

Observational Instrument for Associate Teacher Analysis into Pupils' Involvement in Classroom Dialogue Based on Research: T-SEDA

Dr. Pragya Sharma

Professor, Bhabha University, Bhopal, (M.P), India

ABSTRACT

In this paper we examine two systematic observation methods intended to be used by pre-service and in-service teachers to help increase their awareness of children's participation in productive classroom dialogue. We identify the affordances of these methods for supporting teachers' reflective practice, focusing in this case on students' equitable participation in science group work activities. This involves the use of Teacher-SEDA (T-SEDA), a sub-scheme of SEDA (Cam-UNAM Scheme for Educational Dialogue Analysis), which was empirically trialled by a mixed group of researchers and teachers, using video-recordings from primary science classrooms. The T-SEDA trials reported in this paper compare a 'simulated live' approach based on time-sampling techniques, with a 'follow-up analysis' approach, which uses audio-recordings and transcripts. The findings suggest that using either technique regularly can aid teachers in noticing classroom events and adjusting teaching accordingly. The 'live' coding approach appears to be the more practical method that teachers could use to audit the development of classroom equitable participation. However, the follow-up analysis emerged as a more informative approach, shedding light on more ambiguous cases of relative participation.

Keyword : - Analytic tool; classroom observation; Educational dialogue; Teacher inquiry; Reflective practice.

1. INTRODUCTION

The Teacher Scheme for Educational Dialog (T-SEDA) asset pack has been intended to help you in creating high caliber instructive exchange in your study halls, in entire class talk and between understudies working in gatherings. It is for essential (basic) and auxiliary school experts to use in any branch of knowledge for expert advancement or as an exploration instrument. It might likewise be helpful for understudies to screen their very own cooperation in exchange, and it could be stretched out to apply to different discoursed in schools, for example, educator gatherings. You can adjust the materials to the particular needs of your own setting and understudies.

Instructors constantly consider study hall occasions, anyway they once in a while have the open door for fine-grained efficient perception.

The T-SEDA pack offers you three instruments that have been intended to help orderly perception and point by point reflection. They depend on the most recent research discoveries about the significance of producing high caliber instructive exchange to affect youngsters' reasoning and achievement.

Device 1 - A Self - Audit Grid

Device 2 - A Reflective Cycle of Classroom Inquiry

Device 3 - A Coding Scheme that is explicitly intended for exploring study hall exchange

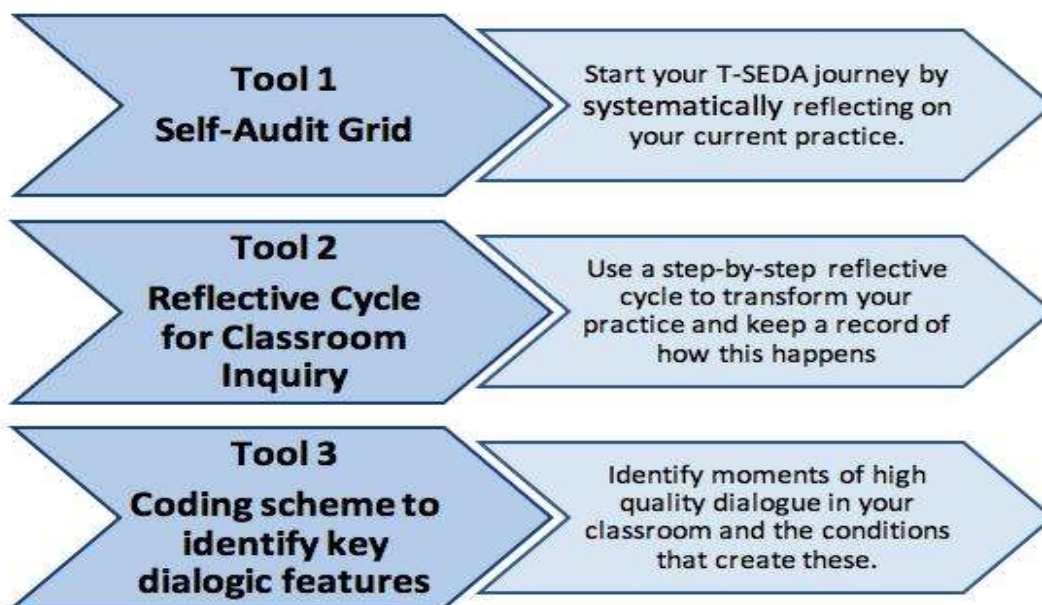
The group that is creating T-SEDA incorporates rehearsing educators who are associated with trialing the materials in their schools. It is trusted that creating and utilizing T-SEDA will bolster sharing of elective methods for

gathering proof about the nature and results of study hall exchange. This may incorporate its potential uses for some, instructive purposes, including the advancement of information and comprehension over the educational plan, the upgrade of homeroom connections and value, and the evaluation of, and for, understudy oracy and learning.

Educators in a few nations and working with various age gatherings have now evaluated the pack and their input has refined it.

The effect of scholarly instructive research on training practice is by all accounts disappointingly low (Admiraal et al. 2017) with expert analysts and instructors evidently having separate motivation. Strikingly, with the foundation of a 'Contracted College of Teaching' in the UK (Hazel 2017), there is an expanding drive for educators to move toward becoming examination locked in. In spite of this, there is a progressing dissimilarity between the ranges of abilities, settings and encounters of analysts and instructors, which should be explored to empower this expect to be met. The principle purpose behind this strain might be the way that instructive research has generally encircled instructors as 'clients' rather than 'makers' of learning (Gore and Gitlin 2004). McIntyre (2005) has proposed an elective elucidation, considering the absence of effect regarding contrasts in the kinds of learning that specialists and professionals will in general use and produce. In his view, analysts support general, increasingly unique learning, though professionals produce exceptionally contextualized and connected information important for ordinary practice. Beginning from these 'boundaries' he proposes a continuum, whereby these two kinds of information are brought into discourse by complex procedures that include instructors' drawing in with research find-ings, through different methods, for example, activity look into. By being effectively included specialists can further build up their expert aptitudes and basic reflection (Admiraal et al. 2017), which will encourage evolving practice. Scientists additionally gain from dynamic research commitment with specialists. This common adapting needs a concentration for sharing various types of learning and comprehension. We propose in this paper the synergistic improvement of research apparatuses holds guarantee for scientists and experts to co-develop and apply valuable knowl-edge, considering logical variables. This article delineates a joint specialist professional exertion to structure and preliminary T-SEDA, an instructor arranged asset dependent on research (see Section 2.1). T-SEDA is an activity explore, self-request instrument that can be utilized for any reason identified with the examination of discourse among instructors and students in school. In creating T-SEDA, we expect to bring specialists' and experts' knowl-edge and apparatuses closer together, crossing over the 'learning hole' (McIntyre 2005). In this preliminary, we consider one of the potential employments of T-SEDA, in particular for checking understudies' cooperation in science groupwork. For this situation, the attention is on the degree to which the youngsters seem to accept up comparative open doors to add to dialog and react to one another, without the deliberate minimization or rejection of a few. This is certifiably not a straightforward matter of taking note of whether there is equivalent turn-taking between kids, however of advancing their gainful commitment in responsive dialogic connection. With expanding proof that homeroom learning is in a general sense group and social (for example Mercer 2013), guaranteeing open doors for understudies' joint cooperation in the co-development of learning ends up fundamental. A few kids may stay calm on specific events or may con-tribute to learning in different ways (for example dealing with the assets for a gathering task). After some time, be that as it may, the making of chances and backing for all youngsters to take part can be viewed as a condition for creating gainful discourse and learning in class. This points out for a scope of organiz-ational, academic and social elements, especially with different understudy gatherings (Baines, Blatch-portage, and Webster 2015). It is significant, along these lines, that instructors are furnished with a scope of devices that will enable them to screen their very own study halls, and think about understudy support as a major aspect of their activity look into situated practice. Including live coding, it is conceived that this device could be utilized by instructors all the time to help their investigation into study hall learning and educating. Receiving a methodological per-spective, this paper writes about the trialing of T-SEDA, utilized in this case to basically assess study hall practice as far as evenhanded support. Moreover, the affordances of 'live' perception for instructors' intelligent request are contrasted with a strategy for additional top to bottom investigation, which included coding transcripts of sound recorded information. This methodological trialing prompted reflection on opportu-nities and difficulties made by joint effort among specialists and educators, and these reflec-tions are likewise detailed.

For experienced and unpracticed instructors alike, network drew in educating can exhibit one of a kind and some of the time troublesome difficulties for which many are not prepared. In any case, when these difficulties are met and survive, network connected with educating permits understudies, personnel, and networks to encounter significant development.



2. CHALLENGES AND ITS SOLUTIONS

There are many challenges for the educators which are described below with their possible solutions (Joe Brandy 2015).

a) Time Commitment

Of the many concerns that educators express about community engaged teaching and research, possibly the most frequent is that it takes a lot of precious time. Indeed, it takes significant amounts of time to develop a productive working relationship with a community partner, to design projects that meet both learning and community goals, to manage the logistics of the projects as they unfold, to engage students in special skills training, and to reflect on the meaningfulness of projects with students.

Solutions:

1. Centers for Teaching and Learning

Centers for teaching and learning offer many resources to assist you in efficiently planning community-based courses that have a high impact on students and the community. Because each course and community project can be unique, the most useful service is usually a one-on-one consultation. However, we also offer workshops on community engaged teaching and we host a working group on these pedagogies for experienced faculty. Here at Vanderbilt's Center for Teaching, the staff has extensive experience with every phase of course planning and thus can help to make your community-based teaching successful. Please call the CFT or write Joe Bandy to schedule an appointment.

2. Public Service Offices

Rely on community service offices to bridge the gap between campus and community. Your fellow educators and your institution's public service centers can help you to develop meaningful partnerships more efficiently. Indeed, peers in your department and the staff of organizations such as Vanderbilt's Office of Active Citizenship and Service (OACS) or the Center for Nashville Studies may have established community partners and project ideas to suit a wide variety of learning objectives. They therefore can help make the planning much easier and help establish a positive working relationship between you and your community partner. They also may be able to assist with services such as campus vans or other logistical necessities that your course may require.

3. Community Partnership Databases

Increasingly, many educational institutions are developing online databases that faculty, students, and community organizations can use to register needs or ideas and develop partnerships. At Vanderbilt, multiple sites may be of service as you identify possible community partners:

- Office of Active Citizenship and Service (OACS)
- Office of Community, Neighborhood, and Government Relations
- Community Research and Action (CRA) Program and its community engagement projects
- Institute for Clinical and Translational Research (VICTR) Research Match Program

4. Community Resources

Likewise, your local community or government may have organizations that facilitate civic action, from volunteerism to campus partnerships. They are likely to know of a variety of community projects that might fit with your research or teaching interests. Please see the Vanderbilt and Community Resources links below for more information.

b) Ensuring Positive Community Impact

What if your community-based project with students turns out to be of limited impact in the community? For many educators this is a significant concern since we would like to have our community partnerships be mutually beneficial and because we want our students to feel effective in their work.

Solutions:

1. Assessing Community Need

To ensure a project has significant impact for a community, it is important to address a community's most urgent needs. Therefore it is important to rely upon well-respected community leaders and organizations for an assessment of its needs and for greater background on the issues the community faces. This should be supplemented with academic or government research that may be available about the community. From these needs assessments, community goals should become clearer, which in turn will allow project ideas to emerge more easily. Again, public service offices or experienced faculty may have done this work already, so please rely upon them.

2. Building Trust

In many campus-community, or "town-gown," relationships there are histories of miscommunication, neglect, distrust, and even conflict. It is helpful to be aware of these histories and the dilemmas they pose for new campus-community partnerships as you enter into dialogue with community members. Even when there are not histories of conflict, there can be an absence of communication that may cause each side to suffer misunderstandings about the other. Open, supportive communications are therefore essential to fostering mutually beneficial partnerships. Also helpful are public conferences, guest lectures, community talks, campus or community tours, and other exchanges that serve to build understanding and trust. Lastly, it is important to rely upon those bridge-builders between your campus and the community, whether they are community members with ties to the campus or staff and faculty who have been active locally.

3. Creative and Flexible Project Design

When designing a project with a community partner it is important to balance both community engagement and student learning goals equitably. This might involve some creativity and flexibility on both sides. Educators need to be flexible in adapting the learning goals of a course to the practical needs of a community partner. Likewise, community partners may need to be flexible in choosing projects that will provide meaningful learning experiences for students. Open and supportive communication, mutual understanding, and trust are invaluable in this process.

4. Setting Realistic Project Goals

In defining a mutually beneficial project, it is important to set learning and community goals that are manageable for your students within the time frame of your course. Further, it is important to communicate these goals clearly to your students and ensure they have a clear sense of what will be expected of them at every step in the course.

c) Ensuring Student Learning

Another common worry is that students will not be prepared well enough to complete a community-based project successfully and that this will limit the learning experience as well as fail in helping their community partner. While failure can happen in any teaching setting, the obligations educators and students may feel to community partners can make that prospect more worrisome. It is therefore important to ensure students have all the preparation necessary to succeed in their projects and to benefit from the learning experience that community engagement provides.

Solutions:**1. Content**

For the greatest synergy between learning and service tasks, and for the greatest chance of project success, it is important to weave the project thoroughly into the content of the class. It is therefore helpful to provide students with course content – readings, lectures, discussions – that develop their knowledge of community issues and their understanding of relevant theoretical perspectives. When possible, it is helpful to have community partners suggest useful readings, provide a guest lecture, or participate in class dialogue.

2. Orientation to the Community Partner

Students may benefit from an orientation to the project and the community with their community partner, whether it is off campus or in a guest lecture. This helps to provide students with an introduction to the community and the project goals, and better understand the synergies that exist between service and learning goals. It also can help the students to make the community partner less abstract and enhance their sense of accountability to the project, serving as an important motivation for student performance throughout the course.

3. Skills Training

If students require skills training that will be helpful in the project – such as interviewing or film-making, just to name two – it is important to set aside time for this inside or outside of class. In these trainings it may be helpful to rely upon colleagues or support staff that has the relevant skills.

4. Ethics Training

It is always crucial to ensure students do no harm to their partners or those they represent. This may require special readings and discussions about potential ethical problems associated with your project and how students should avoid them. When possible, it is useful to have community partners participate in these discussions to help sensitize and inform students, and to enhance mutual trust.

In either of these cases it is important to see these as teaching moments, both for students and for the community partner. Research or service projects conducted in the context of real world constraints may indeed surface unforeseen issues that can be the subject of intensive reflection and critical analysis. When students have the opportunity to problem solve collaboratively to address these issues, they may learn even more about the complexities of real world contexts beyond abstract course content as well as valuable leadership skills of adaptation. However, for these moments to have the greatest educational and community impact, educators need to have the courage to teach in the context of real world complexities and challenges.

3. CLASSROOM DIALOGUE FOR TEACHER INQUIRY INTO PUPILS' PARTICIPATION**3.1. Classroom dialogue and the question of equitable participation**

Recent British Academy funded research conducted over 3 years by large collaborating teams in Mexico and UK developed and tested a theory-informed coding framework for systematically analysing classroom dialogue across a wide range of educational settings, namely the Cam-UNAM Scheme for Educational Dialogue Analysis¹ (Hennessy et al. 2016). SEDA comprises 33 'communicative acts' (Hymes 1972) identified at the utterance level by their interactional function. These are grouped into 8 clusters (see Table 1), each with its own descriptors and illustrative examples, reflecting the key dimensions of dialogue that the team perceived to be represented in the literature. The original research team found that this clustering increases practicability. Collapsing the numerous individual codes into 8 broader categories of related acts allows for easier quantification because codes within clusters are mutually exclusive; it also affords much higher inter-rater reliability and allows users to work at a higher level of granularity, rendering decisions between categories far easier and speeding up coding. Having developed the full framework mainly for researcher use, sub-teams of researchers and teachers from the UK and Mexico decided to go further and adapt it for use by teachers conducting research in their own classrooms: the 'Teacher Scheme for Educational Dialogue Analysis' (T-SEDA). T-SEDA is being developed as a professional development pack for teachers, as well as a research instrument (available at <http://tinyurl.com/BAdialogue>). It is intended primarily for teachers' use as a

tool for identifying and enhancing the nature of dialogic interactions in the classroom, both teacher-student and student-student, and charting change. It is also intended for use by in-service teachers for self-reflection, by teacher professional groups as a basis to discuss each other's practice, or by teacher educators as a tool for self-reflection for their students. Perspectives on dialogue centre around the notion of a difference between two or more perspectives and the co-construction of new meanings that emerge through the gap between those perspectives (Bakhtin 1981). In the dialogic classroom this involves teachers and learners cumulatively building on each other's ideas during extended turns; being receptive to new ideas, posing open questions and speculating; making reasoning explicit; justifying, coordinating and critically evaluating diverse ideas (e.g. Alexander 2008; Mercer and Littleton 2007). Dialogue and co-inquiry may be sustained within or across lessons. Most of the work in this area has roots in sociocultural theory, based on the ideas of Vygotsky (1978), and construing learning as a cultural process enacted through interactions with others (Mercer and Howe 2012; Wertsch 1991). One of the purposes that T-SEDA could be used for is monitoring students' equitable participation. The argument for students' equitable participation in classroom dialogue has two roots relating to social justice and learning. The social justice premise is that all students have a human right to be heard in class, to make their own valuable, and valued, contributions to classroom dialogue and learning while acknowledging other voices that express other views as part of the ethics of plurality (Fernández-Cárdenas 2014). In addition, the fundamentally collective nature of classroom learning calls for all students to have the opportunity to be actively involved in interaction, collaborative activity and classroom talk on the well-established grounds that learning occurs socially through the appropriation, co-construction and transformation of each other's knowledge and thinking (Mercer 2013). For these reasons, as Shepherd (2014, 79) notes, 'when some students are prevented from contributing their ideas, everyone's learning is potentially diminished'. The notion of equitable participation itself shifts the focus from identifying the 'special' learning needs of some students to including all students as learners (Florian and Black-Hawkins 2011). It has been recognized that this may require some teachers to be challenged about their own out-looks through critical self-reflection on underlying inclusive values (Carrington et al. 2015). An intrinsic challenge for any teacher is to balance attention between individuals, groups of pupils and the whole class. Dialogic engagement will not be exactly the same and 'equal' for each pupil in individual lessons, but a teacher may seek to establish equity over longer periods of time, valuing what each child has to offer, creating opportunities for participation and responding contingently to different needs and interests. Researchers have investigated equity in students' participation in whole-class and group dialogue from different perspectives, including: analyses of teachers' discursive strategies for allocating conversational turns (Shepherd 2014); symmetries in talk within student groups (Rajala, Hilppö, and Lipponen 2012); ethnographic and narrative inquiries into students' contributions to classroom dialogues (Clarke 2015); interventions designed to shift the traditional teacher domination of classroom talk (Hargreaves and García-Carrión 2016); children's co-regulation of collaborative groupwork (Kershner et al. 2014); and communicative practices for the inclusion of students identified with disabilities or special educational needs (Berry 2006), to name a few. In addition to the familiar classroom observation methods of diary notes, time sampling, video and audio recording, and so on, there are also several interesting new technology tools for researchers and teachers, such as the 'Equity Maps' app (<http://www.equitymaps.com/>). This enables teachers and students to trace contributions to discussion and group activity, and facilitates reflective discussion when the mapping is played back. The active promotion of equitable participation requires teachers to engage in continuous monitoring, reflection and iterative refinement of pedagogy akin to action research for inclusion (O'Hanlon 2003). Our trialling of T-SEDA in relation to students' equitable participation in dialogue was based on the assumption that a systematic observation approach could lead to distinctive professional insights and starting points for teachers to develop further awareness, skills and confidence as dialogic and inclusive practitioners. In piloting T-SEDA, the complex, real-world considerations about equitable participation in groupwork, focusing particularly on children's dialogic contributions to talk, were seen as ideal for testing and challenging the materials to contribute in a tricky area that is of significant educational and social importance for teachers and students.

Table 1. SEDA clusters.

Cluster name	Brief description
I: Invite elaboration or reasoning	Invite others to build on or respond critically through explanation, justification, argumentation, analogy, use of evidence, speculation
R: Make reasoning explicit	Make reasoning explicit through explanation, justification, argumentation, analogy, making distinctions, use of evidence, exploration of possibilities, prediction, speculation, hypothesizing, extrapolation
B: Build on ideas	Building on, adding to, reformulating or clarifying one's own or other's contributions
E: Express or invite ideas	Make a relevant contribution not covered in other categories (e.g. short responses to closed

	questions), or invite others to express opinions or ideas without reference to prior contributions, ideas or artefacts
P: Positioning and coordination of ideas	Take a position/ stance in the dialogue by challenging or evaluating different ideas, stating (dis)agreement, proposing resolution or synthesizing ideas
C: Connect	Make explicit links to ideas / arguments / artefacts / prior contributions or knowledge from contexts beyond the immediate dialogue or make trajectories of learning explicit
G: Guide direction of dialogue or activity	Take responsibility for shaping and directing dialogue or activity, including encouraging student-student dialogue, offering thinking time, providing informative feedback or other scaffolding strategies
R: Reflect on dialogue or activity	Explicit self or group evaluation or metacognitive reflection on purposes/ processes/ value/ outcome of learning or activity or invitation to engage in this

3.2 Reflective inquiry, action research and professional growth

Reflection and reflective inquiry are considered to be important methods for teacher professional learning, improving classroom practice and tackling educational and social concerns in school. Despite their importance, there is great diversity in their definitions (Lyons, Halton, and Freidus 2013) deriving from key scholars in the field of educational research. For instance, in his definition, Dewey (1933) emphasised scientific thinking which involved ‘giving serious and consecutive con-sideration’ (8) to a subject, whereas Schön (1983) stressed reflective thinking that takes place ‘in’ and ‘on action’, or else during or after teaching. More recent scholars (e.g. Lyons, Halton, and Freidus 2013) define reflective inquiry ‘as an intentional act of mind’ (165) that engages a person in the examination of a situation in order to develop their understanding of its meaning and shape adequate action. Applying this definition to the context of the present study, teachers engage in the examination of their students’ equitable participation in dialogue so that they can shape a plan of action. In teachers’ professional learning, therefore, reflective inquiry becomes central to action research. Teachers’ engagement in and with research has a long tradition in the UK and internationally. While information about teachers’ perspectives on research is somewhat limited in the literature, one finding is that teachers trained to use inquiry understand the interwoven relationship of inquiry and teaching, that it encourages a focus on learners, that it develops and deepens teachers’ metacognitive knowledge and enables them to respond thoughtfully to diagnosed student need (Bennett, Athanases, and Wahleithner 2016). Another general finding is that engaging in and with research is closely associated with the extent to which the professional context supports practitioners’ reflection and affords agency (Leat, Reid, and Lofthouse 2015). This process requires progression over time. This may be not so much to do with the need to develop specific research skills since many teachers engage in research projects during training, with useful contributions to knowledge (Kershner and Hargreaves 2012; Medwell and Wray 2014). The challenges of conducting classroom-based inquiry are associated more with the process of gaining the necessary professional expertise and confidence to ‘interrupt’ routines and critically examine evidence of student learning, moving beyond the early stages of ‘trying to simplify classrooms and make them more predictable and manageable’, even with emotional cost (Leat, Reid, and Lofthouse 2015, 275–6). Moreover, Bennett, Athanases, and Wahleithner (2016) report that although teachers are fully aware of the benefits, they struggle with the shift from high quality reflective practice to working with data that can be ‘measured and visualised’. Teacher action research typically involves small-scale, qualitative research, which aims to describe, understand and evaluate teachers’ own teaching, employing different methods (Admiraal et al. 2017). In that sense, it is highly contextualized. It focuses on increasing understanding of a specific context by tackling problems and improving practice, contributing therefore to pro-fessional learning and the development of knowledge. Clarke and Hollingsworth’s (2002) Intercon-nected Model of Professional Growth relates teachers’ reflection to professional growth. It considers changes within four domains:

a) personal domain (knowledge, beliefs and attitudes),

b) domain of practice (professional experimentation), c) domain of consequence (salient outcomes) and d) external domain (sources of information, stimulus or support). A change in any one domain can trigger changes in other domains through the mediating processes of ‘enaction’ and ‘reflec-tion’, and changes connecting two or more domains would lead to more permanent and meaning-ful professional growth.

3.3. Classroom observation

Observation has long been recognized as an important method for developing and researching classroom practices (Burton and Bartlett 2005). It can generate rich evidence about in-the-moment teaching and learning, and has the potential for supporting reflective practice (Lefstein and Snell 2011). Observations have been classified according

to: their purpose – evaluation or development oriented (Martinez, Taut, and Schaaf 2016); who decides how they are designed and conducted – top-down versus bottom-up (Lasagabaster and Sierra 2011); context level of structure – ranging from structured to unstructured (Wragg 1999). Unstructured observations aim to capture meanings and tend to be more open-ended. Structured observations aim to quantify instances observed in the classroom by rating or counting systems (Wragg 1999). T-SEDA is a development-oriented method, that proposes a bottom up approach to structured observation focusing on class-room dialogue. Observations can be of teachers or conducted by teachers (O’Leary 2012). Much formal classroom observation corresponds to the former category and has evaluative purposes (O’Leary 2012). Nevertheless, observations by teachers, although usually less formal, are a key part of their professional practice. Focusing mainly on children’s behaviour and understanding (Grieshaber et al. 2000), these observations may be daily unstructured observations (Burton and Bartlett 2005) as well as systematic observations. Teachers’ observation of dialogue as part of everyday practice, however, is less evident in the literature; several challenges may explain this. First, initial teacher education programmes cannot always offer opportunities for extensive systematic observation approaches of classroom talk. This points to a need for in-service professional development and tools, such as T-SEDA. Second, the rigorous and responsive classroom ‘noticing’ of student learning is challenging, even when driven by professional imperatives in areas like formative assessment (Sezen-Barrie and Kelly 2017). Indeed, regardless of the technique, observations are interpretative actions dependent on our knowledge (Burton and Bartlett 2005). Having a focus, therefore, can help teachers see previously unnoticed elements (Burton and Bartlett 2005), contributing to their professional growth (Sherin 2001). In this context, engaging with a structured observation of talk could help teachers ‘notice’ relevant features of dialogue. Third, a considerable practical problem is for teachers to find time to conduct systematic observations and subsequent analysis (e.g. using transcripts) while engaged in day-to-day teaching and administrative work (Higton et al. 2017); live observation tools could overcome this issue. Fourth, more evidence is needed on teachers’ perceptions on classroom observation. In a survey study, Lasagabaster and Sierra (2011) found that, although practitioners experienced anxiety about being observed, they saw the potential usefulness provided that some conditions were met, such as a supportive environment, time availability, clear goals and procedures and constructive criticism.

To summarize, we propose that teacher inquiry through systematic observation by teachers focused on dialogue potentially promotes professional growth through teacher noticing (Sherin 2001). In the example given below, increasing the salience of apparent inequities in student participation can inform teachers’ judgements about the likely consequences for collective classroom learning and trigger further inquiry. In light of the above, T-SEDA employs a cyclical reflective inquiry process (see Figure 2).

4. METHODOLOGY

4.1 Reflective cycle for classroom inquiry: focusing on educational dialogue

The approaches outlined in the T-SEDA pack are grounded in the belief that reflective inquiry lies at the heart of teaching. This can involve individual self-reflection as well as collaborative professional development between teacher colleagues. Students are also part of this process and may be encouraged to discuss their own classroom communication and learning. T-SEDA is particularly suited to situations when teachers have identified a particular interest in or concern about classroom talk and learning. Focusing ‘inquiry questions’ and conducting a short classroom investigation can help to target attention, sharpen awareness and build understanding of what is actually happening in the fast-paced classroom setting. Reflecting on observational evidence and further discussion with colleagues supports subsequent decision making about setting priorities and deciding whether and how to intervene. This inquiry process resembles school-based action research, in which knowledge and understanding are developed through iterative cycles of planning, classroom trialling, observation, evaluation, and reflection and modification. This cycle should connect well with other professional practices and approaches to action research that you are already familiar with.

The reflective cycle of inquiry on the next page is intended to represent how use of the T-SEDA materials may contribute to solving problems, building knowledge and generally following up interests in classroom dialogue. It illustrates how T-SEDA materials may help you solve problems, develop your understanding of, and generally following up your interests in classroom dialogue.

A completed reflective cycle can be an effective way of sharing investigation findings with colleagues. (Ahmed and Kershner 2019)



Figure 2. Reflective Inquiry Cycle

4.2 T-SEDA Pack

Teachers, other adults (e.g. teaching assistants) and students could use T-SEDA as a tool for self reflection and for observation of peers. Students' use of T-SEDA may in most cases be initiated and guided by the teacher, although the teacher may not be physically present on every occasion.

Teachers, other adults (e.g. teaching assistants) and students themselves might use the T-SEDA pack in different ways, according to purpose and opportunity.

- videoing own lesson and analysing own teaching to audit current practice, or chart change over time
- observing teacher colleagues and giving feedback – including as part of a Research Lesson Study analysing students' collaboration or reasoning skills and supporting their development
- self-assessment of teacher discussions (e.g. during 'lesson study' conversations)
- engaging in school-based inquiry and in wider research networks with school/university colleagues

Teachers who have worked with T-SEDA have inquired into different aspects of dialogue. Areas of interest include:

- students' reasoning in secondary school historical investigation;
- young learners' group roles in 'thinking together' activities;
- students' equitable participation in primary science groupwork;
- teachers' 'lesson study' discussions;
- teachers' peer lesson observations and professional development

4.3 RECORDED LESSONS

In this section we offer some tools for looking systematically at dialogue in both whole class and groupwork contexts. Having identified your focus and inquiry question, your methods could include structured observation techniques such as checklists, grid and rating scales.. Parts 2A to 2E focus on analysing dialogue using the coding framework. Parts 2F and 2G focus on wider dialogic practices and participation. These approaches can be used separately, depending on the purpose and feasibility (e.g. how much time is available). They can also be used in a combination of fine-grained and broader analysis, which can be particularly informative and powerful in showing how classroom dialogue works in practice. Editable versions can be downloaded from our website: <http://bit.ly/T-SEDA>.

Part 2A: Template for coding an audio/video transcript: how the dialogue develops over time

Part 2B: Time-sampling coding for groupwork (tallying): how frequently different indicators of dialogue occur in a given episode .

Part 2C: Checklist for individual students (groupwork): what the level of individual participation is in the group talk.

Part 2D: Group work quality (rating scale): summarises the quality of participation in small group dialogue in a given episode. **Part 2E: Whole-class participation overview (rating scale):** what and how students are involved in dialogue during whole-class activities.

Part 2F: Student participation and Talk rules (rating scales): assessment across a whole lesson or for each activity

Part 2G: Student self-assessment (group work): students' rating of their own involvement in group work

4.4 Time-sampling coding for groupwork

This time-sampling approach is intended to be used by the teacher or another investigator for observing students working in groups. Groupwork is commonly seen to be one of the best opportunities for students to engage in productive classroom dialogue, allowing each the opportunity to participate. The ideal group size ranges from 3-6, depending on a number of factors, such as the age of the students, their experience in groupwork, and the nature of the group activity. Inquiry questions about groupwork may touch on a number of interrelated aspects of the students' dialogue, social relationships, and learning. It is almost inevitable that, whatever the initial inquiry focus, other elements will become relevant to drawing conclusions. For instance, should non-verbal communication be taken into account? What about the particular influences of technology use? In order to prepare for and handle this complexity, the recommendation is to focus at least one inquiry question centrally on just 1-2 clusters or codes. Also, use the 'Comments' space at the end to record notes about any other insightful observations or anything that seemed to influence the discussion. This will keep dialogue at the forefront of the inquiry, while still allowing other factors to be considered. 'Time sampling' is a common technique used by researchers to sample events at regular time intervals during an episode or whole lesson. It is based on the notion that recording and categorising every single communication or action is often too demanding, while sampling over time gives the researcher a roughly accurate picture, or at least one that is informative enough to make distinctions between individuals. Researchers might observe a group of learners simultaneously or instead categorise the communications of each individual participant in turn, depending on purpose and feasibility. Time sampling can be accompanied by written notes if desired. A time pattern for observing events is decided in advance and for complex behaviours such as dialogic communication whose form and purpose can change quickly, time intervals will be quite short so as to allow the researcher to listen carefully and categorise accurately. In these cases a "rest" period is commonly used when observing live as concentrating on closely observing and analysing interaction is very tiring and it is easy to miss things. If a video record is available, it can of course be replayed or slowed down so coding can take place without time pressures, as mentioned earlier. The time-sampling example below uses the categories B 'build on ideas' and CH 'challenge' throughout, but these can be changed according to need and interest.

4.5 Group rating (groupwork)

As with 2C, this group rating can be used at the end of each groupwork activity (and repeated if the activity or the group changes). Its main purpose is to record judgements about the group as a whole, basing the ratings on the selected categories (in this case B and CH). This group rating can be helpful for establishing the general nature of dialogue in a group activity. The quality of dialogue can then be monitored for the group as a whole. It also provides

a context for judging individual student participation (e.g. if the whole group is not building well on each other's ideas then it is harder for one student to do this than in a group where building on ideas is well-established).

Guidance notes:

- Use a three-point rating scale for the frequency of each dialogue category within the conversation as a whole: 1 = low, 2 = medium, 3 = high

Use the 'Comments' column to add any relevant information to the rating, such as whether the results are typical, or if they show progress.

5. CONCLUSIONS

This paper explored the affordances of live coding (utilizing T-SEDA) and follow-up investigation (trans-content in addition to sound) as strategies for educators occupied with intelligent request, for this situation to look at students' impartial cooperation in gathering exchange. The utilization of the T-SEDA devices contributes unmistakably to the set up employments of efficient homeroom perception, not least in concentrating expressly on the practicality and affordances of various strategies for instructors' utilization. This nitty gritty investigation has drawn out specific variables, for example, taking note of that the speed of occasions occurring in live perceptions brings up valuable issues about precision in live coding; this is the place the subsequent examination could be progressively helpful for certain instructive purposes. While all the more subjectively requesting and time consuming, follow-up investigation can be enhancing for instructors who are worried about impartial interest and have chances to lead more inside and out examinations. For example, in the examinations of appraisals follow-up investigations was useful in seeing increasingly uncertain instances of understudy participation. This uncovers understudies who are probably going to be eclipsed by the non-verbal mastery of their friends just as commitments that may be missed.

These discoveries, together with the more extensive individual, expert, social and relevant elements identified as persuasive, add to instructors' current expert information and ranges of abilities. In creating and trialing this examination educated request apparatus in a group of scholarly and professional scientists, we expect to make information about instructive discourse sensible and usable for instructors. Encircling of the T-SEDA apparatuses and the supporting hypothesis in available language and establishing them in valid homeroom models renders them reasonable for more extensive adjustment by different professionals without dependence on outside help (Hennessy 2014).

The T-SEDA instrument bolsters the basic job of instructors in building up their expert vision and attention to understudy support in study hall action through iterative perception and activity. Utilizing live or follow-up perceptions routinely has potential for expanding educators' ability to see and translate study hall occasions (Sherin 2001) from the outlook of important dialogic functions. The utilization of the T-SEDA device can in this manner bolster proficient development by helping educators to merge connections between improved individual mindfulness, proficient experimentation and its obvious result (Clarke and Hollingsworth 2002).

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