Constructing Interpretations with Participants through Epistemic Network Analysis: Towards Participatory Approaches in Quantitative Ethnography

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Abstract. As societal changes have brought forward issues of equity and social justice that challenge powered dynamics, participatory research approaches have gained traction. In quantitative ethnography (QE), recent calls have highlighted the potential of this approach to expand existing methods and imagine new tools for more collaborative ends. To address this new direction in QE, the purpose of this study was to describe how we used epistemic network analysis (ENA) discourse networks in interviews with pre-service teachers to build interpretations of qualitative data with them. We argue that ENA is a promising methodological tool for researchers and participants to co-construct deep data interpretations. Our findings suggest that discussions of ENA discourse networks provide a space for researcher-participant collaboration to co-construct interpretations of data by modifying codes, adding connections, and reacting to codes. Based on our findings, we contend that a participatory quantitative ethnography (PQE) approach that includes participants in data analysis requires a reconceptualization of QE tools specifically designed for co-interpretation.

Keywords: participatory research, researcher-participant collaboration, teacher education

1 Introduction

As wide societal changes have brought forward issues of equity and social justice that challenge powered dynamics [1], participatory research approaches have gained traction [2–4]. The underlying principle of participatory research methods is that participants and researchers both engage in co-construction of knowledge throughout the research process [4–6]. While traditional research designs position the researcher as playing a central role in generating and shaping research, participatory methods recognize and value the expertise of participants, actively engaging them across research activities working side-by-side with researchers [7]. Such work requires acknowledging and addressing power hierarchies in research by keeping a critical look

towards who researches, for what ends, and for whom. Addressing power issues supports research outcomes that respond to the needs of communities and individuals [1, 2].

In ethnography, this democratic form of inquiry suggests co-constructions and co-interpretations of cultures that offer thick descriptions created by both ethnographers and participants [5, 8, 9]. This joint process is particularly important in educational research in which practitioner-researcher partnerships and action research involving students are increasingly used to solve pressing problems in teaching and learning [2, 10, 11]. Participatory methods in ethnography, and more broadly, can contribute to (a) addressing long-standing issues of incomplete or thin representation of participants [12], (b) closing the gap between theory and practice [2, 13], and (c) generating solutions to problems that involve local cultural points of view [1, 14]. However, these affordances can only be realized if research practices, roles, and tools are reimagined to cultivate and sustain multiple perspectives [2].

An equitable researcher-participant relationship in the co-construction of knowledge recognizes the need for expanding methods that support heterogeneity of epistemologies and respond to the tensions embedded in the process [3, 10, 14]. Nonetheless, considerably less attention has been paid to the specific methods and tools required for such collaborative practices. In quantitative ethnography (QE), recent calls [15–17] have highlighted the potential of this approach to expand existing methods and imagine new tools for more collaborative ends. In this paper, we claim that one of the seminal tools of QE, Epistemic Network Analysis (ENA), can be used and expanded to facilitate researcher-participant collaboration. ENA creates weighted discourse networks from qualitatively coded data to visualize relationships across codes. In extant research in QE, the discourse networks generated by ENA have been predominantly used by the researcher in the data analysis phase. Thus, traditionally, although forms of participant validation have been included in QE, ENA has not been widely used with participants to capture their interpretations of the phenomenon under study. To address this gap, in this paper, we describe how we used ENA discourse networks to build interpretations of qualitative data with participants and argue that ENA is a promising methodological tool for researchers and participants to co-construct deep data interpretations.

2 Theory

Several approaches such as participatory action research and participatory design research have emerged from participatory methods. The commonality across these derived approaches is the premise that all individuals construct social meanings and have the capability of research and analysis [14]. This overarching principle is further explained by the following criteria (a) people should be active agents in their own lives, (b) research should respect research participants' own words, ideas, and understandings, (c) researchers and participants are equal, (d) research methods should be flexible, exploratory, and inventive, (e) both the researchers and research participants should enjoy the research [14, p. 192]. These ideas seek to blur the lines

between the researcher and the researched, creating new opportunities for different roles. For instance, the role of the researcher shifts to that of a facilitator that establishes trust, practices listening, and shares control of the research with participants [18]. On the participants' side, participation should be seen as a continuum, from minimal involvement to sharing a role as co-researchers [3]. This continuum implies creating shared spaces offering varying levels of participation in stages of the research process and providing ways for participants and researchers to leverage their methods and expertise.

In ethnography, participation may seem redundant because ethnographic research is understood as participatory to the extent that ethnographers are participant observers in their participants' everyday activity [9]. However, an explicit focus on participation highlights how participants can be involved beyond data collection. The term participatory or collaborative ethnography has been used to describe the researcher-participant dialogical relationship to produce "multi-vocal" interpretations [18, p. 10]. This collaborative sensemaking "represents a deliberate way to structure participant-research relationships around mutuality and reciprocity" [10, p. 1]. One way to build these relationships is to focus on the knowledge generation process, and particularly whose voices are being heard and how [11, 20]. Of similar importance is to express empathy with participants, which means valuing their wisdom as legitimate ways of knowing from which research has yet a lot to learn from [11, 20]. Attention to process and empathy in collaboration may contribute to creating a shared ground where the emic (participants' perspectives and words) and the etic (researchers' and/or theoretical perspectives) meet to address research problems.

Previous participatory ethnographic research has underscored the role of the voices of participants in design processes, ethnographic writing, debriefing of interviews and observations, and member checks [7, 21, 22]. These voices not only provide increased validity to the research results, but they can also motivate participants to pursue their own interests and goals related to the phenomenon studied [10, 11]. This literature has also discussed that tensions are inherent to collaboration; however, these could be negotiated over time during knowledge building opportunities and with trusting relationships [e.g., 10].

Regarding the strategies or tools for researcher-participant collaboration, privilege has been given to strategies intended to maximize the efficiency of the time dedicated to fieldwork. Among these strategies are member checks, interviewing methods, participatory representations of space and activity, and joint revision of documents and artifacts [23]. However, methods are not inherently participatory [14, 23]. The extent to which they become more or less participatory depends on how mutuality and responsibility are shared and constructed by participants and researchers.

2.1 New Opportunities for Participatory Research in QE

Prominent scholars in the QE field have urged for new directions towards participatory approaches. Arastoopour Irgens' [16] keynote address during the first International Conference of Quantitative Ethnography emphasized the advantages of QE to include stakeholders in research. As an inclusive methodology, QE can make assumptions and

data interpretations transparent for the research community and participants [16]. According to Arastoopour Irgens, through computational methods and human interpretations, QE can confront biases that may be problematic in data interpretation. Inclusivity in QE can also amplify the multiplicity of voices involved in doing consequential research. Arastoopour Irgens urged for the development of new tools that are sensible to issues of equity and power, preserve ethnographic meanings, and improve thick descriptions.

Following Arastoopour Irgens' remarks, Buckingham Shum's keynote [15] during the second International Conference of Quantitative Ethnography raised awareness about the potential of tools within QE to support collaborative approaches in this field. According to Buckingham Shum, ENA affords processing that includes "continuous internal/external cognition interplay and shared focus of visual attention, and accessible shared language for joint sensemaking". In this sense, the power of ENA resides in its capability to scaffold joint cognition and interpretation with others in research. These reflections push our thinking to consider the ways in which data visualizations could shape the etic and emic perspectives and how they can influence each other in researcher-participant collaborations. However, as acknowledged by Buckingham Shum, further development of existing tools is needed to accommodate the interactivity and malleability required for on-the-fly co-interpretations of data.

An example of how ENA representations have been used with participants is Phillips et al.'s pilot study [17]. They explored professional decision-making of six teachers in the subjects of math, science and technology in a secondary school in Australia. They created discourse networks using ENA with coded data from the teachers' lesson plans, and subsequently conducted interviews with participants. In these discussions, some teachers validated the researcher's analysis acknowledging that they captured their tacit understandings of their teaching practices. Other teachers were surprised to see that their networks did not represent all the areas in their decision-making. Having the opportunity to examine the networks with the researcher allowed them to identify that the cause of this difference was that they worked with lesson plans that were not as detailed as those of other teachers, which limited the connections across codes in the networks. This finding suggests that taking back ENA representations to participants may provide a fuller picture of the phenomenon studied. Additionally, this practice demonstrated the interaction between the etic perspective embedded in the networks and emic understandings of practice among teachers.

As QE continues to grow and take new directions, participatory approaches need to address pressing issues of power and equity in research. One area that may contribute to that end is the expansion of tools towards collaborative interactions between researchers and participants. Hence, the purpose of this paper is to explore how ENA can be used by both researchers and participants to co-construct data interpretations.

3 Methods

This study drew from a larger project exploring the identity development of English as a foreign language (EFL) pre-service teachers in Costa Rica [24-25]. In this larger

study, we used interview data to elucidate how the participants grappled with self and socially assigned expectations and identities, following Seidman's [24] three-interview framework for phenomenological studies. This framework includes a first interview for describing experiences relevant to the topic of interest, a second one for further exploring details of experiences, and a third one for reflecting on the meanings of those experiences. This method underscores participants' active role, allowing them to describe and interpret their context-bound experiences [24]. For this paper, we focus on the third interview, which was when we elicited reflection on experiences using ENA discourse networks.

3.1 Context and Participants

The larger study is set in a foreign language in a four-year teacher education program in a public university in Costa Rica. As in the rest of Latin America, in Costa Rica, English plays a fundamental role for socioeconomic development, thus there is a high demand for highly qualified English teachers. In a suburban campus, this education program prepares English teachers to teach at secondary or adult education level to meet the demands for English education in the country. Coursework in this program includes a combination of English language learning and language learning pedagogies. Also, pre-service teachers have several classroom experiences through observations and practicum opportunities to develop their skills. They tend to draw from these experiences when reflecting about their identities.

The participants in the larger research were four Spanish-English bilingual pre-service teachers enrolled in this program. For the purposes of this study, we chose two focal participants, who engaged in a thorough reflection process during the interviews, and particularly in the last one. Moreover, the selection of these two participants affords the provision of a detailed account of their interaction with ENA during the interview process. At the time of the interviews, Nancy and Isabel (pseudonyms) had finished their coursework and were expecting to enter the teaching context soon. They voluntarily participated in the study after an open call for recruitment sent to the students of the program.

3.2 Data Collection and Analysis

As mentioned previously, we focused on the third interview because it was when we used the ENA discourse networks with the participants. This interview aimed at reflecting on the experiences described in previous interviews. Each interview was about 90 minutes, and they were transcribed using a combination of automated and manual transcription. The ENA discourse networks shared with participants were created using coded discourse data from previous interviews from each participant. These networks showed the connections across the codes of adoption, rejection, and tensions in identity negotiation in relation to the idealized figure of the native English speaker.

Prior to the interview, to share the ENA discourse networks with the participants, we developed a script to ensure accessible language for the discussion of the networks.

In this script, we included (a) a simple description of the elements of networks such as the nodes and the lines, (b) the meanings of the codes; for example, the script included the following: "*This is a network that represents the main topics discussed in your first interview and how they are connected to each other. For instance, the 3 main topics were adoption, tension, and rejection. Those circles or nodes are the main topics you discussed. The links or lines between them show that you connected those topics or talked about them together at some point. Let's look at the topics first. Adoption was when you talked about things/practices you liked from the program and you would like to incorporate in your teaching, for example you talked about…* Let's look at the lines, see that some are thick, and others are thin. A thick line says that you made many connections between those 2 topics. A thin line means that you made fewer connections between 2 topics. No line means that you did not make any connections." We also included (c) specific examples of their own utterances for some of the codes, and (d) pauses and spaces for questions or clarification. Also, the researcher prepared questions to elicit reflection and scaffold the discussion about ENA discourse networks.

During the interview, the researcher led with the premise that the networks were open to interpretation, acknowledging that they were still in construction, and they were created out of a snapshot of the participants' thinking as recorded in an interview setting. Thus, any addition, change, deletion, question, or further interpretation was valuable to understand their reflections on their identities and construct robust analyses together with the researcher. For instance, in the script, we stated: *"This network is just an interpretation of what you said in the interview. There might be many possible interpretations. There's no right or wrong answer. I would like to know how* ***you*** *see it.*" The researcher showed the ENA discourse networks to the participants using a tablet and annotated the networks including participants' proposed edits. When annotations were made, the researcher confirmed the accuracy of the annotations with the participant. As the discussion of the ENA discourse networks unfolded, participants required additional examples of utterances and clarifications, which were provided when needed.

To conduct the analysis of the data for this study, the researchers first gained a preliminary understanding of the participants' interactions with the ENA discourse networks. Then, they focused on the instances where participants added or changed interpretations of the networks. Once these instances were identified, open coding was conducted resulting in categories related to the types of interactions with ENA discourse networks, for example modifying a code. Using these categories, analytic memos were written for each participant. Then, these memos were used to select the focal participants and guide the remaining coding process. In a second round of coding, the categories were expanded and refined.

4 Results

In previous studies [25, 26], we have discussed how EFL pre-service teachers negotiated their identities adopting or rejecting practices from their teaching education program. The participants in our study were native Spanish speakers getting prepared

to teach English at the secondary level. Our findings suggested that participants faced tension around the dominant discourse of an idealized native English-speaking teacher. This tension in identity negotiations led to feelings of frustration and self-doubt when participants contrasted themselves with a superior native speaker figure with default expertise for language learning and teaching. To provide context for the results in this paper, Table 1 shows a summary of the codes used in the ENA discourse networks we shared with our participants.

Table 1. Summary of codes included in the ENA discourse networks

Code	Definition
Adoption	Taking on an established practice from the community of practice (CoP), applying it in teaching and/or language learning.
Rejection	Rejecting an established practice from the CoP by showing disagreement or full dissatisfaction with the CoP.
Tension	Demonstrating tension when an established practice from the CoP poses a conflict for identity negotiation. This is demonstrated by not showing full satisfaction with the practices of the CoP, mixed negative and positive comments about them, and/or strong/negative emotions.
The native speaker as the standard	Expressing perspectives about an established practice related to the idealized native speaker, who represents the target language norms against which the non-native speaker measures proficiency.
Reflections on accents	Expressing perspectives about an established practice related to ideas about accent that suggest judgements of legitimacy of accents in relation to a standard language variety.
NNS less legitimate practices	Expressing perspectives about an established practice related to personal linguistic practices perceived as less legitimate than those of an imagined native speaker.

In this section, we describe participants' reactions and interpretations of ENA discourse networks. Three main categories were identified: (1) modifying codes, (3) adding connections across codes, and (3) reacting to a code.

4.1 Modifying Codes

As it can be observed in the ENA discourse network (figure 1), Nancy's network shows that she predominantly adopted discourses that positioned the native English speaker as the standard to follow. In previous interviews, she explained that she intends to incorporate as much as possible interactions with native English speakers in her classes because students would benefit from that kind of input. However, when looking at the network, she decided to modify the code, questioning the term "native speaker" and explained what adoption of that ideology means for her. She asserted,

> "I want to clarify, *native speakers. What are they? Right? Who are they?* So that's what confuses me and creates a little bit of a gray area […] But what if we could get people like me? With a C1 [advanced English level] who would agree to come or even especially now with the Zoom meetings and everything. What if I can get someone here in Costa Rica to talk with students? […] So, *my adoption would be anyone who can have a great English level like a C1*. That to me would be an adoption. So yeah, more advanced because that could be a very useful resource. […] You know, so that's something to consider what a native speaker is."

When revisiting her ideas through the ENA discourse network, Nancy had an opportunity to challenge the term *native speaker* used by the researcher saying that it is broad, and it needs to be more contextualized. For example, English native speakers from Canada or from the US are very different. And even within those contexts, there is a wide variety of accents and dialects, thus it is necessary to have a more nuanced understanding of who this native speaker figure is if she is to adopt this ideology. In a further questioning of the term, she explained that English native speakers might not have the contextual knowledge to interact successfully with students, and it would be difficult to have access to them. In that case, other nonnative speakers, even from Costa Rica would not only be willing to visit her class, but they would also know more about the culture and the language learning process of their students than English native speakers from a completely different setting.

Having made this reflection, Nancy modified the term explaining that a *more advanced speaker* is an option because students need a more knowledgeable other but not necessarily a native speaker. A person with a C1 level (advanced) is also likely to provide comprehensible input to students and meaningful interaction for English language learning. This way, Nancy described that to an extent, she was adopting that discourse. However, through the ENA discourse network discussion, she explained that she was more interested in the quality of guidance that more advanced speakers could bring to her class, regardless of their native speaker status. In this discussion, the researcher pointed to other instances in which she had expressed similar ideas about how central it was for her to provide such guidance to students. This researcher-participant co-interpretation of a code through ENA representations allowed the participant and the researcher to arrive at a more contextualized definition of a code by tying it back to previous data and expanding their understanding of this code.

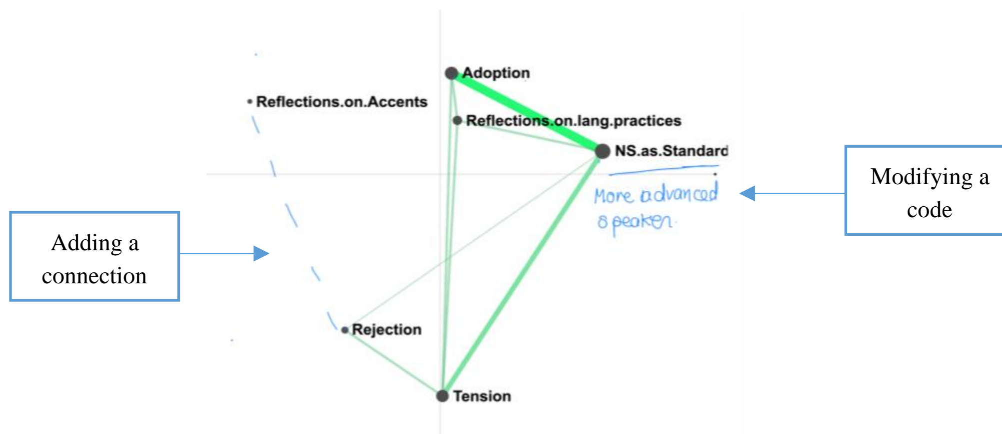

Fig. 1. Nancy's annotated ENA discourse network

4.2 Adding Connections

We found that when discussing ENA discourse networks, participants added absent connections or reinforced those already existing. In Nancy's case, when the researcher asked if she would change anything about the connections across codes, she added a connection between the rejection and reflections on accents (figure 1). The code rejection referred to practices or discourses from their community of practice that they did not intend to take in their teaching. The code reflections on accents referred to perspectives about accents suggesting judgements of legitimacy of accents in relation to a standard language variety. The connection between these two codes meant that the participant did not agree with judging accents that did not approximate standard forms. Nancy explained that in previous interviews, she had not referred to accents explicitly, but looking at the ENA discourse network, she thought that based on her experience, she should pay more attention to accents in her teaching. To explain why that connection was necessary, Nancy referred to her experience with accents having been born in Costa Rica, moving to the US at the age of seven, and going back to Costa Rica as a teenager.

> "*I can see it in Spanish*, when I arrived here [Costa Rica]. I thought I spoke Spanish because, you know, in the US, I was a little bit *self-conscious of my accent as a learner*, but not so much. But when I arrived here and I start speaking Spanish and my friends would say like, Oh, you speak funny. I'm like, but I'm speaking Spanish. But then, so I realized, *oh there's accents in every language* and there's no right or wrong."

Nancy decided to add this connection because by reflecting to her own language learning experiences, she realized that accents may have a crucial role for learners. By saying *I can see it in Spanish* and acknowledging that she once was *self-conscious about*

*her acce*nt, she is becoming aware that judging accents against rigid standard forms is a reality for language learners. In her case, she received judgement in the US because of her Spanish accent, and back in Costa Rica, she was judged because her Spanish had an English accent. Seeing that no connections had been made to reflections on accents made her look into her own experiences to uncover that *accents in every language* may influence how one and others perceive ways of speaking. Thus, although at the time, she did not mention this experience, further exploration on this matter allowed her to bring back her thinking about accents and how they may affect language learners.

In Isabel's case, she made an already existing line thicker between the codes of rejection and reflections on language practices (figure 2). The relationship between these two codes indicates that the participant expressed perspectives rejecting ideas characterizing their linguistic practices as bilinguals as less legitimate than those of a monolingual native speaker. An example of this would be code-switching between English and Spanish. Like Nancy, Isabel connected back to her experience to say that she actually rejected practices that did not support the use of Spanish in English classes. She recalled an experience in her teaching education program, in student presentations when students have a low level of English, and teachers expect them to not resort to Spanish. She narrated the following.

> "*I would still make it thicker*. Because I have seen it many times. Not really with myself, but with other classmates, that made me feel really *uncomfortable* and even fear the teacher because of their reaction. I have an example. […] This person [the professor] would make some difficult questions about politics and religion [during student presentations], and because they [presenters] couldn't understand, they answered Spanish, this person [professor] would get mad […] *I don't think that's right*."

To elicit this reflection, the researcher provided several possible examples of bilinguals' language practices. It took Isabel a few minutes to realize that she actually had observed the situation described multiple times, and every time, she had felt *uncomfortable*. Even though she had not been in her classmates' position, she thought that it *was not right* to completely deny students the possibility to use Spanish when needed. Since the line between rejection and reflections on language practices was very thin in her ENA discourse network, she decided that a slightly thicker line would better reflect how she thought about the role of the first language for bilingual learners. She said that that line should be as thick as the line between reflections on language practices and reflections on accents.

As observed in these two examples, the discussion of ENA representations with participants resulted in adding connections, whether it was to make stronger connections between codes (Isabel) or to include a new one (Nancy). This addition of connections allowed participants to link their experiences to the codes established by the researcher providing additional context and understanding of the nature of the connections between codes.

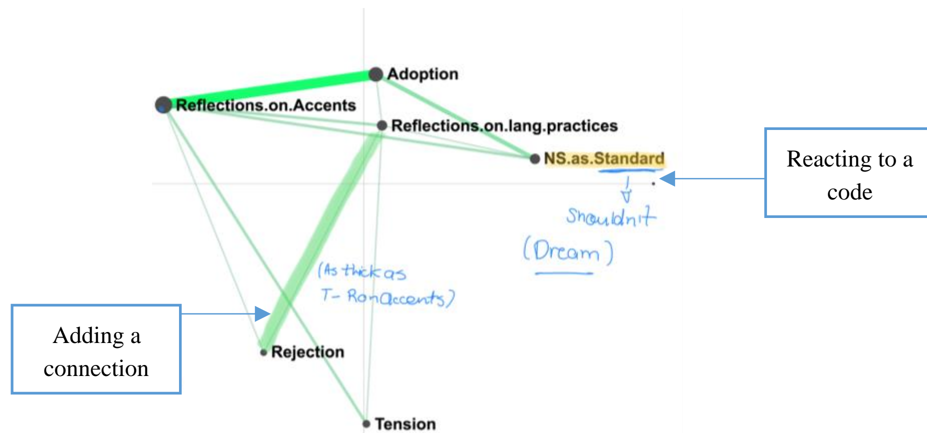

Fig. 2. Isabel's annotated ENA discourse network

4.3 Reacting to a Code

Isabel's annotated ENA discourse networks shows her reaction to the code of the native speaker as a standard. Different from Nancy, she thought the code was an accurate description of her thoughts; however, she acknowledged that it needed to change. During previous interviews, Isabel had expressed that she was frustrated because despite spending much energy and time to perfect her pronunciation, she had a marked accent that made her sound nonnative in English. The following quote describes her reaction to the code of the native speaker as a standard after looking at some of her utterances coded for it.

> "I haven't said that very explicitly. That is true. So, you understood me correctly. But I know it's not, *it shouldn't be*. Not yet, but I guess that in the future, when I read your research, maybe I'm going to think I was being too harsh on myself […] Maybe *I'm going to come with a closure of not being the best, not being native*. I guess that is going to change at some point in the future. And with experience because right now I've just had my practicum, and that's it. Maybe in the future. Those lines will get thicker or maybe, I don't know, *some of the words that you wrote there maybe are going to change into others*."

As observed in Isabel's quote, she agrees with the code and the interpretation for it. Nevertheless, when looking at this explicit relationship in the ENA, it became clear for her that it *should not* be the way to perceive her linguistic performance. She is being

harsh judging herself using the *native speaker* as a benchmark. These are her present self-perceptions, but these views are subject to change as she gains more teaching experience. She is opening the possibility of *changing* this code in the future, hoping that when she begins to teach, she can give credit to her multiple strengths without paying excessive attention to her pronunciation.

This participant-researcher discussion of ENA representations resulted in participant's reaction to a code. This means that although the code was not modified, the participant took the interpretation of the code to reflect about her own views and imagine how she could change, and in turn how the network itself could possibly change.

5 Discussion and Conclusion

Our findings suggest that discussions of ENA discourse networks provide a space for researcher-participant collaboration to co-construct interpretations of data by modifying codes, adding connections, and reacting to codes. In this research, participatory ENA discussions made visible the voices of participants for joint data interpretation. For example, when modifying a code, the participant brought her contextualized understanding of the code *the native speaker as a standard* to expand the definition created by the researcher. By reconceptualizing this code, both the participant and the researcher recognized that a standard for language learning can go beyond a native speaker and also include a more advanced speaker, who is capable of providing modeling and guidance to the language learner. This expansion of the code involved the inclusion of multiple perspectives in data interpretation that required the researcher to listen and the participant to actively work with the researcher to interpret the data. This sort of co-interpretation may allow the researcher and participant to step into more symmetrical roles that challenge traditional power hierarchies in research, which ultimately may support outcomes that better respond to the needs of communities and individuals [1, 2].

In addition to welcoming participants' perspectives, participatory ENA discussions construct results that show a fuller picture of the phenomenon being studied. In this study, when adding connections to ENA representations, participants showed more nuanced understandings of their experiences as they reflected on the configuration of the codes. This reflection contributed to a more solid understanding of these teachers' identity formation compared to previous interviews. For instance, one of the participants introduced her experiences with accents to explain how they rejected normative ideologies from their teacher education program about native English speakers. By including such new revelations from participants during co-interpretation sessions, QE studies can provide richer, thick descriptions that provide another layer where etic and emic perspectives come together. While we acknowledge that this study is limited to a small sample of interview data, we recognize that the findings evidence the potential of creating participatory discussions using ENA representations. These discussions should not only serve as member-checking [27] or as a point to departure for reflections with participants. They should be a collaborative ground, where the emic

and etic perspectives from both the researcher and the participants dynamically interact and feed each other.

Looking specifically at the affordances of ENA in this researcher-participant collaborative space, we highlight Buckingham Shum's [15] assertions about ENA's "continuous internal/external cognition interplay and shared focus of visual attention." In our discussions with participants, the ENA discourse networks provided a tangible representation of teacher's self-conceptualization of their identity development through connections among the codes of tension, rejection, acceptance, and the cultural components of the teacher education program. The discussions were not only about the codes, but also how they were related to each other. The node links elicited a cognitive response from participants that facilitated reflection on their identities and the relationships between identity components. This interaction with the outputs of the ENA tool scaffolded a form of joint cognition that dynamically facilitated the (re)construction of etic and emic perspectives. Importantly, these participatory practices in QE allows for a shared space for researchers and participants to experiment and start a process of co-design of tools.

Although this study suggests that ENA discourse network representations provided a foundation for joint cognition and interpretation, there is still a need to expand QE tools to support collaborative spaces for researchers and participants to tell multi-vocal stories [15, 16, 28]. A participatory quantitative ethnography (PQE) approach that includes participants in data analysis requires a reconceptualization of QE tools specifically designed for co-interpretation. Tools must be designed such that researchers and participants have access and abilities to co-create thick descriptions together in moment-to-moment interactions. Affordances and features of the tools need to be carefully considered, including annotation, discussion, and how to visualize the co-constructed knowledge. Such design choices will affect the roles, responsibilities, and power dynamics between researcher and participant and in turn, will affect the interpretation of the data and how the story is ultimately told.

Although this preliminary study introduced a PQE approach using ENA discourse network with teachers to explore their identity development, this study has also raised many questions for pursuing a new line of PQE research in the QE community. Particularly, in collaboration during data analysis, we think it is important to think about the following questions: how can data interpretation be open and accessible to participants? What complications may arise from such process? How should we leverage researchers and participants' expertise to arrive at deeper understandings of research phenomena in ways that benefit all stakeholders? How can we resolve tensions, disagreements, and issues of confirmation bias when co-constructing data interpretations? As QE researchers explore these questions and develop new PQE tools, the field will develop more equitable research practices in collaboration with our participants as partners and in turn, richer thick descriptions of cultural phenomena.

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