Social Network Analysis Research Report: Realizing Relationships for Distance Education
Pilot Studies in Jordan and Uganda
The Inter-agency Network for Education in Emergencies (INEE) is a global open network of members who are working together within a humanitarian and development framework to ensure that all individuals have the right to a quality, safe, relevant, and equitable education. INEE’s work is founded on the fundamental right to education. For more information and to join INEE, visit inee.org.

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Cover Image:
A group of learners in Palorinya Refugee Settlement during a small group learning session revise their work as they wait for the teacher to arrive. © Windle International Uganda

Acknowledgments:
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ACRONYMS

DE ———— Distance Education
ECHO ———— European Commission’s Civil Protection and Humanitarian Aid Operations
EIE ———— Education in Emergencies
NGO ———— Non-governmental Organization
NRC ———— Norwegian Refugee Council
SNA ———— Social Network Analysis
UNESCO ———— United Nations Educational, Scientific and Cultural Organization
UNICEF ———— United Nations Children’s Fund
UNRWA ———— United Nations Relief and Works Agency for Palestine Refugees
**KEY TERMINOLOGY**

<table>
<thead>
<tr>
<th>Key Term</th>
<th>Definition</th>
</tr>
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<tbody>
<tr>
<td>Eigenvector Centrality</td>
<td>Eigenvector Centrality is a measure of the influence of a node in a network. It is calculated using an algorithm that measures the transitive influence of nodes. Relationships originating from high-scoring nodes contribute more to the score of a node than connections from low-scoring nodes. A high eigenvector score means that a node is connected to many nodes who themselves have high scores.</td>
</tr>
<tr>
<td>Eigencentrality Values</td>
<td>As Eigenvector Centrality is used to measure the level of influence of a node within a network; each node within the network is given a score or value: the higher the score the greater the level of influence within the network. This score is relative to the number of connections a node will have to other nodes.</td>
</tr>
<tr>
<td>Exponential Random Graph (ERG) Models</td>
<td>ERG models are a family of statistical models for analyzing data from social networks. The basic assumption of these models is that the structure in an observed graph $\gamma$ can be explained by a given vector of sufficient statistics $s(\gamma)$ which are a function of the observed network and, in some cases, nodal attributes. These models represent a probability distribution on each possible network on $n$ nodes.</td>
</tr>
<tr>
<td>K-core Analysis</td>
<td>A K-core is the maximal subgraph where all vertices have degree at least $k$.</td>
</tr>
<tr>
<td>Snowball Sampling</td>
<td>In social network analysis and statistics research, snowball sampling is a nonprobability sampling technique where existing study subjects recruit future subjects from among their acquaintances. Thus the sample group is said to grow like a rolling snowball.</td>
</tr>
<tr>
<td>Social Network Analysis (SNA) Metric</td>
<td>SNA is a process of investigating social structures through the use of networks and graph theory. SNA metrics characterizes networked structures in terms of nodes (individual actors, people, or things within the network) and the ties, edges, or links (relationships or interactions) that connect them. Metrics for whole networks provide insights into patterns of relationships that connect social actors.</td>
</tr>
</tbody>
</table>
SUMMARY

This report explores how social network analysis (SNA) could shed light on educational shifts, such as the switch to distance learning during the COVID-19 pandemic, and presents findings from pilot SNA studies of distance education for refugees in Jordan and Uganda.

SNA measures how actors are connected within a network. It illuminates how the structure of or an actor’s positionality within a network affects social outcomes (Folke, 2006; Light & Moody, 2020), in this case the provision of distance education for refugees. Traditionally, the provision of education has been viewed as the output of a static system governed by hierarchical relationships. However, it is increasingly understood as a complex and dynamic ecosystem in which influence, resources, and ideas enter at different points and travel along diverse pathways.

The pilot studies conducted in Jordan and Uganda explored what facilitated and what inhibited distance education for refugees in the midst of the COVID-19 pandemic, with particular attention given to the network of relationships among distance education policy, content development and curation, teacher preparation, and delivery actors. Data was collected from individuals who worked for organizations that delivered, or supported the delivery of, distance education for refugees in Uganda and Jordan in 2021.

The findings point to social power, distinct communities of organizations within the network, and the actors’ positionality and degree of connectivity as facilitators and inhibitors. More specifically:

- The number of actors active in distance education networks in Uganda and Jordan was larger than the number predicted.
- The networks of distance education actors in Uganda and in Jordan are structured differently, though both are hierarchical.
- Some actors are more central within the networks. In the Jordanian network, they are UNICEF, War Child Holland, Care International, Luminus Education, and the Education Sector Working Group. In the Uganda network, they are Finn Church Aid, Windle International, Norwegian Refugee Council, Plan International Uganda, and Humanity and Inclusion.
- The same actors were positioned differently in the two countries.
- International actors were central within the networks, and the central community in the networks was composed of international actors and the national governments.

Following this, the key recommendations for actors involved in delivering distance education for refugees in Uganda and Jordan are as follows:

- Use the knowledge from this research of the structural features of the network to:
  - facilitate improvements in distance education for refugee outcomes; for example, by forming more reciprocal ties
  - shift power dynamics; for example, by promoting localization/decolonization by funding a local NGO to chair their Education Sector Working Groups
- Expand this research to investigate how the social networks that support distance education for refugees:
  - vary between countries
  - change over time
  - are connected to the networks delivering distance education to citizens
  - are connected to the networks delivering in-person education to refugees
  - are affected by investments in sector coordination
- Use SNA to research gaps in service delivery—for example, gaps to certain regions or populations—and to research other networks that affect the delivery of distance education for refugees; for example, teachers’ professional support networks
- Ensure that the design of further SNA research incorporates learning from this research to improve response rates, facilitate knowledge mobilization, and allow comparability with this research.

The findings based on SNA not only help to answer the research question, they also support organizations, such as ministries of education and education sector working groups and their partners, by providing new data and information to enhance strategic planning and change management activities.

The COVID-19 pandemic presented an unprecedented global challenge to the education sector. In response to prolonged school closures that affected an estimated 1.6 billion children around the world, distance education was widely adopted (UNESCO, 2020). This rapid switch to a different way of teaching and learning forced institutions to work in new ways, accelerated changes that were already under way, and made extraordinary demands on administrators, teachers, students, and parents. While the adoption of distance education potentially mitigated learning loss and helped many students stay connected to school, for refugee students it also compounded existing challenges and created new obstacles.

During the rollout of distance education for refugees, there was little time to ensure that the approaches taken were evidence based or to set up monitoring and evaluation systems (Bashir, Groeneveld, & Kaye, 2020). Two and a half years later, stock is being taken of the process and outcomes of making this dramatic shift in learning modalities. This report explores how SNA could improve understanding of educational shifts and presents the findings from pilot studies of distance education for refugee networks in Jordan and Uganda.

WHAT IS SOCIAL NETWORK ANALYSIS?

The premise of SNA is that relationships among different actors of an ecosystem or network affects the achievement of social outcomes. In our case, the provision of distance education for refugees is dependent on the way different network players interact and support each other. It is not merely the actors’ characteristics that predict whether distance education succeeds but how the actors are connected and how they interact. Actors in distance education ecosystems exert power over one another, and information and resources flow through the relationships between them. SNA also can improve understanding of individual outcomes; for example, an actor’s position in a network determines the constraints and opportunities they face, and thus their behavior or beliefs (Borgatti, Everett, & Johnson, 2018).

SNA seamlessly combines qualitative and quantitative information to produce visual graphics of the network. In structured interviews, participants name the distance education actors they have relationships with and describe the nature of those relationships. Graph theory is then used to turn that qualitative data into quantitative data that can be visualized and statistically analyzed.

SNA can be used to study whole networks—for example, all the students in a school or the organizations that are members of an association—or it can be used to study the social network of a single actor, such as a teacher’s professional support network. This study took a whole network approach.
Social Network Analysis Research Report: Realizing Relationships for Distance Education

Traditionally, the provision of education was viewed as the output of a static system governed by hierarchical relationships. It is being understood increasingly as a complex and dynamic ecosystem in which influence, resources, and ideas enter at different points and travel along diverse pathways.

Figure 1. Types of networks

Recognizing the importance of relationships in delivering education for refugees, the Technical Note on Education During the COVID-19 Pandemic, which is aligned to the INEE Minimum Standards Handbook, calls on education actors to coordinate activities and create links with other sectors and their response plans; to be inclusive and to share power and resources with local actors; to engage collaboratively with other actors (e.g., the parents and caregivers supporting children’s learning at home); and to address the marginalization of education-sector personnel. These are all relational goals that can be measured by an analysis of the networks that comprise the refugee education ecosystem.

A relational approach to studying and explaining education is particularly relevant to distance education. For one, technology facilitates and changes how and with whom we build relationships. For example, in the past, a classroom teacher working in a rural area might only have regular access to their students, other teachers in their school, their principal or head teacher, parents and community members, and occasionally a visiting ministry of education official. Professional knowledge was gleaned primarily from books, which often were not readily available or affordable. The education system itself was run through face-to-face meetings, written communications, and, later, cell phone calls. This network did not change substantially over time. Now, a rural school teacher with a smartphone and data plan has the potential to connect with millions of colleagues all over the world and with a dizzying variety of educational resources, many of them free. At the beginning of the COVID-19 pandemic, countless new relationships and the resulting networks for delivering distance education were forged within months, sometimes even weeks. When public health restrictions closed formal institutions, education actors had to rely more heavily on their informal networks.

Analysis of social networks for distance education illuminates the engagement of new actors (e.g., technology and communications companies), changes in the roles and relationships among actors, and the pathways along which ideas, influence, and resources travel. With this new awareness, actors within the network, or those who are trying to influence the network, can adjust their behavior to take advantage of network dynamics or even effect change in the network’s composition and structure.
Goal and research question

The goal of this report is to show the results of two SNA pilots that were created to help understand the rollout of distance education in Jordan and Uganda in response to the COVID-19 pandemic, and to recommend how the sector could use SNA in the future to make better decisions.

The research question is, What facilitated and inhibited the delivery of distance education for refugees in the midst of the COVID-19 pandemic, in particular the relationships among distance education policy, content development and curation, teacher preparation, and delivery actors?

Data was collected from individuals who worked for organizations that deliver, or support the delivery of, distance education for refugees in Uganda and Jordan. Participants answered questions about
- their organizations, including the type of organization (government, NGO, international organization, etc.), whether its headquarters was based in Uganda/Jordan or in a foreign country;
- who their organization shared information and resources with and whom they collaborated with in 2021;
- how closely their organization worked with these other organizations; and
- their organization's distance education programming in 2021, including the type of activities, distance education programming goals, number of employees, budget, number of beneficiaries, and populations targeted.

The research also passed the International Rescue Committee’s ethical review process, and informed consent was obtained from the participants.

See Annex A for a description of the research methodology and Annex B for the questions included in the tool.

Case study countries: Uganda and Jordan

Uganda and Jordan were selected for the pilots because they are major refugee-hosting countries where research with refugees could be conducted with relative ease.

Both countries have progressive refugee education policies, including extending free and mandatory primary-level schooling to refugees of most nationalities within the national education system. However, in both cases, school-age refugees still experience challenges enrolling in, attending, and achieving at school (UNICEF, 2020). Both countries experienced prolonged school closures during the COVID-19 pandemic. In Jordan, in-person schooling was closed for 44 weeks and was only partially open for a further 10 weeks (UNESCO, 2022). In Uganda, in-person schooling was closed for 66 weeks and was partially open for a further 23 weeks.

Figure 2 summarizes some differences between the two countries that may be relevant to the provision of distance education; namely, that Jordan is wealthier and has better access to advanced information and communication technologies. The refugees in Jordan are settled primarily in urban areas (including urban camps), whereas the reverse is the case in Uganda.

Figure 2. Comparison of indicators relevant to distance education in Jordan and Uganda

<table>
<thead>
<tr>
<th>INDICATOR</th>
<th>JORDAN</th>
<th>UGANDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per-capita GDP (as of 2021)</td>
<td>$4,405</td>
<td>$848</td>
</tr>
<tr>
<td>Literacy Rate (as of 2021)</td>
<td>98%</td>
<td>77%</td>
</tr>
<tr>
<td>% of population with access to electricity (as of 2020)</td>
<td>100%</td>
<td>~42%</td>
</tr>
<tr>
<td>% of total population who were refugees (2020-2021)</td>
<td>10.7%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Refugees’ top countries of origin</td>
<td>Palestine and Syria</td>
<td>South Sudan and DRC</td>
</tr>
<tr>
<td>% of refugees settled in urban locations</td>
<td>83%</td>
<td>6%</td>
</tr>
<tr>
<td>% of refugees settled in rural areas</td>
<td>17%</td>
<td>94%</td>
</tr>
<tr>
<td>% of refugees who have a smartphone</td>
<td>73%</td>
<td>8%</td>
</tr>
</tbody>
</table>

Sources: World Bank, 2022a; World Bank, 2022b; World Bank, 2022c; NRC, 2021; UNHCR, 2021a; UNRWA, 2021; GSMA, 2020
What is distance education?

INEE defines “distance education” as an umbrella term encompassing a variety of education approaches that is applied when teachers and learners are separated by space and time, or both. Distance education includes high-, low-, and no-tech approaches and solutions, as well as formal and non-formal learning at multiple levels (pre-primary, primary, secondary, post-secondary, and all tertiary levels, including technical and vocational education and training). Terms like “distance learning,” “online learning,” “remote learning,” and “e-learning,” all of which identify technology-enabled education approaches that require digital devices and internet connectivity, are a critical subset of the wider distance education arena (INEE, 2022).

This research was an opportunity to validate this definition and clarify what types of activities actors are implementing to support distance education. Figure 3 presents the forms of distance education supported in 2021 by the education actors interviewed in Uganda and Jordan. Some of these types of distance education utilized newer forms of technology (e.g., online platforms), while others utilized much older technology or even no technology (small-group learning and home visits). The findings show that only around two-thirds of the organizations interviewed in Jordan and a just under half in Uganda did not support online learning, so distance education was clearly not synonymous with online learning in these contexts. There also were differences in the forms of distance education being implemented in the two countries. Few organizations in Uganda supported the use of learning delivered via electronic devices, which likely reflects the low level of access to electricity, the exception being inexpensive devices that use batteries, like cell phones and radios. In Jordan, no organization reported supporting learning through radio programs, while around half reported doing so in Uganda.

Figure 3. Forms of distance education supported by organizations participating in the research

<table>
<thead>
<tr>
<th>Jordan</th>
<th>Percentage of Organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online platform (website)</td>
<td>75</td>
</tr>
<tr>
<td>WhatsApp groups</td>
<td>50</td>
</tr>
<tr>
<td>YouTube videos</td>
<td>25</td>
</tr>
<tr>
<td>Offline computers or tablets</td>
<td>0</td>
</tr>
<tr>
<td>Educational games</td>
<td>0</td>
</tr>
<tr>
<td>Radio</td>
<td>0</td>
</tr>
<tr>
<td>TV</td>
<td>0</td>
</tr>
<tr>
<td>Printed materials</td>
<td>0</td>
</tr>
<tr>
<td>Small group learning</td>
<td>0</td>
</tr>
<tr>
<td>Home visits</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Uganda</th>
<th>Percentage of Organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online platform (website)</td>
<td>75</td>
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<td>0</td>
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<tr>
<td>Printed materials</td>
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<td>Small group learning</td>
<td>0</td>
</tr>
<tr>
<td>Home visits</td>
<td>0</td>
</tr>
</tbody>
</table>
Actors were recruited into this study through snowball sampling. Beginning with a handful of initial actors, the participants were asked to provide contact information for all the organizations they interacted with that delivered or supported the delivery of distance education for refugees at the primary school level. The research focused on organizational actors rather than individuals, which included:

- **Policy actors**: organizations that influence, develop, and decide on distance education policy for refugees
- **Education content creation actors**: organizations that influence, develop, decide on, and finance distance education content for refugees
- **Teacher professional development actors**: organizations that train those who teach refugees.
- **Education provision actors**: organizations that provide or fund distance education services for refugees

Following from this starting point, inclusion and exclusion criteria were developed for the research. Whole network SNA requires a very high rate of participation of network members (around 70%) for some types of analysis. Given the available resources, the boundaries for the network were set to include around 30 actors. This meant excluding individual schools and education actors who did not have offices in either Uganda or Jordan. However, the actual number of actors who met the inclusion criteria was much higher than expected and, due to the low and slow response to interview requests and the participants’ reluctance to share contact information for other actors in their network, the actual number of interviews conducted was 15 in Uganda and 20 in Jordan. While it was still possible to generate powerful and relevant analysis from this data, interviewing more actors in the network would have increased the number of questions addressed by the research. It was rare for new organizations to be mentioned in later interviews, which suggests that most organizations in the network were identified.
FINDINGS

The analysis uncovered information about the size of the distance education networks, the uniqueness of the structures of the network in each country, the position of the same or similar organizations across the two networks, the networks’ most central actors, in which network it was easiest to form mutual relations, the centrality of national and international organizations in the network, and the organizations within each network.

The number of actors in distance education networks in Uganda and Jordan was larger than actors expected

Contrary to the hypothesis formulated during the pre-research phase of the research—that is, that the networks would comprise around 30 actors in each country—we identified 70 in Uganda and 116 in Jordan (see Figure 4 for more details). While the number could be higher, few new organizations were named during the later interviews, which suggests that we identified most actors in the networks. The researchers’ impressions are that the interviewees may have under-reported their relationships with the companies to which organizations subcontracted services, community-based organizations, schools (though interviews were not sought with school officials, schools were included in the network), and in some cases national NGOs.

Figure 4. Types of organizations present in the network
A participant in Jordan suggested the study may have missed some Arab/Islamic actors and the Jordanian organizations they support.

Refugee students in both countries are integrated into the national school system and thus benefit from the education networks that support Jordanian and Ugandan students. It is likely that some actors in this extended network were missed because we only interviewed organizations that directly supported the delivery of distance education to refugees. Examples might include a telecom company that provided free data credit to all students in the country, the company that designed the national online learning system, departments within the ministry of education that do not directly serve refugees but do significant work on distance education, radio and TV stations that broadcast to all students, and consultants who designed distance education materials that were available to all students. What this points to is the possibility that the distance education for refugee networks is distinct from the national distance education network.

Implications:
- Underestimating the size of the network may lead to the exclusion of more peripheral actors from social networks, which could compromise planning and coordination efforts.
- Certain types of actors may be excluded from sector coordination even though they participate in information-sharing, resource transfer, or collaboration.
- If the networks of distance education actors working with refugees and those working with Ugandans and Jordanians are distinct, it may mean that refugee-serving actors have less influence over the design and delivery of the distance education system as a whole.

The networks of distance education actors in Uganda and Jordan are structured differently; however, both are hierarchical

As can be seen in the visualizations presented in Figure 5, the structure and makeup of the networks providing distance education for refugees in Uganda and Jordan are distinct. This is despite the fact that many actors are the same or similar in the two countries, as are the refugee response coordination mechanisms.

The Jordanian network is unipolar, with UNICEF at the center (shown on the far left in Figure 5). There is a second tier of influential actors (shown in the middle), and, finally, the peripheral actors. Pendants, actors who have only one tie to the network, do not appear in this visualization.

An interconnected group of mostly international NGOs is at the center of the Uganda network. While eight of these are the most central, there is a sizable group of core actors who exert a similar degree of influence within the network. They are surrounded by a second tier of peripheral actors; the pendant actors are not shown in the visualization.

Implications:
- The way distance education actors are networked may differ between countries. Therefore, it can be concluded that network structure is a variable worth considering when studying what contributes to success in the provision of distance education to refugees across contexts. Comparative research like this could determine whether different network patterns explain different outcomes from distance education for refugees.
- Those who work across contexts should expect differences in how the distance education networks are structured. They should take time and devote resources to learning about these networks.
Figure 5. Visualization of Jordanian and Ugandan networks by eigencentrality values

**KEY**

<table>
<thead>
<tr>
<th>Color</th>
<th>National</th>
<th>International</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Square</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Down Triangle</td>
<td></td>
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<tr>
<td>Up-Triangle</td>
<td></td>
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</tr>
<tr>
<td>Diamond</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NGO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circle-in-box</td>
<td></td>
<td>Private</td>
</tr>
</tbody>
</table>

More central
Some actors are central in each network

In this report, we report on eigencentrality, which is a measure of how well connected an actor is to the whole network, not just to those to which the actor is directly connected. Centrality is often considered a measure of social power (Light & Moody, 2020), not just ascribed power—the power the ministry of education or even an education sector working group has due to its formal authority—but achieved, or informal, power.

Below is a listing of the top five central actors for each network with their eigencentrality value.

**Figure 6. Actors with the highest eigencentrality value**

<table>
<thead>
<tr>
<th>JORDAN</th>
<th>UGANDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. UNICEF (0.4)</td>
<td>1. Finn Church Aid (0.29)</td>
</tr>
<tr>
<td>2. War Child Holland (0.3)</td>
<td>2. Windle International (0.28)</td>
</tr>
<tr>
<td>3. Care International (0.2)</td>
<td>3. Norwegian Refugee Council (0.27)</td>
</tr>
<tr>
<td>4. Luminus Education (0.2)</td>
<td>4. Plan International Uganda (0.25)</td>
</tr>
<tr>
<td>5. Education Sector Working Group (0.2)</td>
<td>5. Humanity and Inclusion (0.25)</td>
</tr>
</tbody>
</table>

Because one form of power can be converted into another, social power may also go hand in hand with political power, economic power or influence, the ability to use or mobilize the use of force, or the ability to transmit information or change minds (Morrison et al., 2010). Following from this, social power may contribute to an organization’s ability to achieve distance education for refugee-related outcomes; however, more research is needed to determine under what circumstances this would be the case. This convertibility of power does not necessarily mean that all forms of power are concentrated in the hands of those most central to the network. For example, in the network for delivering distance education to refugees, neither national nor foreign governments are central, although one assumes that they have power through the resources they control as foreign donors and, in Jordan and Uganda, by virtue of being the governing entities.

**Implications:**

- International NGOs wield the most social power in the networks in both Jordan and Uganda, more so than international donor governments or the national governments, and much more so than national NGOs, the private sector, or educational institutions. The sector may wish to reflect on this distribution of power and what follows from it.
- Social power may facilitate an organization’s achievement of outcomes related to distance education for refugees; however, achieving and maintaining social power requires the expenditure of resources.
- An individual or organization seeking to achieve social (or other forms of) power in the network may benefit from fostering relations with organizations central to the network. This could be a new actor looking to enter the network or an existing actor looking to increase its influence. An actor may increase its social power by increasing the number of organizations it has relationships with along the three dimensions included in this research: information-sharing, resource transfer, and collaboration.
- It may be worth considering centrality when deciding which organization should chair a coordination mechanism, which organization to fund, which organization to partner with, which organization to apply to work for, or which to engage with when trying to create change in the network as a whole.

The same actors are sometimes positioned differently in the two networks

Some of the same actors are found across both contexts. For example, UNICEF, Plan International, and the Norwegian Refugee Council work on distance education in both Uganda and Jordan. There also are organizations that serve a similar function in both countries, such as the ministries of education. It might be expected that the same organization will occupy a similar position in both networks, but this is not the case. The same actor (or type of actor) often holds a different position in Jordan than in Uganda. For example, UNICEF is the lone central actor in the Jordan network but a second-tier actor in the Ugandan network.
Implications:
• International organizations, or national organizations with similar functions (e.g., ministries of education or education sector working groups), do not necessarily occupy a similar place in distance education networks across contexts. While the organizations themselves are likely aware of this, foreign donors that fund organizations in multiple countries should keep this in mind.

It is easier to form mutual relations in Jordan than in Uganda

Using exponential random graph (ERG) modeling, it was possible to estimate the likelihood of relationships being formed, given the observed network data. Based on this analysis, we found that it is easier to form mutual relations (i.e., a relationship in which A connected to B and B also connected to A) in Jordan than in Uganda. This powerful modeling technique can also provide insights into which attributes predict different network features; for example, an ERG model can provide insight into the likelihood of realizing a performance indicator (e.g., rates at which refugees’ access distance education), given the observed network. This could be determined if the number of countries included in this study were increased.

Implications:
• Actors in Jordan may have an easier time forming new relationships than actors in Uganda.
• It may be easier for new actors to enter the Jordanian network than the Ugandan network.
• Diffusion of information and collaboration may happen more organically or more quickly in Jordan than in Uganda.
• If the study were replicated in more countries, it would be possible to determine which performance indicators (e.g., rates at which refugees’ access distance education) predict the likelihood of relationships being formed.

Coordination actors are well positioned to carry out their roles in these networks

Though not at the center of the networks, the Education Sector Working Group (ESWG) in both countries is well positioned to have influence over other actors. Jordan is the 5th-most central actor, with an eigencentrality value of 0.20; the ESWG in Uganda is the 25th-most central actor, with an eigencentrality value of 0.18. The ESWGs in these countries are generally housed by one of the members and co-chaired by two or more members. It is notable that the organizations that house or co-chair the ESWG are even more central to the network than the ESWG itself. In both countries, the most central actor, UNICEF in Jordan and Finn Church Aid in Uganda, hosts the ESWG coordinator.

Implications:
• The ESWG’s social power may in part derive from the social power of the organization that hosts its coordinator. It is also possible that the organization gains social power by hosting the ESWG coordinator.
• If the sector wished to vigorously pursue localization/decolonization, it could increase the social power of, for example, a national NGO by having it host the ESWG coordinator.

International actors are likely to be at the center of these networks

International organizations dominated central positions in the network maps, except for the ESWG in Jordan. International organizations consisted of both UN agencies and international NGOs. With the high number of network pendants, our analysis did not provide a clear correlation between nationality and centrality measures; however, qualitatively, international actors were predominantly at the center of both the Ugandan and Jordanian network maps.

Implications:
• International actors have more social power in distance education networks, especially compared to national NGOs. Social power can translate into other forms of power. This finding is consistent with anecdotal evidence about the exclusion of national NGOs and community-based organizations from, for example, access to resources:
EiE Working Group representation: Although it is an open forum, the EiE Working Group has been made up predominantly of international organizations, with the limited participation of local and national NGOs. This may be a reflection of the context, where INGOs make up the majority of actors implementing inside the refugee settlements, and many local organizations do not have presence in Kampala. However, as the ECW call for proposals was disseminated via the EiE WG, this limited the participation of local actors in the process. When local organizations working in the education sector were asked why they had not applied, they said that they were not aware. There have also been challenges with coordination between national and district-level working groups, meaning calls for proposals are not always disseminated to field level. (Uganda’s Education in Emergencies (EiE) Working Group, 2019)

The most powerful community in both networks is comprised nearly entirely of international organizations and the national government

In Uganda and Jordan, the actors are connected in communities, which are groups of actors that are more connected to each other than to the other actors in the network. K-core analysis is used to identify these. There are ten communities in the Ugandan network and seven in the Jordanian network; the members are listed in Figure 7. In both cases, the central community is more tightly knit than the more peripheral communities.

Figure 7. Members of the central community

<table>
<thead>
<tr>
<th>JORDAN</th>
<th>UGANDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVSI Foundation</td>
<td>Care International</td>
</tr>
<tr>
<td>BRAC</td>
<td>ECHO</td>
</tr>
<tr>
<td>Developing Brains Uganda</td>
<td>Education Sector Working Group</td>
</tr>
<tr>
<td>Education Sector Working Group</td>
<td>International Rescue Committee</td>
</tr>
<tr>
<td>Finn Church Aid</td>
<td>Luminus Education</td>
</tr>
<tr>
<td>Humanity and Inclusion</td>
<td>Ministry of Education</td>
</tr>
<tr>
<td>International Rescue Committee</td>
<td>Ministry of Planning and International Cooperation</td>
</tr>
<tr>
<td>Ministry of Education and Sports</td>
<td>Plan International</td>
</tr>
<tr>
<td>Norwegian Refugee Council</td>
<td>Qudrat Association</td>
</tr>
<tr>
<td>Plan International Uganda</td>
<td>Relief International</td>
</tr>
<tr>
<td>Save the Children</td>
<td>UNICEF</td>
</tr>
<tr>
<td>Street Child International</td>
<td>UNRWA</td>
</tr>
<tr>
<td>UNHCR</td>
<td>War Child Holland</td>
</tr>
<tr>
<td>UNICEF</td>
<td></td>
</tr>
<tr>
<td>VVOB Education for Development</td>
<td></td>
</tr>
<tr>
<td>War Child Canada</td>
<td></td>
</tr>
<tr>
<td>Windle International</td>
<td></td>
</tr>
</tbody>
</table>

The existence of a central community of international agencies and the national government speaks to the consolidation of social power within this community in both networks. The corollary is that actors outside of these central communities would likely struggle to exert any influence; this would apply most critically to national NGOs that do not have the same financial capital (power) as international donors. It also means that actors within the community have a strong influence on each other, most critically the international organizations on the national governments.

Implications:
- This finding speaks directly to sovereignty: that international organizations rather than civil society exert influence over the Jordanian and Ugandan government decisions around delivering distance education for refugee networks. This type of relationship is currently being challenged by an agenda aimed at localizing or decolonizing the aid sector. While these findings have already been described, having analytics that support this conclusion in two different countries could be powerful.
This pilot study has demonstrated that it is feasible and beneficial to use SNA to research distance education for refugees. This section begins with recommendations for actors supporting distance education for refugees in Uganda and Jordan, which follow from the findings of the pilot study. This is followed by suggestions for further research that could be conducted in the sector using SNA. Finally, it offers a number of recommendations for those who wish to use SNA to research education in emergencies, which are based on experience from conducting this research.

RECOMMENDATIONS FOR ACTORS SUPPORTING DISTANCE EDUCATION FOR REFUGEES IN UGANDA AND JORDAN

Distance education actors should:

- Aim to increase their social power in delivering distance education for refugees and invest in building relationships, especially with the central actors of the network, along the three dimensions included in this research: information-sharing, resource transfer, and collaboration.
- Question assumptions that UN organizations, national governments, and education sector working groups should always being the most central actors in distance education networks.

Distance education coordination and policy actors should:

- Facilitate reflection on the considerable social power international organizations wield in the sector, as compared to national governments, national NGOs, the private sector, or educational institutions, and what follows from this distribution of power.
- Consider centrality when deciding which organization should chair a coordination mechanism. In some cases, it may be advantageous to choose an organization that is already central in the network. In other cases, it might be advantageous to choose organizations that are not central but that represent an identity or way of working that the sector wants to promote. For example, localization/decolonization could be promoted by choosing a national NGO to chair the education sector working group.
- Facilitate new organizations joining the network or promote information diffusion and collaboration by forming reciprocal ties between organizations, especially during periods of rapid change in the sector.
- Use SNA to research network dynamics that may facilitate or inhibit gaps in service delivery to, for example, certain regions or populations.
Distance education donors should:

- Consider the effects network dynamics have on the outcomes of distance education for refugees, for both individual actors and the sector as a whole, and then plan and provide resources that enable actors to take advantage of and influence the structure of the network.
- Consider centrality when deciding which organizations to fund. While it may be advantageous in some cases to invest in organizations that are already central in the network, in other cases it might be advantageous to invest in building the social power of organizations that are not central but that represent an identity or way of working that the sector wants to promote.
- Question assumptions that UN organizations, local governments, and education sector working groups are the most central actors in distance education networks, or that other organizations are being similarly positioned in distance education networks across contexts.
- Promote localization/decolonization by funding local NGOs to chair education sector working groups. Being at the center of the network may increase their social power and, through network dynamics, the social power of other national NGOs.
- Recommend that recipients use SNA to evaluate relational outcomes and support them in doing so.

SNA RESEARCH QUESTIONS IN EiE/DISTANCE EDUCATION

How do the social networks that support distance education for refugees vary between countries of interest?

This research could answer questions such as, How do investments of time and resources in social networks influence social network metrics and promote the efficient or impactful delivery of distance education to refugees in different countries? To compare future research results with the findings from this pilot study, similar methods and tools and the same ERG model should be used. A standardized SNA metric provides comparative opportunities and supports changes in management practices.

How do the social networks that support distance education for refugees change over time?

This research could answer questions such as, How do longitudinal changes in national social network metrics inform or impact the delivery of distance education to refugees? To compare future research results with the findings from this pilot study, similar methods and tools and the same ERG model should be used.

How similar and/or connected is the network for distance education for refugees to the network for distance education for Jordanians and Ugandans?

This research could answer questions such as, How much influence do refugee education response actors have in the distance education system as a whole? Is there one network or two? If two, who are the brokers? To use data from this pilot study, which looks retrospectively at 2021, this area of research should be carried out soon.

What effects do investments in sectoral coordination have on network dynamics?

There would be value in using SNA to plan, monitor, and evaluate work facilitated by education sector working groups and large consortia. The data from this study reflects the presence of education sector working groups and the large and well-resourced Uganda Education Consortium, which suggests that SNA could reveal more about the impact these types of initiatives have over time, and about the dynamics among members.

These recommended questions have only considered opportunities for SNA at the level and with the actors this pilot study focused on. There is a vast number of questions that could be asked about networks composed of different actors. For example:

- What professional support networks of teachers are delivering distance education?
- What networks do students who are participating in distance education access for learning?
RECOMMENDATIONS FOR THOSE CARRYING OUT FURTHER SNA RESEARCH IN EDUCATION IN EMERGENCIES

When lacking the resources and capacities to conduct formal SNA, actors can seek information about the social networks in their sector through, for example, a participatory action mapping exercise with staff members and partners. Social network data could be collected more formally as part of scoping exercises and feasibility studies prior to commencing new work in the sector. Some of the relational questions from the tool included at Annex B could be used as a starting point.

Carry out SNA research in partnership with coordination actors, ministries of education, large consortia in the sector, and possibly donors. Ideally, collect SNA data alongside the data regularly collected from members of these collectives. In particular, link new research to existing data-collection processes, such as annual education sector reviews or the monitoring and evaluation of sectoral response plans. This could save data-collection resources, improve response rates, and facilitate the mobilization of knowledge. Only a few questions would need to be added to a larger survey. To improve data quality, the SNA questions could be administered to all members simultaneously during a coordination meeting. This also would enable the data about organizations and their activity to be used as attributed data in the analysis.

Use the ERG models from this study to carry out comparative research. As already mentioned, this includes comparisons across countries, comparisons with other education in emergencies approaches, and longitudinal studies.

In the process of gaining informed consent, advise research participants that organizational names will be included on the network visualizations. Network maps are far more useful to those within or those trying to understand the network when this information is included. There is minimal sensitivity and risk in sharing this type of data, and participants are likely to agree.

To increase response rates, invest in ensuring that those in the network own the research. The type of analysis used was limited by only being able to collect data from a minority of network members. Incentivizing participation, or in some circumstances making it mandatory (e.g., for members of a consortia), could help raise response rates.

Investigate other sources of network data that could be mined and analyzed. Examples include records of attendance at meetings, email correspondence, and WhatsApp group messages.

Ensure that SNA studies are adequately resourced. As with qualitative and quantitative methods, sufficient resources are needed to collect a sufficient quantity and quality of data to answer the research questions.

For these types of participants to research these types of questions, it is feasible and cost-effective to conduct SNA research virtually with the support of Network Canvas. For the most part, internet connection speeds were not a barrier to participating in the pilot study and it was possible to build sufficient rapport over video conference calls. However, in-person administration would be necessary for participants who lack access to the appropriate technology (a computer) or have slow connection speeds, and possibly with sensitive topics.

Ensure that recruitment materials are highly personalized and enlist earlier participants, especially sector coordinators, to recruit participants. Better yet, appoint a well-connected individual from within the sector to coordinate recruitment. Recruitment through mailing lists or even through presentations at sector meetings elicited few responses. Directly introducing participants to their network of contacts and sending personalized emails addressed to an individual by name elicited more responses. Follow-up via phone and WhatsApp was often necessary. It was extremely challenging to solicit the UN’s participation in Uganda and to engage donors in both countries.
CONCLUSION

The initial research question was, What facilitated and inhibited the provision of distance education for refugees in the midst of the COVID-19 pandemic, in particular the relationships among distance education policy, content development and curation, teacher preparation, and delivery actors.

Following from this question, the social network data revealed three relevant themes:

1. **Network position**, specifically eigenvector centrality. We identified the most influential actors in the network and the proximity of other actors relative to these centers of social power.

2. **Shared network attributes**, using k-core values. Actors formed communities; international organizations and the national governments formed the most central communities in both Uganda and Jordan.

3. **The likelihood of forming mutual relationships** within a whole network (i.e., in Uganda or Jordan) or of forming mutual relationships was described by the ERG models. The actors in Jordan are more likely (3.1 times) to form new relationships than those in Uganda (2.3 times). This provides a valuable comparative measure between countries of refugee education networks.

These three themes based on SNA support not only answer the research question, they support organizations, such as INEE and its partners, in providing new data and information to enhance strategic planning and change management activities. For example, new refugee education social network data and maps of Jordan and Uganda (Annexes C and D) help us understand where and how to support future allocation of social network resources in each country.

In order to compare network positions, shared network attributes, and the likelihood of forming mutual network relationships, future research will benefit from a larger sample size. Moreover, developing longitudinal studies that collect network data annually will help in understanding how networks change over time, and the effects organizational investment in network development have on network attributes.
REFERENCES


ANNEX A: Methodology

This study undertook a whole network analysis bound by geography (country), actor type (organization involved in refugee primary education), and time (2021). The International Rescue Committee institutional review board approved the ethics of the study.

Ethnographic pre-research
Consultations were held with key informants in each country being researched, and a brief review was made of relevant research and program documentation on the context. This helped determine the types of actors, relationships, and attributes to be queried. It also provided an opportunity to test and improve the social network data-collection tool.

Social network data collection
Social network data was collected remotely using Network Canvas, an open source software that facilitates researchers’ administration of SNA interviews through an online video conference. Data was collected from organizational staff members about their organization.

Whole network SNA requires data about all network members. As there is no preexisting list of all the members of these distance education networks (in SNA, this is referred to as a roster), participants were recruited using snowball sampling. Earlier respondents were asked to share the contact information of members of their networks, who in turn did the same. Ideally, this process should be repeated until no new members who meet the recruitment criteria are still being identified. However, due to resource constraints, up to 30 interviews were conducted in each country.

Analysis
Social network data analysis and network visualization were developed using the software package R, specifically the iGraph and StatNet analysis packages. Whole network analysis was used to reveal the nature and strength of the relationships that connect actors and the structural features of the network. SNA statistics that indicate the following were calculated:

- How densely connected the network is
- Actors who occupy a central place in the network
- Components of or cliques in the network

Exponential random graph modeling was also used to estimate the likelihood of relationships forming (edges), given the observed network data. This powerful modeling technique provides insights into which attributes predict different network features; for example, an ERG model provides insights into the likelihood of realizing a performance indicator (e.g., rates with which refugees accessed distance education), given the observed network. ERG model development is dependent on data availability.

Ethnographic validation
After social network data collection and the initial analysis were completed, virtual focus groups were held with participants in each country. This gave them the opportunity to explain the implications of the network’s relationships and structural characteristics for the provision of distance education for refugees, as well as factors that may contribute to these dynamics.
ANNEX B: Questions Included in Tool

Attribute data: Organization
To begin with, I would like to ask you some questions about your organization and your role.

What is the name of your organization? (include any acronyms/abbreviations)
What department do you work for?
What is your title?
Which best describes your organization?
  - local government
  - state government/Uganda: Office of the Prime Minister
  - national government
  - foreign government (i.e., embassy, ministry or agency of a foreign government)
  - educational institution (excludes teacher training)
  - teacher training institution
  - community-based organization (CBO)
  - local NGO (non-governmental organization)
  - international NGO (non-governmental organization)
  - international organization (i.e., UN)
  - business
What is your organization's country of origin?
  - Uganda/Jordan
  - Foreign (reports to HQ in a foreign country)

Relationships
Think about your work to deliver or support distance education for refugees in 2021. Who has your organization provided information to?

Think about your work delivering or supporting distance education for refugees in 2021. Who has your organization received information from?

Think about your work delivering or supporting distance education for refugees in 2021. Who has your organization provided financial or in-kind resources (funding) to?

Think about your work delivering or supporting distance education for refugees in 2021. Who has your organization received financial or in-kind resources (funding) from?

Think about your work delivering or supporting distance education for refugees in 2021? Who has your organization collaborated with?

Who has your organization not collaborated with, but would like to?
Influence
Please position the organizations you have named among the concentric circles. Place organizations that influence each other close together, and place organizations that influence you closer to the center of the circle.

Attribute data: Programming
Finally, I would like to learn more about your organization’s work on distance education for refugees in 2021.

Which policy-related activities did your organization implement to ensure the delivery of distance education for refugees in 2021? (choose all that apply)
- made policies and regulations
- approved educational curricula
- enforced regulations
- funded distance education
- researched distance education
- advocated for policy change
- provided technical assistance to government
- coordinated distance education actors

Which content development and/or curation activities did your organization implement to ensure distance education for refugees in 2021? (choose all that apply)
- designed educational curricula or curated distance education content
- created or contributed to the creation of distance education content
- designed distance education platforms
- programed distance education software/applications

Which teacher professional development activities did your organization implement to ensure distance education for refugees in 2021? (choose all that apply)
- trained distance education teachers or facilitators
- supported networking or peer support among teachers
- developed distance education teacher training materials

Which educational instruction activities did your organization implement to ensure distance education for refugees in 2021? (choose all that apply)
- administered a distance education platform
- employed or paid teachers or facilitators
- provided or facilitated access to technology or educational materials
- monitored or evaluated distance education

How many employees worked for your education program in 2021? (exclude employees who work outside of the country)

What type of distance education did you deliver or support in 2021? (select all that apply)
- online platform (website)
- WhatsApp groups
- YouTube videos
- offline computers or tablets
- educational games
• radio
• TV
• printed materials
• small-group learning
• house visits

What level of distance education did you deliver or support in 2021?
• early childhood education (includes kindergarten)
• primary/basic education
• secondary education/high school
• vocational training
• tertiary education/university/college
• accelerated education/learning
• non-formal (Jordan only)

What type of distance education did you deliver or support in 2021? (select all that apply)
• government
• private
• NGO
• community
• UNRWA (Jordan only)

What population of students did you serve in 2021? (choose all that apply)
• refugees/asylum seekers in camps
• refugees/asylum seekers in host communities
• refugees/asylum seekers in informal tented settlements (Jordan only)
• other migrants
• vulnerable host community (excluding IDPs-Uganda only)
• IDPs (Uganda only)
• non-vulnerable host community

Which nationalities of refugees and asylum seekers does your program serve?
• Syrian
• Palestinian
• Other nationalities

Did your organization deliver or support distance education before the COVID-19 pandemic?
• Yes
• No

What were your organization’s reasons for delivering or supporting distance education for refugees in 2021? (select all that apply)
• access (to reach children who otherwise would not go to school)
• continuity (to keep children connected to schooling during school closures)
• earning gains (so children learn)
• psychosocial support
• protection/safeguarding
Did you deliver distance education programming directly to primary school-age children in 2021? (i.e., NOT through a partner)

- Yes
- No

How many primary school-age children directly benefited from your distance education programming in 2021? (Please exclude those who benefited through a partner you support)

How many of these were refugees?

What was your organization’s distance education budget for 2021 in USD?

Follow-up

We believe it is important to share the results of the research with those who participated in it.

We will be doing this through an online workshop where we will share and discuss preliminary results with participants and through a final report.

Please send me an invitation to attend the workshop where the results of the study will be shared and discussed with participants. I can decide at the time whether I wish to attend.

- Yes
- No

Please send me a copy of the final report for the study.

- Yes
- No
ANNEX C: 2021 Jordan Refugee Distance Education Social Network Analysis Summary

Magnitude of actor influence (eigenvector)

Top five actors (by eigenvector) [k-core]
- 91 UNICEF (0.39) [7]
- 96 War Child Holland (0.34) [7]
- 11 Care International (0.24) [7]
- 47 Luminus Education (0.23) [7]
- 20 ESWG (0.22) [7]

Top Government
- 56 Ministry of Education (0.21) [7]

Top Coordinating
- 20 ESWG (0.22) [7]
- 34 INEE (0.09) [5]

Exponential Random Graph Model (ERGM) Results

ERGM=Edges (- 4.1 ***) + Mutual (3.1 ***)
*** Statistically significant 0.001

High

Low

Reciprocal ties (blue lines), colors reflect k-core grouping

COLOR
- National
- International

SHAPE
- Circle — Coordination
- Plus — Education
- Square — Foundation
- Down Triangle — Government
- Up-Triangle — IO
- Diamond — NGO
- Circle-in-box — Private

Exponential Random Graph Model (ERGM) Results
Likelihood of forming mutual relationships (edges) [a->b and b->a]
ANNEX D: 2021 Uganda Refugee Distance Education Social Network Analysis Summary

Magnitude of actor influence (eigenvector)

**HIGH**
- Top five actors (by eigenvector) [k-core]
  - 28 Finn Church Aid (0.29) [10]
  - 77 Windle International (0.28) [10]
  - 52 Norwegian Refugee Council (0.27) [10]
  - 56 Plan International Uganda (0.25) [10]
  - 31 Humanity and Inclusion (0.25) [10]

  Top Government
  - 46 Ministry of Education and Sports (0.19) [10]

  Top Coordinating
  - 25 Education Sector Working Group (0.18) [10]

**LOW**

Exponential Random Graph Model (ERGM) Results
Likelihood of forming mutual relationships (edges) (a->b and b->a)

ERGM=Edges (- 3.1 ***) + Mutual (2.3 ***)
*** Statistically significant 0.001

COLOR
- National
- International

SHAPE
- Circle — Coordination
- Plus — Education
- Square — Foundation
- Down Triangle — Government
- Up-Triangle — IO
- Diamond — NGO
- Circle-in-box — Private

Reciprocal ties (blue lines), colors reflect k-core grouping
Inter-agency Network for Education in Emergencies