


Fig.A.36. Admin Improvement Reciprocated

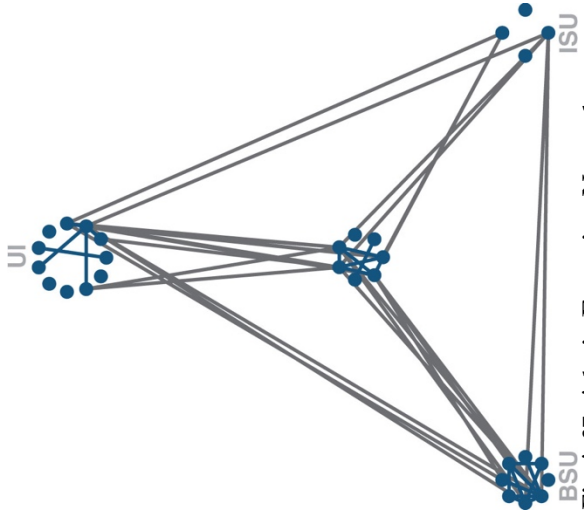


Fig.A.37. Admin Expertise Network

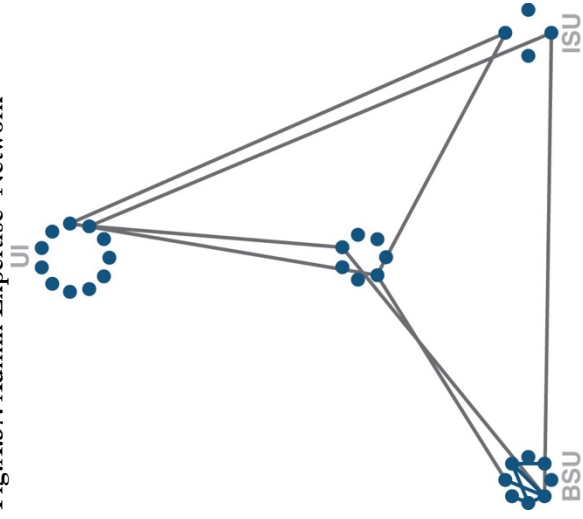


Fig.A.38. Admin Expertise Reciprocated

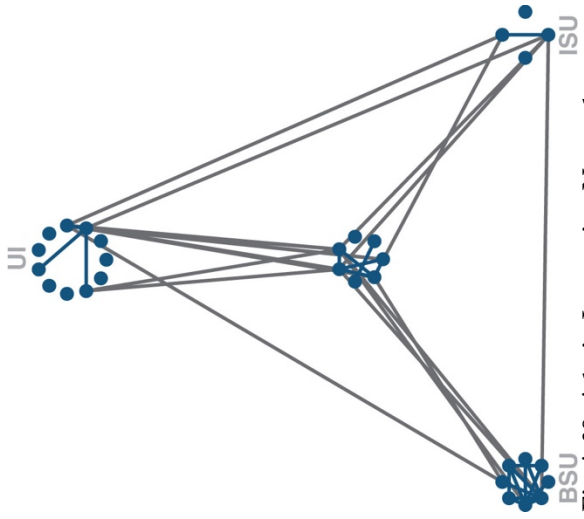


Fig.A.39. Admin Innovation Network

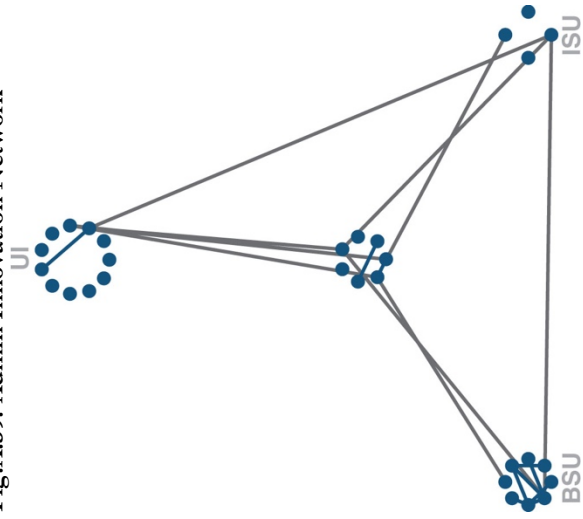


Fig.A.40. Admin Innovation Reciprocated

A4.3. INSTITUTIONAL SUBNETWORKS

A4.3.1. BOISE STATE UNIVERSITY NETWORKS

The following visualizations show the network of interactions among 2016 MILES survey respondents affiliated with BSU. Nodes are arranged by groups based on the primary MILES activity with which they are involved. Orange edges indicate interactions between participants primarily involved in the same activity. Visualizations in the top row include all reported interactions, regardless of whether they were reported by one or both interacting participants. Figures on the bottom row show only those interacts which were reciprocated.

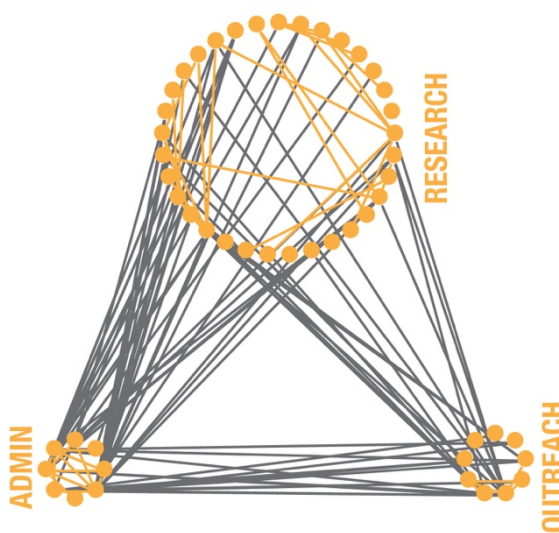


Fig.A.41. BSU Informal Network

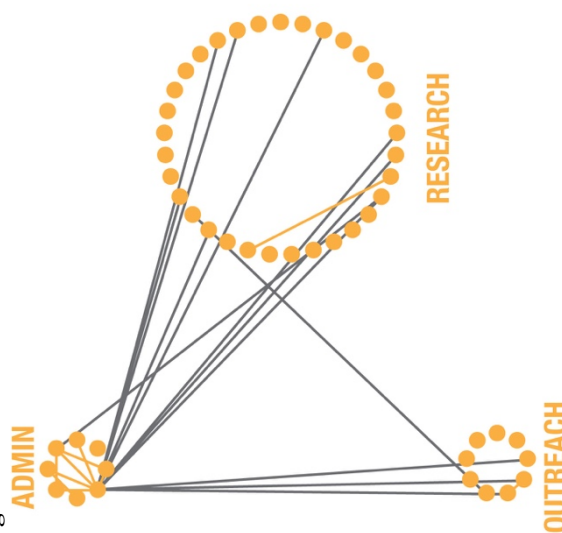


Fig.A.42. BSU Informal Reciprocated

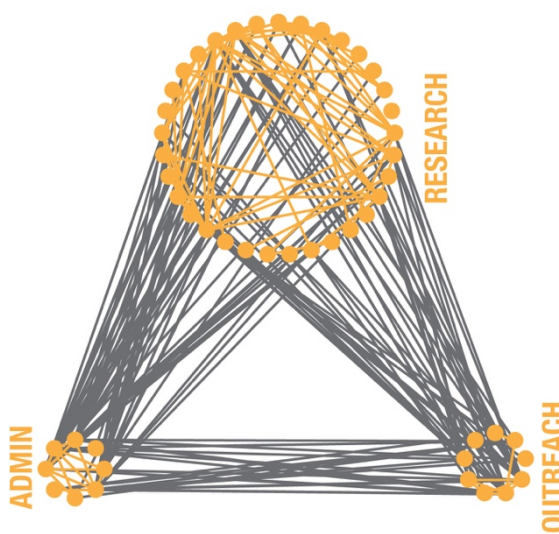


Fig.A.43. BSU Work Network

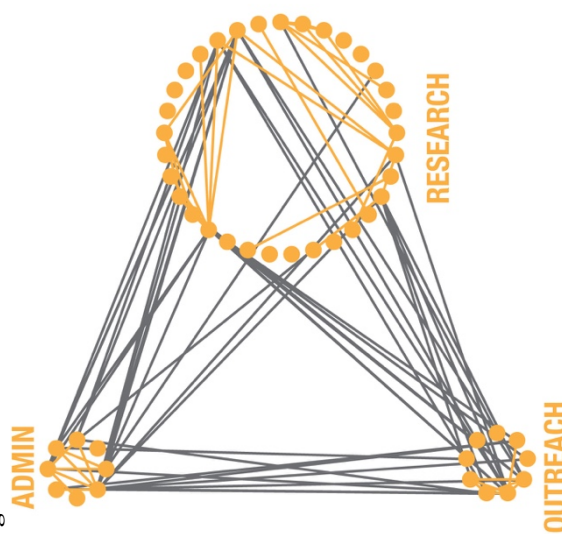


Fig.A.44. BSU Work Reciprocated

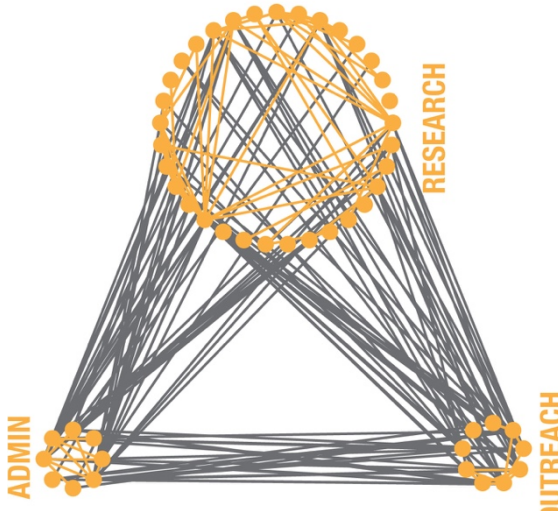


Fig.A.45. BSU Improvement Network

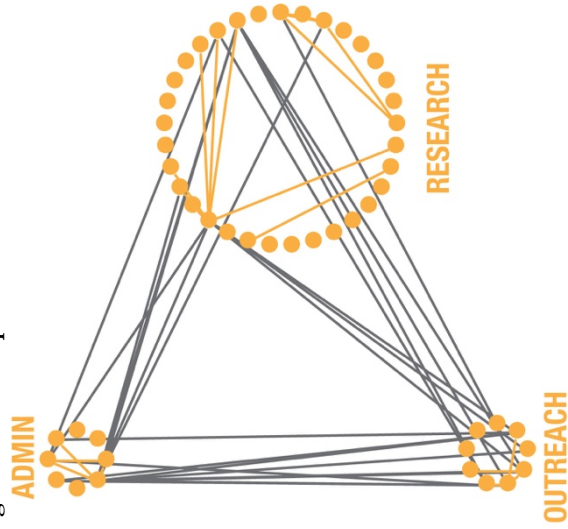


Fig.A.46. BSU Improvement Reciprocated

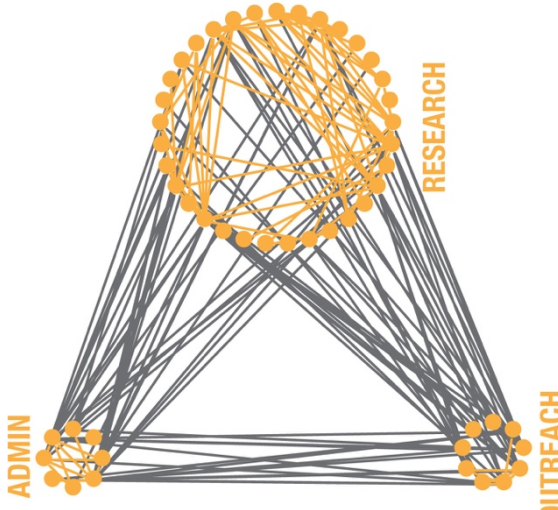


Fig.A.47. BSU Expertise Network

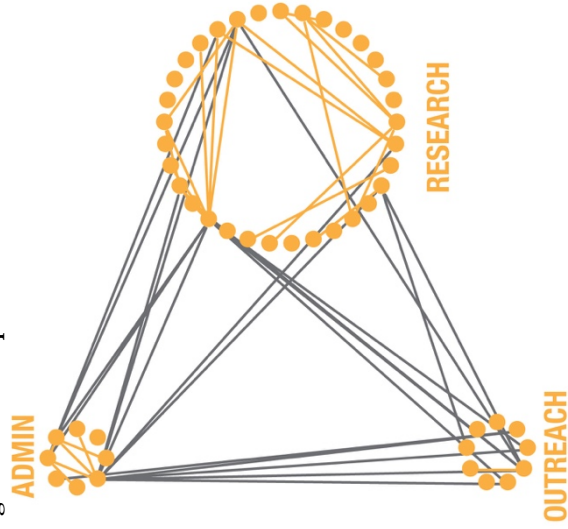


Fig.A.48. BSU Expertise Reciprocated

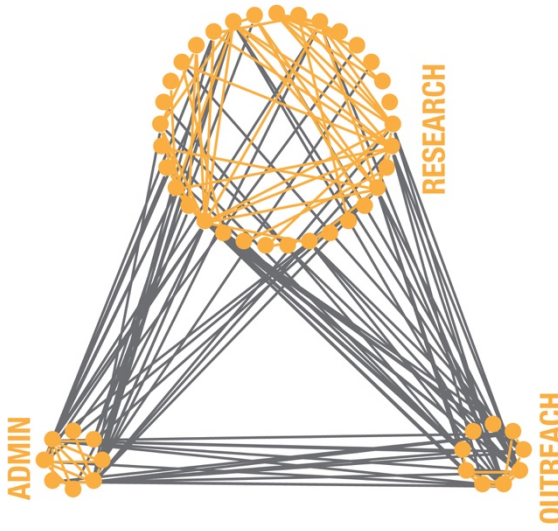


Fig.A.49. BSU Innovation Network

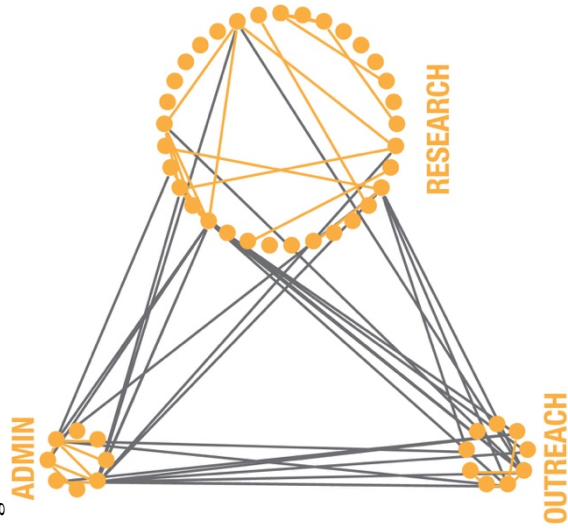


Fig.A.50. BSU Innovation Reciprocated

A4.3.2. IDAHO STATE UNIVERSITY NETWORKS

The following visualizations show the network of interactions among 2016 MILES survey respondents affiliated with ISU. Nodes are arranged by groups based on the primary MILES activity with which they are involved. Red edges indicate interactions between participants primarily involved in the same activity. Visualizations in the top row include all reported interactions, regardless of whether they were reported by one or both interacting participants. Figures on the bottom row show only those interacts which were reciprocated.

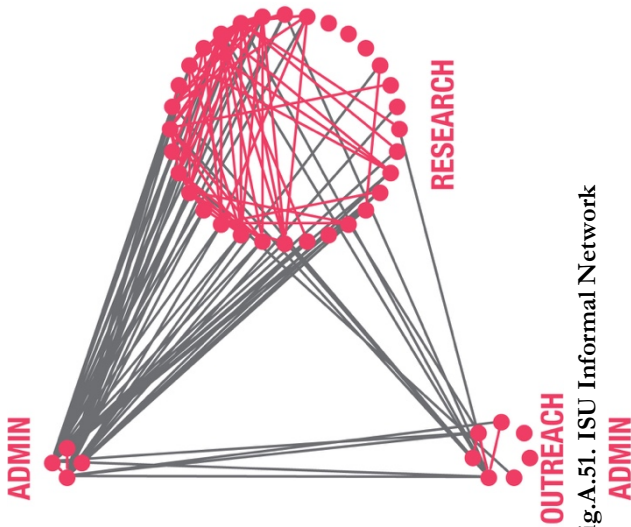


Fig.A.51. ISU Informal Network

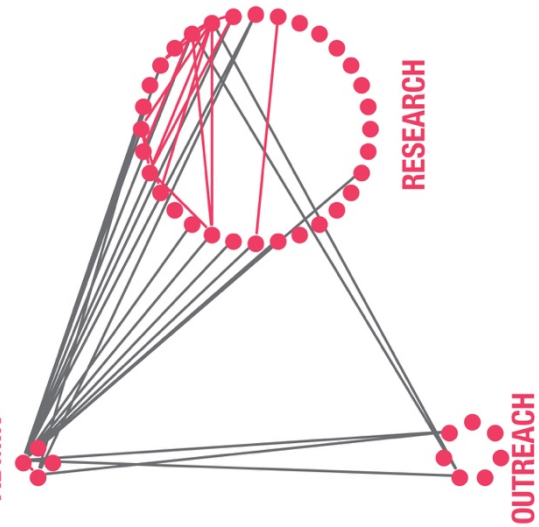


Fig.A.52. ISU Informal Reciprocated

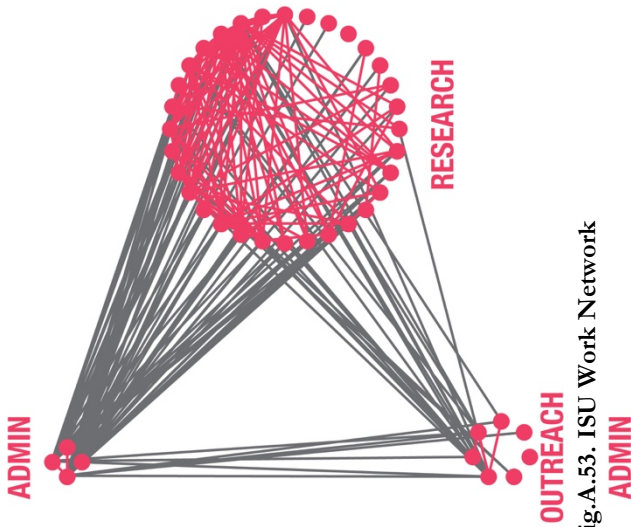


Fig.A.53. ISU Work Network

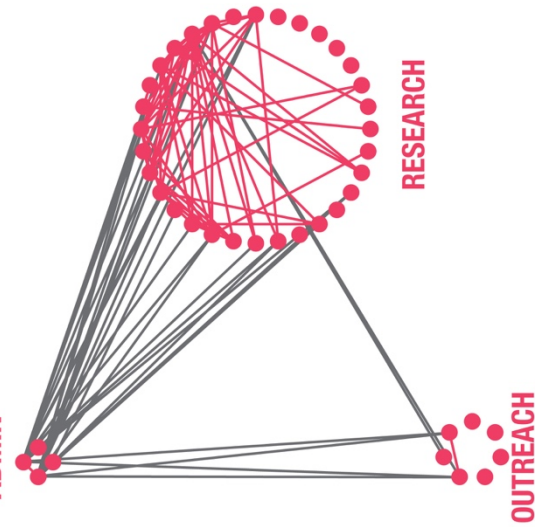


Fig.A.54. ISU Work Reciprocated

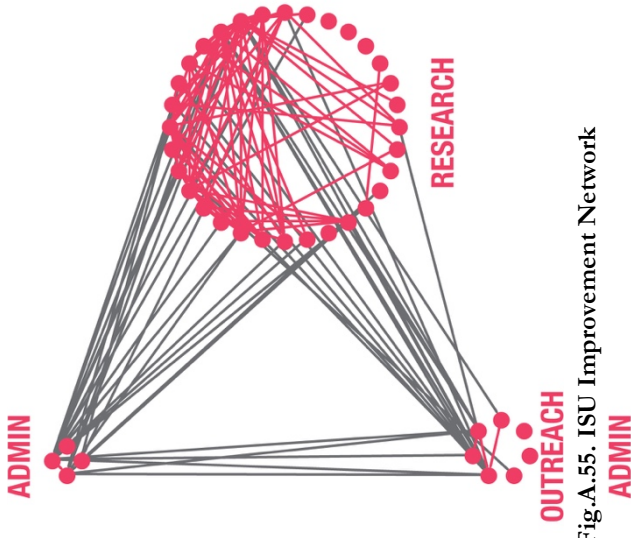


Fig.A.55. ISU Improvement Network

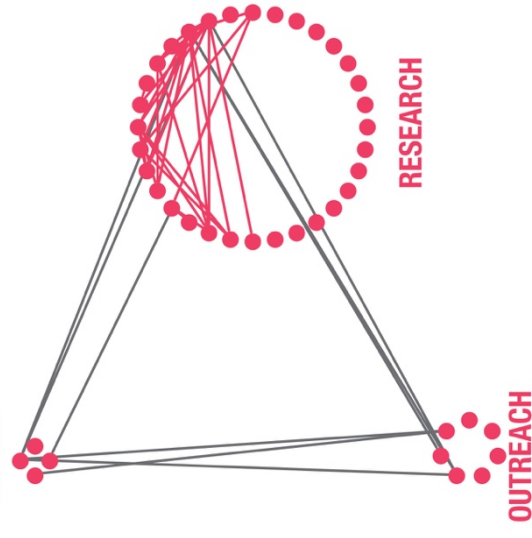


Fig.A.56. ISU Improvement Reciprocated

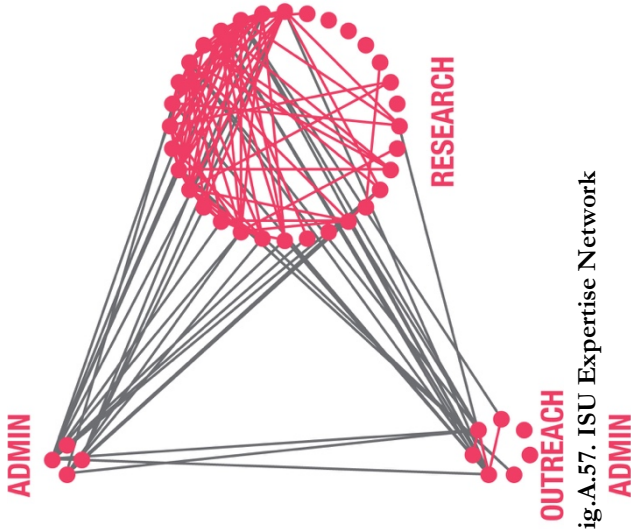


Fig.A.57. ISU Expertise Network

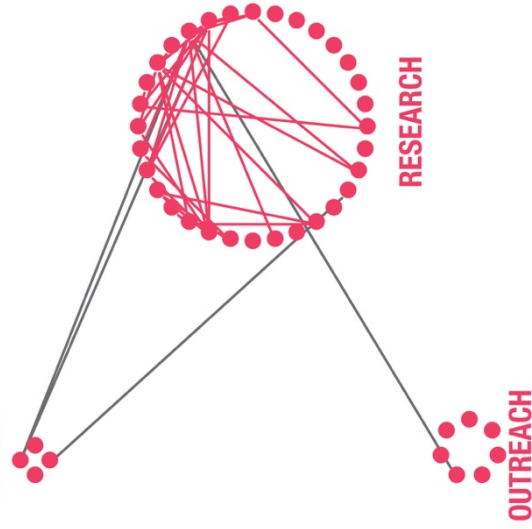


Fig.A.58. ISU Expertise Reciprocated

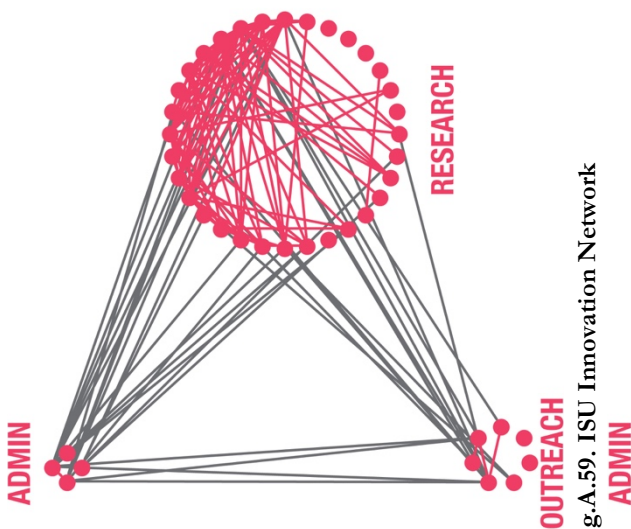


Fig.A.59. ISU Innovation Network

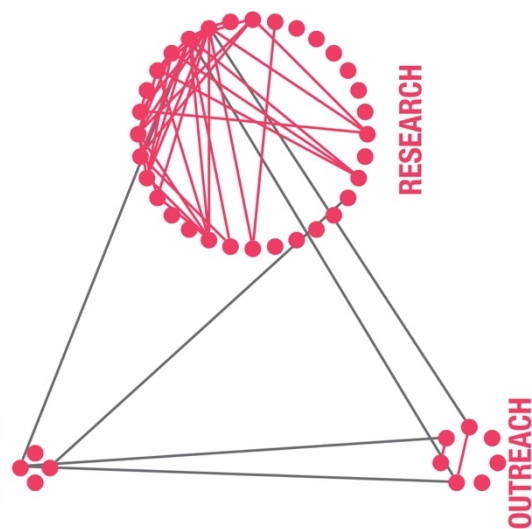


Fig.A.60. ISU Innovation Reciprocated

A4.3.3. UNIVERSITY OF IDAHO NETWORKS

The following visualizations show the network of interactions among 2016 MILES survey respondents affiliated with ISU. Nodes are arranged by groups based on the primary MILES activity with which they are involved. Blue edges indicate interactions between participants primarily involved in the same activity. Visualizations in the top row include all reported interactions, regardless of whether they were reported by one or both interacting participants. Figures on the bottom row show only those interacts which were reciprocated.

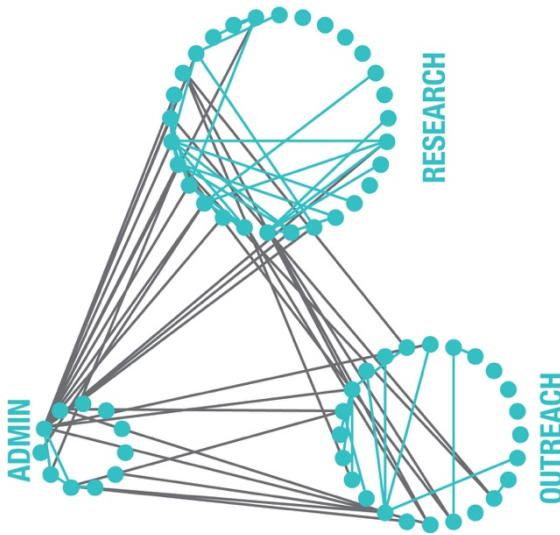


Fig.A.61. UI Informal Network

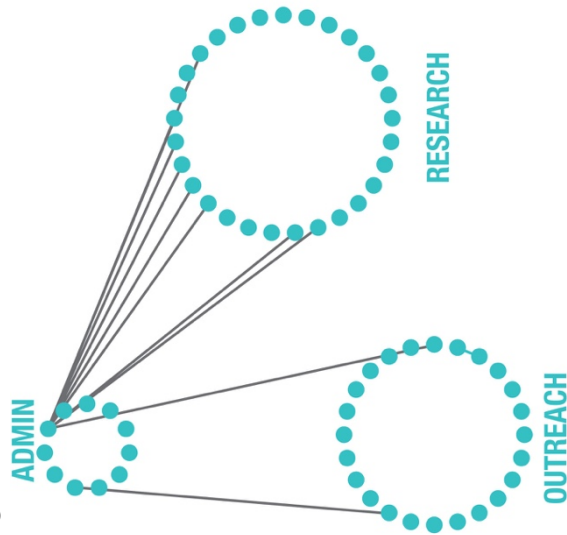


Fig.A.62. UI Informal Reciprocated

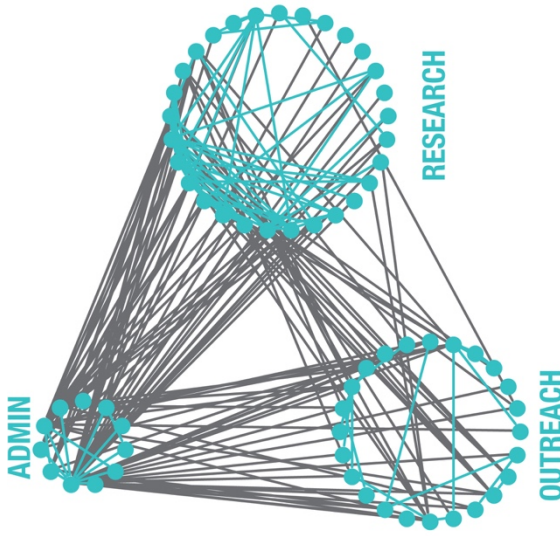


Fig.A.63. UI Work Network

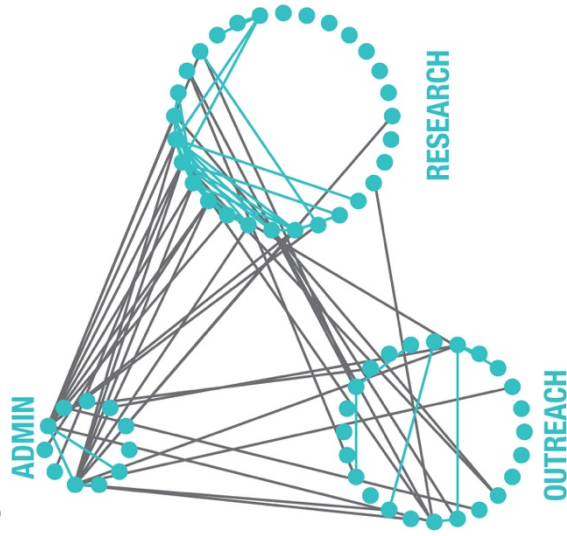


Fig.A.64. UI Work Reciprocated

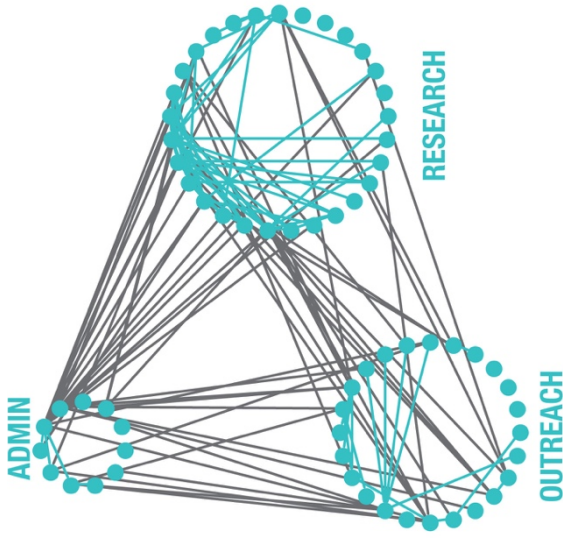


Fig.A.65. UI Improvement Network

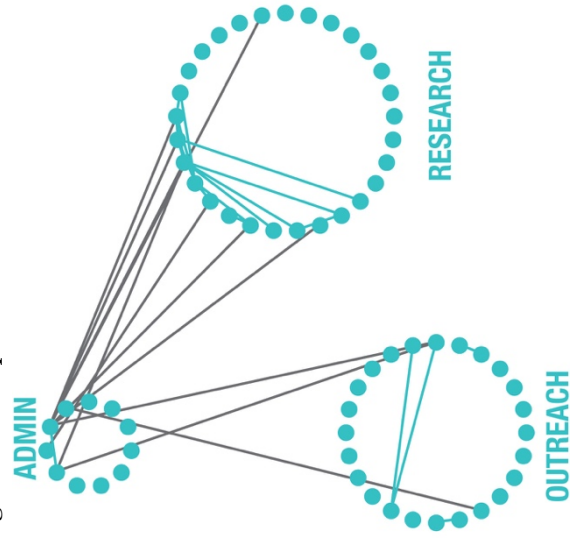


Fig.A.66. UI Improvement Reciprocated

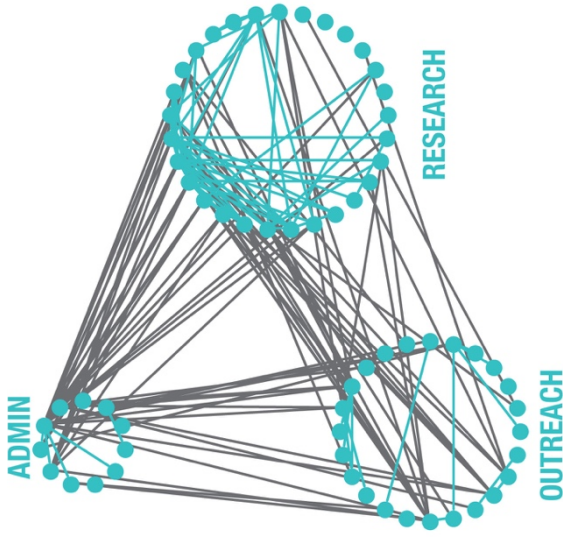


Fig.A.67. UI Expertise Network

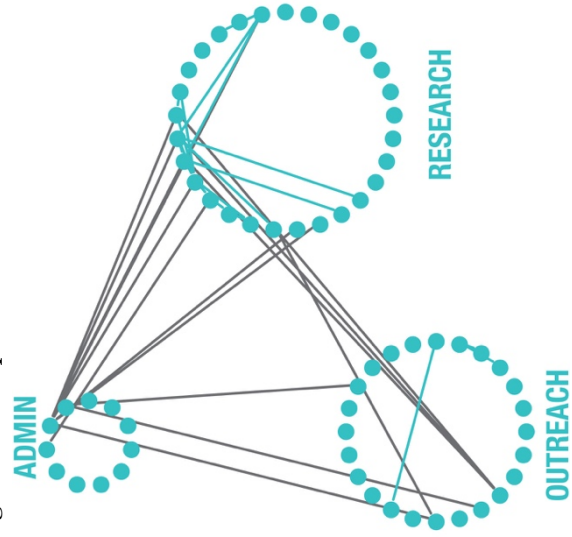


Fig.A.68. UI Expertise Reciprocated

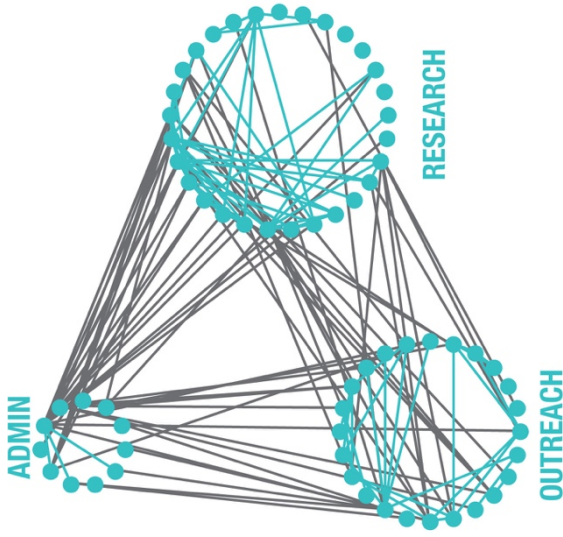


Fig.A.69. UI Innovation Network

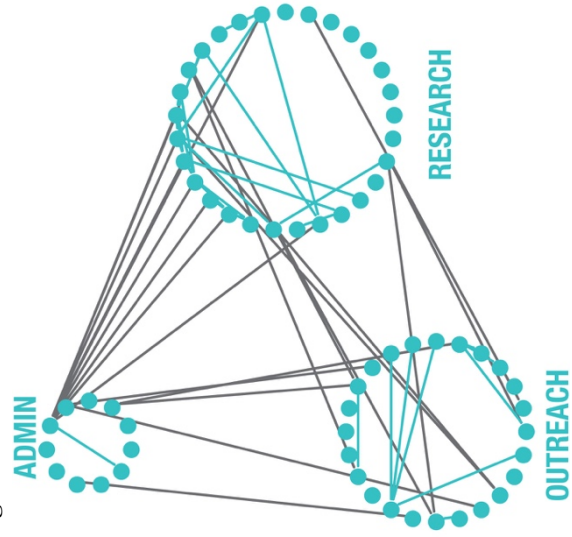


Fig.A.70. UI Innovation Reciprocated

A4.4. GENDER NETWORKS

A4.4.1. MILES GENDER NETWORK

The following visualizations show interactions among all 2016 MILES participants. Nodes are arranged by gender. Blue and red edges indicate interactions between participants of the same gender.

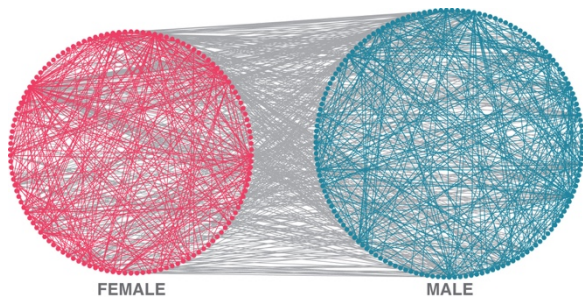


Fig.A.71. Work Network by Gender

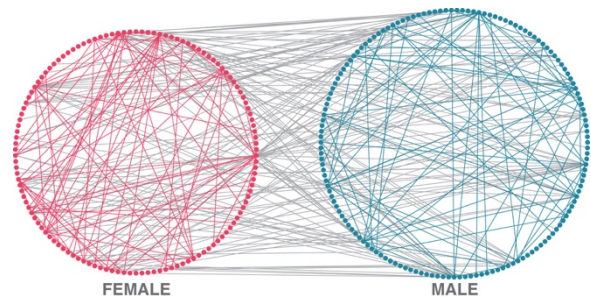


Fig.A.72. Work Reciprocated Edges by Gender

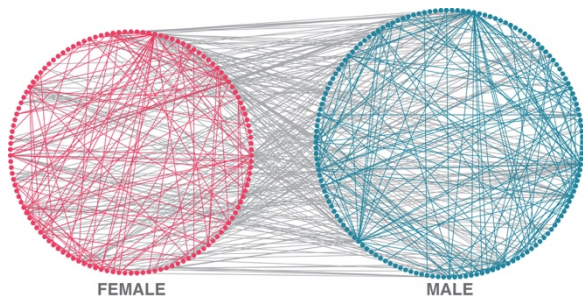


Fig.A.73. Informal Network by Gender

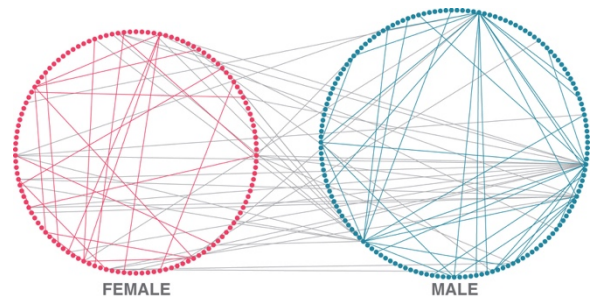


Fig.A.74. Informal Reciprocated by Gender

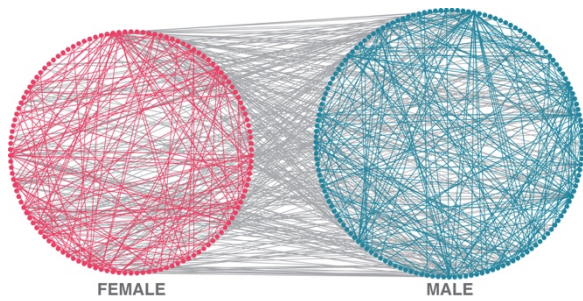


Fig.A.75. Innovation Network by Gender

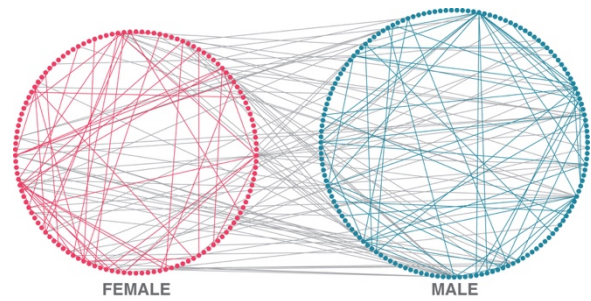


Fig.A.76. Innovation Reciprocated by Gender

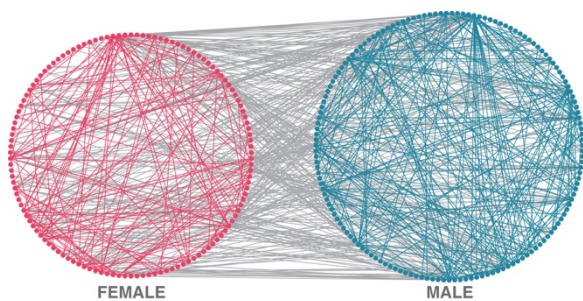


Fig.A.77. Expertise Network by Gender

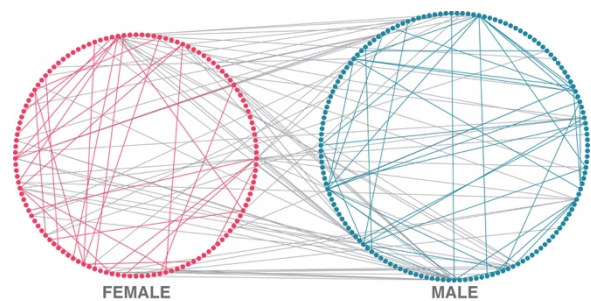


Fig.A.78. Expertise Reciprocated by Gender

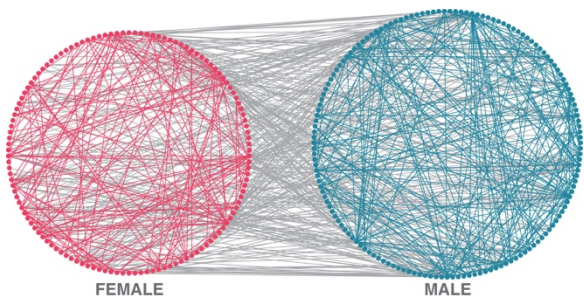


Fig.A.79. Improvement Network by Gender

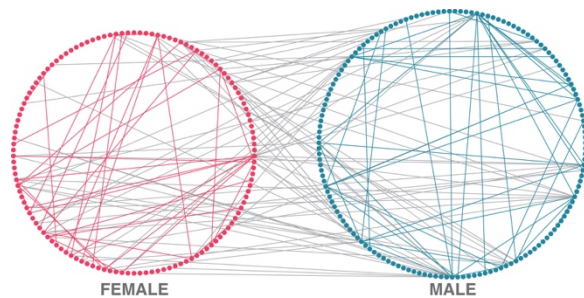


Fig.A.80. Improvement Reciprocated by Gender

A4.4.2. BSU GENDER NETWORKS

The following visualizations show interactions among Boise State University MILES participants. Nodes are arranged by gender. Blue and red edges indicate interactions between participants of the same gender.

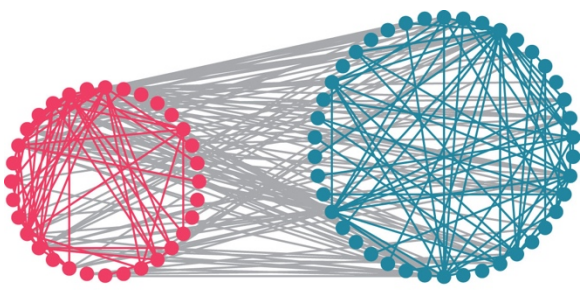


Fig.A.81. BSU Work Network by Gender



Fig.A.82. BSU Work Reciprocated by Gender

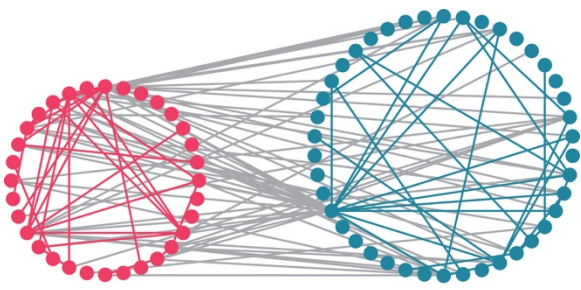


Fig.A.83. BSU Informal Network by Gender

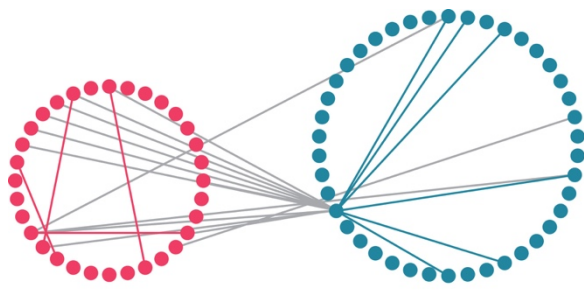


Fig.A.84. BSU Informal Reciprocated by Gender



Fig.A.85. BSU Innovation Network by Gender

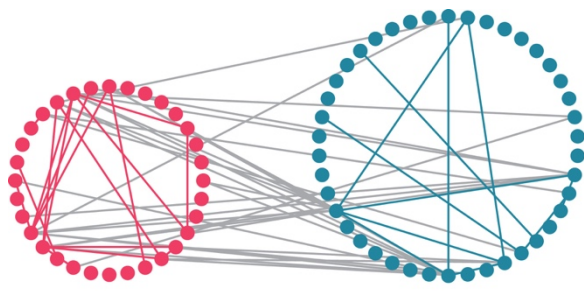
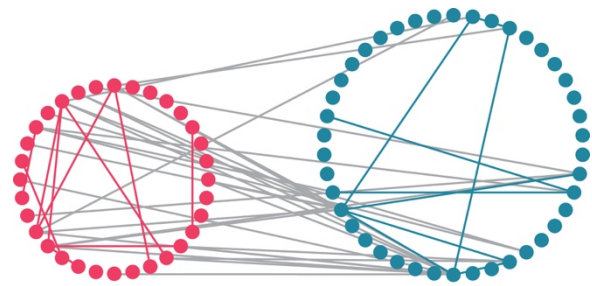


Fig.A.86. BSU Innovation Reciprocated by Gender



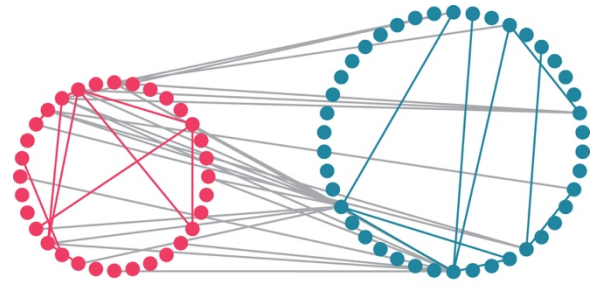
FEMALE MALE
Fig.A.87. BSU Expertise Network by Gender



FEMALE MALE
Fig.A.88. BSU Expertise Reciprocated by Gender



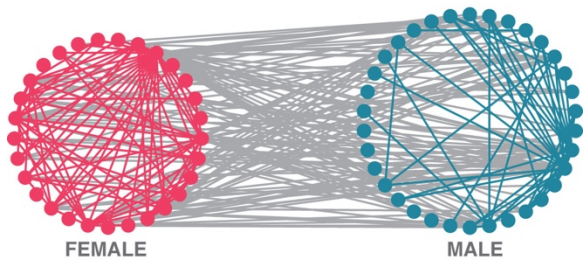
FEMALE MALE
Fig.A.89. BSU Improve Network by Gender



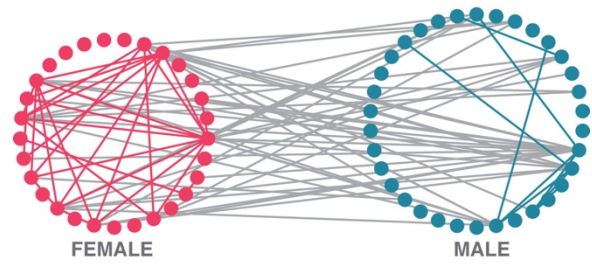
FEMALE MALE
Fig.A.90. BSU Improve Reciprocated by Gender

A4.4.3. ISU GENDER NETWORKS

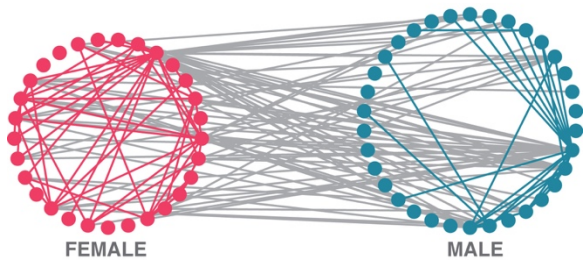
The following visualizations show interactions among Idaho State University MILES participants. Nodes are arranged by gender. Blue and red edges indicate interactions between participants of the same gender.



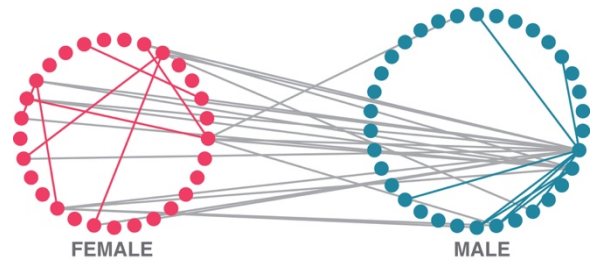
FEMALE MALE
Fig.A.91. ISU Work Network by Gender



FEMALE MALE
Fig.A.92. ISU Work Reciprocated by Gender



FEMALE MALE
Fig.A.93. ISU Informal Network by Gender



FEMALE MALE
Fig.A.94. ISU Informal Reciprocated by Gender



Fig.A.95. ISU Innovation Network by Gender

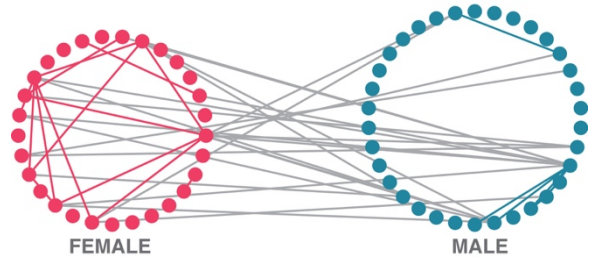


Fig.A.96. ISU Innovation Reciprocated by Gender

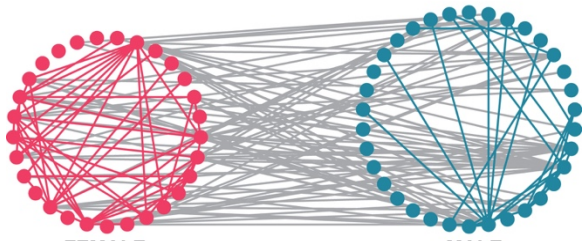


Fig.A.97. ISU Expertise Network by Gender

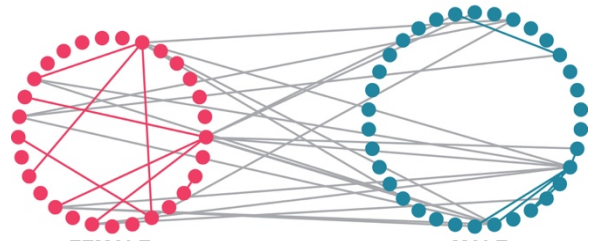


Fig.A.98. ISU Expertise Reciprocated by Gender

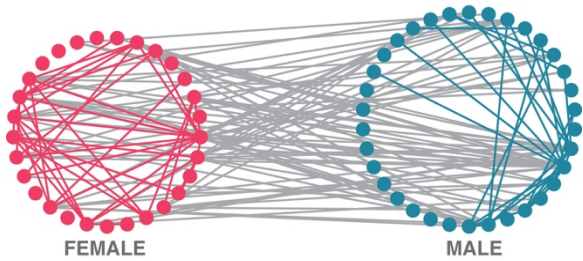


Fig.A.99. ISU Improve Network by Gender

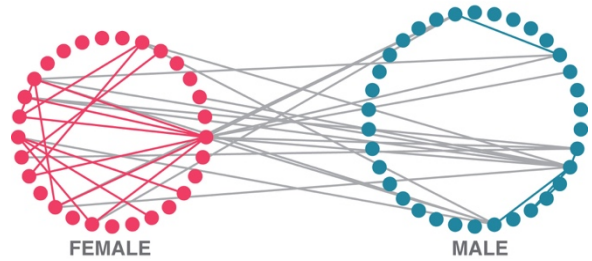


Fig.A.100. ISU Improve Reciprocated by Gender

A4.4.4. UI GENDER NETWORKS

The following visualizations show interactions among University of Idaho MILES participants. Nodes are arranged by gender. Blue and red edges indicate interactions between participants of the same gender.



Fig.A.101. UI Work Network by Gender



Fig.A.102. UI Work Reciprocated by Gender

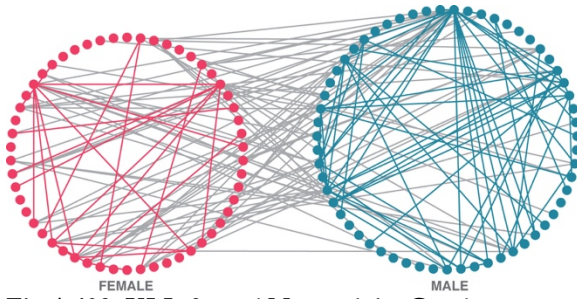


Fig.A.103. UI Informal Network by Gender

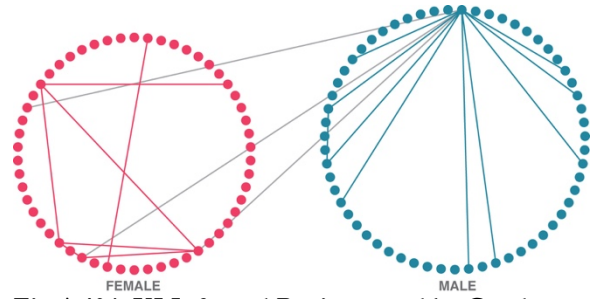


Fig.A.104. UI Informal Reciprocated by Gender



Fig.A.105. UI Innovation Network by Gender

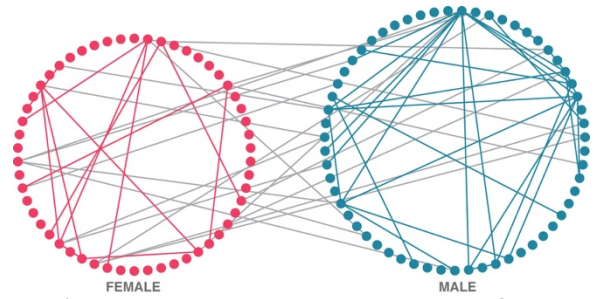


Fig.A.106. UI Innovation Reciprocated by Gender



Fig.A.107. UI Expertise Network by Gender

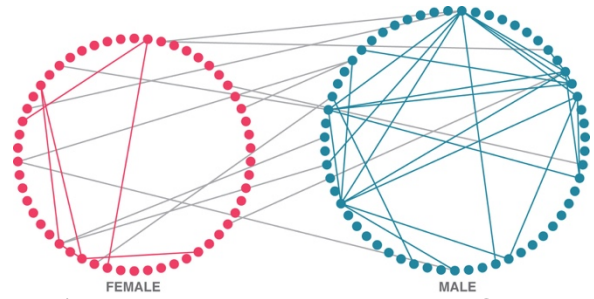


Fig.A.108. UI Expertise Reciprocated by Gender



Fig.A.109. UI Improve Network by Gender

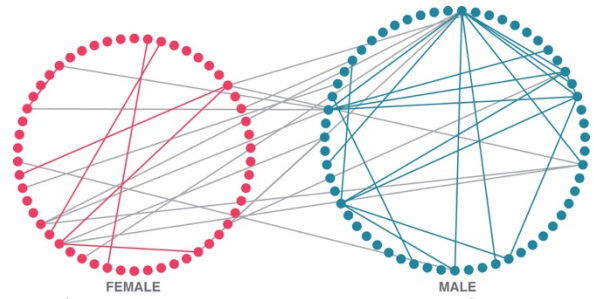


Fig.A.110. UI Improve Reciprocated by Gender