

ATE Evaluation Community Social Network Analysis Results for Year 3

Prepared for:

Lyssa Wilson Becho, Ph.D.
Principal Investigator, EvaluATE

Emma Leeburg
Co-Principal Investigator, EvaluATE

The Evaluation Center
Western Michigan University
4405 Ellsworth Hall
Kalamazoo, MI 49008

Prepared by:

Michael FitzGerald, Ph.D.
Senior Research and Evaluation Associate

Julia Siwierka, Ph.D.
Director of Research and Evaluation Services

The Rucks Group, LLC
130 W. Second St., Suite 1050
Dayton, OH 45402

April 2022



This material is based upon work supported by the National Science Foundation under grant number 1841783. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

Table of Contents

Background.....	3
Survey and Data Collection for the Social Network Analysis	3
ATE Evaluator Respondents	4
The Number, Frequency, and Types of Connections among Evaluators from 2019 to 2021	4
Visual Description of the Network using SNA.....	6
Quantitative Descriptive SNA Measures	7
Density.....	7
Centralization.....	7
Concluding Thoughts	8
Appendix A – Social Network Analysis Questions from the ATE Evaluator Survey (abbreviated version)	9

Background

An aim of EvaluATE is to increase professional exchanges among ATE evaluators. To reach this aim, EvaluATE provides opportunities for ATE evaluators to meet and learn from one another through organized events. These include the reception hosted by EvaluATE at the annual ATE PI conference, monthly webchats, and an ATE Evaluation Summit that had been planned for the end of 2020 but was delayed due to the COVID-19 pandemic. EvaluATE has also developed and promoted a dedicated Slack channel as a means for those in the ATE evaluator community to connect with EvaluATE and each other.

The Rucks Group, the external evaluator for the project, has been working with EvaluATE to explore the network of connections among evaluators in the ATE evaluation community and assess changes between them over time using social network analysis (SNA) methodology. This report provides information about the community network in Years 1, 2, and 3 of the project in terms of the number of connections among ATE evaluators, how frequently ATE evaluators connected with each other on evaluation-related matters, and what types of interactions they had.

Survey and Data Collection for the Social Network Analysis

A set of questions was developed and added to EvaluATE's annual spring survey of ATE evaluators starting in 2019 to capture the information needed for the SNA. The questions were designed to determine the number of connections among ATE evaluators as well as the characteristics of those connections in terms of interaction frequency and types. Survey respondents were first presented with sequential alphabetized lists of 20 to 30 ATE evaluators at a time. They were asked to select each ATE evaluator with whom they had at least one evaluation-related interaction within the past 12 months. Examples of evaluation interactions included the following:

- Providing evaluation guidance, resources, or information.
- Receiving evaluation guidance, resources, or information.
- Working together on an evaluation.
- Collaborating on educational or outreach activities (e.g., article, presentation, committee).

Informal types of interactions, such as conversations at conferences, are certainly important for initiating and sustaining connections. However, people's attempts to recall connections based solely on casual conversation would be burdensome and too susceptible to recall error. Consequently, respondents were deliberately directed to only consider connections that included more substantive types of evaluation-related interactions.

After identifying each of their ATE evaluator connections, respondents were then asked to indicate how often they interacted with that individual on evaluation-related matters (i.e., 1-2 times, 3-10, or more than 10) during the previous 12 months and then were instructed to identify the types of interactions they had with that person. While respondents were provided with the four types of interactions as previously described (e.g., providing evaluation guidance, resources, or information, etc.), they also had the option to select "Other" and to describe the type of interaction. An abbreviated copy of the SNA survey items is provided in Appendix A.

Findings

ATE Evaluator Respondents

EvaluATE’s survey of evaluators is administered every summer to individuals who are evaluating or who have evaluated projects funded by the National Science Foundation’s (NSF) Advanced Technological Education (ATE) program within the past five years. The primary source of names for this population comes from information gathered through the annual ATE survey, as the NSF ATE program does not maintain a database with that information, but that survey does not capture newer evaluators on projects that have not yet been submitted as well as evaluators who are seeking opportunities in the ATE area. Additional sources of information include individuals who have signed up for one of EvaluATE’s webchats or who have joined EvaluATE’s Slack Network.

In 2019, the number of evaluators identified in the ATE community – all of whom were invited to complete the survey – was 147, and 61 (42%) completed the survey. In 2020, there were 217 evaluators invited to complete the survey, with 88 (41%) who responded. Finally, in 2021, the number of identified evaluators rose to 247, with 92 (37%) responding to the survey. While the number of evaluators in the ATE community rose each year, the response rate has remained relatively steady.

Table 1 shows the number of evaluators represented in the network each year broken down by the number of individuals who completed the SNA survey that year, the number who did not respond to the survey request but were selected as a connection, and the number of evaluators who were not included in the SNA distribution that year but were written in as an additional connection.

	2019	2020	2021
Evaluators represented in the network	115	148	154
Evaluators who completed the survey (response rate)	(61)	(88)	(92)
Evaluators who didn’t complete the survey but were selected as a connection	(35)	(45)	(57)
Evaluators who were not included in the SNA survey but were written in as an additional connection	(19)	(16)	(5)

Table 1. Evaluators represented in the network across years broken down by survey response status.

While the response rates were not particularly strong over the three years, 30 individuals have completed the SNA survey in all three years.

The Number, Frequency, and Types of Connections among Evaluators from 2019 to 2021

The number of connections across all ATE evaluators who completed the survey increased from 2019 to 2021, which is consistent with the population of ATE evaluators that has increased over that same period as shown in Table 2. The average number of connections per evaluator provides a more comparable indication of the number of direct connections evaluators have in the network.

From 2019 to 2021, the average number of connections ranged from 6 to 7 which indicates that ATE evaluators continued to connect with each other, even during the COVID-19 pandemic.

Number of evaluator connections			
	2019	2020	2021
Total number of connections across all evaluators who completed the survey	422	516	577
Average number of connections per evaluator who completed the survey	7	6	6

Table 2. The total and average number of connections over the past 12 months across all evaluators who completed the survey. (2019 n=61, 2020 n=88, 2021 n=92).

While there was a decrease in the average number of connections after 2019, these averages are based on the members who responded to the survey and not the full population. Given the relatively moderate response rates, one can assume that the sample estimates are likely different than the true population and the average connections ranging from 6 to 7 should be interpreted more as consistency than meaningful difference.

There was an increase in the number of interactions per connection each year from 2019 to 2021.

As shown in Table 3, the percentage of connections characterized by only one or two interactions over the past 12 months decreased from 2019 to 2021 while the percentage of connections who interacted more than ten times increased over that period. The rise in interaction frequency was slight but it is a positive indication that the connections among those in the ATE evaluation community are increasing.

Frequency of interactions per connection			
	2019	2020	2021*
1-2 times	52%	46%	42%
3-10 times	29%	32%	33%
More than 10 times	19%	22%	25%

Table 3. The frequency of interactions per connection over the past 12 months across all evaluators who completed the survey (2019 n=61, 2020 n=88, 2021 n=92). *7 of the 577 reported connections did not include frequency data.

The majority of reported interactions between ATE community evaluators from 2019 to 2021 were in the form of receiving guidance, information, or resources.

Collaborating on educational or outreach activities and working together on evaluations were also common types of interactions between ATE evaluators as shown in Table 4.

Types of interactions			
	2019	2020	2021
RECEIVED guidance, resources, or information from this person	48%	47%	38%
PROVIDED guidance, resources, or information to this person	36%	31%	21%
Collaborated on an educational or outreach activity	28%	33%	34%
Worked together on an evaluation	29%	26%	30%
Other	10%	7%	9%

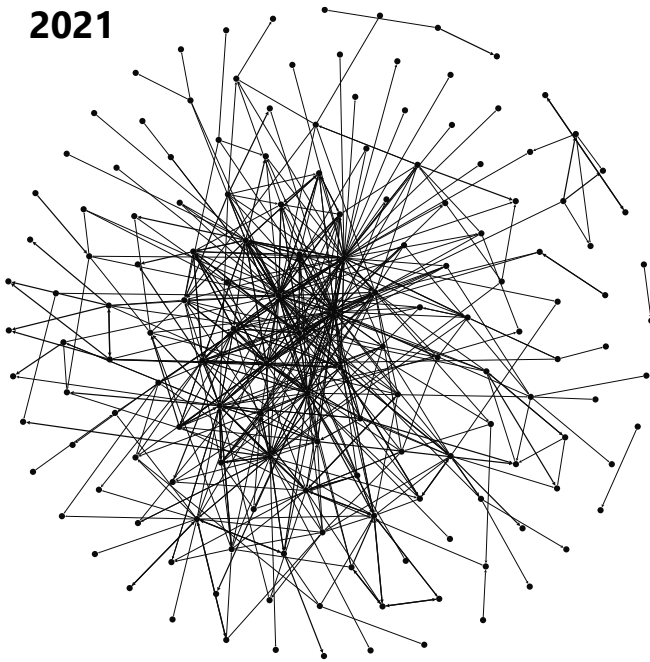
Table 4. The frequency of connection types over the past 12 months across all evaluators who completed the survey (2019 n=61, 2020 n=88, 2021 n=92). *7 of the 577 reported connections did not include frequency data.

Visual Description of the Network using SNA

A key strength of SNA as a method for evaluating networks is the ability to generate visualizations of those networks that can provide rich and useful information about the network as a whole and the position of individuals within that network. The network graphs below illustrate the increase in the number of individuals represented in the network from 2019 to 2021.

The graphs below show how that the network has consistently been characterized by a relatively small group of individuals who are highly connected within the network with the remaining individuals having relatively fewer connections.

2021



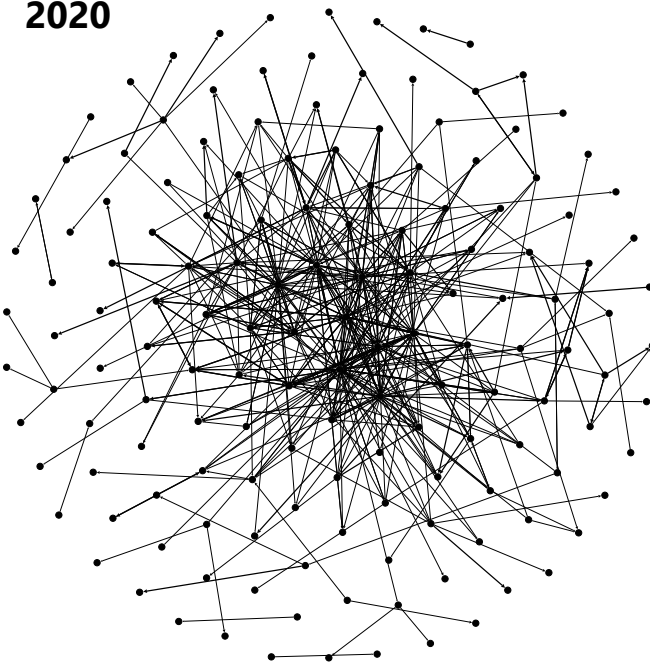
Each dot in these figures represents an individual (or "node" in SNA terminology) in the network.

- The larger and darker the dot, the more connections that individual has.

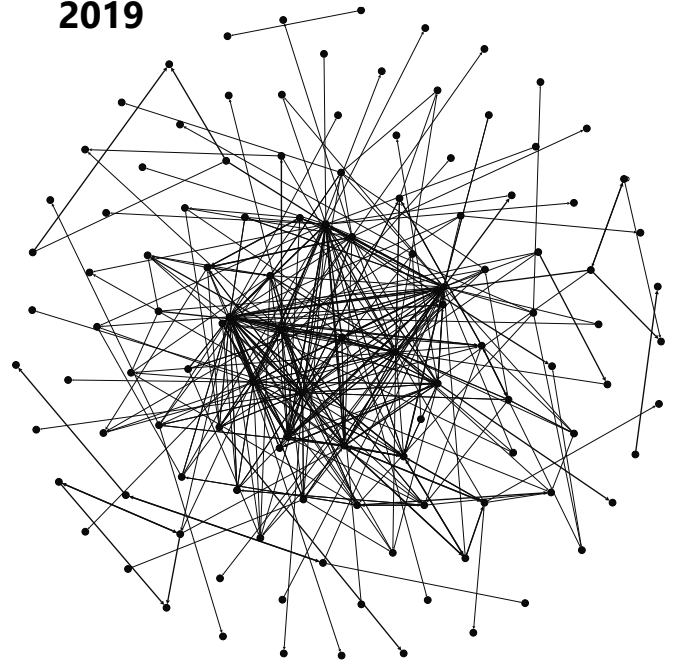
Each line represents a connection (or "edge" in SNA terminology) between two individuals.

- The darker the line, the more interactions reported for that connection over the prior year.
- An arrow indicates that one individual identified the other as a connection. Connections with arrows on each end indicate that

2020



2019



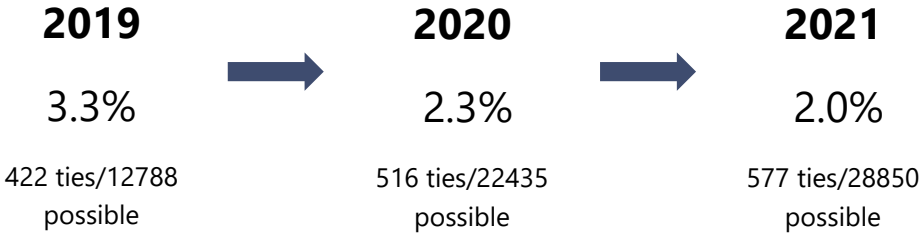
Quantitative Descriptive SNA Measures

In addition to generating powerful visual depictions of networks, SNA can also be used to quantitatively describe the networks at a given point and then tracked to monitor changes over time. For example, SNA provides measures for analyzing the degree to which the individuals within a network are interconnected (i.e., density) and the extent to which the number of connections is distributed evenly across the network (i.e., centralization). These quantitative measures in relation to the information gathered from ATE evaluators are described below.

Density

The simplest SNA measure to describe the connectedness at the network level is density, which measures the extent to which individuals in a network are interconnected. It is calculated as the total number of paired connections or ties in a network divided by the maximum number of ties possible.

There has been a slight decrease in the density of the network over the three years. This difference might be explained by the apparent increase in the number of less-connected individuals who are represented in the network.



Centralization

Degree centrality is a common individual-level measure used in SNA to denote how influential a given individual is within the network and based purely on the number of connections associated with the individual. Centralization, however, is a network-level measure that indicates the extent to which the number of connections varies among members in a network. In a highly decentralized network, most individuals within the group have similar numbers of connections while in a highly centralized network, most connections are held by a small minority of individuals. Centralization ranges from 0 (i.e., all individuals have the same number of ties to others) to 1 (i.e., all ties are held by a single individual in the network).

The network is characterized by a relatively few number of individuals who are highly connected within the network.



Concluding Thoughts

This report provides a description of the ATE evaluator community in 2019, 2020, and 2021. The network of ATE evaluators continues to be characterized by a relatively small number of individuals who are highly connected or central within the network. However, the data also continue to show an increase in the number of individuals who have developed a few connections within the network. It is hoped that EvaluATE's efforts to provide more opportunities for evaluators to connect will also lead to an increase in the interconnectedness among those members, thus decreasing the network density. As a consequence, ATE evaluators will develop a broader range of individuals to whom they can go for evaluation-related guidance, support, and collaboration.

Recommendations

The consistently moderate response rates on the SNA survey make it difficult for the project team to draw confident conclusions about the true nature of the connections among ATE evaluators, particularly in terms of changes over time. Rather than using the SNA data to understand the network as a whole, it is recommended that the project team use the data to identify opportunities for connecting some of the less-connected individuals within the network. The project team could also use the data to identify individuals who seem particularly well-connected and to learn more about the nature of those connections and what those evaluators are doing to develop and expand their own networks. Information gathered through this process could then inform efforts to help less connected evaluators meet and interact with other evaluators in the ATE community.

Appendix A – Social Network Analysis Questions from the ATE Evaluator Survey (abbreviated version)

You will be presented with 7 alphabetized lists of ATE evaluators. Each list will contain 20 to 30 names. This may sound like a lot, but it should take no more than 5 minutes to complete this part of the survey. Please select the name of each evaluator with whom you have had at least one evaluation-related interaction in the past 12 months.

Evaluation-related interactions could include any of the following: Providing or receiving evaluation guidance, resources, or information; Working together on an evaluation; Collaborating on educational or outreach activities (e.g., article, presentation, committee).

Q1. I have had at least one evaluation-related interaction with each of the following individuals in the last 12 months.

- Name 1 Name 2 Name 3

Q2. Can you think of any other ATE evaluators with whom you have had at least one evaluation-related interaction in the last 12 months?

- Yes No

Display this question if Q2 = Yes

Q3. Please enter the me(s). _____

Q4. What types of evaluation-related interactions have you had with each person in the last 12 months? (Select all that apply)

Carry forward names selected in Q2 and write-ins from Q3

	PROVIDED guidance, resources, or information	RECEIVED guidance, resources, or information	Worked together on an evaluation	Collaborated on an educational or outreach activity	Other
Name 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name (write-in)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q5. About how often have you had evaluation-related interactions with each person in the last 12 months?

Carry forward names selected in Q2 and write-ins from Q3

	1 – 2 times	3 -10 times	More than 10 times
Name 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name (write-in)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>