Pedagogical Perspective

2024, TSTT 2023 Special Issue, 62-73
ISSN: 2822-4841
https://doi.org/10.29329/pedper.2024.26

The potential of classroom video recordings in detecting the TA-to-pupil, teacher-to-TA and peer interactions: An overview[1]

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Article Info

Keywords

Video recordings,
TA-to-pupil interaction,
Teacher-to-TA interaction,
Elementary schools,
Flanders interaction analysis system

Article History

Received 17.02.2024
Received in revised form 08.04.2024
Accepted 17.04.2024

Article Type

Review Article

Abstract

Technology in the classroom comes in many shapes to differentiate instruction, create meaningful learning experiences, actively engage the learners, or inform about classroom exchanges. Video recordings are no exception. They facilitate the investigation of classroom interactions and the collection of audio-visual data that provide further insights into the teaching practice and classroom dynamics. Previous education research has almost turned a blind eye to uncovering the intricacies of elementary classroom behavior and interactions through the medium of modern technologies. Only scattered attempts have brought to bear the issue. To this end, this paper presents an overview of the salient role of digital technologies, mainly video materials, in clarifying the different interactions that take place within the confines of the classroom, including teacher-to-teaching assistant (TA) relationships, teacher-aide-to-pupil interactions, and peer-to-peer interaction drawing on an ongoing data collection from elementary schools around Hradec Králové (HK) region in the Czech Republic. Classroom recordings might be a fountainhead for detailed, reflective analysis, enhanced participant communication, and better teaching-learning practice if used properly. The first part of the paper reviews some related definitions based on several previous theoretical grounds. Then, it highlights the peculiar classroom interactions aided by various analytic angles. Deeply rooted in education research, these dynamics are indebted to the presence of audio and visual records. Most importantly, the paper is built around the research endeavor by researchers at the University of HK, mainly the Faculty of Education, that aims at getting down to brass tacks of TAs interactions by means of technological intervention in data collection (video recordings) and measurement (Flanders et al. – FIAS).

1 Introduction

The current overview is an attempt to unveil the subtleties of video-recorded data and their

[1] This research was presented as an oral presentation at the "TSTT International Conference Rethinking How We Train Teachers of Tomorrow" at Prague Karlova University on 15-17 September 2023.

Cite: Boufahja, I., Janet,W., & Martina, M. (2024). The potential of classroom recordings in detecting the ta-to-pupil, teacher-to-ta and peer interaction: An overview. *Pedagogical Perspective, TSTT 2023 Special Issue*, 62-73. https://doi.org/10.29329/pedper.2024.26

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potential to detect the main interactions within the boundaries of classrooms in several elementary schools. Despite the ethical concerns voiced in the past (Schmidt, 2019), data from video recordings have continued to inform research on pre-primary and primary schools, to be resources for teacher learning and part of formal or informal professional development opportunities. Through the lens of a video camera, multitudinous insights into how the curriculum is enacted, and various human classroom interactions have availed state-of-the-art classroom research. It is worth mentioning that the complex nature of the learning environments makes moment-by-moment judgments challenging and devotes equal amounts of attention to everything happening even harder. Reproducing the classroom dynamics via the help of technological tools can be a focal factor in directing and placing attention where it needs to be (Jacobs et al., 2010). Observing the recordings partakes in training the teachers to auto-reflect and notice, improving how the teaching assistants carry out their tasks, and enhancing all forms of interactions in the classroom. In this work, we draw on data gathered from typical Czech primary schools to answer the following questions:

- What are the distinct aspects of teacher-to-TA interactions?
- What is meant by TAs-to-pupils interactions?
- In what sense do the video recordings from primary schools contribute to education research in general and to the improvement of classroom interactions in particular?

1.1 Classroom interaction: A gold mine

Classroom interaction permeates class research as it comes in many shapes and wears multiple hats. It can be used as an umbrella term to encapsulate engagement, participation, on-task talk, off-task talk, uptake, classroom conversation, classroom management, classroom discourse, turn-taking, and turn allocation, to mention a few (Gardener,2019). According to Cazden's (2001) framework, classroom interaction plays a referential function of conveying the curriculum content, a social function of building and maintaining social relationships, and an ideational function of encouraging teachers and learners through discourse to converse and express their respective identities. Wagner (1994) simplifies the concept of interaction as the “reciprocal events that require at least two objects and two actions. Interaction occurs when these objects and events naturally influence one another”. It is, therefore, worth noting that the actors in the classroom, i.e., teachers, pupils, and teacher assistants, interact and build relationships that provide feedback and evaluation that are crucial to the overall teaching-learning process. Howe and Abedin (2013) initially brought to attention an inclusive approach to the phrase classroom dialogue as “all verbal exchanges where one individual addresses another individual or individuals, and at least one addressed individual replies” (2013, 326) and turned to analyze the dialogue as a major contributing factor to understanding the classroom dynamics. Attempts to delve deeper into this field have embarked on both qualitative and qualitative endeavors.

The last few decades of research on classroom T-A and S-S have witnessed an interplay of both analytical and quantitative in the form of field coding, whereby observations are enhanced within some predetermined systems of categories and qualitative approaches. However, more recently, the emphasis has been placed on the latter because of the objections to field coding being short of accounting for the temporal sequence of utterances. Ultimately, the research remains open to duality, and the preference for one model over another does not hold. Howe and Abedin (2013) propose a methodology that makes the comparisons across a wide range of contexts possible and encompasses the temporal aspect: sequences of interactions are considered, are valid for whole-class situations, allow relevant variables like gender, and the inclusion qualitative data and

contributes a visual aspect to T-S interaction.

1.2 Teacher-to-TA interaction

TAs or teacher aides are a vital part of the teaching-learning process in many countries. Schools in the Czech Republic did not flinch. They joined the bandwagon as put forward by the Education Act (Česko, 2004) and the Regulation on the education of students with special educational needs and exceptionally gifted students (Česko, 2016). TAs, also known as paraprofessionals, spend much time with vulnerable pupils and those with Special Educational Needs and Disabilities (SEND) (Blatchford et al., 2012). Mixed views have been reported regarding the liaison between the teachers. Bonding and resenting can be two opposing directions towards which the relationships between the teachers and the TAs are geared (Devecchi & Rouse, 2010). Given the modalities whereby the Teacher/TA bond navigates its way to the classroom, it could be useful for the pupils' motivation, learning, and engagement. This argument rests on evidence from research that underlines effective training, preparedness, adaptability, collaboration, and workplace well-being as major conditions for the T/TA interaction to thrive (Brock et al., 2015). Setting the boundaries right from the outset is the tested formula for the success of the classroom interactions between the instructors and the assistants, such as including in the lesson plan the respective tasks, amount of intervention, and roving briefs in order to keep pupils on task, clarify a point or answer a call of assistance. Farrell (1997) states that defining the responsibilities leads to the inclusion of all learners in the classroom and positive T/TA interactions.

Many studies and guides have tried to answer the loaded question about the inextricable link between teaching and assisting the teaching (Chambers et al., 2002; DfEE, 2000). Many teachers' assistants are but another piece of the jigsaw, and no classroom balance is possible without them, especially for children with disabilities. They express their willingness to make the best use of the support staff at their disposal, whose efforts taper the teachers' workload and lower their stress levels (Blatchford et al., 2012). Others resent having TAs in their classrooms, claiming that they interrupt the learning process and impinge on the pupils' independence as these young learners start living the classroom experience with the help and perspective of the TAs. In light of this view, the support the pupils receive from the TAs hampers their way towards their full potential. Therefore, it is fair to mention that the role of the teaching assistant heavily depends on the framework set by the teacher. Otherwise, the process will resemble a coasting bicycle creeping down the road (DfEE, 2000). The strands of support the teaching assistants provide depend on the school requirements, the differing situations, the lesson plans, and objectives. To illustrate, in whole-class teaching sessions, the class teacher trusts the T/A‘s ability to make the right judgments about who needs the assistance, when, and what type. TA-to-Pupil interaction:

The type and amount of support TAs give pupils are a moot point and a matter of contention. Concerns about learners' independence have come to the fore since the inception of TAs deployment in the classrooms. Pupil/TA interaction is, in many cases, shaped according to a clear-cut structure referred to as IRF (Initiation-Response-Feedback) (Sinclair & Coulthard, 1975). The term question can replace initiation while the response is the best guess the learner can come up with. The feedback is the reaction to the guess in light of the expected answer. A line or research details explicit and theory-informed cases of indivisible affinity between young pupils and teacher aides inside the classroom. However, at the crossroads, the role of the teacher emanates to lead the way and guide the classroom management process (Logan & Malone, 1998; Jerwood, 1999).

According to DfEs (2000), what makes the work of TAs worthwhile is their ability and readiness

to foster the participation, motivation, and scholastic performance of the pupils, to enable them to become more independent learners, and to help raise standards of achievement for all pupils. Simply put, the TA/pupil interactions focalise on what is best for the learners in terms of academic success and personality development. In the case of special educational needs and disabilities (SEND), learning support assistants (LSAs) interact with the learners for extended periods of time (Giangreco et al., 1998; Webster et al., 2010; Wood, 1998). This, in turn, accounts for less interaction with the teacher and a relaxed atmosphere, and a climate of trust hangs in the balance (Rose, 2000). It is undeniable that, like most interactions within the classroom setting and the school as a whole, the connection between the teacher and the TA necessitates ground rules, a clear framework, and clearly set parameters specifying its key characteristics.

The interplay between the teachers and the instructional assistants revolves around distinct aspects. In their systematic review, Jackson et al. (2021) identify the perceptions of ten teachers about their interaction with TAs. They classified these perceptions into four main areas: roles and responsibilities, planning and pedagogy, leadership, and interpersonal relationships. As per the roles and responsibilities, they are crucial and determining factors in the equation. They create the balance needed in the classroom. Failure to strike this balance inflicts detrimental effects not only on the communication between both extremes of the relationship but also on the overall classroom dynamics. Effective collaboration hinges on recognizing strengths, weaknesses, and individual contributions. Teachers are primarily at the forefront of curriculum design, the leading edge of instruction delivery and student assessment. They cater to direct instruction, facilitate their learning activities, and create a classroom environment conducive to learning. TAs, on the other hand, typically have a stake in a broad spectrum of tasks. They provide one-on-one or small-group support to students with special needs (Butt, 2016; Butt, 2018). In this setting, they are a 'solution to inclusion' (Rutherford, 2012, p. 760). However, the contribution of TAs is not limited to inclusive environments as it goes beyond these borders to reach mainstream education (Opoku et al,2024). Since factors like school size, student population, and individual teacher needs are considered, roles of the TAS, also called shadow teachers and resource teachers, might vary considerably, ranging from assisting with classroom management and classroom routines, supporting preparation of learning materials and resources (Opoku, 2022a, 2022b; Vogt et al., 2021; Webster et al., 2011), keeping an eye on student behavior (Jardi et al., 2021; Pinkard, 2021; Zhao et al., 2021) to facilitating differentiated instruction. Another layer to the connections between the team players lies in fostering interpersonal relationships. By reducing teacher stress levels and alleviating the overwhelming workload (Blatchford et al., 2012; Giangreco et al., 2011; Lacey, 2001; Rose, 2020; Vogt et al., 2021), a collaboration and trust relationship is built between the teacher and the TA. While it may be true that the controversy reported in the literature about whether the TAs are qualified enough to have their spot in the classroom (Butt, 2016, 2018; Giangreco, 2013, 2021; Opoku et al., 2024), the contributions of this workforce still carry weight in the classroom. Along with the key variables pertaining to the concerted efforts of the teachers and TA, peer-to-peer interactions are the cornerstone of a successful classroom.

1.3 Peer interaction

With its various facets of acceptance and rejection, peer interaction has occupied a big chunk of classroom action research. Children contribute to one another's development and alter and influence each other's behavior through different social experiences. Furthermore, a line of research emphasizes peer feedback as a source of knowledge (Foster & Ohta, 2005; Ohta, 2001;

Storch, 2002). Even if unintentional and without corrective intention, observing peer interaction plays a pivotal role in classroom research. The learner is at the center of the teaching-learning process, and interacting with learners through pair work, group work, or whole-class discussions can be decisive in directing the lesson toward its objectives. The Vygotskian sociocultural perspective foregrounds the necessity of social interaction for cognitive development. It is only within "the zone of proximal development" (ZPD) that learning takes place, and this ZPD means that an array of tasks can be performed by a learner with assistance from a more knowledgeable person. Ellis (1994) suggests that interaction between learners facilitates the exchange of information and impedes communication failure. The classroom becomes more dynamic and student-centered by proselytizing conversations and exchanges between the different participators in the learning process. Engaging in conversations allows sharing of ideas and experiences, fosters critical thinking skills and an inclusive learning environment, and promotes their understanding of the subject matter. These exchanges provide the teachers with invaluable insights into the different learning styles, facilitating tailoring their lesson plans and teaching methods.

1.4 Classroom interactions: A glimpse of the past and an eye on the present

The quality of interactions within the borders of the classroom has drawn much attention and yielded differing results. An impressive array of tools that are harnessed to measure the dimensions of interactions have been highlighted in the literature. One such tool is The Classroom Assessment Scoring System (CLASS), developed by Robert Pianta at the University of Virginia and used in research to record T-S interactions (Domitrovich et al., 2009; Longobardi et al., 2020; Stipek & Byler, 2004). The tool encompasses three main categories: Emotional support, classroom organization, and instructional support, with each domain capturing further details about teachers' interactions with learners.

Although Longobardi et al. (2020) admit to the limited applicability of this observation instrument, several studies purport its validity in analyzing classroom interactions in the preschool and primary school context (Cadima et al., 2010; Leyva et al., 2015; Pakarinen et al., 2010). Further, as technology continues to take leaps, modeling classroom interaction with direct observational methods is undoubtedly making good use. The social network analyses witness this technological progress, hence the subsequent projects Work Activity Observer App for the iPad and the HART app by the trailblazers Hansberger (2012) and Baker, Salvi, Van Velsen, and Whiting (2013). Bokhove (2016) also argues the importance of dynamic social network analysis (SNA) in modeling and exploring in-class interactions, especially "verbal utterings". The research project builds on six videos from the TIMSS study (Hiebert et al., 2003) and observations of classrooms in South England and harnesses Lesson Note which is an iPad application observing the classroom interactions.

In another study grounded in the Complex Dynamic Systems Approach, Zeinstra et al. (2023) specify the multilevel and state space grid analyses of videotape observations as an alternative to record the states viz. the real-time behaviors and patterns of interaction (Hollenstein, 2007, 2013; Pennings & Hollenstein, 2020). Similarly, Sadak (2023) explores the potential of audio recordings and field notes in detecting the negotiation mechanism and its reflection on the communication between the actors in the classroom. The critical ethnographic research design approach unveiled contractual and normative types of relations that were vital for the learning-teaching experience. The normative relationships rested on the norms that emanated from the classroom's cultural

sphere. In contrast, the contractual relationships were built upon the syllabus contract that marked out the roles of the students and the instructor. In tackling the same issue, Taylor et al. (2023) conducted a cross-sectional study that highlighted peer engagement and teacher-child interaction, focusing on pre-kindergarten classrooms. To measure the quality and quantity of interaction, the researchers harnessed the bifactor analytic approach to a sample of 714 children from 214 classrooms.

By all means, the above-mentioned studies have provided ways to investigate the multi-layered and multi-dimensional interactions that take place in the classroom. The question remains to be answered: How many of these tools are adjustable to fit in different contexts? Are their results generalizable to Czech primary schools? The following section will attempt to address this last question by focusing on integrating video recordings to capture the varying aspects of classroom interactions.

1.5 Classroom recordings in the elementary schools of Hradec Králové

The role of the TAs has undergone major shifts over the years, and the requirements for deploying them in the education area have been drastically affected. The support staff has made up part and parcel of the scholastic reforms in many schools worldwide, and the Czech Republic is one of them. They first arrived to promote inclusion in mainstream schools and worked hand-in-hand with teachers in different settings and learners from various backgrounds. Video recordings from a cornucopia of schools under the aegis of the Czech Republic educational system have given grounds to this overview, chiefly primary schools in HK, the capital of the HK Region. Measuring classroom interactions in primary education provides insights and answers to questions about classroom dynamics and the uptake, which refers to how much knowledge is grasped, the activities, the plan, and the objectives. To obtain generalizable and reliable outcomes, researchers must pick the appropriate tools and techniques to collect the data and undergo statistical analysis. Indubitably, these findings have their implications and reverberations on classroom practice.

1.6 Implications of video materials for classroom interaction via FIAS

Technology has gone above and beyond in serving the educational arena, be it primary, secondary, or tertiary, and schools have searched high and low for these aids to be implemented and harnessed. Technological tools in education and for education are equally important as they lay the practical basis for umpteen school subjects and curricula (Toma et al.,2023). Worries about these technologies taking over the roles of teachers have been deterred and disregarded by the advantages brought to the teaching practice. Apart from that, technology goes hand in hand with education research. Various research documents have stated that recording classroom activities provides educators and stakeholders ample opportunities for data collection, transmission, storage, teacher learning, and research projects (Seidel et al., 2011; Tripp & Rich, 2012).

The shift in focus stands out in this paper, which introduces a project by researchers at the Faculty of Education, University of Hradec Kralové (UHK). Unlike a prior line of research that emphasizes the key contribution of several affordances of video in the development of classroom observations and student thinking (Barnhart & van Es, 2015; Star et al., 2011), the present work is an attempt to explore a different facet of implementing video recording equipment for classrooms: the interactions that shape the role of the teaching assistant. The early days of classroom recordings witnessed the intervention of meticulously planned Video Enhanced Reflective Practice (VERP) programs in the UK, which allow reflecting on weaknesses and strengths, considering ways of

improving things in the classroom, and developing interactional skills of learners and key adults. These research-based projects, developed from Video Interaction Guidance™ (VIG) (Kennedy et al., 2011), apply VERP, are based on a meta-analysis of video feedback methods, and cater to the needs for professional development (PD).

Fast forward, the projects continued to be more inclusive and to stretch their impacts on different countries, including Czechia. What set out as a PD project targeting strategies for improvement is, in the next breath, extended across aspects of communication and areas of interactions between teaching assistants, main class teachers, and learners. The corpus for the forthcoming project has been gathered via video recordings from mainstream schools and schools for SENs. This project aims to collect corpora on subjects different from HK primary schools between the years 2022 and 2023. The researchers at UHK will use the Flanders Interaction Analysis Technique (FIAS), a technique consisting of objective and systematic observation of the classroom events useful for capturing qualitative and quantitative dimensions of sets of verbal behavior in the classroom. Tichapondwa (2008) contends that Flanders' interaction Analysis focuses on capturing, identifying, categorizing, and observing in-class interaction; hence, the significance of this technique in breaking down or codifying the interaction into the learner's talk, teacher talk, and silence. Measuring the corpus not only clarifies the big picture without getting caught up in the details, but it also unveils the challenges, hurdles, and shortcomings.

The current project highlights the significant role of pedagogical communication in the educational process. Špilka & Maněnová (2014) put together a simple definition of pedagogical communication as "a specific form of social communication [that is tied by distinctive rules] and takes place between the participants of the educational process and relates to a specific pedagogical situation (p.2)". Therefore, pedagogical communication can make or break the teaching-learning experience, and tracking the progress or the lack thereof through video recordings of classroom dynamics might help maintain the multiple interactions. Extending the FIAS technique to measure degrees of interaction and involvement, as well as motives and aspects of communication of the TAs, is the crux of this project. Using FIAS, Martina et al. (2021) case study analyses senior and novice teachers' direct and indirect talk in teaching students. The highlights of this research endeavor included the teacher's characteristics, silence and confusion, clear articulations, and talk time. The findings entail 40.45% and 28.35%. of indirect and direct talk, suggesting that the novice teachers were more drawn to indirect talk and lecturing. Another important finding pertains to senior teachers resorting to 40.45% indirect and 28.35% direct talk. Although the focus is different, the use of FIAS is a linchpin that relates directly or indirectly to chunks of what our current study aims to consider. What is worth noting is that the results of this interaction analysis study and similar studies can have short-term and long-term benefits. Nevertheless, it is safer to consider the potential pitfalls and shortcomings.

At this point, dwelling on the implications of gathering the corpus on classroom interaction patterns via video recordings is paramount. It provides research and researchers with insights into the common practice of the classroom. Areas for improvement and suggestions for adjustments to the teaching methods and strategies can be identified. Additionally, the teachers can use the recordings to reflect on and refine their teaching by improving the questioning techniques, promoting more active learning environments, and enhancing lesson planning skills. They also stand to gain in terms of differentiated instructions. The teachers can see through the varying needs of the learners and their level of engagement and tailor their instructions accordingly. Consequently, I will share the recorded classroom practices and teaching styles in continuing

professional development (CPD) workshops and training. can be fruitful to both seasoned and novice teachers. That being said, a look at the flipside is mandatory, as the practice of recording the classroom can bring anxiety levels in teachers to a peak. Considering the uniqueness of every classroom meeting, it is vital to state that the recordings might not offer a holistic picture of the classroom culture due to limited or unreliable technology. The informed consent might add another challenge to recording classroom interaction. Privacy concerns can be raised, implying that extra attention should be allocated to schools' policies.

Grounded in Ethnomethodology, a sociological approach developed by Harold Garfinkel in the 1960s, this paper aims to fathom the intricacies behind classroom interactions that ultimately shape the teaching-learning environment. The framework also argues that social meanings and orders are continually scaffolded and negotiated in interactions rather than preset and predetermined, a tenet that challenges traditional sociological assumptions and concepts. Building on these insights from Ethnomethodology and contributions from pedagogical research, this overview puts the theoretical bedrock for a project in motion. Maněnová et al. (2024) have dealt at length with the scales, methodological scope (e.g., dissecting the activities around which observations are set), sample, and target setting. They highlight the prime role of FIAS and Specialized software Codenet in data collection and analysis.

2 Conclusion

The success of classroom interactions is bound by the context, the surroundings, and the roles of the participants. Lack of any of these components is a leading factor to detrimental effects on the delivery of the lessons according to a plan and potential pitfalls of the interactions between class teachers and TAs who are initially brought together to develop an inclusive school ethos; hence the fiasco in supporting the learning of primary school pupils. In this way, neither the passive presence of the TA within the room nor the over-indulgence of the pupils can create a comfortable climate for learning. Instead, a combination of increased independence on the side of the learners and willingness to support when the need arises, at any time during the lessons, is a recipe for a successful interactive classroom and effective lesson delivery. Inasmuch as joint planning and evaluation are taken into consideration, respect and trust relationships are built between the T/TA. This means building a bridge towards the smooth running of the lessons and further learning. Since it found its way into the educational system, technology has come in handy to keep track of what is going on in the classroom. Video recordings in the classroom have altered the approach to professional development and made the interactions that shape the teaching-learning process, mainly TA-pupil, TA-teacher, and peer-to-peer relationships, a subject of reflection and change. The corpus from these recordings, which is the core of the present project, helps identify the gist behind the classroom interactions. By using the measuring technique FIAS, the researchers will be able to work on the corpus to uncover all sorts of interactions the TAs, teachers, and learners undertake in the classroom and contemplate ways of adjustment, change, and improvement. The learners' passive or active roles in the classroom, availability or lack of real-life exchanges and group-work activities, shortage or profusion of higher-order thinking skills in the learning, and types of exchanges between the different players are moot points that beg replies. These suggestions can undoubtedly guide future research endeavors in different contexts.

5 Statement of Researchers

5.1 Researchers contribution rate statement

The authors equally contributed to this overview.

5.2 Conflict statement

The authors declare no potential conflicts of interests

5.3 Support and thanks

We extend our gratitude to the researchers at the University of Hrades Kralové who are working towards the completion of the current project and to teachers and teacher-assistants in the multiple institutions around the city of HK included in this endeavor. Without their collaboration, this paper would not have come to fruition.

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