



Capturing Our Stories in Our Voices: Constructing a Narrative Analysis Study of African-American STEM Mentors

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Abstract—To address the gap in research regarding the narrative experiences of African-American STEM PhD mentors in higher education, the narrative experiences of this population was examined using interviews and narrative analysis in a research study. This paper presents the specific details about one approach to constructing a narrative study analysis and the methods employed to capture and transform the stories of African-American mentors into informative narratives about their experiences. This approach provides an example of how to effectively analyze and present information in narrative form to detail and garner critical insights from people’s experiences.

Keywords: mentoring, African Americans, narratives

Introduction

Some research studies examine the mentoring contributions of African-American faculty mentors; however, there is a gap in research regarding the narrative experiences of African-American STEM PhD mentors who work in various higher education contexts. Understanding the experiences and stories of African-American STEM PhD mentors in higher education and their mentoring relationships with African-American STEM undergraduates can provide many beneficial insights. Yet, evidence of the experiences of this population as well as information about how to craft their stories into informative narratives is scarce. Ten select African-American STEM PhD mentors from various backgrounds in academia, government, and industry were interviewed in a research study that focused on understanding the personal, professional, and mentoring experiences and relationships of African-American STEM PhD mentors who mentor African-American undergraduate protégés. The study’s research questions were: 1) what are the personal and professional experiences of select African-American STEM mentors who mentor African-American undergraduate protégés in higher education and 2) how do select African-American STEM mentors in higher education describe and explain their mentoring relationships and experiences with their African-American undergraduate protégés in mentoring relationships? A narrative analysis approach was used to examine the data and provide critical insights and narratives about the sample population and their experiences.

In this paper, one approach to constructing a narrative analysis of this study’s data is detailed. Also, explicit details are provided about methods used to capture and transform the stories of African-American mentors into informative narratives about their experiences. Specifically, the approach used for constructing the narrative study analysis of the interview data collected involved using: 1) an interpretivist paradigm, 2) a modified version of an existing phenomenological interview protocol, 3) a qualitative research framework for making and handling data, and 4) specific criteria of a narrative analysis method to construct narratives. The following paragraphs detail the research and narrative analysis methods used in this approach.

Research Methods

Methodological Framework: Interpretivist paradigm using narrative tradition

An interpretivist paradigm was selected to assist in developing narratives and interpreting stories and experiences that participants shared. An interpretivist paradigm is a useful framework for this study because it provides an interpretive lens of the participants' experiences without further marginalizing them, and it assists in addressing differences and aiming to understand specific issues¹. Using this paradigm in conjunction with a narrative tradition also allowed me to focus on the "multiple-perspective stories of individuals and who tells the stories" while also acknowledging the "co-construction of the account between the researchers and the participants"¹. In addition, theoretical frameworks (situated identity and intersectionality) and conceptual frameworks (learning partnerships, cultural capital, and social capital) were used to examine the experiences of ten select African-American STEM mentors. These frameworks served as lenses of interest for the researcher and are not detailed in this paper. Future researchers should employ frameworks of interest to them to examine their data.

Interview Protocol Development

A modified version of Dolbeare and Schuman's² series of three interviews was used to conduct multiple interviews to map out participants' stories³. This interview approach consists of three interviews: focused life history, details of the experience, and reflection on the meaning³. A *focused life history interview* provides an opportunity to allow the interviewee to tell the interviewer about him or herself spanning back to past lived experiences up to the present. A *details of the experience interview* asks the interviewee what they actually do in a particular experience in order to put their experience within a certain context. Finally, a *reflection on meaning interview* asks the interviewee to reflect on an experience's meaning by looking at "how the factors in their lives interacted to bring them to their present situation"³. Since Dolbeare and Schuman's interview approach was designed for the phenomenological tradition and this study uses an interpretivist paradigm which is closely related to that tradition, I decided to use a similar, yet slightly modified version of their interview approach to develop the interview protocol.

Modification of Schuman and Dolbeare's interview approach is allowable to accommodate interviewer and participants' needs⁴. Specifically, two interviews were conducted: a focused life history interview and a reflection interview. For the *focused life history interview*, interviewees discussed their past experiences, values, and beliefs and who they think they are presently. The reflection interview examined what mentors do in mentoring situations and what this means to them. For the *reflection interview*, participants were interviewed after they had participated in a mentoring session or event and I had them walk me through their experience. By combining the *details of the experience* and the *reflection on the meaning* interviews into a *reflection interview*, participants could more easily draw upon their concrete experiences and how they made sense of these experiences. A summary of the study's interview approach as compared to Dolbeare and Schuman's interview approach is shown in Table 1.

Some of the interview protocol questions were sampled from an existing mentoring scale from a phenomenological study of African-American faculty mentors⁴. This interview scale was useful in the development of the study's interview protocol because: 1) it is situated in phenomenological tradition that is closely related to my interpretivist paradigm, 2) it addresses race and identity functions in mentoring African-American undergraduates, and 3) the study's sample population possesses some characteristics which are similar to those of my participants. Primarily, the questions modified and used from this scale address race, identity, and mentoring minority undergraduates.

Table 1. A Comparison of Interview Approaches

Schuman and Dolbear's Interview Approach³:	
Three 60 minute interviews	
Focused Life History	• Interviewee tells about past lived experiences up to the present.
Details of the Experience	• Interviewee talks about something they actually do in order to put their experiences within context.
Reflection on the Meaning	• Interviewee reflects on an experience and how related factors brought them to their present situation.
My Interview Approach:	
Two 60+ minute interviews	
Focused Life History	• Interviewee discusses their past experiences, values, and beliefs and construct information about who they think they are presently.
Reflection	<ul style="list-style-type: none"> • Interviewee is debriefed after mentoring a student, designing a mentoring program or experience, etc. in order to unpack an experience around mentoring to add layers. • Interviewee is asked to walk the interviewer through the mentoring program or experience. This examines what mentors do in mentoring situations and what this means to them. • Interviewee is asked to self-reflect on several mentoring experiences.

Piloting the Interview Protocol

Four pilot interviews were conducted to determine the clarity of the questions and to examine initial themes that emerged from the data. This process helped me to further develop and clarify my research questions. All of the participants earned PhDs and mentored African-American undergraduates in STEM areas. Only three of the mentors had a STEM degree. I decided to interview a mentor with a social science background to see how well the interview questions could be answered about non-STEM undergraduates and to test the translational nature of the questions.

Data Collection

Background Information

Prior to analyzing the data, information about participants' backgrounds and experience was collected from public, institutional and corporate websites, see Table 2. I collected biographical information about the interviewees (educational institutions attended, degrees attained, places they had worked) and information about their current places of employment (their institution or place of work's demographics, geographic location, and policies).

Table 2. Background Information

Info about the Interviewee	Info about the Interviewee’s Place of Employment
Educational institutions attended	Demographics about current department, college, institution, and/or business
Degrees attained	Geographic location
Work experience	Setting in which they practice mentoring e.g. mentoring program, special events, workshops, etc.
Publications and Books	Academic or professional programs related to mentoring
Honors and Awards	Academic or professional policies related to mentoring/education

All of the background information attained was printed out and stored in secured folders and electronic file folders that corresponded to each interviewee. All data collected corresponding to the individual interviewees was stored in these respective folders. Also, this information was beneficial to me when I performed my data analysis because it was used to provide historical and cultural contexts to better interpret the data and construct rich narratives about the interviewees’ experiences. After collecting this information, I conducted the interviews and proceeded to analyze the data using the steps detailed in the following sections.

Narrative Analysis of the Data

Data Preparation

There were several steps taken to prepare the data. The interviews were recorded as .wav sound files. I transcribed all of the interviews myself. There was approximately 20 hours of audio tapings. The general procedures I used for transcribing were to: 1) transcribe the participants’ responses verbatim, 2) include most utterances such as “uh”, “um”, “ah”) in the transcription, 3) include transcription of expressions such as “(laughs)”, “(chuckles)”, “(sighs)” especially where significant to what was being said, and 4) include references to interviewer-interviewee interaction such as conversational exchanges.

Data Analysis Process

The three main steps used in analyzing the data involved: 1) using the background information gathered about each participant to create a backdrop and contextual setting to complement the interview data, 2) performing a narrative analysis method of the interview data and open coding the emergent themes, and 3) constructing narrative stories that present themes and results. An overview of the study’s data analysis and management plan and the results of each step are summarized in Table 3. The following paragraphs detail the steps in the data analysis process.

Table 3. Summary of Data Analysis and Management Plan

Data Analysis Step	Action	Result
1. Create a contextual backdrop summary	<ul style="list-style-type: none"> • Write backdrop summaries for each interviewee based on background information research 	<ul style="list-style-type: none"> • One backdrop summary for each interviewee
2. Perform narrative analysis method and open code the emerging themes	<ul style="list-style-type: none"> • Examine, analyze, and write notes on backdrop summaries • Use the narrative method to examine, analyze, and write notes about transcript data • Open code emerging themes • Write an individual interviewee summary for each participant • Examine the summaries and write a themes and patterns summary for each participant • Examine, analyze and write summaries based on themes and findings within and across summaries 	<ul style="list-style-type: none"> • Narrative analysis coded notes • Codebook of emerging themes • Log of interview quotes • Individual interviewee summary • Themes and patterns summary for each individual interviewee • Themes and patterns across interviews summary
3. Construct narratives	<ul style="list-style-type: none"> • Review the individual interviewee summary, log of interview quotes, themes and patterns summary for each individual interviewee, and the themes and patterns across interviews summary. 	<ul style="list-style-type: none"> • Write individual interviewee narratives • Write a synthesis about the themes and patterns found across interviewees

Create a Contextual Backdrop Summary

Using the background information, I created a backdrop and contextual setting for the interview data by writing up a backdrop summary to be used as an introduction for each interviewee’s narrative. These backdrop summaries were added to the interviewees’ file folders. These contextual backdrop summaries allowed me to present elements pertinent to the identity of the interviewee that may not be addressed in detail in the interviews. Also, this information helped situate and configure the interviewee’s story because it situates the interviewee in a particular context that assists in constructing a rich narrative.

Perform a Narrative Analysis Method and Open Code Emerging Themes

Research has proposed specific criteria for judging a life history in order to generate stories from research data ⁵. Building on Dollard’s work, Polkinghorne ⁶ proposed a further developed narrative analysis method. Polkinghorne’s ⁶ narrative analysis method features seven criteria as guidelines that are used to configure order and meaningfulness from data to develop rich, full narratives that reflect lived experiences. Criteria guidelines from this narrative analysis method were used to analyze this study’s data, see Table 4. Using these guidelines provides a methodical examination of specific data elements across different transcripts such as the plot and settings of each transcript and supports the development of narratives. Given that narrative research is typically used to capture the life experiences or detailed stories of individuals, this

Table 4. Narrative Analysis Method Guidelines and Application

Narrative Analysis Method Guidelines	Polkinghorne's ⁶ Instructions	Application to the Research Study	Example(s)
1. Include descriptions of the cultural context in which the storied case study takes place.	<ul style="list-style-type: none"> Attend to the contextual features that give meaning to events that relate to the protagonist's values, social rules, meaning systems, and conceptual networks 	<ul style="list-style-type: none"> Examine the cultural context elements such as values, social rules, etc. in the backdrop summary Review transcript and identify values, social rules, etc. present in the data 	<ul style="list-style-type: none"> Types of organizations and affiliations the interviewee has and what honors or awards were received Values and social rules abided by in interactions
2. Gather and configure the story and attend to the embodied nature of the protagonist.	<ul style="list-style-type: none"> Attend to the spatial and temporal nature of the protagonist by recognizing the protagonist's temporal limits 	<ul style="list-style-type: none"> Examine transcript and identify markers that indicate when and how an interviewee's physical or mental characteristics has influenced or affected them over a continuing historical context 	<ul style="list-style-type: none"> Race, gender, or other social categories Physical constraints, disabilities, or bodily impediments Mental impediments or disabilities e.g. he or she struggled to overcome a reading disability
3. Develop the story's setting being mindful of the general cultural environment and person embodied and significant others in affecting the protagonist's actions and goals.	<ul style="list-style-type: none"> Provide an explanation of the relationship between the protagonist and others 	<ul style="list-style-type: none"> Examine transcript for where the interviewee talks about his or her relationship with others such as their mentors and protégés and/or antagonists 	<ul style="list-style-type: none"> Discusses initial relationship with protégé as volatile Mentions hostile environment or unfriendly encounters with fellow faculty
4. Recognize that the cultural setting, body, and others provide limits and context.	<ul style="list-style-type: none"> Focus on the choices and actions of the protagonist as related to how he or she moves toward an outcome 	<ul style="list-style-type: none"> Examine transcript for instances indicating his or her plans, purposes, motivation, interests, and vision as well as personal struggles and emotional states and affects 	<ul style="list-style-type: none"> Chose to attend an HBCU to receive support Good in math and science, encouraged to go into engineering by parents
5. Consider the historical continuity of the characters.	<ul style="list-style-type: none"> Recognize that characters previous experiences are a part of who they are and manifest as habits and partially through recollection. Also, recognize that there are social and historical events that contribute to who they are and may need explanation in order to make the characters' decision and actions understandable 	<ul style="list-style-type: none"> Use the backdrop summary to identify potential historical or social events that may have occurred in the context of the interviewee's experiences From the transcript, identify any potentially relevant historical or social events that may have occurred in the context of the interviewee's experiences 	<ul style="list-style-type: none"> First African American in their respective college to receive tenure at their institution A death in the family influenced their decision to attend graduate school They were relocated to another university because of Hurricane Katrina 9-11 affected their decision to take a certain job
6. Keep in mind that the narrative analysis outcome is the generation of a story.	<ul style="list-style-type: none"> Establish beginning and end points of the story while focusing on the context in which the plot occurs while presenting enough details to establish the uniqueness of the characters 	<ul style="list-style-type: none"> From the backdrop summaries and transcripts, identify the characters beginning points, unique details about their experiences, and end with where they are currently at and hope to go 	<ul style="list-style-type: none"> Interviewee has progressed from college student to graduate student to professor by doing xyz and having these xyz experiences
7. Remember the narrative analysis must make the research plausible and understandable.	<ul style="list-style-type: none"> Provide a story line that configures data elements into a meaningful explanation of the protagonist's responses and actions 	<ul style="list-style-type: none"> Use the backdrop summary and transcripts to reconstruct a series of events that attempts to explain how and why certain outcomes are produced 	<ul style="list-style-type: none"> Mentoring relationship as a high school student then developed mentoring relationship as an undergraduate with a professor, and these and other events led to he or she becoming a mentor

approach allowed me to investigate the experiences of this select sample population of mentors and reflect on how these stories and experiences demonstrate the effects of mentoring ¹.

Using the backdrop summaries and interview transcript data, I applied Polkinghorne's narrative analysis method to: 1) interpret the data, 2) identify elements that assisted me in creating a narrative for each interviewee, and 3) present the research study's results and findings. "Narrative analysis is the procedure through which the researcher organizes the data elements into a coherent developmental account" and then synthesizes the data ⁶. Thus, a narrative analysis of the study's interview data allowed me to individually organize and examine the interview data elements of each interviewee, interpret and develop this data into a coherent account of their experiences, and then synthesize the data to present an overview of the research findings.

For my first analysis iteration, I read over each interviewee's file folder information (backdrop summaries and interview transcripts) and used each narrative analysis method guideline to take detailed notes about what specific elements from the transcripts corresponded to each guideline. For my second iteration, I read through the transcripts again and identified emerging themes which I coded. I also created a log of specific interview quotes that corresponded to the narrative analysis coded notes and the coded emergent themes. This was beneficial for when I constructed the narratives at the end of the analysis process because I was able to provide specific quotes and vignettes as supportive references to my claims. Then, I wrote up an individual interviewee summary of the findings using my notes. This summary was useful because it provided an overview of the individual findings about each interviewee so I could compare and contrast their different experiences.

For the third iteration, I read through each individual interviewee summary and identified outstanding themes and patterns. This information was used to write a themes and patterns summary for each individual interviewee. Next, I compared the themes and patterns summaries for each interviewee with each other to identify common themes and patterns across the summaries and interviewees. I then wrote a themes and patterns across interviews summary using this information.

Construct Narratives

In order to begin constructing the narrative stories of the individual interviewees, I reviewed the data, notes, and summaries I wrote and compiled for each interviewee. I reviewed the individual interviewee summary, the identified emerging themes that I coded, the log of interview quotes, and the themes and patterns summary for each individual interviewee. I used this information to construct individual interviewee narratives that provides biographical details about the interviewee and their experiences.

Then after constructing narratives for each interviewee, I used the themes and patterns across interviews summary to write a synthesis that discussed the common themes and patterns identified across interviewees. Thus, I produced brief narratives about the individual interviewees as well as a synthesis about the common themes and patterns among the

interviewees to present in the research findings. An overview of the study’s analysis process and outputs is summarized in Table 5.

Table 5. Analysis Process and Outputs

Analysis Step	Output
1. Read each interviewee backdrop summary and transcripts and used a narrative analysis method to take notes.	Notes about interviewees.
2. Read through the transcripts again using narrative analysis method, open coded the emerging themes, and used individual interviewee notes.	Coded narrative analysis methods and emergent themes and compiled in a codebook. Created a log of interview quotes. Wrote up an individual interviewee summary.
3. Read through each individual interviewee summary and identified outstanding themes and patterns.	Wrote a themes and patterns summary for each individual interviewee.
4. Used the themes and patterns summaries for each individual interviewee and the codebook themes and compared them with each other to identify common themes and patterns across the summaries.	Wrote a themes and patterns across interviews summary.
5. Wrote individual interviewee narratives and wrote a synthesis about the themes and patterns found across interviewees.	Created the individual narratives and a synthesis of themes and patterns in the study’s results.

Data Coding Process

Coding the data involved several iterations of reading the transcripts and using open coding to identify themes as they emerged, see Table 6. First, I wrote notes about potential themes and corresponding codes during transcription of the interviews. Then, I read the transcripts and used Polkinghorne’s narrative analysis method to write notes about major narrative points about each participant. At the same time, I also identified themes as they emerged from the data and assigned codes to each theme. These codes were compiled in a codebook.

Using the codebook, I went through each code and wrote a condensed theme(s) for all of the coded themes and used these results to compare condensed theme results and similarities and differences in themes across participants. A summary of the coding aspects of this process is shown in Table 6. Thus, I had a collection of analyzed data products (i.e., individual interviewees summaries, themes and patterns summaries, themes and patterns across interview summary, and coded, emergent themes) to present as results and findings.

Table 6. Coding Process

Coding Process Steps
1. While transcribing the transcripts, wrote notes about potential themes that appeared from the data.
2. Read the transcripts and wrote notes about the major narrative points about each participant using Polkinghorne’s narrative analysis method as well as identified emerging themes using open coding process.
3. Created an interview log in which I copied each code, theme, and quote for each participant to the codebook.
4. Wrote a condensed theme(s) for all coded themes.
5. Compared coded theme results and similarities and differences in themes across participants.

Validity and Reliability of Research within the Research Process

For the validity of this research process, I implemented Walther, Sochacka, and Kellam's⁷ integrated framework, a quality in engineering education research framework, in addition to performing member checking processes. Walther's et al. framework focuses on designing high quality, interpretative qualitative research by checking the validity of making and handling data using: 1) theoretical validation, 2) procedural validation, 3) communicative validation, 4) pragmatic validation, and 5) process reliability.

To confirm the theoretical validation of the making and handling of the data, the study population was comprised of individuals with diverse backgrounds and experiences to capture the full extent of the reality of the participants in accordance with theoretical validation. In addition, purposive sampling and an emergent research design that included two types of interviews were used. The data was open-coded and themes and subthemes were identified for interpretation. To preserve procedural validation, I performed member checking with the participants in which I provided participants with narratives and transcripts to receive their feedback regarding the accuracy of the information and interpretation. Also, I used two different types of interview protocols (life history and reflection) which were adapted from a questionnaire from existing literature that examines the experiences of African Americans in higher education⁴. I also spoke with the author of the questionnaire to get feedback and advice regarding the procedures that he used in making the data for his interviews (R. Reddick, personal communication, January 23, 2015).

In addition, I addressed the interpretive awareness of the data that is required in this interpretivist research paradigm and used narrative quotes and excerpts from the participants' actual words in making the data for interpretation. Also, I acknowledged and discussed my bias as the interviewer and my positionality as the researcher. I developed personal narratives from the data, conducted member checks, and acknowledged in the interpretations of the narratives and quotes that there may be contrasting experiences of participants and ties to other themes in the study's data to capture the participants' reality as a form of communicative validation. In handling the data, there were multiple open-coding iterations and continuous engagement with the data in the form of peer debriefing and formal conversations with my research group.

For pragmatic validation, the research design's compatibility with the reality in the field was maintained by the selection of respondents with diverse backgrounds and experiences and significant mentoring experience and practice in their areas of expertise. The knowledge produced is meaningful to the applicability of mentoring research to mentoring practices and this research has implications for discourse in the research community. Process reliability was maintained such that the data was collected and recorded in a credible and systematic way. For example, I transcribed and checked the transcripts and used documented interview protocols. Also, I used procedures for generating and representing knowledge such as a standardized interview debriefing form and an interview and analysis checklist. In addition, a narrative analysis method and an open-coding method was used to separate descriptive and interpretive coding. Consequently, this study's research design, research methods, data acquisition methods, and data analysis methods incorporate quality aspects that are characteristic of the validity and reliability requirements of Walther's et al. framework.

Member Checking for Validity Purposes

For member checking purposes, after performing the analysis iterations, I sent the following items to the participants: 1) their individual transcripts, 2) their personal, coded short narrative based on the interview data, 3) a table of the characteristics of the sample population, and 4) a table of data results of emergent themes. I received email responses from four of the ten participants indicating that they had no issues with the accuracy of the information and the narrative analysis. One participant said, “You have captured the true essence of our conversation.”

Some reasons why this information was sent to participants was to let them review what was written about them from the data and provide them with an opportunity for feedback, approval of accuracy of information, ability to express any concerns with the confidentiality based on the information presented, and approval of information shared. Also, this information was sent to provide them with some information about other participants and their mentoring experiences as reciprocity for their participation in the study.

In addition, having the participants review the data and analysis output serves multiple purposes related to the validity and quality of the research. Specifically, participants’ review of the data analysis output serves as an inter-rater reliability process for accuracy. It also provides a triangulation check to ensure that the interpretation is valid. Furthermore, this step also addresses challenges associated with interpreting engineering education research such as ensuring research quality in the sensemaking process and the knowledge generated by the researcher ⁷.

Implications for Practice

As an example of an approach to narrative analysis, I have provided explicit details about methods I used to capture and transform the stories of African-American mentors into informative narratives about their experiences. This approach can also be used to capture the narrative experiences of other populations. In providing details about how to collect, examine, analyze and present data as informative narratives, this approach can provide critical insights about understanding the experiences of populations that may not be well captured through other types of analysis. Specifically, using this type of methodical approach to construct narrative and thematic analysis may result in better understanding African-American mentors’ experiences and mentoring practices which can inform us about specific ways to improve practices and policies to increase diversity in STEM higher education. Making this method visible as an approach for researching and analyzing the experiences of this population may significantly advance the understanding of the benefits of mentoring and how to use mentoring to address obstacles that African-American STEM undergraduates confront in college. Subsequently, this approach can be used to examine the experiences of various populations and it provides an example of how to effectively analyze and present information in narrative form to detail and garner critical insights from people’s experiences.

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