

Grounded Theory in Medical Education Research

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Abstract: The grounded theory method provides a systematic way to generate theoretical constructs or concepts that illuminate psychosocial processes common to individual who have a similar experience of the phenomenon under investigation. There has been an increase in the number of published research reports that use the grounded theory method. However, there has been less medical education research, which is based on the grounded theory tradition. The purpose of this paper is to introduce basic tenants of qualitative research paradigm with specific reference to ground theory. The paper aims to encourage readers to think how they might possibly use the grounded theory method in medical education research and to apply such a method to their own areas of interest. The important features of a grounded theory as well as its implications for medical education research are explored. Data collection and analysis are also discussed. It seems to be reasonable to incorporate knowledge of this kind in medical education research.

Keywords: grounded theory approach, qualitative research methods, medical education research

In the last 10 years, there has been an increase in the number of papers published addressing “grounded theory” in the health care system. Qualitative research, including grounded theory, was developed in response to the overwhelming belief held by positivists that qualitative research approaches were unscientific and anecdotal.¹ The grounded theory approach, it could be argued, is only one of numerous accepted qualitative research approaches, which has contributed to minimize the debates about the effectiveness of qualitative research within medicine and related disciplines.

Grounded theory was originally developed by Glaser and Strauss as a means to make possible the ‘systematic discovery of theory from the data of social research’. They described this method in the book, *The Discovery of Grounded Theory*.² In earlier times, only phenomena which were controlled through experiments were acceptable by positivist thinkers. The positivists believed that qualitative research approaches only explore or describe the phenomena under investigation in naturalistic settings such as hospitals or outpatients departments without taking into account any hypothesis or null hypothesis at the beginning of study. As a result of such a philosophy, the grounded theory methodology was developed to attempt to generate a theory.

It is becoming increasingly accepted within medicine that the grounded theory approach provides a systematic way to generate theoretical constructs and/or concepts that illuminate human behavior and the social world.³ There is, however, less understanding of the theoretical principles that underpin grounded theory, and consequently, of its appropriate application. In recent years, debates concerning the current status of grounded theory have been rising. May has raised questions about diffusion and dilution of the grounded theory.⁴ Furthermore, issues have been raised concerning the quality of research labeled as grounded theory.^{4,5} Wilson and Hutchinson⁶ concluded that the corruptions of grounded theory in recent years place its trustworthiness at risk, and the findings generated are earning a reputation as insignificant or obvious.

On the other side of the coin, in 2005, one of the authors conducted a workshop on an introduction to qualitative research methods in medical education for academic clinical staff. It was designed to increase faculty members’ awareness of how qualitative research approaches have been utilized in health care research and medical education and how to utilize this knowledge in their own work settings.⁷ We realized that most of the participants had poor levels of knowledge of qualitative research methods, particularly on the methodology of grounded theory. This could be due to the fact that medical edu-

cators across the world have overlooked how qualitative inquiry approaches contribute to the medical education's body of substantive knowledge.¹ Grounded theory is an extensively applied research approach and makes important contributions to medical education development. This may be attributed to the fact that most theories and hypotheses generated from the grounded theory are empirically testable. Therefore, the purpose of this paper is to introduce basic tenants of qualitative research paradigm with specific reference to grounded theory. The paper aims to encourage readers to think how they might possibly use the grounded theory method in medical education research and to apply such a method to their own areas of interest.

What is Grounded Theory?

Grounded theory is a qualitative inquiry method that looks systematically at qualitative data aiming at the generation of theory that accounts for a pattern of behavior that is relevant and problematic for those involved.⁸ Humans construct theories in order to explain, predict and master phenomena. The theoretical orientation of grounded theory studies is symbolic interactionism, which emphasizes that human conduct is developed through human interactions, through ongoing process of negotiation and renegotiation. Indeed, symbolic interactionism focuses on how people define events and realities and how they behave based on their beliefs.⁹ Grounded theory is used to explore the social processes that are present within human interactions. Through grounded theory, researchers develop explanations of key social processes that are grounded in empirical data.¹⁰

Unlike quantitative inquiry approaches, grounded theory does not begin with an existing theory, but rather generates a specific substantive or formal theory for the phenomena of interest. Glaser and Strauss differentiated a substantive theory from a formal theory.² Substantive theory is grounded in data on a specific substantive or empirical area of investigation. It can be a facilitator for formal grounded theory, which involves developing a higher abstract level of theory from a collection of substantive theory studies regarding the phenomenon of interest. Kearney¹¹ used an analogy to differentiate substantive theories and formal theories. In this analogy, substantive theories are assumed to be like "custom-tailored clothing" and formal grounded theories are assumed to be as "ready-to-wear clothing". Therefore, formal theories (ready-to-wear) can fit a wider variety of users, and they are not personalized like substantive theories (custom-tailored). Rather, they provide a conceptualization that applies to a boarder population experiencing a common phenomenon. Formal grounded theories are ideally

generated by formally studying a substantive grounded theory. Such theories are essential to develop a scientifically-based practice for all disciplines, including medical education. Otherwise, the disciplines need to borrow theoretical assumptions, concepts, and research methods from other disciplines. Therefore, if the medical education profession is to develop scientifically, medical educationalists should debate about generating substantive grounded theories, and gradually shift from the use of borrowed theories and methods to original medical education theories.

Features of a Grounded Theory

Application of grounded theory approaches to inquiry of phenomena important to medical education research, practice, and administration involves several processes. The following is a discussion of important features of a grounded theory as well as its implications for medical education research.

Research Questions - In a grounded theory, inquirers state research questions, not objectives or hypotheses.¹² The research question in a grounded theory study is very different to the hypothesis or null hypothesis generated at the beginning of an experimental design quantitative study. Furthermore, the question must be flexible and open-ended to allow the theory to develop. It should be sufficiently broad to enable a systematic inquiry to be conducted of all the aspects of a phenomenon in depth.¹³ Since the methodology of grounded theory is an emergent design (a design that unfolds in the course of a grounded theory study as the inquirer makes ongoing design decisions reflecting what has already been learned), researchers improve the research question as they generate and analyze the study data. It should be noted that the data generated in a grounded theory may change the focus of study. Therefore, the original question only lends focus to the study. Hutchinson argued that a really precise research question is not possible to pose before beginning any grounded theory study.¹⁰ Based upon these arguments, researchers, therefore, should expect that they will evolve the question over the course of the study.

Sampling - Unlike the quantitative inquirer, the grounded theorist does not decide on the size of the sample population before the study begins. Participants are not recruited on a representative basis, but rather because of their expert knowledge of the phenomenon under inquiry.¹⁴ In fact, the researcher selects informants who are closely experiencing the social process under investigation. The sample size is not fixed as in statistical sampling used in the quantitative approach; rather, it ideally relies on what Glaser calls '*theoretical sampling*'.¹⁵ Glaser de-

defined this sampling as “the process of data collection for generating theory whereby the analyst jointly collects, codes, and analyzes his data and decides what data to collect next and where to find the data, in order to develop his/her theory as it emerges”.¹⁵ Glaser stressed that the theoretical sampling differs from purposive and selective sampling commonly used in qualitative research. Purposive or selective sampling methods are usually used at the beginning of a qualitative research to recruit informants to provide data about the experiences or phenomena of interest to the inquirer. The research question causes the adoption of who or what is of interest. It is generally accepted that theoretical sampling goes beyond purposive or selective sampling, according to Jeon.³ Jeon stated that “theoretical sampling is driven by the emerging categories and hypotheses, the need for theoretical elaboration, and by the researcher’s need to ground developing theory in the empirical data”.³ Theoretical sampling is an integral part of the constant comparative method of data collection and analysis. It is noteworthy to pay attention to Beker’s work revealing common pitfalls in published grounded theory research. She criticized that researchers fail to adhere to the underlying principles of the grounded theory study. For instance, researchers in published papers used purposive sampling in place of theoretical sampling.¹⁶ Theoretical sampling’s endeavor is to discover categories and their properties and to present interrelationships that take place in the substantive theory. The central question in theoretical sampling is: what groups or subgroups, does one turn to next in data collection? That is, the selected participants should be determined by the emerging data, and data analysis will offer further participants for further interview. Data collection continues until saturation is reached. That is, exploring further data does not add to the insight already gained. At this point, the analytical framework is said to be saturated, and further analysis is not necessary. It should be noted that these groups are not recruited before the inquiry begins but only as they are needed for their theoretical relevance for developing further emerging categories.

The Collection of Empirical Data - Data collection usually follows the normal procedures for field research. The grounded theorist will immerse him/herself in the setting being studied and gather data by such means as participant observation, unstructured interviews, or other written documents or a combination of some methods.^{13, 15} The need to combine many data collection methods in grounded theory has been well documented.^{13, 15} In some disciplines, however, researchers only used interview data for creating their theory.¹⁷ The process of data generation requires the researcher to collect, code, and analyze data concurrently. This process allows the researcher to evolve richer data where needed. Indeed, simultaneous collec-

tion and analysis of data and emergent theoretical structure help to orient further data collection.^{13, 15} The choice of data treatment and collection methods is directed mainly by inquirer choice. Researchers usually tape-record interviews, transcribe verbatim, and then analyze them using specific procedures, which are discussed below.

Data Analysis: Generating Theory

As noted previously, a unique aspect of grounded theory study is that of data collection, coding and analysis run concurrently from the beginning of the research. Furthermore, the stated aim of grounded theory is the discovery of a core variable. Glaser argued that “the researcher undertakes the quest for this essential element of theory, which illuminates the main theme of the actors in the setting, and explicates what is going on in the data”.¹⁵

To achieve grounded theory, the researcher should systematically go through steps which have been described by Stern.¹⁸ Once sufficient data (one interview could be enough) has been collected and transcribed line by line, the researcher should dwell with the data by listening to tapes and re-reading transcripts or field notes until he/she is closely familiar with them in their entirety. The investigator is then ready to move to the next stage of building an indexing or coding system for the data. This allows the researcher to manipulate and analyze the collected data in order to form concepts using a coding scheme.

Concept Formation: Coding - At this point, the inquirer reads and re-reads the transcript line by line, and then conceptualizes underlying patterns in the data. Coding occurs at three levels.

Level I Coding - As ground theorists receive data, they study the data line by line, and then identify code words in the manuscript. In level I coding, the codes are called substantive codes or *in vivo* codes because they codify the substance of the data and use the words of participants.¹⁸ For example, we asked medical course planners about communication skills with patients. One participant reflected “Communication with patients is only based on authority and power”. You may code this sentence as a substantive code. Mullen and Reynolds, also, argued that substantive codes may be derived from codes constructed by researchers based on concepts gained from the data.¹⁹ At this point, ground theorists try to find as many categories as possible and to compare them with new indicators to uncover features and relationships.¹⁹

Level II Coding - As researchers constantly compare new level I codes with previously identified ones,

they condense them into broader categories. In other words, categories emerge from collapsing level I codes by comparing each level I code collected.^{10,13} A category is a unit of information composed of events, happenings, and instances.¹³ Each category is then compared with every other category to make sure that they are mutually exclusive. In the above example, you may tentatively conceptualize the substantive code into broader category as “patient-oriented approach”.²⁰

Level III Coding - This step is sometimes called theoretical constructs. They are the most abstract level of codes. These constructs “add scope beyond local meaning”¹⁵ to the emerged theory. At this point, the researcher collapses level II codes in order to aid in identifying constructs, which is led to the discovery of the basic social psychological processes (BSP). For example, McCann and Baker identified a basic social psychological problem in their study that was experienced, but was not clearly articulated by their participants. They conceptualized the participants’ unarticulated problem as “Uncertainty of Direction”.²¹

Concept Development: Emerging Core Variable - Three major steps are involved in the emerging core variable: reduction, selective sampling of the literature, and selective sampling of the data.

Reduction - During data analysis, the researcher may produce an overwhelming number of categories that need to be collapsed to reduce the number. Comparing categories allow researchers to see how they cluster or connect and can be placed under broader categories.²² It is similar to clustering items in factor analysis. Category reduction is a vital component in identifying the BPS and core variable. At this point, indeed, the investigator identifies theoretical links among the categories and reduces them to form general categories in order to form the core variable.

Selective sampling of the literature - Grounded theory research contrasts with quantitative inquiries in that there is no review of the literature in the area of the study before data collection. The rationale for this argument is to avoid biasing the investigators’ attempts to develop concepts and ideas from the data that actually fit the data.¹⁸ Selective sampling of the literature is recommended and generally follows or takes place concurrently with data analysis. As theory begins to emerge, researchers carry out a literature review to learn what has been published about the emerging concepts.²²

Selective sampling of the data - As the main concepts or variables become apparent, selective sampling of the data takes place. At this point, researchers may gather further data in a selective manner to evolve the hypotheses and identify the properties of the main variables. Through selective sampling, saturation of categories takes place,²⁰ and then the *core variable* emerges. “The concept of core variable refers to a category which accounts for most of the variation in a pattern of behavior and which helps to integrate other categories that have been discovered in data”.¹⁹ It has been argued that core variable contributes to generating grounded theory, and “the integration and density of theory are dependent on the discovery of a significant core variable”.¹⁰ According to Strauss, the core variable has six important features: (a) it repeats frequently in the data, (b) it links various data, (c) because it is central, it explains much of the variations in all data, (d) it has implications for a more general or formal theory, (e) because it becomes more detailed, the theory moves forward, and (f) it permits maximum variation and analyses.²³ Following the emergence of the core variable, researchers move to concept modification and integration in order to move from a descriptive to a theoretical level. During concept modification and integration, researchers use memo to keep their ideas relating to the emerging theory. It should be noted that the experienced analyst produces memos from the beginning of the analysis process until reaching closure. Memos vary in length, from one line to several pages. Their purpose is to help the researcher to raise data to a conceptual level, to develop the properties of each category, and to generate hypothesis about interrelationships between the categories.¹⁵ The analyst may carry a Dictaphone or laptop around with him or her to record these memos.

Application to Medical Education

The grounded theory approach has been used in the field of social sciences and nursing as a result of the ample guidelines that have been developed in order for researchers to attach the qualitative research project to the ‘good science model’.²⁴ Although there has been an increasing interest in publishing qualitative research papers in medical education research, mainly in the areas of teaching, curriculum planning and evaluation research studies,²⁵ there have been few papers of grounded theory in medical education. It may be argued that other qualitative research traditions, particularly that of case study and ethnography research, have been the more preferred mode of studies in medical education. This may be attributed to the fact that the nature of the questions raised was relevant to such qualitative research methods.

It has been argued that problem areas that involved complex human intentions and motivations occurred in a dynamic context, which needs to be studied using qualitative research such as grounded theory approach. Examples of such complex areas might include teaching and learning in hospital and ambulatory settings, specialty choice, role modeling, evaluation of programs, problem-based learning, and processes of curriculum implementation and development.²⁶ Appropriate research questions that could be answered through grounded theory approach might include “By which process are medical students socialised into the profession of medical training?”, “In what way do medical students become independent learners?”, “In what way do interactions with medical teachers influence the clinical decision making of medical students?” and “By what process is decision making learned by students in medical training education programs?”

To illustrate further, to answer the last question, grounded theorists may conduct unstructured interviews related to decision-making processes that medical students have experienced. Students, medical teachers, and course planners may be interviewed and observed in action. The grounded theorist provides a ‘thick’, rich description of the learning of decision-making processes, and then creates a process model of learning clinical decision making, resulting in a set of propositions explaining the clinical learning decision-making processes. Furthermore, the findings of such a new paradigm are useful in clarifying unique aspects of medical education practice, in providing criticism of the experimental research design, and in creating new hypotheses for future inquiry.

Conclusion

Grounded theory was developed in response to positivist claims that qualitative research was based on unscientific and anecdotal methodology. However, grounded theory is based on set procedures, techniques and assumptions for formulating theoretical constructs in order to elucidate the action in the social context under investigation. Despite the seemingly perspective method of grounded theory, medical educationists have overlooked grounded theory as a systematic methodology in medical education research. This paper illustrates how grounded theory can be an appropriate and effective means to advance the discourse on data analysis for medical education research.

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