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Leveraging Social Network Analysis for a Fusion of Methodologies in Sociology

Nino Zhghenti

School of Governance and Social Sciences, Free University of Tbilisi

Abstract
This article argues for a new paradigm in understanding social behavior through the application of a mixed methods design within social network analysis (SNA). By understanding SNA as a field of study and integrating quantitative and qualitative methodologies within it, the article proposes a comprehensive research design capable of constructing social mechanisms that has the potential to elucidate explanations at micro, meso, and macro levels. The article thoroughly examines SNA as a field of study where both methodological traditions are equally valued and needed. The implications offer a robust approach for scholarly pursuits investigating social phenomena in sociology.
Key words: social network analysis, mixed methods design.

Aproveitando a análise de redes sociais para uma fusão de metodologias em sociologia

Resumo
Este artigo defende um novo paradigma na compreensão do comportamento social através da aplicação de um design de métodos mistos na análise de redes sociais (ARS). Ao compreender a ARS como um campo de estudo e integrar nele metodologias quantitativas e qualitativas, o artigo propõe um desenho de pesquisa abrangente capaz de construir mecanismos sociais que tenham o potencial de elucidar explicações nos níveis micro, meso e macro. O artigo examina minuciosamente a SNA como um campo de estudo onde ambas as tradições metodológicas são igualmente valorizadas e necessárias. As implicações oferecem uma abordagem robusta para atividades acadêmicas que investigam fenômenos sociais em sociologia.
Palavras-chave: análise de redes sociais, abordagem de métodos mistos

Tirer parti de l'analyse des réseaux sociaux pour une fusion de méthodologies en sociologie

Résumé
Cet article plaide en faveur d'un nouveau paradigme dans la compréhension du comportement social à travers l'application d'une conception de méthodes mixtes au sein de l'analyse des réseaux sociaux

(SNA). En comprenant le SNA comme un domaine d'étude et en y intégrant des méthodologies quantitatives et qualitatives, l'article propose un modèle de recherche complet capable de construire des mécanismes sociaux susceptibles d'élucider des explications aux niveaux micro, méso et macro. L'article examine en profondeur le SNA en tant que domaine d'étude où les deux traditions méthodologiques sont également valorisées et nécessaires. Les implications offrent une approche solide pour les recherches scientifiques étudiant les phénomènes sociaux en sociologie.
Mots clés: analyse des réseaux sociaux, approche méthodes mixtes

Aprovechar el análisis de redes sociales para una fusión de metodologías en sociología

Resumen
Este artículo aboga por un nuevo paradigma en la comprensión del comportamiento social mediante la aplicación de un diseño de métodos mixtos dentro del análisis de redes sociales (SNA). Al entender el SCN como un campo de estudio e integrar dentro de él metodologías cuantitativas y cualitativas, el artículo propone un diseño de investigación integral capaz de construir mecanismos sociales que tiene el potencial de dilucidar explicaciones a niveles micro, meso y macro. El artículo examina exhaustivamente el SCN como un campo de estudio donde ambas tradiciones metodológicas son igualmente valoradas y necesarias. Las implicaciones ofrecen un enfoque sólido para las actividades académicas que investigan los fenómenos sociales en sociología.
Palabras clave: Análisis de redes sociales, enfoque de métodos mixtos.

Introduction

Mixed methods research, which combines both qualitative and quantitative methods, has garnered significant attention from sociology scholars. This approach aims to achieve a comprehensive understanding of complex issues by leveraging the strengths of both types of data while preserving their unique qualities (Wellman *et al.*,1988; Provan & Milward, 1995; McLean, 1998; Diani & McAdam 2003; Smith, 2005; Small, 2009). Within this context, the domain of social networks (SN), encompassing multifaceted interactions among individuals and groups, emerges as a relevant field for this methodological paradigm. It not only covers observable structural dimensions, but also includes the insider perspectives of participants within the network. This enhances the comprehension of social relationships, the broader social fabric, and insights into social behaviors derived from such interactions. Consequently, by providing a strong foundation for relational, descriptive and explorative explanations, it becomes a source of the development of social mechanisms. The scholarly discourse within the field of sociology seldom engages in an in-depth examination of the mixed methods design, specifically tailored to encompass rigorous research analysis steps, as applied within the domain of social network analysis. Therefore, this paper posits that the integration of social network analysis (SNA) with a mixed methods design establishes a novel

paradigm for generating comprehensive data. This approach aids in elucidating social behavior across micro, meso, and/or macro levels, ultimately holding the potential to contribute to the development of social mechanisms.

SNA, which is a prevalent analytical tool utilized by scholars to examine social networks across various contexts, predominantly adheres to a quantitative orientation in its pursuit of comprehending and decoding social phenomena (Carrington *et al.*, 2005; Wasserman & Faust, 1994). This makes an impression that SNA implies exceptionally quantitative research. Notwithstanding the under-recognition of the complete potential of qualitative dimensions, there are still some important work done in qualitative social network analysis (Ahrens, 2018, Hollstein, 2011, Carpentier & Ducharme 2005, 2007). Nowadays, even an ascending trajectory is evident in the convergence of qualitative and quantitative methodologies within a singular research endeavor (Crossley, 2010; Fuhse & Mützel, 2011; Froehlich *et al.*, 2020). Most of the existing sociological scholarship is focused either one or another methodological dimension and usually is limited to single or multiple variable based explanations.

In this scholarly backdrop, this paper argues that SNA serves as a conceptual and methodological framework implying both quantitative and qualitative research methods in a cyclic scheme of research design. The later bears the capacity to operate as a source of dual-faceted mechanism, facilitating and integrating both explanatory and exploratory methods, effectively capitalizing on the mutually beneficial relationship inherent in both methodological traditions. All of this creates complex and rich data that has the potential to generate a mechanism-based understanding of social phenomena.

In particular, this paper thoroughly examines the concept of social network and social network analysis as a non-methodological tradition but the conceptual and methodological framework where both quantitative and qualitative methods are equally valued (Nooraie, 2020; Carrington, 2014). The paper further elucidates a specific mixed methods research design within SNA that collects data from micro to macro levels. Through this careful analysis, the paper enhances our understanding and application of SNA with a mixed method design for building social mechanisms related to social phenomena in scholarly pursuits in sociology and beyond.

1. Literature Review: From Mono to Mixed Methods Approach in SNA

1.1. SNA as a Field of Study

SNA is built on the fundamental idea that social structure emerges from the intricate web of relationships in which individuals, groups, and other social actors participate. A fundamental facet of SNA involves discerning giver and receiver relationships, termed in-degree and out-degree ties in the realm of social networks. SNA offers a systematic approach for studying a wide array of social networks, encompassing friendships, communication, collaborations, and information flows, among

others (Scott, 2000). Through the examination of these networks, researchers gain valuable insights into how information, influence, resources, and other elements circulate and are distributed within a social system (Newmann, 2010). A nuanced comprehension of these ties is essential for grasping how the research topic manifests within the context of a social system. SNA serves as both a methodological and theoretical framework for delving into the structures, patterns, and dynamics of these social networks.

Consequently, to gain insights into social structure or behavior shaped by it, one must focus on the study of social networks. In academic inquiries within this field, methodologies such as quantitative, qualitative, or a combination of both may be utilized. It is crucial to emphasize that SNA is not intrinsically characterized as either quantitative or qualitative; moreover, it does not inherently represent a synthesis of the two approaches (Carrington, 2014). Rather, its primary focus lies in the structural nature and characteristics. As Nooraie (2020) puts it, it is a "continuum of fusion in network research". The primary goal of SNA is to unravel the complexities of social structure through the examination of social network characteristics. While observing or quantifying aspects of social networks, like the average number of direct connections an individual has or the qualitative nature of social ties among individuals, can be valuable analytical techniques, the aim is to grasp the underlying structural aspects of the network, which are neither reducible to quantity nor quality (Carrington, 2014). Furthermore, SN research within SNA is concerned with data visualization, where social networks and their characteristics are clear and easily readable. This creates a field of wide range of research designs and methods and this is what makes this perspective, or if I may say, field of study, so unique.

Even though SNA with all its idea and characteristics is more a field of exploration or as usually scholars put it a research approach, it has a long history and tradition of quantitative methodology and methods. The reasons for this do not lie in fact that it is really a quantitative approach, but in the period when this approach, field of study emerged in sociology and was evolving step by step through an interdisciplinary collaborative effort of social psychologists, anthropologists, sociologists, mathematicians, physicians, and economists.

1.2. Evolution of SNA

SN as a social system is conditioned with the idea that all the individuals or social groups in any type of society are somehow (inter)related with each other and this relationship creates social context for social behavior on individual or group level. Due to this contextual and structural concept, even in times when there was no systematic approach and no practice of researching particularly social relations or social systems as such, scholars from different disciplines were still inadvertently

exploring patterns of social relationships on micro, meso or macro level (Durkheim, 1983; Malinowski, 1922; Lasswell, 1932; Lazarsfeld, 1944; Knight, 1921). Over time, this universality naturally created interest in systemic approaches, analytical tools and concepts of studying social networks in sociology and social science literature. The formal methods and terminology of social network analysis, as we understand them today, have developed gradually, and the term "social network analysis" itself was coined later (Barnes, 1954; Freeman, 2004). In early 1900s, anthropologists such as Henry Morgan (1818-1881), psychologists such as John C. Almack (1883-1953), and most prominently Jacob Moreno (1889-1974) used systematic approaches to study human interactions, mostly through blending of qualitative interviews and fieldwork with graphical presentation of patterns (Freeman, 2004).

Jacob Moreno (1932, 1934) was the first who used visual images to display the patterning of linkages among social actors (Freeman, 2000). In Moreno's images, each actor was represented by a point, and each link was shown by a line connecting a pair of points. He characterized the image as delineating a social group wherein two prominent individuals exhibit a robust unity, establishing direct and indirect connections with other members. Consequently, Moreno construed the imagery as not only conveying a sense of cohesiveness, denoted by their pronounced unity, but also encapsulating the embodiment of social roles inherent in the dominating individuals (Freeman, 2004). This created the whole new paradigm of data understanding and, as a result, SNA approach has been targeted not only on social networks, but it has been applied also for explaining diverse social behavior and social phenomena. After Moreno, Researchers from Manchester University brought about a significant shift in SNA. Unlike prior focuses on societal norms and institutions, these scholars directed their attention to understanding the intricate dynamics of relationships driven by power and conflict among individuals (Scott, 1993). John Barnes, a notable sociologist, significantly advanced SNA by exploring how social structures and interpersonal connections impact various facets of society, including the flow of information, social support, and the transmission of cultural norms and behaviors (Barnes, 1954). Building upon Barnes's ideas, Siegfried Nadel furthered the field with his foundational work on role analysis (Nadel, 1957). Nadel's contributions, alongside Barnes and their contemporaries, expanded the understanding of the complex web of social connections and their implications in sociology and related fields (Pattison, 1993).

In the years that followed, Harvard became a hub for significant progress in SNA, witnessing key advancements in theory and formal methodologies. During that period, sociology was still in the process of establishing itself as a discipline. The scientific method primarily involved quantitative approaches that accessed reality through deduction. Sociologists were actively instilling this tradition as it was the only way through which how scientific knowledge was possible to achieve. Harrison C. White, along with his research team, extended the exploration of roles by delving deeply

into the mathematical and formal aspects of SNA (White, 1963). They utilized graph theory and semigroup algebra to formalize the varied structural relationships within groups. White emphasized prioritizing emergent role structures over predetermined categories, placing a strong emphasis on genuine relationships among nodes (Lorrain & White, 1971; White, Boorman & Breiger, 1976). The evolution of the quantitative tradition in sociological research was a response to the growing need for scientific methodology. Mark Granovetter's study on the impact of weak ties, especially in contexts like job searches, left a profound mark on the field (Granovetter, 1973). His insights brought about a transformation in research methodologies, underlining the importance of these less influential connections in diverse social settings.

At present, SNA predominantly emphasizes quantitative approaches. Nevertheless, there is a discernible shift in emphasis, with an increasing exploration of qualitative methods and aspects of mixed methodologies within the realm of SNA. This evolving trend has garnered heightened attention in recent times.

1.3. Quantitative Methods in SNA

SNA concepts encompass various key elements like strong and weak ties (Granovettor, 1973, 1974), bridge ties, structural holes (Burt, 1992), centrality measures, network constraint, and more. These concepts significantly influence the network's structure and offer vital insights into both individual actors and the overall social system, as documented by Carpenter *et al.* (2012) and Tasselli, Kilduff & Menges (2015). These foundational concepts evolved over time, primarily within the realm of quantitative SNA, gradually refined by diverse scholars. Its strong association with quantitative methods was drawn from graph theory, a mathematical discipline specializing in the analysis of connections among entities (Moreno, 1934; Barnes, 1954). It emerged as a response to the need for systematic analysis of empirical data, particularly in sociology. SNA's graphical representation made complex social structures understandable, while quantitative metrics allowed measurement and comparison of network properties. This approach introduced scientific rigor, enabling hypothesis testing and statistical analysis. SNA's adaptability led to its interdisciplinary use in various fields of social sciences, and advancements in technology made large-scale data analysis practical and efficient.

In the current landscape of SNA, characterized by its graphical representations, mathematical models and computational methods remain foundational elements shaping its contemporary state (Freeman, 2004). Advocates of the quantitative approach in SNA assert that these methods provide a rigorous and systematic means to examine the structure and patterns within social networks (Wasserman & Faust, 1994; Borgatti & Everett, 2006). Indeed, mathematical perspective was pivotal

in SNA development as it implied quantitative analysis and excelled at capturing the form and characteristics of relationships, including their strength and frequency. Case studies conducted by Schippera and Spekkinkb (2015) once again illustrated the benefits of quantitative SNA when studying complex social systems. Quantitative analyses unveil system-level patterns that might remain obscured in a purely qualitative approach. For instance, these patterns encompass numerous indirect relationships and hidden information flows between actors in small and large social systems. This is, for sure, where the quantitative tools of SNA shine. However, it's important to note that quantitative SNA may be less suitable for capturing the content of relationships, such as individual interests and motivations (Schippera & Spekkinkb, 2015). Complex social systems are inherently dynamic, involving numerous motivational and intentional factors that quantitative methods alone may not fully detect. This often results in SNA representations appearing static and purely descriptive, limiting their capacity to explain the underlying social mechanisms that drive the observed patterns.

1.4. Qualitative Methods in SNA

In more recent times, there has been a notable upsurge in using qualitative research approaches into SNA. This shift is exemplified by the works of scholars like Hollstein (2014) and Ryan & D'Angelo (2018). Qualitative research in SNA diverges significantly from traditional quantitative methodologies by adopting an exploratory nature. A qualitatively oriented approach does not allow for the same statistical rigor, but it holds its own advantages and reveals sheds the light on different side of data. As Crossley (2010) points out, many different mechanisms are at play in complex systems and the interactions between mechanisms make it difficult to isolate specific mechanisms responsible for the observed outcomes. Because we cannot always know in advance which mechanisms account for the emergence and development of complex social systems, it may be necessary to rely on qualitative observations to understand how mechanisms manifest and operate in a specific context (Byrne & Callaghan, 2022; Crossley, 2010). This can even lead to the discovery of new mechanisms (Crossley, 2010).

Qualitative SNA allows researchers to move beyond descriptive patterns and delve into the insights of social interactions and relationships. The data collection process extends beyond the mere identification of interactions between individuals; rather, it empowers researchers to gather comprehensive data on relationships, their inherent characteristics, and the broader contextual landscape in which they transpire. Embracing this exploratory perspective, qualitative methods facilitate the collection of nuanced insights from the perspectives of respondents.

1.5. Mixed Methods in SNA

Despite the historically clear division between qualitative and quantitative methodologies in Social Network Analysis (SNA), there is a burgeoning interest in adopting a mixed methods approach. Advocates of such an approach recognize the inherent benefits of combining both internal and external perspectives to attain a holistic understanding of social relationships and networks, as highlighted by Edwards (2010). Quantitative methods, with their numerical depictions of structural networks, offer an external vantage point on the network. In contrast, qualitative methodologies provide descriptions, perceptions, and interpretations of relationships, offering an insider's view into network practices. When these methods are complemented through visualizations, the typically abstract relationships within the network come to life, making the underlying processes more tangible to the reader (Ryan & D'Angelo 2018). The incorporation of mixed methods can be tailored in three distinct ways within the research process, contingent upon specific research objectives (Wald, 2014). First, qualitative approaches can be employed to enrich and provide context to quantitative data. Second, quantitative approaches can furnish complementary insights to enhance the understanding of qualitative data. Finally, a cohesive integration of both quantitative and qualitative methodologies can be pursued to achieve a comprehensive and synergistic analysis, as recommended by Edwards (2010). These three modes of utilization manifest across two primary stages: data collection and data analysis.

In his paper, Langer and his colleagues delineate three key data collection processes: name generating, name interpreting, and name inter-relating. In these processes, both quantitative and qualitative data synergize, collectively painting a comprehensive data landscape tailored to serve the research objectives rather than adhering to methodological traditions. In a separate academic exploration, Wissink and Mazzucato (2018) delved into the examination of transformations within migrant networks. Their approach encompassed a field study, employing an array of data collection techniques such as observations, interviews, and questionnaires to assemble pertinent network data.

Likewise, Rienties and Hosein (2015) investigated formal and informal learning within an academic development program through a two-step methodology. Initially, they employed a closed-ended method to generate quantitative data, focusing on factors like the frequency of contact and the nature of relationships. Subsequently, a qualitative reflection exercise was undertaken, employing an open-ended approach supported by visualizations. This reflection allowed participants, both individually and in groups, to delve into their networks, exploring how informal and formal learning were facilitated. This combined approach of name interpreting and inter-relating enabled data triangulation. The quantitative data illuminated quantifiable relationships, while the visualizations provided an external perspective on the network. Concurrently, the qualitative data offered an

insider's viewpoint into the network's inner workings. Through the harmonization of these three complementary methods, the researchers crafted a comprehensive dataset offering insights into the intricate relationships at play during the academic development program.

To summarize this section, SNA is more than a quantitative or qualitative method—it's a comprehensive field of study. It doesn't just focus on relationships and connections within networks but also delves into understanding social behavior through that lens. SNA uses both methods but goes beyond them by focusing on the structure, dynamics, and patterns within networks, investigating how these connections influence behavior, information flow, and societal outcomes. It's not solely a method; it's a comprehensive framework that delves into the intricate interplay among actors, their interactions, and the emergent properties of networks. This complexity necessitates a reliance on mixed methods when the aim is to construct a model, mechanism, or theory-based explanation.

2. Methodological Framework of Mixed Methods Design in SNA

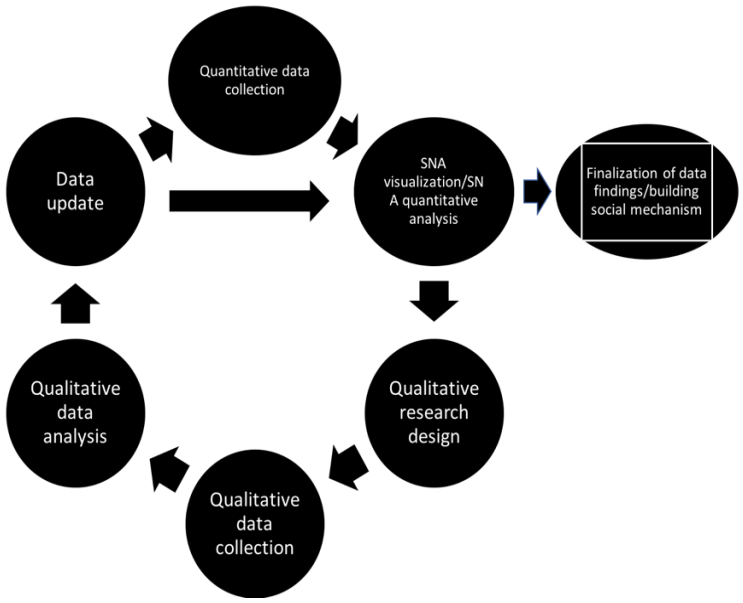
Mixed methods research within SNA presents a certain way to investigate research questions that cannot be adequately addressed by using only one methodological approach. In this section, I specifically focus on how the fusion of qualitative and quantitative methodological traditions, when applied to SNA, can open new avenues for overcoming missing data and developing holistic explanations that eventually can lead to social mechanism development. By utilizing mixed methods within SNA, researchers can delve into critical aspects of networks and other social constructs, examining them both in isolation, as a micro process and as a part of a larger system. The approach leads to the identification of network measures that contribute to revealing data on micro, mezzo and macro levels.

The presented research design model is derived from an ongoing research project titled "How Social Capital Affects Academic Performance: A New Approach to Higher Education," which is funded by the Shota Rustaveli National Science Foundation in Tbilisi, Georgia. The primary objective of this research is to comprehend the relationship between social interactions and academic performance among undergraduate students. The study encompasses comparative cases involving six undergraduate groups in Tbilisi, Georgia. For illustration in this paper, the research design of a singular case, focusing on a smaller group of undergraduate students (totaling 76 participants), is expounded upon.

The model of a mixed-method research design within SNA follows a cyclical process that integrates diverse methodological principles. Its rationale for data collection, reflection, and subsequent collection is reminiscent of the principles in Grounded Theory. Grounded Theory relies

on a continuous back-and-forth cycle of gathering data, organizing, categorizing, sorting, validating, and writing. Through this iterative process, a theory gradually takes shape (Fetters & Molina-Azorın, 2017). SNA with mixed methods design implies the same cyclic process of validation and advancement between and within quantitative and qualitative data collection and analysis methods. Diagram #1 provides a succinct overview of the intertwined process of data collection and analysis, facilitating the creation of an in-depth explanation. This, in turn, opens avenues for the development of social mechanisms within SNA.

Diagram #1 – Cycle of Data Collection and Data Analysis for Social Mechanism Development.



Source: Research Project - How Social Capital Affects Academic Performance: A New Approach to Higher Education – supported by Shota Rustaveli National Science Foundation, Tbilisi, Georgia. Free University of Tbilisi, Tbilisi, Georgia. 2019-to date.

As illustrated in the diagram, the data collection and analysis cycle consist of three phases that either lead to the finalization of findings or is a source of new cycle. Data collection begins with formal stages of data collection and analysis. These subsequently evolve into research cycles, facilitating ongoing data updates where the two methodological traditions complement and enhance each other to provide more comprehensive data on structure and individual level.

2.1. First Phase

The first phase covers two stages: quantitative data collection and SNA visualization/SNA quantitative analysis. Data collection for SNA is done through quantitative research methods that would be face-to-face or online surveys. A survey method is a valuable approach for visualizing social networks in SNA due to its speed and convenience (Agneessens & Labianca, 2022). It offers

advantages such as wide coverage, structured and controlled data collection, data consistency, suitability for quantitative analysis and the ability to briefly transform data into visual representations (Wasserman & Faust, 1994; Borgatti *et al.*, 2018; Scott, 2017; De Nooy *et al.*, 2018). These attributes make surveys an efficient and reliable means of collecting network data and creating visual representations that are central in understanding the relationships and structure within social networks. SN visualization with its quantitative analysis reveals prominent and influential persons, strong and weak ties, structural holes, social clusters, etc., of a network, depending on what is the objective of the research (Freeman, 1977, 1979). Hence, the first phase - or the first two stages – develop important data with preliminary insights that become a base for further exploratory research design in the subsequent phase.

To provide an empirical illustration, the investigation into the relationship between social interactions and academic performance initiated with the distribution of an online survey to a specific undergraduate cohort comprising 76 students. The survey included inquiries related to academic advice interactions, participation in pair work, collaboration in teamwork, and Grade Point Average (GPA). In the initial phase, only 52 students completed the survey, which proved inadequate for a comprehensive understanding of group dynamics (Borgatti, Carley, & Krackhardt, 2006). Consequently, the research protocol integrated a qualitative phase, involving in-person engagement with those students who had not participated in the initial survey. Simultaneously, the qualitative sample included those students already present in the network data, chosen based on the combination of their positions, ties, and GPA, rendering them particularly interesting to understand the student network (individually and group-based) in relation to GPA.

2.2. Second Phase

This phase is about developing qualitative research design and data collection and analysis. This phase starts with setting and implementing purposeful sampling criteria and data collection guide. Qualitative research sampling can be achieved through recruiting pertinent respondents for in-depth interviews and focus groups. Alternatively, sampling may involve selecting specific locations and/or activities for observation if participant observation is employed. If the primary source of analysis are documents, then purposeful sampling design of relevant documents will be developed. In all the cases, research guide will be developed with relevant research questions and objectives, based on sampling frame and visual and quantitative analysis of SN. Hence, this phase is directly determined by and dependent on the first phase. If in-depth interviews and focus groups are applied, respondents within the study group are selected based on their number of mentions, interactions and position in the network. In particular, some respondents are usually missing from the network data

due to non-completed questionnaires, inaccuracy or because of missing contact details. In-depth interviews and focus groups open new opportunities by engaging new respondents in research sample, thereby helping overcome data gaps. Such missing data, based on the same principle, may also be completed by observational data or document analysis, if such exists. Apart from filling gaps in existing data, qualitative research design is also used for discovering new patterns of study phenomena that were overlooked by deductive processes of research planning and implementation. These, I will call identification of additional micro processes. With the help of in-depth interviews and focus-groups, a researcher can grasp the subjective motives and meanings that members of the network imply while interacting within the group. In-depth interviews represent a powerful tool for exploring and understanding ego-centric networks (Miles & Huberman, 1994), as well as group-centric networks. Through face-to-face conversations, researchers gain a unique opportunity to explore an individual's relationships from their subjective perspective, encompassing both past and dynamic interactions. This format of data collection enables researchers to collect in-depth information on social relationships and interactions (Fontana & Frey, 2005). Focus groups also hold great value in examining social networks. Beyond offering insight similar to in-depth interviews, focus groups provide researchers with a platform to observe group dynamics and how interactions reflect upon one another. Real-time cross-checking of data within focus groups fosters an environment of deeper elaboration, resulting in a more comprehensive understanding of relationships and their characteristics. The participant observation method, involving observation, active engagement, and informal interviews, stands out as an effective approach for comprehensive data collection. This method employs a combination of structured observation and both formal and informal interviews to offer a nuanced perspective on relationships. It facilitates a holistic understanding of social dynamics, incorporating both subjective and objective viewpoints, meticulously documented in a field diary. Immersement in the social context enables researchers to acquire invaluable insights into the complexities of social networks (Clark & Trousdale, 2013).

Although document analysis does not provide first-hand subjective testimonies, it is still valid tool for the researcher to develop alternative and complementing ideas for data explanation. Document analysis can also have a critical role in enriching data for more comprehensive SNA analysis (Alfani & Gourdon, 2012; McLean, 2007; Padgett & Ansell, 1993). Researchers, by selecting documents that are pertinent to the social network they are studying, can approach and check the existing data through different sources such as social media or any other documents. Document analysis, like any other qualitative research method add a layer of depth to social network analysis by providing textual and contextual information that can enhance researcher's understanding of the network's structure, function, and the social processes at play within it. It allows to capture the "how" and "why" behind network connections and interactions. Unlike the adaptability observed in

various qualitative methodologies, document analysis, which encompasses archival research, adopts a more concentrated approach. This technique heavily depends on pre-existing content and does not possess the ability to create fresh data beyond the confines of the provided textual resources. Nevertheless, document analysis continues to serve as a valuable instrument for particular research goals and can be a valuable supplement to other qualitative techniques.

Qualitative data is processed in Qualitative Data Analysis Software (QDAS), which makes it easier to link it to already obtained SNA - the network diagram and corresponding, quantitative analysis.

Returning to the empirical example, qualitative interviews were most relevant technique to employ in this research to augment and enhance the dataset. Specifically, 23 in-depth interviews were selected from the initial pool of 76 students, with 11 participants drawn from those who had completed the survey and 13 from those who had not. In the former case, respondents were purposively selected based on their roles and positions within the social networks, encompassing students with the highest and lowest interactions in each category of interactions, considering both high and low GPA. The interviews were conducted using semi-structured interview guides, prompting students to share insights about their experiences and how various forms of interactions influenced their academic outcomes, specifically GPA. Conversely, the interviews with the remaining 13 students served a dual purpose: firstly, to gather survey responses in person, and secondly, to elicit reflections on their survey answers and discern how their interactions impact their academic performance.

As elucidated earlier, the acquisition of data pertaining to students' subjective interpretations of the influence of various interactions on their GPA constitutes a fundamental element of the proposed research design. This approach offers an insider perspective and phenomenological insights into the social network dynamics, thereby contributing to a nuanced comprehension of the intricate relationship between interactions and GPA at both individual and group levels.

2.3. Third Phase

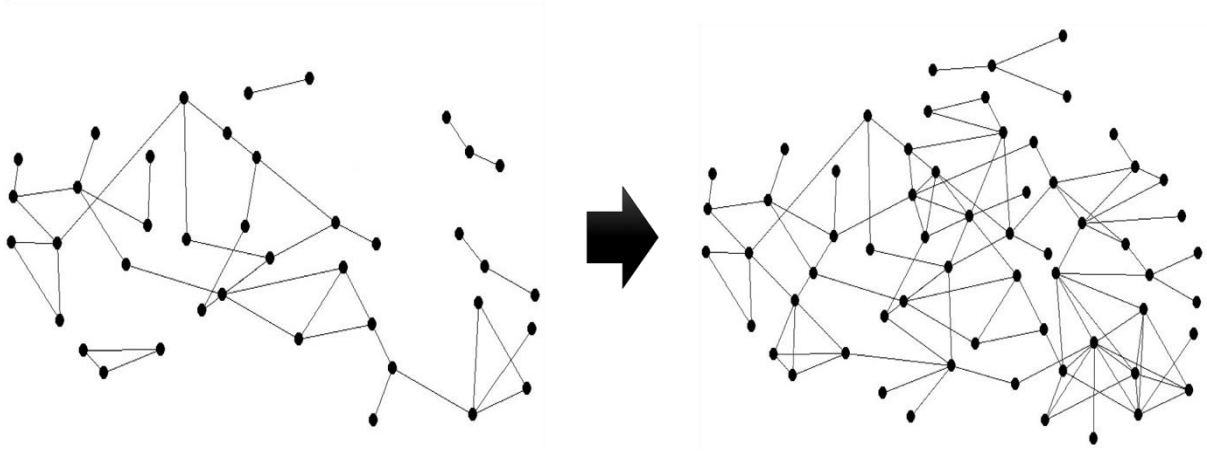
In this phase qualitative data results are integrated with existing SNA from the Phase#1. This means that new data a) completes the missing data, b) sheds light to puzzles and inconsistencies, c) reveals new patterns that are important for micro-macro model of the given social phenomenon, and d) eventually, new finalized network visualization and analysis achieved. Where actors (nodes) or ties are missing, relevant data is added to the SNA node/tie data and SN diagrams are updated

accordingly. As for other variables they are put in relation to network variables and explained in narrative, holistically.

Diagram 1 (see the page 12) illustrates how data updates can lead to either the culmination of final visualization/analysis or to further survey and/or qualitative data collection. This is where the grounded theory principle comes into play. When a researcher determines that it's time to construct an interconnected model of social behavior, the research process reaches its conclusion. The research output becomes a social mechanism featuring interrelated categories that elucidate the connection between macro and micro processes. However, if qualitative research and data updates give rise to additional questions, the entire data collection and analysis cycle recommences until the developed mechanism is comprehensive. This iterative process embodies triangulation, ultimately resulting in a robust and dependable explanatory framework.

In the empirical example portrayed in Diagram 2, a noticeable enhancement in the comprehensiveness of the network visualization is evident from qualitative research phase. The incorporation of new students resulted in a substantial alteration of the network structure, leading to a more intricate visualization and quantitative data analysis. Additionally, the insights shared by students regarding the influence of their relationships, interactions and interactions on academic performance contributed significantly to a more holistic understanding of the causal relationships underlying the variables. The interview data is highly detailed, encompassing various aspects related to individuals within the group context. Beyond merely filling in the gaps left by the online survey, the interviews provide a contextual understanding of interrelated factors in relation to the study variables.

Diagram #2 – Data Completion from the First to Second Phases



Source: Research Project - How Social Capital Affects Academic Performance: A New Approach to Higher Education – supported by Shota Rustaveli National Science Foundation, Tbilisi, Georgia. Free University of Tbilisi, Tbilisi, Georgia. 2019-to date.

The proposed research design integrates data from micro, meso, and macro processes by employing quantitative methods to understand individual connections (micro, meso, macro), followed by qualitative techniques that delve into group dynamics (micro, meso). The integration of these methodologies refines the overall network analysis, encompassing larger structures and patterns from larger to smaller context. This cyclic process continuously refines and merges insights from these levels, culminating in a holistic understanding of the social system.

Conclusion

This article advocates the SNA mixed design as a reliable tool for developing social mechanisms to explain phenomena. Sociology grapples with generating valid and reliable knowledge, prompting an ongoing exploration of effective research methods. The proposed SNA mixed methods design integrates micro, meso, and macro processes, using quantitative methods to explore individual connections, followed by qualitative techniques to delve into group dynamics. This integration refines network analysis, revealing larger structures and patterns, creating a comprehensive understanding. SNA as a field permits the fusion of deductive and inductive techniques, uniting different data types to create a more holistic picture, connecting subjective and objective viewpoints. This approach allows for the development of a comprehensive social mechanism, emphasizing the importance of integrating methodological traditions.

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Nino Zhghenti. School of Governance and Social Sciences**.** Free University of Tbilisi**,** Tbilisi, Georgia**.** Email: n.zhgenti@freeuni.edu.ge**.** Tel: +995599226069**.** Kakha Bendukidze Campus, 240 David Aghmashenebeli Alley, Tbilisi, 0131, Georgia