Research Enriched by the Student Voice

Gaye Williams
Deakin University
<gaye.williams@deakin.edu.au>

This paper illustrates the enriched understanding of classroom activity that can occur when the student voice is included in the research design and valid data is generated. It presents interpretations of classroom activity based solely on lesson video, and the same activity interpreted though video stimulated post lesson student interviews. It draws attention to the need to synthesize data from complementary sources.

This paper discusses data collected through student interviews, and identifies the problematic nature of research designs that do not include the student voice. A Year 8 student's observed classroom behaviour as visible on video was initially examined. This was compared with interpretations based on student reconstruction of lesson activity in post lesson video-stimulated interviews. Differences in interpretations are considered.

Literature Review

Clarke's (Clarke, Keitel, & Shimizu, 2006) use of video-stimulated recall enabled students to view their classroom activity and to become involved in listening to, discussing, and writing about their mathematical experiences. Clarke (2001) had previously found that observational data alone had led to misinterpretation of the activity of a particular student. The teacher's characterisation of this student as inattentive was consistent with the video record and the student herself, on viewing the videotape, commented that it did not look as though she was paying attention. During her post-lesson video-stimulated interview, this student provided convincing evidence that she had been engaged with the lesson content. Clarke has found that considering the data from all three sources (lesson video, teacher interview, and student interview) reduced the potential for such misinterpretation. This example illustrated that student behaviour needs to be well grounded in the individual's documented statements or actions, and, where possible, corroborated by other data sources such as post-lesson interviews (Clarke, Keitel, & Shimizu, 2006). This paper demonstrates that valuable data can be lost without attention to the student voice, and illustrates inconsistencies between complementary interpretations and synthesis of these interpretations.

Limitations to using students interviews as a data source have been identified (e.g., Krutetskii, 1976; Fine & Sandstrom, 1988; Barnes, Williams, & Clarke, 2001) and strategies to overcome these limitations have been developed (e.g., Ericsson & Simons, 1980; Fine & Sandstrom, 1988; Williams, 2005). Krutetskii found students did not always share unproductive pathways and Ericsson & Simons suggest the use of salient stimuli (like video) in post-task interviews to reduce this occurrence. Where a subject can spontaneously "describe one or more specific sub-goals, … [that] were both relevant to the problem and consistent with other evidence of the solution process, …" (Ericsson & Simons, 1980, p. 217) the validity of the student reconstruction increases. On the other hand, if the interviewer asked questions that included constructs the subject had not identified in the interview, the subject could "generate answers without consulting memory traces" (Ericsson & Simons, 1980, p. 217). Descriptions of grounded theory approaches to

interviews illustrate how to generate data by letting the subject focus the content and select the language, and the researcher probe to identify the meaning the subject intended for the language used (e.g., Bowers, 1989).

In addition to the ethical issues associated with student unease during interviews (Fine and Sandstrom, 1988; Barnes, Williams, & Clarke, 2001) the validity of data can also be affected by such unease if the student responds, as they perceive the interviewer expects rather than through reconstructing their experiences.

> We believe that ethical behaviour when interviewing children includes a requirement for the researcher to help child informants to feel comfortable and at ease, and as far as possible to avoid placing them under stress. To achieve this, every effort must be made to minimise the negative effects of the inevitable power imbalance. … [this also] helps to ensure that the resulting data are meaningful and valid. (Barnes, Williams, & Clarke, 2001)

The interviews undertaken in this study took into account limitations identified herein. The intention of this paper is to draw attention to the problematic nature of interpreting student activity from video observation alone, and draw attention to how valid data can be collected through the student voice when complementary accounts are synthesised.

Research Design and Mathematical Setting

The Year 8 lesson from which the data were drawn was the twelfth lesson in a sequence of 14 lessons in one set of the Australian data within the broader *Learners' Perspective Study,* designed to explore the teaching and learning of mathematics as viewed from the perspective of the learner. The methodology included videotaping a sequence of lessons, post-lesson video-stimulated student and teacher interviews, collection of student work and lesson tasks, and teacher questionnaires (Clarke, Keitel, & Shimizu, 2006). The primary data were collected by three video cameras that operated simultaneously in the classroom to display the actions of (a) the whole class; (b) the teacher; and (c) a pair of focus students. Following the lesson, the focus students took part in individual audio-taped interviews stimulated by a mixed image of the video of themselves (large image) and the teacher (small insert). During the interview after Lesson 12, the student (Leon) controlled the video remote and fast-forwarded to the parts of the lesson that were important to him and talked about what was happening, what he was thinking, and what he was feeling. By asking Leon to find and discuss what was important to him, he had opportunity to discuss the lesson without the interviewer imposing language and ideas. The following type of statement at the start of the interview was intended to put students at ease:

> I [interviewer] just wanted to say is there is nothing right or wrong about anything you say 'cause what we are interested in is how the maths classroom looks to you when you're in it and the sort of thinking that you are doing in the class. We are not really concerned about whether the things that you are saying about the maths are exactly right or- or [pause] wrong or [pause] in the middle or whatever, … [the interviewer then explained the purpose of the research, and added we wanted to know what the student was thinking and feeling] and you know and we don't.

Like other students, Leon smiled, and his body language indicated he was more relaxed. By undertaking non-judgemental interviews, some ethical considerations raised by Fine and Sandstrom (1988) and Barnes, Williams, and Clarke (2001) were addressed. In addition, attention was paid to the 'equality of interaction' (Alro & Skosmove, 2004) to reduce power differentials and increase the richness of the data. This type of interaction, identified in classroom interactions, was adapted to the interview process by Williams (2005).

> A dialogue maintains equality including a respect for diversity. This does not mean that a dialogue presupposes similarity or symmetry. We are speaking of interpersonal equality and human respect. In dialogue there should be no use of power or force, no persuasion of the other and no winning. ... to be productive, a dialogue develops as a dynamic process between equal communicating partners. … Even when the teacher is a more knowing or competent party to the dialogue, classroom conversations can be dialogic. The roles can be different and so can the competencies. (Alro & Skovsmose, 2004, p. 41)

Mutual respect was built by: reinforcing the value of student responses to the research team, the absence of coercion to respond in certain ways, and the demonstrated fallibility of the interviewer as a *person*: "Now I wonder have I remembered to turn on the tape?" and "Yes- I sometimes make that mistake too" – [pointing remote control at monitor not video recorder]. Leon's interview resulted in a collaborative interaction. As interviewer, I was unable to decipher a comment made by Leon early in the interview as we watched the video. I commented as a matter-of-fact "out loud" reflection: "well sometime I am going to have to transcribe that and what you were saying there so eventually I'll know, I'll go back over it a hundred times [laugh] till I find it [laugh]". This changed the interview dynamics. Leon responded: "I can rewin- can I rewind it? … I can tell you what I was saying if I rewind it". My casual sharing of the work involved in deciphering almost inaudible statements led to Leon volunteering assistance and continuing to do so throughout the interview. He even deciphered the talk of students laughing at a question he had asked.

Lesson Context

Students worked in pairs to find the area of one triangle (see Figure 1). Leon and his partner Pepe worked with Triangle 1. The measurements of side lengths of each triangle were written on the diagrams on the board. Pepe began trying to represent Triangle 1 on the A3 sheet provided. He did not know how to construct triangles when three sides are given and did not ask anyone for assistance.

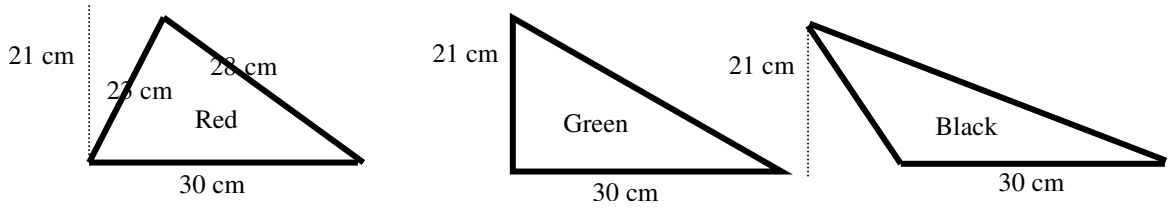

Figure 1. The three triangles on the board in Lesson 12

Pepe remained focused on finding his own way to construct this triangle over the next five and a half minutes. He no longer engaged in off-task activity, he requested various implements from students seated around him, and leant over his page using pencil, compass, and ruler. When Leon began to ask Pepe questions about what he was doing, he did not explain. If he responded to Leon's queries at all, these responses were generally short and/or abrupt. Pepe demanded that Leon watch and work it out himself, or explained the problem but not how it was overcome. On occasions, Pepe enlisted Leon's assistance. For example, when he found the compass span insufficient for the length required, he directed Leon to hold the end of the ruler as a pivot so the ruler could act as a compass.

Video Record of Leon's Practice in the Classroom

From the video record of the lesson, the following observations about Leon's activity were considered indicators of his inattentiveness (Williams & Clarke, 2002):

- Whispered prompt from Pepe, prompting an answer about homework (~ 4 min)
- Whispered prompt from Earl, prompting answer to a teacher question (~ 12 min)
- Question to Elena regarding the triangle the pair should be working on (~24 min)
- Question to Pepe regarding which triangle they were working on (~32 min)
- Pepe's attempts to get Leon on task, which included slapping his face (~35 min)
- Question to Pepe, prompted frustrated "If you've been listening, Leon" (~37 min)

Observations of Leon's activity in class (without access to the interview data) suggested a student whose level of engagement with the mathematics fluctuated frequently during the course of the lesson and a student not inclined to precise work. For example, when Pepe was attempting to construct Triangle 1, Leon stated, "Go twenty-one centimetres straight up, go in a little bit." Pepe demanded to be left to do it his own way. Pepe appeared committed to a careful construction, and was annoyed with Leon's lack of care. Pepe's insistent repeated comment to Leon "Leon. Make sure that, make sure that twenty-eight always stays on … look it idiot (hits Leon's face)" appeared to indicate Leon's lack of care in holding the ruler as a pivot while Pepe made an arc.

The Post-lesson Video-stimulated Reconstruction of Leon's Classroom Practice

These interpretations arise from Leon's video-stimulated post-lesson interview. Table 1 includes excerpts of lesson transcript and Leon's interview reconstruction.

Table 1
Leon's Reconstructions Lesson Activity

Lesson Transcript	Interview Reconstruction
Leon [to Pepe]: What are you doing?	Leon: He's got the compass and I didn't know what he was doing [laugh in voice] with the compass because he was supposed to be ruling straight lines.
Pepe: Ah, watch yourself. [Pepe stretched the compass along the ruler and Leon watched. Pepe kept his eyes on the equipment and the page]	Leon: Sometimes Pepe is a better teacher than the teacher.
Pepe [to self]: It doesn't make like twenty-eight centimetres [returns ruler, hesitates, extends hand]. Wait wait wait wait wait, I still need it.	
Leon: What the hell are you doing Pepe? Are we actually going to do any work or not? [Pepe has drawn a line and started using the ruler for something else.]	He was doing the circle thing and I didn't know why he was doing the circle thing … that sort of threw me off course.

Leon's interview (see Table 1) showed he was unaware of the process for constructing triangles and did not recognise the compass' possible purpose when he saw Pepe using it. After the interaction in Table 1, Leon continued to challenge what Pepe was doing. Pepe became frustrated and used expletives and a sharp, voice to clarify the problem:

> We don't know how … bloody … ooh, twenty eight centimetres is. We don't know where the fucking measurement is [slapped hands down on the page indicating both ends of the line]. Think about it. [Leon looked at the triangle on the board for a short period of time remaining motionless].

Leon then suggested his approximate way to replicate the triangle. His interview comments (Table 1) show he was not aware of Pepe's more precise way. Pepe responded:

"Let me do it my way" and Leon returned to teasing the girls beside him. When Pepe hit Leon, it was to regain his attention. Pepe's intense repeating of how Leon needed to hold the ruler occurred when he was trying to regain Leon's attention not because Leon was holding the ruler inappropriately. As Leon held the pivot, his new realisation about Pepe's activity occurred:

> and he's [Pepe] gone all the way around it [compass arc] "What are you doing that for?" and he's gone "Just watch" and I've gone "Oh, so you can get the angle that is sloping down?" and Pepe has gone "Yes exactly". That was where I understood it.

Analysis, Discussion and Conclusions

Pepe's frustrated outburst triggered a short burst of intense focus by Leon that resulted in his realising there was a problem. Leon's suggested way of overcoming this problem was initial thinking about a newly discovered complexity. His rudimentary method is consistent with him being unaware of other methods at that stage. Pepe's request to proceed alone led to Leon's subsequent inattention. Later, Pepe repeated his instructions about how to hold the pivot to regain Leon's attention rather than because Leon was not holding the pivot appropriately. Once Pepe had gained his attention, Leon leant over and concentrated intently on holding the pivot. This was when Leon reported realising the relationship between the position of the side of the triangle and the angle formed. This illustration emphasises the need to include the student voice in classroom research to add to the validity of interpretations. What on the surface appeared to be lack of care and an inattention to detail was at least partly due to a lack of understanding of the mathematics involved. Williams and Clarke (2002) provide another example of synthesis of complementary interpretations in other activity of these students. Including the student voice increases the need to develop strategies to synthesise complementary interpretations.

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