Visualizing Funds of Identity:
Using Network Software to Model Collective Identity in a Classroom

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Abstract: Funds of Identity is a valuable way of understanding the resources learners bring to the classroom from home and that are relevant to them. In the present study, we supported learners in using the Net.Create network visualization software to support 5th- and 6th-grade students in representing their collective funds of identity as part of a data literacy unit. We present analyses showing how this tool supported their articulation and a summary of the ideas they viewed as central to their identity.

Introduction

Identity is a central concept in many learning theories, for instance, the funds of identity (FOI) framework proposed by Esteband-Guitart and Moll (2014). Funds of identity refer to the subset of their background knowledge that students find relevant to their own lives in their current context. While it is crucial that teachers understand their students' FOI to develop dignity-affirming instruction, teachers struggle to elicit this kind of information (Neri et al., 2019). In this study, we attempted to extend the theoretical notion of FOI in two ways, one practical and one theoretical. Practically, we show how network visualizations can help make identities - a key component of FOI work - visible in new and interesting ways. Theoretically, we expand the conception of a fund of identity as something that can be understood as shared or emergent. This allows us to lay the groundwork for theorizing the concept of collective funds of identity, a concept developed in collaboration with Dr. Rebecca Colina Neri.

A network visualization is a graph composed of 'nodes' which are connected to each other via lines, called edges (see Figure 1 for an example). They are often used to understand complex datasets where the relation between entities is important - for instance, a social network like Twitter. Net.Create is an online tool designed to create network visualizations (Craig, 2017; Craig et al, 2021). It supports simultaneous editing by many users, making it ideal for in-classroom use. Other analyses (Zhou et al., 2023) have shown how Net.Create can mediate students' understanding in classroom activities; the present analysis focuses on how these interactions support identity exploration.

Figure 1
An anonymized section of the identity network visualization made by participants in the class. The labeled circles are nodes, the lines between them are edges. Full graph: http://theraptlab.org/projects/netcreate_examples

Methods and Design

The research team designed and led a six-day unit on networks and data literacy in a combined 5th- and 6th-grade classroom. The classroom was in a private school located in the midwestern United States. 11 students self-identified as female or girls, and 11 identified as male or boys between the ages of 10 and 12. Most students self-identified as White or American, 1 identified as 'Latina', 1 as 'Mexican', and 1 as 'Mixed'; English was the primary language spoken at home by all participants. From this intervention, the team collected video recordings (both classroom interactions and post-activity debriefs), physical artifacts, and digital networks created by students.

Each day, students participated in several activities designed to engage them with the concepts of network science, such as centrality, gravity, or betweenness (Hammer & Berland, 2014). Some of these activities used the

Net.Create software while others used physical materials such as yarn to represent edges; most were playful. In addition to the other activities, students worked in pairs using the Net.Create software to iteratively construct a network visualization of their likes, interests, and connections. The categories (node types) in this network were based on the categories used in the FoI Literature (Esteban-Guitart & Moll, 2014). While individual students were only supposed to add and connect themselves to things that they personally liked, the eventual effect was something that showed collective as well as individual interests. For instance, students were able to see which people and things were more central to the classroom network - pet ownership was very central, something that several students claimed to not have been aware of before the activity.

Findings

Our analysis indicates that students, generally, articulated a greater number of network science concepts after engaging in network visualization activities (Zhou et al, 2023). Importantly for the present analysis, the identity network created by the students shows some of the key interests that students have and are comfortable sharing in their classroom such as interests in cats, drawing, and a wide range of foods. When asked in the post-interviews and during the implementation whether they felt the identity network 'represented' them *as a class*, students almost universally agreed (8 of 9 groups), leading us to infer that these entities are representative of actual interests. However, when asked if they felt the network represented them as an individual they were less positive.

Using interaction analysis of post-implementation interviews, paired with an analysis of the network artifacts, we also found that students felt like they learned a lot about their collective identity and how it may be represented through the network visualization activities. Much of this was specific facts, e.g., a lot of people in the class like cats or listening to music, but several students went further indicating that the network increased their sense of belonging. One student stated "I never knew how connected we all were…[or that] I had so many connections to people I don't even talk to" while another claimed that the amount of overlap in the classroom connection made them realize "if we just talked to each other more we'd be friends". When asked if the network helped them learn anything about themselves, one student said they "found out stuff I didn't think I was into", but then when they saw those things in the network they realized that not only did they like those things, others in their class also did.

Conclusions and Significance

Eliciting identity in a way that is useful to an instructor is difficult (Neri et al., 2019). The use of network visualization software offers a promising classroom-based approach to eliciting students' individual and collective funds of identity in a manner that has the potential to support greater asset-based instructional work by teachers, though additional work is needed to better document how this representation both does and does not reflect learners' ideas and identities.

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