FQS FORUM: QUALITATIVE SOCIAL RESEARCH SOZIALFORSCHUNG

Volume 26, No. 3, Art. 3
September 2025

Iterative Mixed Analysis Using Grounded Theory Methodology and Structural Equation Modeling: Contributions of Qualitative and Quantitative Methods to the Evaluation of Social Programs

Marianne Daher, Antonia Rosati, Alemka Tomicic & Esteban Hurtado

Key words: iterative mixed analysis; grounded theory methodology;; evaluation of social programs

Abstract: Grounded theory methodology (GTM) and structural equation modeling (SEM) have been employed in numerous studies; however, the methodological benefits of their integration are still not fully understood. In this article, we present an iterative mixed analysis proposal that leverages relational models informed by GTM and SEM for evaluating social programs. To illustrate this approach, we examine the evaluation of a micro-entrepreneurship program targeted at people living in poverty. We outline the step-by-step application of iterative mixed analysis and present each of its steps: Contextualization, familiarization with the phenomenon, collaborative methodological design, iterative mixed data generation and iterative mixed analysis. We share the results of our qualitative descriptive analysis (based on open coding from GTM) alongside those from our inferential statistical analysis, followed by the transition from qualitative relational analysis (derived from the selective coding process of GTM) to estimating the hypothesized SEM, which also incorporates qualitative supporting data. Finally, we provide a definition of iterative mixed analysis and discuss conclusions regarding the combined and simultaneous use of explanatory models.

Table of Contents

1. Introduction

Unlike a few decades ago, many researchers no longer consider that a clear-cut dichotomy exists between quantitative and qualitative methods. There has been an increasing focus on mixed methods (CRESWELL, KLASSEN, PLANO CLARK & SMITH, 2011; ONWUEGBUZIE & JOHNSON, 2021) which are defined as a multidimensional continuum of various methodologies, as opposed to dichotomous approaches which rely solely on either qualitative or quantitative designs (TASHAKKORI, JOHNSON & TEDDLIE, 2021). The expansion of mixed methods has led to the emergence of scholarly communities focused on this approach, along with a process of institutionalization in both the scientific and academic fields (NOVELLO, 2023). In this regard, researchers have identified various ways to apply mixed methods based on the following aspects: level of admixture, i.e., whether they are partially or fully mixed; temporal orientation, whether the qualitative and quantitative phases occur concurrently or sequentially; and the significance of each method, where qualitative and quantitative components can either hold equal status or one may dominate over the other (LEECH & ONWUEGBUZIE, 2009). [1]

A relevant aspect of mixed methods is integration which is considered its hallmark (FETTERS & FRESHWATER, 2015). Also referred to as "mixing," it involves the linking, merging or embedding of qualitative and quantitative strands in a mixed methods study—a process that is absent when the study strands are kept parallel or distinct (CREAMER, 2018). As KNAPPERTSBUSCH, SCHREIER, BURZAN and FIELDING (2023) indicated, the methodological discourse on method integration has also become broader and more diverse. Many authors have contributed to this discussion. For example, ONWUEGBUZIE (2022) emphasized the importance of positioning integration as a central aspect of mixed methods, stating that a higher degree of integration can yield more in-depth answers to research questions while also making it possible to address more complex and intricate questions. Similarly, along with other authors, he showed that integration is not merely a technical issue, but one that also requires reflection on its philosophical and theoretical foundations (JOHNSON, ONWUEGBUZIE & TURNER, 2007). [2]

Other authors have enhanced the understanding of integration forms and approaches in mixed methods. For instance, BAZELEY (2011) identified several integration approaches: 1. those that integrate results from analyses of distinct data components, 2. those wherein one type of data informs the design or analysis of another, 3. those that combine multiple data components or sources during the analytic process, 4. those employing more than one analytical strategy and 5. those with sampling-based methods that are "inherently mixed." [3]

Despite these advances, BAZELEY (2016, p.192) found that the "real challenge" of mixed methods research lies in integration, particularly during analysis and reporting. In response, she developed various strategies for integrated analysis, demonstrating how such integration is necessary to satisfy the purpose of a mixed methods study (BAZELEY, 2018). Additionally, other authors have

introduced integration strategies rooted in classical qualitative methods such as grounded theory methodology (GTM), leading to the development of mixed method grounded theory methodology (CREAMER, 2022), among other innovations. [4]

Mixed methods are ideal for evaluation research due to their capacity for responding to complex questions and their flexibility. This approach involves the triangulation of qualitative and quantitative methods to examine the acceptability, integrity and effectiveness of intervention methods as both a formative and summative process (NASTASI et al., 2007). Mixed methods have been used in the evaluation of programs from a range of social science disciplines, significantly influencing the theoretical approach adopted as well as its data collection and analysis. In these settings, mixed methods have helped to increase the reliability of the data, expand the interpretation of the results and add validity to the conclusions and recommendations, thus boosting the effect of the programs evaluated (BAMBERGER, 2012; GREENE, CARACELLI & GRAHAM, 1989; McCONNEY, RUDD & AYRES, 2002; RALLIS & ROSSMAN, 2003). [5]

Mixed methods have been used in the evaluation of programs in the fields of health care (FETTERS, CURRY & CRESWELL, 2013; SENDALL, McCOSKER, BRODIE, HILL & CRANE, 2018) and education (ONWUEGBUZIE & JOHNSON, 2004; ROCCO et al., 2003) but have been less prevalent in the social intervention area. This is despite the evidence of the transformative potential of mixed evaluations in social intervention and social policy demonstrated by MERTENS (2018). Also, the value of the participation of people and communities in the evaluation process has been highlighted in this context, with researchers exploring the questions of who should be engaged in the work and how that should happen (DEAN-COFFEY, GWYNN, MERTENS & ORTIZ ARAGÓN, 2022). [6]

Recognizing the relevance of integration, in this article, we aim to elaborate on the methodological particularities of the specific use of qualitative (GTM) and quantitative analysis methods (structural equation modeling, SEM) and how they interact and reinforce each other. Also, we are interested in the particularities of applying mixed methods to the evaluation of social programs since the literature on this topic is comparatively scarce. [7]

Thus, we explore here the use of a mixed method design and provide a detailed description of iterative mixed analytical steps to evaluate social programs. Specifically, we discuss the iterative mixed analysis that combines qualitative and quantitative methods—GTM and SEM—to evaluate a micro-entrepreneurship program from the study "Evaluation of social intervention programs in poverty: Opportunities and challenges of integrating objective and subjective dimensions" (DAHER, 2015, p.51)[1], which was funded by *Comisión Nacional de Investigación Científica y Tecnológica* (CONICYT) [National Commission for Scientific and Technological Research], now superseded by *Agencia Nacional de Investigación*

1 All translations from non-English texts are ours.

y Desarrollo (ANID) [National Research and Development Agency] of the Chilean Government. [8]

The article begins with a background section on theoretical aspects related to GTM and SEM (Section 2). Then, an explanation is provided of how iterative mixed analysis is performed, considering the following steps: Familiarization with the phenomenon, collaborative methodological design, iterative mixed data generation and iterative mixed analysis (Section 3). Finally, the conclusions of the project are presented (Section 4). [9]

2. Background

Despite methodological differences, GTM and SEM are used to develop explanations based on relational models. Thus, combining GTM and SEM can yield a deeper understanding of the phenomenon being studied. However, the potential relationship between GTM and SEM has received limited attention in methodological discussions, despite the presence of empirical studies that integrate both methodologies. [10]

The value of combining SEM with qualitative methodologies in general has been acknowledged in some theoretical contributions (ANGUERA, 2008; VERDUGO, CRESPO, BADÍA & ARIAS, 2008). Furthermore, the use of both GTM and SEM can be observed in empirical research on a range of topics (e.g., AGUIRRE-DÁVILA et al., 2023; AKBARPOUR, SADEGH & NOURI, 2024; HASSANZADEHA, KAMYABIB, KHALILPOURA & RAMEZANIA, 2023; KE, LU & LUO, 2023; TAYOURI, HOSSEINI & SABORI, 2023). However, in many of these articles, the space dedicated to methodological discussion was limited. Consequently, the researchers focus on reporting results about specific topics, without explaining how both methods are employed in the analysis procedures. As a result, there is limited space for discussion on integrating GTM and SEM. Also, articles with a more methodological focus often consist of reviews and validations of existing models. Additionally, it can be noted that most authors, when incorporating results from GTM and SEM, typically analyze data in a single direction, often starting with a qualitative phase followed by a quantitative one. [11]

Also, authors who combine GTM and SEM have rarely evaluated social programs. Recent examples of this trend include studies on education, skills and school climate (KHOSRAVI RAD, AKBARI, KARIMI & CHERABIN, 2023); academic adaptation in international settings (ZHU et al., 2023); employment and welfare (MAHMOUD, BABAB & SALEHI, 2024); experiences of visits to historical sites (ACUN & YILMAZER, 2019); complexity and productivity in public organizations (JAMSHIDI, AHMADI & FARHADI, 2024) and spiritual values in organizations (AMOOZESH, MOHSENI & GHASEMI, 2024). However, this type of mixed analysis combining GTM with SEM has been more prevalent in other fields, such as large companies (AKBARPOUR et al., 2024; MARAGHEH, ROUHOLAMINI & NABAVICHASHME, 2024); finance and investment (SAMIMI, BADAVAR NAHANDI & MOTTAGHI, 2022); taxes (HASSANZADEH et al., 2023); engineering (BASTAN, ZAREI, TAVAKKOLI-MOGHADDAM & SHAKOURI,

2022); industry (NAZARI, MEHRMANESH & HAGHIGHAT MONFARED, 2021); agriculture (TAYOURI et al., 2023); transportation (NADIMI, MANSOURIFAR, SHAMSADINI & SOLTANINEJAD, 2024); digital intelligence (KE et al., 2023) and computing (ELSHEIKH, 2011). [12]

Here, we aim to offer a methodological article that allows for an in-depth and extensive discussion of aspects related to methodology, using examples from the evaluation of a social program to illustrate the process of conducting iterative mixed analysis. Additionally, we seek to show how it is possible to carry out an integrated and iterative analysis of quantitative and qualitative data in the field of social program evaluation, pursuing a more holistic approach (DAHER, JARAMILLO & ROSATI, 2020) and contributing to this field with an innovative proposal. [13]

2.1 Grounded theory methodology (GTM)

GTM is a qualitative method initially developed by GLASER and STRAUSS (1967) and further refined by STRAUSS and CORBIN (1990, 2002 [1990]). It originated in the Sociology Department at the University of Chicago, influenced by pragmatism and symbolic interactionism. Its premises, based on the general framework advanced by STRAUSS (1987), included the necessity of conducting fieldwork to uncover what truly happens in real life, the significance of grounding theory in data generation that can aid in the advancement of a discipline and establish a foundation for social action, the complexity and variability of human phenomena and actions, the belief that people are agents who actively engage with challenging situations, making decisions with intention—an intention that is defined and redefined through interaction, a recognition of the evolving and continually developing nature of events (processes) and the ongoing relationship between conditions (structure) and actions (agency), along with their causes and effects. [14]

The classical authors of GTM strongly emphasized the need to construct theoretical models derived from systematically generated data and then analyze these models through research. When this approach is adopted, the project does not begin with a preconceived theory but with a research field that allows the theory to emerge from the data (STRAUSS & CORBIN, 2002 [1990]). Analysis informed by GTM involves an interpretation process aimed at discovering concepts and relationships within the data, which are subsequently rearranged into collaborative explanatory models (ibid.). The data may originate from various sources, including interviews, focus groups, observations, documents and products. Procedures for interpreting and organizing the data include identifying concepts, generating categories, taking notes, formulating memos, establishing relationships among the data and creating diagrams. The data generation and analysis processes co-occur, forming an iterative and circular process in which the information analyzed guides subsequent phases of data generation. Furthermore, in the version of GTM inspired by STRAUSS and CORBIN, the analytical process is shaped by the dynamic interaction between researchers and data. Researchers must find a good fit between the data (what people say or do)

and their interpretation while maintaining some distance from the situations studied to analyze them critically and correct any distortions or biases. [15]

The GTM analysis process consists of three steps, specifically identified by STRAUSS and CORBIN as open coding (descriptive analysis) and axial and selective coding (relational analysis). The latter is particularly important for this article due to its integrative and relational nature. Open coding is the analytic process through which concepts are recognized in the data and subsequently organized into categories or sub-categories. Following this, their properties and dimensions are revealed, resulting in a hierarchical classification scheme (ibid.). Axial coding is used to develop explanatory models that emerge from the data and account for salient phenomena identified in the results. It is called "axial" because the coding process centers around the axis of a phenomenon, linking concepts and memos associated with its manifestations or explanations (DAHER, ROSATI, CAMPERO & STEVENSON, 2025). Selective coding is the stage in which an explanatory model is derived, summarizing the essential aspects of the results in relation to a central phenomenon. Its name originates from the identification of such a phenomenon, which involves selectivity, integration and interpretation (ibid.). Here, the emergent theory can be described as a collection of well-developed concepts linked through connecting statements that form an integrated conceptual framework capable of explaining phenomena (STRAUSS & CORBIN, 2002 [1990]) by employing relational models based on axial or selective coding. [16]

2.2 Structural equation modeling (SEM)

SEM is a multivariate statistical analysis method used to examine complex relationship patterns among variables and to support theory validation through empirical modeling (ORTIZ & FERNÁNDEZ-PERA, 2018). It consists of generalization, integration and extension of linear models such as analysis of variance, multiple regression and factor analysis, and has been recognized as a comprehensive, integral and flexible approach to hypothesis testing through modeling in the social sciences (HOYLE, 2015a). [17]

SEM can be applied to a wide range of research questions, types of variables (continuous and discrete) and designs (experimental and non-experimental) (ORTIZ & FERNÁNDEZ-PERA, 2018). However, its use in mixed methods has been relatively limited. Although the foundational techniques of SEM were established in 1970 and became widely accessible in the 1980s, the method remains subject to ongoing development, with new functions being regularly added to the software used for its implementation and fresh insights being generated regarding the causal relationships established with SEM (MATSUEDA, 2015). [18]

The application of SEM consists of the steps outlined below. In the first step, the researchers specify a model (HOYLE, 2015b) which is a formal statement that encompasses the processes or mechanisms used to describe the relationships or patterns found in the data. In other words, the model provides a visual

representation of the hypothesized relationships among the variables that prompted the analysis. Models can arise from theoretical material and evidence provided by other data or from the results of narrower prior studies of the same data. Models can be specified before or after the data are collected and prepared for analysis; however, the former option is preferable because it allows researchers to gather the data that the model requires. This specification involves labeling variables, selecting measurement tools and determining relationships among the variables, which are represented through equations or a diagram. [19]

The second step involves estimating the model parameters (LEI & WU, 2015) which are linked to the relationships between the variables. Various methods are available, with maximum likelihood (ML) being the most common and default option in most software packages. This method executes successive iterations until it converges on a solution. [20]

The third step entails evaluating overall model fit (WEST, TAYLOR & WU, 2015). This evaluation is necessary because, while parameters confirming the hypothesized relationships among the variables can be estimated, it is also important to verify whether the model adequately explains the data or if it should be rejected or needs to be re-specified. Several indicators can be utilized to express model fit, including chi-square $\chi 2$ or normed chi-square (NC), comparative fit index (CFI) or Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA) or standardized root mean residual (SRMR), non-normed fit index (NNFI) and goodness of fit index (GFI), among others. [21]

The fourth step is interpreting and reporting the model (BOOMSMA, HOYLE & PANTER, 2015) after determining that the estimation and evaluation of fit support either the original model or a modified version, justifying the established relationships and their direction (causal effects). To achieve this, it is essential to examine the foundations of the model by reviewing the latest research, theoretical support and empirical evidence regarding the hypotheses that uphold aspects of the model, or narrower exploratory analyses conducted using the same or other data. Lastly, the researchers present the information obtained, detailing the results associated with the methods used to estimate and evaluate model fit, including all indicators and a diagram. Additionally, it is important to include information about the variables and the interpretative support used to specify the model beforehand. Furthermore, it should be noted that the *a priori* model reflects a theory or a set of interconnected hypotheses that can be derived from various theories; therefore, the interpretation of a parameter is always theoretical, regardless of its result (ORTIZ & FERNÁNDEZ-PERA, 2018). [22]

3. How Is Iterative Mixed Analysis Performed?

3.1 Contextualization

An iterative process is one in which prior results are used to progressively adjust each stage. Iterative processes are commonly utilized in problem-solving, work methodologies and computing. Consequently, iterative mixed methods employ both qualitative and quantitative analysis methods to develop emerging and confirmatory explanatory models that provide a comprehensive understanding of social phenomena. The process includes the following steps: Familiarization with the phenomenon, collaborative methodological design, iterative mixed data generation and iterative mixed analysis. For this article, we illustrate iterative mixed analysis using the evaluation of a micro-entrepreneurship program. While several mixed methods studies have investigated this common type of social intervention (systematized by CAMERON & MOLINA-AZORÍN, 2011), there are few evaluations of such programs that integrate qualitative and quantitative information. [23]

The micro-entrepreneurship program examined in this study consisted of training courses offered by a Chilean non-governmental organization. The organization's most frequent and well-established courses were "Start a business workshop" (SBW) and "Managing your micro-business" (MYMB). SBW was an introductory course designed for people looking to begin their entrepreneurship careers with the final task being the development of a business plan. MYMB was an advanced course intended for those starting a business, focusing on improving or expanding it. [24]

Both courses were available every trimester, with group classes led by a facilitator who taught technical skills based on the proposals put forth by OSTERWALDER and PIGNEUR (2009), along with personal skills in accordance with the recommendations of CEFE INTERNATIONAL (2021). Both components were considered essential for effectively developing a business and ensuring its growth (GLAUB & FRESE, 2011). However, in a systematic review of studies on entrepreneurship, McKENZIE and WOODRUFF (2013) criticized the lack of research designed to determine how and through which means training programs impact business outcomes. [25]

Consistent with the increasing inclusion of women in initiatives of this type (GLOBAL MONITOR ENTREPRENEURSHIP [GEM], 2023), most participants in these courses were women facing social and/or economic vulnerabilities, such as those who had lost their jobs or needed to supplement their household income. The businesses they started were typically small ventures with no more than one employee, including sewing workshops, small restaurants and craft shops. In this context, there was a need for evaluation focused on the aforementioned courses, encompassing the development of the participants' businesses along with the technical and personal skills involved in their design.

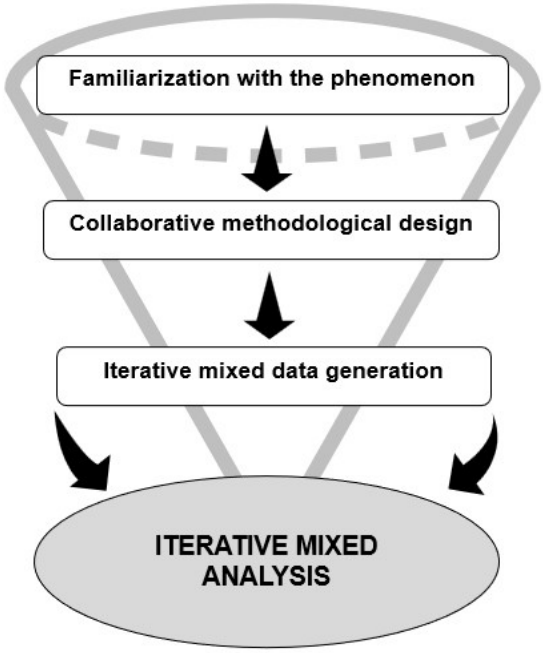

Figure 1: Iterative mixed analysis: Grounded theory methodology and structural equation modeling [26]

3.2 Familiarization with the phenomenon

The familiarization process began, in this example, due to the principal investigator's interest in conducting evaluations of social programs, as this approach can provide a fuller, more comprehensive view of the interventions carried out. This effort was also stimulated by the social organization's desire to evaluate its entrepreneurship program, which it anticipated would allow it to report its effects, promote transparency and enhance accountability for the benefit of its staff members, partners and participants. With this goal in mind, the organization contacted the researcher since its members were familiar with her work in the social domain. Several meetings were held to clarify the requirements and share additional information. Subsequently, a review of theoretical and empirical material was conducted to create an up-to-date picture of the evaluation of social programs and entrepreneurship as a social intervention strategy. This enabled the research team to begin identifying the qualitative and quantitative dimensions to consider. [27]

3.3 Collaborative methodological design

The methodological design of the evaluation was collaborative, incorporating the principal investigator as well as the board members, central staff and coordinators from the entrepreneurship centers. In their discussions about the organization's evaluation needs, these participants actively listened to each other and welcomed everyone's input. This openness enabled them to refine the organization's requirements and develop a feasible and viable methodological proposal, tailored to its specific context as applied research. Moreover, they worked together to create flow charts for each evaluation stage which allowed them to adapt the proposal to the organization's evaluation needs and the available methodological options while considering each milestone in the process: Problematization, definition of questions and objectives, selection of participants, generation of qualitative and quantitative information, data analysis and production of an evaluation report. [28]

The overall goal established through this process was to perform an iterative mixed analysis of the processes and results related to the development of the participants' businesses, along with their connection to technical and personal skills in a micro-entrepreneurship program centered on training courses. Over a two-year period, we carried out a process and outcome evaluation using the integral evaluation model (DAHER et al., 2020), making some adjustments to fit the specific context of the program. This model combined qualitative and quantitative methods, treated evaluation as an ongoing part of the intervention, and incorporated the perspectives of multiple stakeholders through a collaborative approach. [29]

Our qualitative approach was descriptive and relational. We adopted the principles of GTM (STRAUSS & CORBIN, 2002 [1990]), which allowed us to develop a comprehensive understanding of the program, establish the evaluation parameters (what to evaluate and how) and capture the processes and results from the participants' perspective. The quantitative approach was quasi-experimental, using a measurement instrument administered at three points (baseline, endpoint and follow-up). [30]

To carry out the evaluation, we created a manual which was used to train everyone involved in data generation. Throughout this process, the organization's staff demonstrated an impressive level of commitment and made significant contributions. The ethical guidelines of the AMERICAN PSYCHOLOGICAL ASSOCIATION (2010) were consistently followed, as were those set forth by the ANID (2022). Prior to their inclusion in the study, all participants reviewed and signed an informed consent document that clearly stated that their involvement or non-involvement in the evaluation would not negatively impact their participation in the program, that their data would be managed confidentially and that they could withdraw from the evaluation at any time if they chose to do so. The study received ethical approval from the Ethics Committee of the Psychology Department at Pontificia Universidad Católica de Chile. Additionally, the lead

author obtained certification for human subject research from the Collaborative Institutional Training Initiative (CITI program). [31]

3.4 Iterative mixed data generation

Instances of qualitative and quantitative data generation were conducted iteratively, beginning with group evaluative conversations, followed by the construction of the quantitative instrument, including a pre-test, and the administration of this instrument (baseline, endline, follow-up), concluding with final group evaluative conversations. These instances are explained below. [32]

First, to learn about the topic of entrepreneurship, considering its technical and personal aspects, and to generate emerging information, we held group evaluative conversations with 22 people who had participated in the training courses implemented during the previous year. Most of the participants were women, whose average age was 40 years and who had completed secondary school, married with school-age children. The evaluative conversations were group meetings based on the conversational approach (CANALES, 2002) and participatory action research (DURSTON & MIRANDA, 2002), as well as systematic discussions for evaluation (MONTERO, 2006). These meetings served as open spaces guided by general themes, allowing participants to share their stories and comment on others' experiences in a storytelling format while also discussing the products of their businesses. The conversations with participants were guided by a flexible and exploratory thematic script designed to facilitate dialogue rather than interrogation (DAHER, JARAMILLO & ROSATI, 2018). This exploratory script first delves into participants' experiences in the program through the following questions: "To start the conversation, we would like to know about your experiences in the program. How has your participation in this program been? We hope you can share what has happened in your life since joining the program." Following this, questions regarding the effects of the intervention on the participants' business, as well as questions about technical and personal skills, were included. Some questions were: “Specifically, have you noticed any changes resulting from your participation in the courses? For instance, have there been changes in the hours you dedicate, income per sale, number of workers (both paid and unpaid) or in the formalization of your business? Do you believe there are other aspects that have changed?” Additionally, questions concerning the effects on unsuccessful cases or dropouts were included. Data analysis was conducted following GTM procedures (STRAUSS & CORBIN, 2002 [1990]). Open coding was performed, based on an analysis plan composed of five recursive stages: 1. Reading of the transcripts of the group evaluative conversations by the whole research team; 2. open coding, consisting of the identification of key concepts in the transcripts; 3. production of hierarchical classification schemes where concepts are organized into categories, subcategories, dimensions and properties; 4. triangulation of the hierarchical classification schemes within the research team, which, in line with DENZIN (1970), involved considering a range of elements to compare, contrast and complement perspectives, leading to a more comprehensive and in-depth

understanding of the phenomenon under study; 5. writing of reports based on the hierarchical classification schemes. [33]

Second, the results of the conversations enabled the construction of quantitative instruments relevant to the specific evaluation to be conducted, while also informing a preliminary, inductive explanatory model of the relationship between the participants' technical and personal skills and the development of their businesses, based on their experiences and meaning-making. [34]

To gain a clearer understanding of the program's results, we created scales for the variables that we aimed to evaluate, adapting instruments already in use within the organization and utilizing information gathered from the initially collected qualitative data. We also considered the opinions of two entrepreneurship experts and two methodology experts. We administered three scales: Business development, technical skills and personal skills. [35]

The 100 individuals who participated in the pre-test had completed the SBW or MYMB courses in the year prior to the evaluation. The pre-test provided insights that made it possible to refine and validate the instruments with all stakeholders involved. Additionally, this constituted a secondary source of information used in the development of the final explanatory model. [36]

The business development scale consisted of the following variables: Sales income (declarative answer), business status (closed, developing the idea, starting, in operation), formal establishment (the official start of commercial activities certified by the Chilean Internal Revenue Service) and hours dedicated to the business (ranging from 0 to 60 hours per week). The technical skills scale consisted of three sub-scales. Business management included ten items that addressed notions of marketing and commercialization, productive processes, cost accounting and cash flow, with a reliability estimate of 0.91. Legal aspects comprised two items and had a reliability of 0.83. Information technologies consisted of 3 items with a reliability of 0.75. For all items, answer choices ranged from 1 (I don't do it, I know nothing about it, I'm incapable of doing it) to 3 (I always do it, I'm fully informed about it, I'm perfectly capable of doing it). The baseline Cronbach's alpha for technical skills was 0.89. [37]

The personal skills scale included two sub-scales. Psychological empowerment, comprising 7 items that represented self-efficacy, autonomy, locus of control and social support, exhibited a reliability of 0.74. Entrepreneurial characteristics, incorporating 12 items that encompassed persistence, responsibility, information seeking, strategic planning, taking controlled risks and teamwork, showed a reliability of 0.89. Both utilized five-point Likert scales ranging from 1 (strongly disagree) to 5 (strongly agree). The baseline Cronbach's alpha for personal skills was 0.90. [38]

The technical skills and personal skills scales were administered at the baseline and end line points. Business development was evaluated at both points and during follow-up. Additionally, we included a socio-demographic questionnaire

covering aspects such as sex, age, family status and educational status, and a business characterization questionnaire addressing aspects such as economic sector, associativity and the entrepreneur's experience, both of which were administered at baseline. [39]

To administer the quantitative instruments, we invited all individuals who had attended SBW or MYMB during the evaluation year. Table 1 showcases the instruments administered to the participants, organized by the course they attended and the specific trimester. The final analysis included the 398 individuals who completed the instruments at all three measurement points (173 from the SBW course and 225 from the MYMB course).

Trimester	Baseline		End line		Follow-up	
	SBW	MYMB	SBW	MYMB	SBW	MYMB
First trimester	64	50	43	42	32	31
Second trimester	104	128	94	95	61	63
Third trimester	151	234	119	195	80	131
Subtotal	319	412	256	332	173	225
Total	731		588		398	

Table 1: Participants who completed the quantitative instruments [40]

The baseline included everyone who attended the courses, while the end line group was smaller due to a 20% dropout rate reported by the organization. At follow-up, because this was a non-captive sample, the sample loss was greater. Five of the seven entrepreneurship centers managed by the organization across various cities in Chile were included in the evaluation, including Antofagasta (north), Santiago and Valparaíso (central) and Concepción and Coronel (south). The average age of participants was 43.5 years (ranging from 22 to 74, SD=10.88), with the majority having completed their secondary education (33.7%, with an average of 11.6 years of education, SD=3.19). A significant majority were women (84.4%). We observed no differences related to the course attended. Additionally, we found no significant socio-demographic differences (age, education level and gender) between those who participated in the evaluation and those who did not. [41]

Third, at the end of the quantitative data generation process, we conducted 16 group evaluative conversations led by coordinators from the entrepreneurship centers. 98 participants were included in the group evaluative conversations (who also completed the quantitative instruments). This thematic script was more detailed and focused than the exploratory one and consisted of four sections. First were the guidelines for the moderator which provided recommendations to facilitate the conversation and to avoid introducing bias or social desirability

among the participants. Second the introduction framed the participants in relation to the conversation, emphasizing their freedom to express themselves honestly, the value of their perspective for the study and the confidentiality of the discussion. Third, the presentation gathered information about age, family situation, educational level, occupational status and participant trajectories in the social program. Fourth was a section with questions regarding the changes or effects of the program, inquiring about the changes in their businesses, the effects on their business knowledge development, the effects as entrepreneurs and the effects on their personal lives. Furthermore, we asked about factors to which they attributed these changes, such as whether the business was emerging or already established, whether they had prior experience in entrepreneurship, whether there was an urgent need to generate income, whether they had higher education, whether they were male or female and whether they were young or older, among others. Fifth, a section exploring their experiences in the program asked about the fulfillment of their expectations for the program, their appreciation of the program activities, the ideal profile of a program participant and the factors that facilitated or hindered their participation, along with any recommendations they had. [42]

This thematic script was modified in response to emerging phenomena; for instance, the initial conversations covered the overall effects of the program while subsequent ones addressed the inferential quantitative results identified. Data were analyzed according to the same plan consisting of five recursive stages specified earlier. The information obtained from this analysis process enriched both the relational qualitative analysis and the explanatory model tested quantitatively which is reported below (in the iterative mixed analysis section), along with the program implementation processes. [43]

3.5 Iterative mixed analysis

In this section, we present how qualitative and quantitative data can be used recursively for a richer understanding of a phenomenon. Each piece of data was analyzed according to its type—qualitative or quantitative—using appropriate methods—GTM or statistical analysis. However, during this analysis, examining the results from each source as a whole and engaging in dialogue with the actors involved allowed us to develop a comprehensive model that was both inductive and deductive (rather than simply comparing qualitative and quantitative outcomes). This model revealed a high degree of convergence between the emerging qualitative data and the estimated quantitative data. [44]

To achieve this, we held periodic evaluative meetings where the various actors involved in the program had the opportunity to collaborate (DAHER et al., 2020). Additionally, these sessions served to present the results of the evaluation process and to address practical issues that arose during it. This allowed us to enhance the complexity of the analysis by incorporating the views of 15 staff members and making operational adjustments to improve the evaluation. Moreover, the analysis was enriched by the application of the encounter-context-themes device (DAHER, CARRÉ, JARAMILLO, OLIVARES & TOMICIC, 2017)

which is aimed at generating explanatory models through the systematization of reflective memos related to the data generation process. [45]

Below, we present the key findings of the evaluation to illustrate the iterative mixed analysis conducted. We discussed the results of the qualitative descriptive analysis alongside those of the inferential statistical analysis. Then, we covered the transition from qualitative relational analysis (which stems from selective coding) to the estimation of the proposed SEM, which also incorporated supportive qualitative data. Both analytical approaches reflect the ongoing recursivity of the process. [46]

Based on what the participants expressed during the group evaluative conversations, technical skills were crucial for them. These skills, defined as the knowledge and practices that enabled them to manage their businesses more effectively and ultimately consolidate them, were critical. For these participants, the technical aspect of the courses helped them to learn and organize their businesses better:

> "You have to start by learning; you need to gain some [technical] knowledge. That much should be clear to us. What are we here for? We're here to learn, to be taught new things so we can better organize our businesses" (Group Evaluative Conversation 13, Participant 5)[2]. [47]

This was consistent with the quantitative results derived from an analysis of variance with repeated measures which included the factors of course and time of measurement, using technical skills as the response variable. We identified an effect for time of measurement [$F(1, 392)=96.187$; $p<0.01$; $\eta p2=0.20$], with technical skills scores being higher at the end line [$M=1.77$; $SD=0.03$] than at baseline [$M=1.58$; $SD=0.02$], indicating a general improvement over time. [48]

Additionally, the significance of cultivating personal skills was naturally expressed by the participants, who viewed it as a transformation in their personal image and as an indication of their new status as entrepreneurs:

> "I'm a woman entrepreneur. I want to do things that for a long time I felt I wasn't capable of doing. But it's never too late to learn, start a business, and improve yourself. The program has helped me to identify my weaknesses and my strengths. I've realized I'm a fighter and that over time I'll become a businesswoman ... Believing in ourselves is key, having the courage to say 'I can do it,' because I actually can" (Group Evaluative Conversation 13, Participant 1). [49]

This was consistent with the quantitative results obtained from an analysis of variance with repeated measures, which included the factors of course and time of measurement, using personal skills as the response variable. We identified a statistically significant effect for time of measurement [$F(1, 392)=17.209$; $p<0.01$; $\eta p2=0.04$], as personal skills scores were higher at the end line [$M=4.31$,

2 All the textual quotes were originally in Spanish and have been translated.

SD=0.03] than at baseline [M=4.19, SD=0.03], indicating a positive overall change. [50]

Most participants reported starting the courses feeling insecure and fearful, as they were under pressure to make their businesses thrive to support their households. This feeling gradually faded as they progressed through the courses, which helped them to gain the confidence to say, "I can do it," and enabled them to develop an entrepreneurial attitude, as one participant noted:

> "Something we saw was the fear of failing: 'What's the course going to be like for me? Will I do well or will I do badly? Maybe I won't be good enough, maybe it's not what I want.' And we had to face those fears that are right in front of me whenever I want to do something [start a business]. This course helped me and gave me the strength to just go for it!" (Group Evaluative Conversation 14, Participant 2) [51]

On a different subject, based on the analysis of variance with repeated measures for the response variable sales income, we found a statistically significant effect for time of measurement [$F(1, 391)=10.083$; $p<0.01$; $\eta p2=0.03$], with income being higher at follow-up [M=$307,598, SD=44,482] than at baseline [M=$191,124, SD=27,395]. This finding is consistent with the qualitative data exemplified by a participant who talked about the process that led to raise prices and thereby increase profits:

> "First of all, I learned to calculate my true production costs, I learned to value my product, I dared to advertise it more and realized that it was a good product, so I could charge more. So, I raised the prices [referring to business profits]" (Group Evaluative Conversation 1, Participant 8). [52]

The core phenomenon of the qualitative relational analysis is illustrated as "You learn to become an entrepreneur: The entrepreneurial process" (Figure 2), as detailed in DAHER et al. (2018, p.215). This phenomenon represents the route from an idea to a business. This becomes achievable when the participants gain new technical knowledge and experiences personal growth. [53]

The participants valued acquiring knowledge and skills, as this enabled them to enhance the management of productive processes such as commercialization, financial competencies, accounting, legal procedures, computer tools and utilizing the Internet for their businesses, all embodied by the statement: "I know how." They also appreciated achieving personal growth and gaining skills that made them feel more empowered, leading to increased self-confidence, control over their lives and personal appreciation, among other benefits. This empowerment allowed them to identify as entrepreneurs, a mindset they referred to as an "entrepreneurial attitude." This attitude encompasses a set of relevant qualities for individuals wishing to start a business such as responsibility, perseverance, planning, teamwork skills, overcoming fears, taking risks and thinking about the future or "dreaming," which was conveyed by the expression "I can do it." [54]

These skills were found to be interconnected, as the participants reported that technical learning boosted their confidence in situations that had previously made them fearful, while personal development enabled them to position themselves more advantageously in the market. Ultimately, all these factors contributed to the growth of the participants' micro-businesses in terms of profit. This resulted in a heightened sense of well-being linked to improvements in their living conditions and an increased ability to contribute to their household income, which was especially significant for the women participants. [55]

In this process, the role of the facilitator was crucial, as this person imparted knowledge and guided the participants' introduction to the business world while also instilling confidence in them and serving as a form of personal support, providing the final "push" that they needed to become entrepreneurs. For the participants, their businesses represented not only a productive activity but also a means of asserting themselves as individuals capable of turning a dream into a sustainable project which reinforced their technical and personal skills: "I learned to believe in myself, I realized I had potential ... Economically, it has to do with believing that this can guarantee my well-being, and [emotionally, it has to do with] not having to belittle myself ever again" (Group Evaluative Conversation 2, Participant 9).

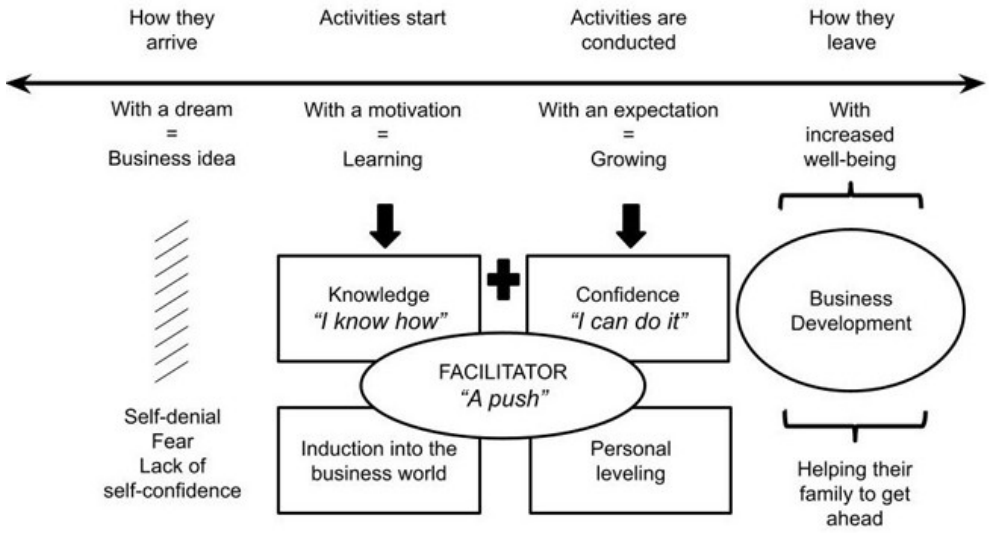

Figure 2: You learn to become an entrepreneur—The entrepreneurial process [56]

This qualitative relational model laid the groundwork for creating the hypothesized SEM by defining variables and establishing relationships based on what the participants themselves stated (Figure 3). We transitioned from the GTM model to the SEM model by presenting the data to the participants and key actors of the organization we collaborated with, who, based on their practical expertise, discussed these results to refine the SEM model. Since quantitative models must be parsimonious regarding the number of variables and their relationships, which also need to be consistent with the number of available participants to adjust the model using the existing data, it was necessary to simplify the qualitative model.

This simplification involved excluding some aspects from the quantitative testing, although they were still considered later for explaining and gaining a deeper understanding of the relationships along with contextual data (e.g., referring to the initial situation of the entrepreneurs and their motivations). Thus, the core notions of the qualitative model, rooted in the experiences and meanings of the participants (which imparts local and cultural relevance to the model), were employed in the hypothetical structure of the SEM and then in the SEM itself.

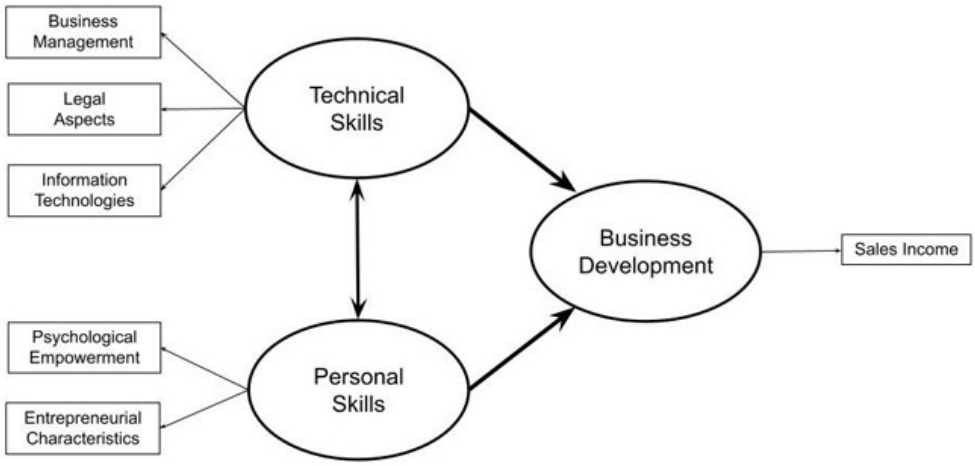

Figure 3: Hypothesized structural equation model [57]

We utilized SEM to examine the hypothesized model in which technical skills (comprising business management, legal aspects and information technologies) and personal skills (including psychological empowerment and entrepreneurial characteristics) contribute to business development. As is common in this type of research, for business development—represented by sales income—, we calculated the logarithm instead of using it declaratively in order to to mitigate the effect of its asymmetric distribution. To evaluate this model, we employed data from both courses under evaluation (SBW and MYMB) at the end point, including a larger participant pool to enhance the representativeness of the phenomenon (from 120 participants in the qualitative data generation to 398 in the quantitative data generation). The estimation method used was maximum likelihood. Figure 4 displays the final model. Below, we offer an explanation of this model, integrating qualitative data that help to saturate and add depth to each variable and its relationships, as well as to the context. This approach allows us to consider emerging aspects not anticipated in the theoretical literature or previous empirical evidence.

Figure 4: Model of the relation between skills and business development. Please click here for an enlarged version of Figure 4. [58]

At the beginning of the courses, the entrepreneurs all had a "dream" or "business idea," but they also faced self-denial, fear and a lack of self-confidence. These challenges were addressed and overcome during the courses. The motivation for business development was linked to reaching higher levels of well-being and assisting their families in improving their economic situation and quality of life, which one participant expressed as follows:

> "I tell my husband 'look, I learned all this' and he says 'did you learn all that?' and I say 'yes! Because I come to learn, I don't come for a walk to get out of the house, I come because my objective is to get ahead, my objective is to have my own microenterprise and help my family get ahead'" (Group Evaluative Conversation 13, Participant 8). [59]

Regarding the overall fit of the model, some indicators were adequate, while others were marginally below acceptable values [$\chi 2(553, N=398)=1457.33$; $p<0.01$, normed chi-square NC=2.6; root-mean-square error of approximation RMSEA=0.064; comparative fit index CFI=0.86; non-normed fit index NNFI=0.85; goodness of fit index GFI=0.82]. However, we confirmed that all the hypothesized relationships functioned well; that is, the indicators representing the variables were measured adequately and the structural variables exhibited significant associations. [60]

As expected, the technical skills and personal skills factors were positively associated with business development, represented by sales income in SEM and understood in GTM as a way of positioning oneself as capable of transforming a dream into a sustainable project. This indicates that as the participants' technical and personal skills improve, their businesses grow and their projects solidify, confirming emerging phenomena identified qualitatively. [61]

In this regard, returning to the qualitative relational model, the acquisition of technical skills, which the participants defined as "I know how," is a fundamental

element for explaining business development as well. The technical skills in the SEM comprised business management, legal aspects and information technology. These skills were valued because they provide the security and motivation to take on new challenges in the development of the business, as some participants commented:

> "Participant 3: I feel more optimistic, as you learn new things you dare to tackle new challenges, for example, finding new providers or entering another market. Participant 1: You feel more confident. Participant 5: Right, knowledge gives you more self-assurance, you gain trust in the work you're doing and so, when we enrolled in this course, the tools they gave us were valuable because they led to these changes. Participant 2: I mean, you realize that you can actually do things, it's just a matter of having the necessary knowledge and applying it, that immediately makes you say 'yes, it's possible.' [...] Participant 4: And that confidence they were just talking about gives you the stance and the mentality you need to face the market" (Group Evaluative Conversation 16, multiple participants). [62]

Personal skills were also essential in explaining business development. The personal skills in the SEM consisted of psychological empowerment and the promotion of entrepreneurial characteristics. Regarding the qualitative relational model, this is particularly important due to the changes of mentality or attitude involved in being an entrepreneur, which relates to planning and establishing long-term goals, as noted by two participants:

> "Participant 6: There are many activities that seek to develop people's entrepreneurial attitude ... for example, learning the basics of business planning and leadership. But they don't say 'to make a plan you need to follow these steps,' it's your mind that needs to form the idea of planning, you need to install this entrepreneurial attitude into your brain. [...] Participant 2: It's about wanting to go far, being more in control of what you're doing as an entrepreneur, as you manage your company" (Group Evaluative Conversation 1, multiple participants). [63]

Moreover, technical skills and personal skills showed a significant association with one another in the SEM. This may suggest that learning about entrepreneurship facilitates the acquisition of personal skills (such as gaining psychological empowerment and developing entrepreneurial qualities). Simultaneously, these skills lead individuals to be more receptive to technical knowledge (specifically regarding business management, legal aspects and information technologies), enabling both to reinforce each other mutually. This is demonstrated in the following vignette:

> "Everything I did here helped me to say: 'I can get ahead in life.' I needed that little push, because they give you the [personal] tools and tell you: 'You can do it, you have enough [technical] knowledge to get out of this situation.' It's about knowing that you're doing things well" (Group Evaluative Conversation 4, Participant 2). [64]

All this suggests that, in addition to supporting the development of participants' businesses, it is equally important to provide knowledge that will enhance these

aspiring entrepreneurs' personal capabilities and prepare them to manage their businesses effectively. Therefore, the program's scope should be expanded to benefit participants and strengthen their skills. These skills, which are validated in the SEM, gain subjective meaning when applied to the qualitative relational model, revealing how, within a processual context of skill acquisition, the program facilitates business development. This approach broadens the range of results presented, thus increasing their credibility. [65]

4. Conclusions

In this article, we aimed to explore the use of a mixed method design and provide a detailed description of iterative mixed analytical steps to evaluate social programs. We sought to provide methodological information on the procedures involved in conducting iterative mixed analysis, as well as on the preceding steps that helped to frame the study in such a way that the iterative mixed analysis remained both relevant and contextually grounded. In this respect, the first contribution of this article was to offer a methodological approach for integrating SEM and GTM. This insight rests on the acknowledgment that integration does not occur suddenly at the end of a project, but rather results from an intentional and reflective process throughout the entire research project, as noted by BAZELEY (2018). [66]

More specifically, the second contribution of the study was to propose the use of qualitative relational models informed by GTM to generate SEM within iterative mixed analysis. This approach allows for the construction of hypotheses grounded on *in situ* qualitative data, the definition of variables and anchoring of relationships based on participants' statements and the incorporation of emerging aspects not anticipated in the theoretical literature or prior empirical evidence. Also, using GTM makes it easier for researchers to transition from inferential statistics to advanced techniques while also yielding exploratory products that allow for the prefiguration of qualitative relational models, which can later be tested using confirmatory methods associated with statistical models. We suggest that, since SEM is a confirmatory method, researchers must first gain a deep understanding of the phenomenon under study (ORTIZ & FERNÁNDEZ-PERA, 2018). However, given that GTM is both an approach and an analysis method that researchers can use to generate emerging theories based on data (STRAUSS & CORBIN, 1990, 2002 [1990]), such knowledge can also be qualitative in nature, or, as in this case, mixed. [67]

Furthermore, since GTM has not often been used to support SEM, the contributions of SEM to GTM have received even less recognition. Thus, acknowledging this influence is the third contribution of this article, because the researchers of this article, through iterative mixed analysis, highlighted the multiple benefits of SEM as a complement to GTM: Broadening the range of results presented which increases credibility; including more participants to enhance the representativeness of the phenomenon; confirming emerging phenomena identified qualitatively and providing information that clarifies the causal relations among qualitative results. [68]

In summary, both GTM and SEM are used to construct relational models, with GTM utilizing qualitative data and SEM employing quantitative data. Thus, as GTM and SEM are used to establish and/or test relational or causal models, they are compatible from a mixed methods perspective, which is essential for iterative mixed analysis. This approach combines the advantages of both analysis methods. Not only does it provide quantitative evidence that supports causal relationships, but it also produces qualitative data that offer deeper insights and explanations regarding how these causal relationships manifest themselves. The iterative nature of the analysis is evident in the interplay between qualitative and quantitative results and how understanding these results in a complementary way leads to a more accurate and richer comprehension of the phenomenon under evaluation. In this sense, qualitative and quantitative data—despite differing significantly in terms of condensation and structure (SCHOONENBOOM, 2023)—serve in this case to construct relational models, providing a clear example of integration. [69]

Similarly, both SEM and the relational models developed from GTM are analytical strategies designed to account for the observed data. With the first method, which is deductive in nature, the researchers of the article wanted to illustrate that all models are merely approximations of the real-life forces that generate data which are often too complex to be captured by a single statistical model (HOYLE, 2015b). With the second method, which is inductive, the researchers' objective was to create situated and relevant models that are not meant to be representative or generalizable, but rather dense, sensitive and highly saturated. Because of these characteristics, researchers have increasingly embraced GTM, as it includes rigorous procedures for examining, refining and developing interpretations while remaining close to the data, since the levels of abstraction are built directly upon them (INFANTE, RUJANO & SÁEZ, 2011). [70]

Given the above, generating explanatory models through iterative mixed analyses should consider the data observed across multiple levels and from various perspectives, ensuring a more comprehensive, complex and holistic understanding of social phenomena. However, some authors argue that one of the main purposes of research in the social sciences is not only to recognize particular phenomena but also to explain them rigorously by identifying trends or patterns and revealing and defining key aspects (TARKA, 2018). From this perspective, the researcher's objective regarding the social sciences should be to develop a more integral viewpoint that, given the complexity of social life, often requires analytical methods capable of achieving such a goal (ibid.), for instance, generating explanatory models through the integrated use of relational models from GTM and SEM. Although this type of mixed research has been employed in fields related to large companies (AKBARPOUR et al., 2024; MARAGHEH et al., 2024), finance and investment (SAMIMI et al., 2022) and industry (NAZARI et al., 2021), among others, the significance of our article lies in its description of how this type of analysis is conducted in social research or the evaluation of social programs. [71]

Furthermore, this article represents a step toward reconciling the qualitative and quantitative paradigms (paradigmatic integration). According to ARRIETA, PÉREZ and NARANJO (2023), integrating these paradigms based on their epistemic contributions aids in developing a holistic view of the phenomenon (one that focuses on the whole) by embracing the principle of complexity or totality (GUTIÉRREZ, 2015). This can contribute to a perspective that includes both the objective and subjective dimensions of social phenomena (DAHER et al., 2020), in the present study, entrepreneurship as a social intervention strategy used for tackling poverty. Such a perspective should lead not only to mixed program evaluations but also to acquiring an approach that enables both dimensions to enhance the scientific understanding of phenomena. Using this method goes beyond merely collecting or generating and subsequently analyzing both types of information: It emphasizes the integration of both paradigms to strengthen the rigor of a study (CRESWELL & PLANO CLARK, 2007). [72]

Despite its advantages, using iterative mixed analysis also presents specific challenges in evaluating social programs. First, it involves high costs in terms of human resources, team training and the use of specialized software and both qualitative and quantitative methods. Second, participating staff must be committed and have a positive attitude, as time and dedication are essential to carry out iterative mixed analysis according to the steps outlined in this article. Third, researchers must be willing to achieve comprehensive and holistic results rather than just traditional evaluation outcomes (e.g., coverage, satisfaction, fulfillment of indicators and objectives). [73]

Overall, in this article, we recognize the role of iterative mixed analysis in the evaluation of social programs which represents a form of applied research vital for social development. When addressing new or innovative social programs that lack prior evidence, iterative mixed analysis can be used to enable a transition from qualitative relational models to quantitative explanatory and confirmatory models. Moreover, when there is a lack of agreement between quantitative models, using qualitative models helps to clarify the reasons and dynamics surrounding the program. Similarly, iteratively using both analytical methods to create explanatory models provides a more comprehensive understanding of the program, encompassing its outcomes and processes while also guiding decision-making. This broadens the objectives of social research and the evaluation of social programs, ultimately promoting social development. [74]

Funding

This work was supported by a doctoral scholarship awarded by the *Comisión Nacional de Investigación Científica y Tecnológica* (CONICYT) [National Commission for Scientific and Technological Research], now superseded by the *Agencia Nacional de Investigación y Desarrollo* (ANID) [National Research and Development Agency] of the Chilean Government. [75]

References

Acun, Volkan & Yilmazer, Semiha (2019). Combining grounded theory (GT) and structural equation modelling (SEM) to analyze indoor soundscape in historical spaces. *Applied Acoustics*, *155*(1), 515-524.

Agencia Nacional de Investigación y Desarrollo [ANID] (2022). *Lineamientos para la evaluación ética de la investigación en ciencias sociales y humanidades* [Guidelines for the ethical evaluation of research in the social sciences and humanities]. Santiago: Gobierno de Chile, https://s3.amazonaws.com/documentos.anid.cl/proyecto-investigacion/Lineamientos-evaluacion-etica.pdf [Accessed: March 21, 2025].

Aguirre-Dávila, Eduardo; Sanchez Mattson, Haidy; Destéfano, Gloria; Rojas-Lozano, Teresa; Villegas-Otárola, Marcela; Morales-Castillo, Miguel; Figueroa-Leguizamón, Maryuri; Rosas-Martínez, Laura & Maldonado-Almirón, Claudia (2023). Trastorno del espectro autista: análisis cualitativo del conocimiento, estigma, apoyo social y calidad de vida en familias latinoamericanas [Autism spectrum disorder: Qualitative analysis of knowledge, stigma, social support and quality of life in Latin American families]. *Revista de Investigaciones Científicas de la Universidad de Morón*, *6*(12), 31-46, https://doi.org/10.34073/310 [Accessed: December 30, 2024].

Akbarpour, Hossein; Sadegh, Mohammad & Nouri, Iraj (2024). Identifying factors affecting financial technology in small and medium businesses using grounded theory and structural equation model. *The International Journal of Nonlinear Analysis and Application, 15*(2), 165-172, https://doi.org/10.22075/ijnaa.2023.30137.4346 [Accessed: January 20, 2025].

American Psychological Association [APA] (2010). *Ethical principles of psychology and code of conduct.* Washington, DC: Department of Health, https://www.apa.org/ethics/code [Accessed: June 13, 2024].

Amoozesh, Nasrollah; Mohseni, Abdolreza & Ghasemi, Mostafa (2024). Modeling the determinants of spiritual capital in companies based on the grounded theory and structural equation modeling (SEM). *International Journal of Nonlinear Analysis and Applications, 15*(10), 131-141, https://doi.org/10.22075/IJNAA.2023.29793.4262 [Accessed: August 13, 2024].

Anguera, María Teresa (2008). Metodologías cualitativas: características, procesos y aplicaciones [Qualitative methodologies: Characteristics, processes and applications]. In Miguel Ángel Verdugo, Manuela Crespo, Marta Badía & Víctor Arias (Eds.), *Metodología en la investigación sobre discapacidad. Introducción al uso de las ecuaciones estructurales* [Methodology in disability research. Introduction to the use of structural equations] (pp.141-156). Salamanca: Publicaciones del INICO, https://gredos.usal.es/bitstream/handle/10366/82465/VI_SimposioCientificoSaid.pdf?sequence=1&isAllowed=y [Accessed: March 29, 2025].

Arrieta, Emilio José; Pérez, Oscar & Naranjo, Robin (2023). Conciliación paradigmática: la investigación holística [Paradigmatic reconciliation: Holistic research]. *Revista Ensayos Pedagógigos*, *18*(1), 19-29, https://doi.org/10.15359/rep.18-1.1 [Accessed: May 15, 2024].

Bamberger, Michael (2012). *Introduction to mixed methods in impact evaluation*. New York, NY: InterAction & The Rockefeller Foundation, https://www.interaction.org/wp-content/uploads/2019/03/Mixed-Methods-in-Impact-Evaluation-English.pdf [Accessed: March 14, 2025].

Bastan, Mahdi; Zarei, Masoumeh; Tavakkoli-Moghaddam, Reza & Shakouri, Hamed (2022). A new technology acceptance model: A mixed-method of grounded theory and system dynamics. *Kybernetes*, *51*(1), 1-30.

Bazeley, Pat (2011). Integrative analysis strategies for mixed data sources. *American Behavioral Scientist*, *56*(6), 814-828.

Bazeley, Pat (2016). Mixed or merged? integration as the real challenge for mixed methods. *Qualitative Research in Organizations and Management*, *11*(3), 189-194.

Bazeley, Pat (2018). *Integrating analyses in mixed methods research*. London: Sage.

Boomsma, Anne; Hoyle, Rick & Panter, Abigail (2015). The structural equation modeling research report. In Rick Hoyle (Ed.), *Handbook of structural equation modeling* (pp.341-360). New York, NY: The Guildford Press.

Cameron, Roslyn & Molina-Azorín, Jose (2011). The acceptance of mixed methods in business and management research. *International Journal of Organizational Analysis*, *19*(3), 256-270.

Canales, Manuel (2002). Conversaciones para el entendimiento [Conversations for understanding]. In John Durston & Francisca Miranda (Eds.), *Experiencias y metodología de la investigación participativa* [Experiences and methodology of participatory research] (pp.33-40). Santiago:

CEPAL, https://repositorio.cepal.org/server/api/core/bitstreams/ee76a4e1-bf36-48b2-942c-08ad81278c93/content [Accessed July 10, 2025].

CEFE International (2021). *CEFE Panorama 2021. Review of the year. Experiences of the global CEFE network*, https://cefe.net/pdfs/cefe-panorama-2021.pdf [Accessed: May 25, 2025]

Creamer, Elizabeth (2018). *An introduction to fully integrated mixed methods research.* Thousand Oaks, CA: Sage.

Creamer, Elizabeth (2022). *Advancing grounded theory with mixed methods. New York, NY:* Routledge.

Creswell, John & Plano-Clark, Vicki (2007). *Designing and conducting mixed methods research. Los Angeles, CA: Sage.*

Creswell, John; Klassen, Ann; Plano Clark, Vicki & Smith, Katherine (2011). *Best practices for mixed methods research in the health sciences.* Bethesda: Office of Behavioral and Social Sciences Research (OBSSR), National Institutes of Health (NIH), https://obssr.od.nih.gov/sites/obssr/files/Best_Practices_for_Mixed_Methods_Research.pdf [Accessed: June 30, 2025] .

Daher, Marianne (2015). Evaluación de programas sociales de intervención en pobreza: oportunidades y desafíos de integrar las dimensiones objetiva y subjetiva [Evaluation of social intervention programs in poverty: Opportunities and challenges of integrating objective and subjective dimensions]. *PhD Thesis.* Escuela de Psicología, Pontificia Universidad Católica de Chile, Santiago, Chile, https://rimisp.org/wp-content/files_mf/1439402568Tesis_Doctorado_MarianneDaherGray.pdf [Accessed: January 10, 2025].

Daher, Marianne; Jaramillo, Andrea & Rosati, Antonia (2018). A ser emprendedor se aprende: efectos técnicos y psicológicos de un programa de emprendimiento [Entrepreneurship can be learned: Technical and psychological effects of an entrepreneurship program]. *Revista Interamericana de Psicología*, *52*(2), 211-224, https://doi.org/10.30849/rip/ijp.v52i2.393 [Accessed March 15, 2024].

Daher, Marianne; Jaramillo, Andrea & Rosati, Antonia (2020). Avances en la evaluación integral: aportes para programas sociales de intervención en pobreza [Advances in integral evaluation: contributions to social programs for overcoming poverty]. *Revista de Estudios Sociales*, *74*, 84-98, https://doi.org/10.7440/res74.2020.07 [Accessed April 29, 2024].

Daher, Marianne; Rosati, Antonia; Campero, María José & Stevenson, Sofía (2025). Gender approach applied to qualitative research: Proposal for a methodological device. *Unpublished Manuscript*.

Daher, Marianne; Carré, David; Jaramillo, Andrea; Olivares, Himmbler & Tomicic, Alemka (2017). Experience and meaning in qualitative research: A conceptual review and a methodological device proposal. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, *18*(3), Art. 9, https://doi.org/10.17169/fqs-18.3.2696 [Accessed July 20, 2024].

Dean-Coffey, Jara; Gwynn, Charon; Mertens, Donna & Ortiz Aragón, Alfredo (2022). Transforming research and evaluation. In Alonzo Plough (Ed.), *Necessary conversations understanding racism as a barrier to achieving health equity (culture of health)* (pp.171-185). Princeton, NJ: Oxford University Press.

Denzin, Norman K. (1970). *Sociological methods: A source book.* Chicago, IL: Aldine Publishing Company.

Durston, John & Miranda, Francisca (2002). *Experiencias y metodología de la investigación participativa* [Experiences and methodology of participatory research]. Santiago: CEPAL, https://repositorio.cepal.org/server/api/core/bitstreams/ee76a4e1-bf36-48b2-942c-08ad81278c93/content [Accessed July 10, 2025].

Elsheikh, Yousef (2011). A model for the adoption and implementation of web-based government services and applications. a study based in grounded theory validated by structural equation modelling analysis in a Jordanian context. *PhD Thesis*, School of Computing, Informatics and Media, University of Bradford, Bradford, West Yorkshire, England, https://bradscholars.brad.ac.uk/handle/10454/5378 [Accessed: July 22, 2024]

Fetters, Michael & Freshwater, Dawn (2015). The 1 + 1 = 3 integration challenge. *Journal of Mixed Methods Research*, *9*(2), 115-117.

Fetters, Michael; Curry, Leslie & Creswell, John (2013). Achieving integration in mixed methods designs principles and practices. Health research and educational trust. *Health Services Research*, *48*(6), 2134-2156.

Glaser, Barney G. & Strauss, Anselm L. (1967). *The discovery of grounded theory: Strategies for qualitative research.* New York, NY: Aldine de Gruyter.

Glaub, Matthias & Frese, Michael (2011). A critical review of the effects of entrepreneurship training in developing countries. *Enterprise Development and Microfinance*, *22*(4), 335-353.

Global Monitor Entrepreneurship [GEM] (2023). *GEM 2022/23 women's entrepreneurship report: Challenging bias and stereotypes.* London: Global Entrepreneurship Research Association, https://kadingirisimci.gov.tr/media/ziheafe2/11-gem-2022-23-women-s-entrepreneurship-report.pdf [Accessed September 25, 2024]

Greene, Jennifer; Caracelli, Valerie & Graham, Wendy (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis*, *11*(3), 255-274.

Gutiérrez, Roger (2015). *Investigación holística* [Holistic research]. Mérida: Instituto Politécnico "Santiago Mariño".

Hassanzadeha, Seifolah; Kamyabib, Yahya; Khalilpoura, Mehdi & Ramezania, Javad (2023). The effect of tax incentives on tax collection in the comprehensive tax plan using grounded theory and structural equation model. *International Journal of Nonlinear Analysis and Applications*, *14*(5), 113-120, https://doi.org/10.22075/ijnaa.2022.27266.3544 [Accessed: April 25, 2024].

Hoyle, Rick (2015a). Introduction and overview. In Rick Hoyle (Ed.). *Handbook of structural equation modeling* (pp.3-16). New York, NY: The Guildford Press.

Hoyle, Rick (2015b). Model specification in structural equation modeling. In Rick Hoyle (Ed.). *Handbook of structural equation modeling* (pp.126-144). New York, NJ: The Guildford Press.

Infante, Pedro; Rujano, Rauma & Sáez, Raquel (2011). Teoría fundamentada: una visión crítica [Grounded theory: A critical view]. *Revista Trabajo Social*, *13*(1), 33-53. https://revistas.udea.edu.co/index.php/revistraso/article/view/24187/19764 [Accessed May 12, 2024]

Jamshidi, Nasrin; Ahmadi, Masoud & Farhadi, Ali (2024). Complexity of services and productivity in public organizations; model design and explanation by grounded theory and structural equations. *International Journal of Nonlinear Analysis and Applications*, *15*(2), 71-86, https://doi.org/10.22075/ijnaa.2022.26119.3240 [Accessed April 5, 2024]

Johnson, Burke; Onwuegbuzie, Anthony & Turner, Lisa (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research*, *1*(2), 112-133.

Ke, Youan; Lu, Lin & Luo, Xiaochun (2023). Identification and formation mechanism of key elements of supply chain resilience: Exploration based on grounded theory and verification of SEM. *PLoS ONE*, *18*(11), 1-30, https://doi.org/10.1371/journal.pone.0293741 [Accessed: June 7, 2024].

Khosravi Rad, Motahareh; Akbari, Ahmad; Karimi, Mohammad & Cherabin, Moslem (2023). Designing a model for the development of questioning skills in students based on the school environment using grounded theory and structural equation modeling. *Journal of Adolescent and Youth Psychological Studies*, *4*(10), 54-65, https://doi.org/10.61838/kman.jayps.4.10.7 [Accessed June 12, 2024]

Knappertsbusch, Felix; Schreier, Margrit; Burzan, Nicole & Fielding, Nigel (2023). Innovative applications and future directions in mixed methods and multimethod social research. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, *24*(1), Art. 22, https://doi.org/10.17169/fqs-24.1.401 [Accessed: June 5, 2025].

Leech, Nancy & Onwuegbuzie, Anthony (2009). A typology of mixed methods research designs. *Quality & Quantity*, *43*, 265-275.

Lei, Pui-Wa & Wu, Qiong (2015). Estimation in structural equation modeling. In Rick Hoyle (Ed.). *Handbook of structural equation modeling* (pp.164-180). New York, NY: The Guildford Press.

Mahmoud, Seyyed; Babab, Amir & Salehi, Jamshid (2024). Identifying the factors affecting the job regeneration of employees in the social security organization using grounded theory and structural equation model. *International Journal of Nonlinear Analysis and Applications*,*15*(3), 211-220, https://doi.org//10.22075/ijnaa.2023.30101.4332 [Accessed: July 4, 2024].

Maragheh, Omid; Rouholamini, Mehdi & Nabavichashme, Ali (2024). Evaluating the impact of decision-makers and managers' characteristics on the export development of SMEs by grounded theory and structural equations approaches. *International Journal of Nonlinear Analysis and Applications*, *15*(8), 135-147, https://doi.org//10.22075/ijnaa.2023.31041.4552 [Accessed: June 28, 2024].

Matsueda, Ross (2015). Key advances in the history of structural equation modeling. In Rick Hoyle (Ed.). *Handbook of structural equation modeling* (pp.17-42). New York, NY: The Guildford Press.

McConney, Andrew; Rudd, Andy & Ayres, Robert (2002). Getting to the bottom line: A method for synthesizing findings within mixed-method program evaluations. *American Journal of Evaluation*, *3*(2), 121-140.

McKenzie, David & Woodruff, Christopher (2013). What are we learning from business training and entrepreneurship evaluations around the developing world?. *The World Bank Research Observer*, *29*(1), 48-82.

Mertens, Donna (2018). *Mixed methods design in evaluation.* Thousand Oaks, CA: Sage.

Montero, Maritza (2006). *Hacer para transformar: el método en la psicología comunitaria* [Doing to transform: Method in community psychology]. Buenos Aires: Paidós.

Nadimi, Navid; Mansourifar, Fariborz; Shamsadini, Hamed & Soltaninejad, Mostafa (2024). How to outperform airport quality of service: Qualitative and quantitative data analysis extracted from airport passengers using grounded theory (GT) and structural equation modeling (SEM). *Iranian Journal of Science and Technology, Transactions of Civil Engineering*, *48*(1), 483-496.

Nastasi, Bonnie; Hitchcock, John; Sarkar, Sreeroopa; Burkholder, Gary; Varjas, Kris & Jayasena, Asoka (2007). Mixed methods in intervention research: Theory to adaptation. *Journal of Mixed Methods Research*, *1*(2), 164-182.

Nazari, Mehdi; Mehrmanesh, Hasan & Haghighat Monfared, Jalal (2021). Production resilience model in Iran, mixmethod study with using the grounded theory & structural equation modeling approach. *Management Research in Iran*, *24*(4), 177-198.

Novello, Noemi (2023). Communities of scholars and mixed methods research: Relationships among fields and researchers. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, *24*(1), Art. 19, https://doi.org/10.17169/fqs-24.1.4008 [Accessed: June 5, 2025].

Onwuegbuzie, Anthony (2022). Towards full(er) integration in mixed methods research: The role of canonical correlation analysis for integrating quantitative and qualitative data. *Publicaciones*, *52*(2), 11–34, https://doi.org/10.30827/publicaciones.v52i2.27664 [Accessed: January 24, 2025].

Onwuegbuzie, Anthony & Johnson, Burke (2004). Mixed method and mixed model research. In Burke Johnson & Larry Christensen (Eds.), *Educational research: quantitative, qualitative, and mixed approaches* (pp.408-431). New York, NY: Sage.

Onwuegbuzie, Anthony & Johnson, Burke (2021). *The Routledge reviewer's guide to mixed methods analysis*. Abingdon: Routledge.

Ortiz, Manuel & Fernández-Pera, Montserrat (2018). Modelo de ecuaciones estructurales: una guía para ciencias médicas y ciencias de la salud [Structural equation modeling: A guide for medical sciences and health sciences]. *Terapia Psicológica*, *36*(1), 47-53, https://doi.org/10.4067/s0718-48082017000300047 [Accessed: June 30, 2024].

Osterwalder, Alexander & Pigneur, Yves (2009). *Business model generation.* Amsterdam: Autoedition, https://www.camarabaq.org.co/wp-content/uploads/2020/11/Generacion-de-Modelos-de-Negocio-2010.en_.es_.pdf [Accessed: July 25, 2024]

Rallis, Sharon & Rossman, Gretchen (2003). *Learning in the field. An introduction to qualitative research.* Thousand Oaks, CA: Sage.

Rocco, Tonnete; Bliss, Linda; Gallagher, Suzanne; Perez-Prado, Aixa; Alacaci, Cengiz; Dwyer, Eric; Fine, Joice & Pappamihiel, Eleni (2003). The pragmatic and dialectical lenses: Two views of mixed methods use in education. In Abbas Tashakkori & Charles Teddlie (Eds.), *Handbook of mixed methods in social and behavioural research* (pp.595-615). London: Sage.

Samimi, Saeed; Badavar Nahandi, Younes & Mottaghi, Ali (2022). The convergence of the expectations between auditors and the users of financial statements: A multidimensional grounded theory and structural equation modeling. *Iranian Journal of Accounting, Auditing and Finance*, *6*(3), 29-54, https://doi.org/10.22067/ijaaf.2022.42039 [Accessed: July 23, 2024].

Schoonenboom, Judith (2023). The fundamental difference between qualitative and quantitative data in mixed methods research. *Forum Qualitative Sozialforschung / Forum:Qualitative Social Research*, *24*(1), Art. 11, https://doi.org/10.17169/fqs-24.1.3986 [Accessed: June 4, 2025].

Sendall, Marguerite; McCosker, Laura; Brodie, Alison; Hill, Melisa & Crane, Phil (2018). Participatory action research, mixed methods, and research teams: Learning from philosophically juxtaposed methodologies for optimal research outcomes. *BMC Medical Research Methodology*, *18*(1), 1-6, https://doi.org/10.1186/s12874-018-0636-1 [Accessed: June 6, 2024].

Strauss, Anselm L. (1987). *Qualitative analysis for social scientists.* New York, NY: Cambridge University Press.

Strauss, Anselm L. & Corbin, Juliet M. (1990). *Basics of qualitative research: Grounded theory procedures and techniques.* London: Sage.

Strauss, Anselm L. & Corbin, Juliet M. (2002 [1990]). *Bases de la investigación cualitativa: técnicas y procedimientos para desarrollar la teoría fundada* [Basics of qualitative research: Techniques and procedures for developing grounded theory]. Medellín: Editorial Universidad de Antioquia.

Tarka, Piotr (2018). An overview of structural equation modeling: Its beginnings, historical development, usefulness and controversies in the social sciences. *Quality & Quantity*, *52*, 313-354.

Tashakkori, Abbas; Johnson, Burke & Teddlie, Charles (2021). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioural sciences*. Thousand Oaks, CA: Sage.

Tayouri, Mansour; Hosseini, Seyed Jamal & Sabori, Mohammad (2023). The role of skill development in improving the performance of agricultural extension agents in Iran using structural equation modeling and grounded theory. *Brazilian Journal of Biology*, *83*(1), 1-9, https://doi.org/10.1590/1519-6984.275161 [Accessed: May 10, 2024].

Verdugo, Miguel Ángel; Crespo, Manuela; Badía, Marta & Arias, Benito (2008). *Metodología en la investigación sobre discapacidad. Introducción al uso de las ecuaciones estructurales* [Methodology in disability research. Introduction to the use of structural equations]. Salamanca: Publicaciones del INICO, https://gredos.usal.es/bitstream/handle/10366/82465/VI_SimposioCientificoSaid.pdf?sequence=1&isAllowed=y [Accessed: March 29, 2025].

West, Stephen; Taylor, Aaron & Wu, Wei (2015). Model fit and model selection in structural equation modeling. In Rick Hoyle (Ed.). *Handbook of structural equation modeling* (pp.209-231). New York. NY: The Guildford Press.

Zhu, Junqi; Gu, Mengdi; Yang, Li; Xun, Shoukui; Wan, Ming & Li, Jie (2023). Academic adaptation of international students in China: Evidence from the grounded theory and structure equation model. *Sustainability*, *15*(1), 1-22, https://doi.org/10.3390/su15010692 [Accessed: May 11, 2024].

Authors

Marianne DAHER holds a PhD in psychology and a master's degree in social community psychology from Pontificia Universidad Católica de Chile. Currently, she is an assistant professor at the Psychology Department and coordinator of the professional training in social community psychology at the same university. She has been distinguished by CLAYSS, Uniservitate, Fundación Superación de la Pobreza FUSUPO, Centro Latinoamericano de Desarrollo Rural RIMISP and Vicerrectoría de Investigación UC. In her academic career, she has focused on leading research projects and publications on research methodologies, social program evaluation, social intervention, burnout and care, community mental health, integral human development, gender and university teaching, among others. She is the creator of the platform https://www.praxiscomunitaria.com.

Contact:

Dr. Marianne Daher

Pontificia Universidad Católica de Chile
Escuela de Psicología
Avenida Vicuña Mackenna 4860, Macul, Chile

E-mail: mdaher@uc.cl
URL: https://www.psicologia.uc.cl/persona/marianne-daher/

Antonia ROSATI is a social community psychologist from Pontificia Universidad Católica de Chile, PhD candidate and master in social sciences from Universidad de Chile. Currently, she is adjunct instructor professor at the Psychology Department, Pontificia Universidad Católica de Chile. She has been distinguished by Uniservitate and Fundación para la Superación de la Pobreza FUSUPO. She has participated as a researcher in projects about the evaluation of social programs, qualitative methodology, social programs for overcoming poverty, social protection and welfare system, gendering process and gender approach, community mental health, university teaching and service learning. Also, she is a consultant on community mental health, rights in mental health, citizen participation, local development and burnout and team care.

Contact:

Dr.(c) Antonia Rosati

Pontificia Universidad Católica de Chile
Escuela de Psicología
Avenida Vicuña Mackenna 4860, Macul, Chile

E-mail: aarosati@uc.cl

Alemka TOMICIC holds a PhD in psychology from Pontificia Universidad Católica de Chile and is a full professor at the Faculty of Psychology, Universidad Diego Portales in Santiago, Chile. She directs the School of Psychology and is an associate investigator at the Centre for Studies in Clinical Psychology and Psychotherapy (CEPPS-UDP) as well as co-director of the Millennium Institute for Research in Depression and Personality (MIDAP). In her academic work, she focuses on process-outcome research in psychotherapy, including the dialogical and neurophysiological correlates of therapeutic change, community mental health and culturally competent care for sexual- and gender-diverse populations. She has led multiple national grant-funded research projects and international collaborations. In teaching, she coordinates undergraduate and postgraduate training in qualitative and mixed methods research and mentors early-career scholars.

Contact:

Dr. Alemka Tomicic

Universidad Diego Portales
Facultad de Psicología
Vergara 275, Santiago, Chile

Centro de Estudios en Psicología Clínica y Psicoterapia CEPPS
Grajales 1746, Santiago, Chile

E-mail: alemka.tomicic@mail.udp.cl

Esteban HURTADO holds a PhD in psychology and a master's degree in engineering, and is a civil engineer in computer science. He has teaching experience in research methods and research experience in cognitive science, social neuroscience and human interaction research. He has a strong interest in the philosophy of science. Outside of academia, he works in software development and electronic design.

Contact:

Dr. Esteban Hurtado

Pontificia Universidad Católica de Chile
Escuela de Psicología
Avenida Vicuña Mackenna 4860, Macul, Chile

E-mail: eahurtad@uc.cl

Citation

Daher, Marianne; Rosati, Antonia; Tomicic, Alemka & Hurtado, Esteban (2025). Iterative mixed analysis using grounded theory methodology and structural equation modeling: Contributions of qualitative and quantitative methods to the evaluation of social programs [74 paragraphs]. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, *26*(3), Art. 3, https://doi.org/10.17169/fqs-26.3.4285.