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A Probe into Quantitative Approaches to Discourse Analysis

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Abstract: *There exists diverse research approaches to classroom discourse. Scholars from different research fields have put forward varied research approaches from distinct perspectives and for different research purposes. This paper mainly summarizes and comments on two quantitative approaches: interaction analysis and discourse analysis.*
Key words: classroom discourse, FIAS, IRF

INTRODUCTION

There are multiple analytical approaches to classroom discourse, mainly including interaction-analysis approach, discourse-analysis approach, critical discourse-analysis approach, multimodal discourse-analysis approach and sociocultural discourse-analysis approach. Among them, interaction analysis and discourse analysis are both quantitative analytical approaches.

Interaction Analysis

The interaction-analysis approach is mainly represented by Flanders' Interaction Analysis System, namely FIAS. Flanders from the University of Minnesota first proposed an interaction-coding mechanism in 1970, which is the most well-known and systematic data-analysis tool for classroom discourse. This mechanism adopts a set of pre-selected and pre-defined categories to identify and encode teachers' ongoing verbal behaviors, attempting to establish correlations between teacher behaviors (e.g., praise, questioning, feedback) and student academic performance. In Flanders' coding mechanism, terms such as "teacher" and "student" appear as basic designated labels in coding categories, standing for the two types of participants in classroom settings. FIAS classifies classroom interactive speech into three categories: "teacher talk", "student talk" and "silence", which are further subdivided into ten situations coded from 1 to 10 respectively, as shown in the table below:

Behavior	Code	Content	Behavior Description
Indirect Influence	1	Accepting feelings	Accepting and understanding students' positive or even negative feelings in a non-threatening manner
Indirect Influence	2	Praising or encouraging	Praising or encouraging students through verbal or non-verbal behaviors, such as nodding in approval, verbal guidance or compliments
	3	Adopting students' ideas	Recognizing and adopting students' ideas by interpreting, repeating or developing their viewpoints or suggestions
	4	Questioning	Teachers raising questions for students based on teaching content or procedures and expecting student responses
Direct Influence	5	Lecturing	Teachers explaining content or procedures, stating personal opinions, presenting facts and viewpoints or citing remarks from authoritative individuals or institutions
	6	Giving directions	Teachers issuing instructions or directions to students verbally
	7	Criticizing or justifying authority	Teachers criticizing students authoritatively to correct or change their behaviors and explaining reasons for criticism
Student Behaviors	8	Student passive response	Students answering questions upon being called on by the teacher
	9	Student active speech	Students voluntarily speaking up to elaborate their own viewpoints and thoughts on teacher-raised questions
Silence	10	Silence or confusion	Temporary pauses, silence or disorder; unclear expressions where teacher-student communication cannot be recorded by observers

FIAS stipulates rules for observation and coding: (1) Sample classroom activities every three seconds. Assign one code to each three-second segment of classroom verbal activities according to the coding

system. A 45-minute lesson generates approximately 900 codes. (2) Codes recorded for one lesson are linked in chronological order to represent successive classroom activities and form a time-series. Analysis of this sequence reveals the behavioral structures and patterns of teacher-student interaction in class. (3) Form "pairs" with each code and its subsequent code. Except for the first and last codes which are each used once, all other codes are used twice. Given *N* recorded codes, *N-1* pairs are generated. Statistical processing helps construct the Flanders' teacher-student interaction analysis matrix. Each cell value in the matrix indicates the frequency of a certain classroom interactive behavior. Frequencies, their proportional relationships and matrix distributions enable meaningful interpretations of classroom teaching.

Interaction analysis is theoretically rooted in behavioral psychology, which holds that observable behaviors can be analyzed and that teacher-student verbal interaction lends itself to systematic analysis. FIAS was initially applied to first-language research. Influenced by FIAS, numerous other interaction-analysis systems emerged and were gradually adopted for second-language classroom research.

From the late 1970s to the early 1980s, 25 interaction systems had been developed (Chandron, 1988). Apart from FIAS, representative systems include FLINT (Moskowitz, 1971), Focus (Fanslow et al., 1977), and the system proposed by Bellack et al. (Bellack, 1966). Most systems refine categories and processes of classroom communication. This research path establishes an analytical framework based on research questions and classroom activities. Researchers categorize observable classroom activities and utterances recorded via video or audio, then conduct quantitative statistics and analysis on categorized discourse to determine to what extent certain speech types influence learning outcomes.

Interaction analysis contributes to teaching improvement. Analyses help identify classroom activities or speech patterns that optimize teaching effectiveness. Its strengths are as follows: (1) Pre-established categories allow researchers to apply the framework directly without building new systems; (2) It enables simultaneous processing of data from multiple classrooms; (3) Statistical data yield persuasive and objective analysis of correlations between classroom activities and teaching effectiveness.

Its limitations include: (1) Incomplete analytical outputs. Only observable utterances fit into pre-set categories; some utterances cannot be processed, leading to partial conclusions. (2) Subjectivity in coding and analysis. Coding relies entirely on observer judgment without considering teachers' and students' own interpretations of classroom events. (3) Neglect of the multi-functionality of speech. Language is dynamic rather than static or monofunctional. The system focuses on surface linguistic forms, while the same utterance may carry different meanings across contexts.

Discourse Analysis

Discourse analysis is one of the most frequently-used approaches for classroom discourse research.

Classroom discourse analysis systems have drawn criticism for inconsistency, limitations and low reliability. They fail to explain how classroom interaction unfolds in specific contexts and why certain linguistic behaviors predominate. Hence, more qualitative discourse-analysis approaches for classroom interaction research have been developed. Such approaches center on the sequential structure of teacher-student turns-at-talk, emphasize contextual features of interaction, and adopt ethnography as data-collection method. Mehan put forward the IRF (Initiation-Response-Feedback) model for teacher-student communication: the teacher delivers an initiation move by raising a question; the student produces a response move; the teacher follows with a feedback move commenting on the student's answer. Another similar classroom-interaction model was proposed by Sinclair and Coulthard in 1975. Their analytical system is grounded in linguistic descriptions and structures of teacher-student interaction. The Sinclair-Coulthard IRE/IRF model stands as the most representative framework for discourse analysis. In Britain, it is known as IRF: teacher Initiation-student Response-teacher Feedback. In the United States, it appears as IRE: teacher Initiation-student Response-teacher Evaluation. Sinclair and Coulthard argued that classroom discourse consists of hierarchically-organized acts.

The IRF sequential model of classroom interaction proposed by Sinclair, Coulthard and Mehan has been widely adopted in other classroom analyses. Compared with frequency-counting methods, IRF contributes more to interpreting meanings within interaction. It reveals what actually happens in class, how and why it occurs. Researchers can identify interaction norms from turn-taking and organizational patterns. Although identity is not the primary focus for researchers, it is vital to acknowledge role implications embedded in labels such as "teacher" and "student" and respond to their institutional rights and obligations. For instance, Sinclair and Coulthard (1975) stressed the necessity of raising such questions: "Who controls discourse?", "How do other participants exercise discourse control?", "How are speaker-hearer roles shifted among participants?"

Mehan (1975) highlighted the importance of enhancing students' communicative competence through social interaction so that they can engage in effective interaction in socially acceptable ways, which points to the developmental nature of identity. Heap (1992) elaborated on this point. By observing sequential arrangements across classroom turns-at-talk, Heap explained how and why a student's attempt to act within a turn-at-talk may be rejected by the teacher. The student is treated as a rule-breaker for misinterpreting the teacher's prior directive. Heap (1992) drew conclusions on what occurs and why it occurs. Speakers enact certain roles within contexts. For example, teachers hold the power to ignore or marginalize students by denying them speaking turns.

The three-move IRF conversational structure constitutes the primary interactive framework for teacher-student classroom exchanges, yet its limitations cannot be overlooked: (1) In IRF-structured classroom communication, teachers dominate discourse: they decide who speaks, what to speak about and speaking duration. Consequently, students get limited speaking opportunities, hindering the

development of their linguistic knowledge and competence. The rigid IRF structure, with teachers acting as authority figures, greatly constrains student active participation. (2) IRF was originally developed for analyzing English primary-school classrooms in the 1960s. Decades of shifts in teacher-student relations and teaching philosophies render this unchanged analytical model insufficient for contemporary analytical needs. (3) The model only analyzes utterances at specific hierarchical levels. Classroom speech takes diverse forms, yet IRF overlooks the multi-functionality of classroom language. Its narrow, rigid categorization fails to capture variations of utterances of identical forms shaped by different role relations and contexts.

CONCLUSION

Both interaction analysis and discourse analysis are quantitative research approaches. Equipped with explicit classification systems, they collect large volumes of classroom data, categorize and statistically process corpus, and identify correlations among variables. Their merit lies in large-scale samples and datasets, generating generalizable conclusions. Nevertheless, both suffer from rigid pre-set classification and statistical systems that cannot exhaust all linguistic phenomena and classroom activities. They overlook the dynamism and multi-dimensionality of language, so their conclusions are not fully conclusive. Given the multiplicity of classroom-discourse analytical approaches, combining quantitative and qualitative research enables more scientific and accurate investigations into the relationship between communication and language learning.

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