Social Learning Frameworks for Analyzing Collaboration with Marginalized Learners

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ABSTRACT

Collaborative learning has potential to serve as a platform for fostering social connection, particularly in non-traditional contexts. Recent years have seen an increase in (long overdue) interest in supporting communities within such contexts through research. This has been often approached through ethnographic methods such as naturalistic observations, which are suitable for smaller, marginalized populations, However, the analysis of data produced by such methods often lack standardization, which limits generalizability of results and makes comparison across populations and learning contexts challenging. In this paper, we argue how greater grounding of data analysis in collaborative learning theories can provide standards for more meaningful comparison across contexts. We review Vygostky's social learning theories, shared social regulation of learning, and the trialogical approach. We discuss how anchoring inductive and deductive approaches in social frameworks may yield standardization metrics for unstructured, qualitative data from studies of social learning. We base this in our ongoing research on collaborative language learning between immigrant grandparents and grandchildren.

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COLLABORATIVE LEARNING FOR SOCIAL CONNECTION

Collaboration enriches the learning process by providing opportunities for shared sense-making. There is also a social process involved in collaboration, where peers must learn to articulate ideas, negotiate disagreements and reach shared resolutions [3]. Thus, collaboration presents opportunities not just for learning, but for fostering social connection between learners. Measuring the latter outcome is the primary goal of collaboration in certain contexts, particularly in non-academic situations where learning is used as a means of fostering social connection.

For instance, immigrant grandparents have a desire to pass down their heritage language to their grandchildren [7]. Conversely, immigrant grandchildren growing up in English speaking countries have English language skills that their grandparents do not. Thus, a two-way language exchange has benefits for both the grandparent and grandchild. In intergenerational immigrant families where risk of social isolation is high, collaborative language learning also provides a platform for grandparents and grandchildren to find a set of shared goals and values, and to foster social connectedness [4, 15]. Technology mediation has the potential to support this process by guiding grandparents and grandchildren in negotiating shared goals and transforming learning into a social activity [12]. However, existing learning technology, with limited focus on social connection as a goal, must be redesigned for such learners.

CHALLENGES OF INTERPRETING UNSTRUCTURED SOCIAL LEARNING DATA

When designing technologies for populations historically overlooked in research, an understanding of the users and the problem space is required through use of ethnographic methods such as naturalistic observations, focus groups, Contextual Inquiry and Participatory Design. The resulting data may consist of audio and video transcripts, and artifacts created by participants. Analyzing the data generated from these richer, qualitative approaches involves unit level coding of participant dialogue, interactions, and artifact creation process. One popular approach is grounded theory, where data is iteratively abstracted to identify common themes and patterns [2]. The approach may be inductive, where themes are drawn from the data itself, deductive, where themes are drawn from a theoretical interest or framework, or a mix of both.

The inductive approach ties the themes closely to the data, and avoids bias as data is not organized into a pre-existing framework. However, an inductive approach is not sufficient in these contexts for two reasons. First, when working cross-culturally, the researchers may not have the knowledge for contextualizing data from an insider's perspective [11]. Second, measuring learning constructs is a challenge without a guiding framework, and limits meaningful comparison across studies.

Vygotsky's social development theory: Posits that social learning precedes development. According to Vygotsky, individual cognition is the product of social behavior. Thus, all learning is a socially scaffolded activity and "what the child is able to do in collaboration today [the child] will be able to do independently tomorrow [21].".

More Knowledgeable Other (MKO): An individual with a better understanding of the study topic than the learner. The MKO plays an essential role in the learning process by guiding the learner.

The Zone of Proximal Development (ZPD): The space where learning occurs. The ZPD represents the gap between a learner's actual abilities, and the learner's potential that is achievable through the guidance of a MKO.

Illustration 1. Concepts from Vygotsky's Social Development Theory

The inductive-deductive approach is recommended for analysis when there is limited prior work with the target population [6]. Thus, a deductive approach is required to complement the inductive, but which framework to use and how it should be applied remains an open question. The challenge lies not just in data analysis, but in meaningfully interpreting unstructured qualitative data from field studies. This interpretation is needed to provide understanding of the social learning dimensions for better grounding the design of collaborative learning technologies for marginalized populations.

In the prior work that informs our present study, we studied challenges of new immigrants in accessing English learning resources for writing development [10]. Our fieldwork consisted of ethnographic methods such as contextual inquiry and participatory design, and interpretation of results was grounded in learning frameworks such as Achievement Goal Theory. We found that grounding our ethnographic methods in educational theories provided context to empirical findings, shined light on hidden assumptions, identified limitations of existing technology, and helped bring theory to the real world [9]. In our present case study, we expand our approach to new contexts and present our ongoing research to apply frameworks grounded in Vygotskian social learning theories [13], Shared Social Regulation of Learning [8], and the trialogical approach [14] to analyze collaborative learning processes with marginalized populations.

CASE STUDY: INTERPRETING DATA FROM FIELDWORK WITH IMMIGRANT FAMILIES THROUGH SOCIAL LEARNING FRAMEWORKS

In our present study we aim to design a digitally-mediated tool for supporting social language learning between immigrant grandparents and grandchildren. We are conducting an observational study with 10 pairs of grandchildren and grandparents. In these session, grandparent-grandchild dyads work together to create an artifact (paper, pens, and markers are provided) to teach a family member overseas about life in Canada (the country where this research is being conducted). Dyads are asked to generate several words in English and their heritage language to teach the family member overseas. Sessions are audio and video recorded, and artifacts created are collected to analyze the dynamics of social learning in grandparent-grandchild pairs and identify how to develop inquiry-based tools for informal learning. The next section discusses our proposed framework for analysis.

Vygotsky's Social Development Theory

We provide two concepts here from Vygotsky's social development theory (defined in Illustration 1): the more knowledgeable other (MKO) and the zone of proximal development (ZPD), and describe how we plan to use these two as a framework in our inductive-deductive analysis. By defining in broad terms the social learning environment, Vygotsky's theory provides a well-grounded starting point for drawing out themes in our deductive analysis. For our present work, we code the transcripts and video recordings of the artifact creation to observe which member of the dyad takes on the role of the MKO and how that changes over the learning session. We also observe how the learners progress

Socially Shared Regulated Learning (SSRL): From a Vygotskian perspective, collaborative learning is governed by socially shared regulation of learning (SSRL) where there is a group component to motivation, cognition, and context [8].

Self-regulated learning (SRL) theories: Models proposing how learning is affected by motivation, cognition, and context [16]. For example, Winne and Hadwin's SRL model explains that the studying process can be characterized by four main stages [16]. Learners engage in task definition, goal setting, enactment, and evaluation. In each phase, learners metacognitively monitor, adjust, and move recursively between phases [16].

Illustration 2. Frameworks aiding the interpretation of social learning activities

Trialogical Approach: Through understanding the artifact creation process, insights into the process of collaboration. By observing how objects evolve over time, the trialogical approach reveals insights into the collaboration process [14].

Illustration 3. The Trialogical Approach

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within the ZPD from the lower bound (starting abilities) to the upper bound (potential possible with the MKO).

Socially Shared Regulated Learning

In our study, we use a Socially Shared Regulated Learning framework (Illustration 2) for organizing and making sense of the interactions of the grandparent-grandchild dyads during the collaboration process. SSRL frameworks expand traditional self-regulated learning models (Illustration 2) to account for the collaborative component of studying. In our study, we identify the characteristics of each phase, patterns of how the dyads transition between them, and how they collaboratively define tasks, set goals, carry out tasks, and evaluate performance.

Technology as a platform for collaborative creation of objects

Technology introduces an additional dynamic to the learning process by creating a shared space where learners and MKOs must collaborate to construct a joint product. This facilitates a move from learning as a dialogic process (where collaboration entails discussion but not necessarily the creation of shared artifacts) to a trialogic one which brings artifact creation to the centre of the collaboration (Illustration 3).

In our study, video recordings are analyzed to determine how the artifacts produced by the grandparent-grandchild dyads evolve throughout the collaboration process. Some themes of interests include who makes the contribution (MKO or learner) and type of contribution (group level or individual).

RESEARCH CONTRIBUTION TO CSCW

Current educational technology contexts reinforce existing power structures, which can contribute to adverse consequences [1] that include misinterpretation and misuse of data [5]. The need to make learner decision-making processes explicit makes the development of new methods crucial for designing better tools, streamlining the design process, generating novel insights, and increasing tool adoption in ways that traditional methods cannot.

Our proposed frameworks for guiding the inductive-deductive analysis is expected to create standards for grounded theory, providing codes and themes as a basis for comparison across studies. We hope this approach will allow for more meaningful comparisons even when the populations of interests or the learning contexts vary. From our experience, we propose this approach for understanding collaboration with marginalized populations in informal learning contexts, as the smaller sample size and limited prior work to guide such studies make the design and evaluation of results challenging to contextualize. Grounding research in existing learning theories has potential to guide the research process from informing the study design, to analyzing the data, and to comparing results across populations and contexts.

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