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Teachers and the Temporal

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Abstract

How teachers spend their time in the classroom is an area worthy of discussion and debate. What time do teachers spend on various activities including teaching practices and duties especially in classtime? What proportion of classroom time is allocated to certain activities, interactions with students, delivery of content and to the many unplanned incidences that occur in a classroom? Which activities are consistently time consuming and how much time do teachers spend on these activities? How does the time on particular tasks relate to pedagogy? Many studies have investigated student engagement and time but rarely have the above questions been specifically addressed. We are developing an innovative method to assist us in answering these questions and have observed teacher time usage in three typical classrooms. We have begun to answer the question "What do teachers do?"

Keywords: *Teachers' work*

Introduction

What do teachers do? What happens after a lesson commences? How do teachers spend their time in their mostly private classroom world? These seemingly simple questions arose as a response to our discussion about how to gather broad scale data from classrooms that could serve as indicators of the impact of specific classroom interventions. Our reasoning was also simple, like the initial question: If teachers have really changed, in response to an intervention, then this should be reflected in a change in their pedagogy. In turn, a change in pedagogy would mean that teachers spend a different amount of time on their usual classroom activities and may spend time on new classroom activities. For example if learning technologies were introduced into a classroom then teachers might spend less time talking to the class as a whole and might spend more time on supervising individual tasks.

There is some evidence that learning technologies enable teachers to diversify their pedagogy (Cook Sather, 2001) and that time on activities like group work increases in technology rich classrooms. This should be able to be confirmed by careful classroom observation. There is also evidence that if learning technologies are regarded by teachers as

simply a tool then they tend to reinforce existing pedagogies. This means that careful observation should detect little difference in time spent on common teaching tasks after the introduction of these technologies to a classroom,

Our assumptions are these. A teacher's pedagogy is directly reflected in, and related to, the time they spend on classroom activities and so if pedagogy changes then the time spent on different activities also changes. We recognise that we are setting aside questions of *quality* and concentrating on *quantity*. We recognise that even if we observe for example that a particular teacher spends more time working with groups than another teacher this does not necessarily mean that learning is increased in that classroom. Similarly, we recognise that if we observe that a teacher spends a majority of their time in speaking to a class that students are not necessarily not learning.

Slavin (1989, p. 11) posits that "Instruction takes time. More time spent teaching ...does not always translate into additional learning, but if instructional quality, appropriateness of instruction, and incentives are high, then more time on instruction is likely to pay off in greater learning." It has been noted that it is not only the teachers that control classroom time usage but also students. Outcome based education, open-ended learning designs and the focus on student centred learning potentially give more control of classroom time to students (Zielinski, Brooks, Crippen, & March, 2001). Teaching and learning is a complex business: we seek a simple indicator of change, particularly of change in response to interventions.

Seeking to test our assumptions above firstly from the literature, we found that historically there has been little research into teacher's use of instructional time. Most research related to time usage in schools has investigated the time students have been engaged on task and the variety of tasks within the classroom (Walberg, 1988). He uses the terms "time-on-task", "engaged time", "allocated time" and "productive time". Research on instructional time could also be divided into three main areas - theoretical studies of time and learning, descriptive studies of the allocation and use of time and effect, and studies that measure the importance of various time factors for learning (Karweit, 1989).

It is difficult to generalise about the use of classroom time as each lesson and each class brings with it entirely different demands and factors but commonalities may exist. A foundational study of time and learning by Carroll (1963) provides a model of school learning which represents links between time needed and time spent. Carroll (1985), in later discussions of his model, contends that there are many other factors which impede and impact on student learning which the original model did not take into account. Nonetheless we recognise that teacher engaged time and the effective use of this time are important elements in learning; but the effective use of teacher time depends upon and impacted by other factors, many of which are out of teachers' control.

Classroom-teaching interventions designed to get teachers to perform differently in terms of pedagogy will affect the "actual minutes" spent during different teaching activities. At this stage we do not have a good picture of the range and type of different teaching activities employed in Western Australian classrooms by teachers, at any level.

Research into school time has indicated that not all allocated time is used specifically for instruction. Teachers perform a variety of activities in a classroom many of which are not directly related to instruction. However we do know some of the typical activities that teachers may be involved in. Harnischfeger & Wiley (1978) observed that teaching and learning occurs in a variety of different learning situations in the classroom including whole class instruction, cooperative learning or group work and individual work.

A recent study investigating time-on-task levels during individual work by Roelofs & Veenman (2000) found that teachers spent varying amounts of time in different instructional settings, such as whole class instruction, and guided individual seatwork. They also identified, via observation, that different teachers spent various amounts of time on instructional content. Karweit (1989) notes that "the amount of time that teachers allocate to instruction in a particular content area is positively associated with student learning in that content area". Many investigations into what teachers actually do with their time only focus on the positive effects between teacher time and student engagement but it is evident that there is a scarcity of research into how and on what teachers spend their time.

How do we assess time spent on specific activities?

To answer this question we need to effectively observe teaching behaviour. This means that it is necessary for us to have an understanding of different observational research processes and practices.

Flanders' (1970) proposed a detailed guide for the analysis of classroom interaction. He explains that "techniques for analysing classroom interaction are based on the notion that these reciprocal contacts can be perceived as a series of events which occur one after another" (Flanders, 1970, p. 1). This is a particularly useful technique for obtaining information about teacher behaviour. We considered using this approach but decided that we would trade the fine grain detail obtainable using this system for a technique which would provide less detail but more breadth (across different classrooms) in the limited time available to us as researchers.

There have been a number of studies which have used observation and time sampling such as studies by Roelofs & Veenman (2000); Cooley and Mao (1981); Sargent (1981). Sargent's (1981) study applied a time sampling technique, based on Hall, Hawkins & Axelrod's (1975) work, to measure how teachers used their time and how work load and student demands effected the distribution of their time. Observations of teachers' activities were recorded at two minute intervals. They found that teacher estimates of time were not reliable indicators of actual time used. Most time was spent in direct instruction but the observers found that this time was eroded by interruptions such as school assemblies and various other school events.

A study by Cooley and Mao (1981, p. 31) investigated the question of "how much classroom observation is necessary in order to obtain reasonably precise estimates of the frequency with which various kinds of events occur in the classroom during a school year". The researchers applied Rowley's (1976; 1978) technique which takes into account the length and number of observation periods needed. They found that many studies of classroom time have used inadequate samples to measure behaviour.

Reliability of measuring classroom observation has been an important research issue. Rowley (1976; 1978) has posited some useful generalisations, based upon measurement theory, regarding the length of observational time. He explains that researchers have been perhaps over concerned about reliability of their measurements (this essentially positivistic approach may have obfuscated many issues and findings arising from this kind of research) It is well recognised now that if observational techniques are correctly applied then it is almost certain that observations will be reliable (Rowley, 1976). Cooley and Mao (1981, p. 32), found that "...hour-long observations reduce sampling error".

Some initial results

To test our data gathering and analysis techniques we conducted a pilot investigation involving three classrooms. Classes involved were:

- A. Year Nine Social Studies class in an outer metropolitan school;
- B. Year Nine Computing class in an outer metropolitan school; and a
- C. Pre school class in an inner metropolitan location

All teachers were experienced teachers having been teaching for at least ten years each. In all classes, photographs were automatically taken one minute apart for the whole lesson. The camera was situated unobtrusively in the back corner of the room and generally students were not at all perturbed by its presence. The researcher was not in the room while photographs were taken. In classes A and B the lessons were of 60 minutes duration and in C the lesson lasted 69 minutes.

Each separate photograph was coded and the following codes, which all arose from the data, are presented in the order in which they were established:

Table 1

Codes arising from initial data analysis

Code Number	Explanation
1	Classroom management - material related, assembling resources, collecting thoughts at start of lesson...
2	Classroom management - calling for attention, eyes to me, sit down, dismissing class...
3	Classroom management - distributing material - collecting/distributing papers or books....
4	Sitting at desk, students working on own
5	Working with individual students at student's desk, explaining, assisting...
6	Managing class behaviour - whole class desists - stares...
7	Missing in action! (Not in photograph, unable to be coded)
8	On Patrol - walking around class
9	Lecturing to whole class
10	Explaining a worksheet and/or activity to whole class
11	Individual/class behaviour management

12	Talking to parent /aide
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Using these codes we were able to classify all the observed teacher behaviours. The following data were obtained using these codes.

Table 2

Numbers of coded behaviours from classrooms A, B, C.

Code	1	2	3	4	5	6	7	8	9	10	11	12
Class A (n=60)	8	3	2	3	9	3	7	5	11	8	1	0
Class B (n=59)	8	1	1	2	22	3	18	4	0	0	0	0
Class C (n= 69)	4	0	0	0	39	0	2	0	19	0	0	5

For ease of comparison between classes the above raw numbers were converted to percentages. The percentages calculated did not include those photographs where the teacher was missing from the frame.

Table 3

Percentages of each code from classrooms A, B, C.

Code	1	2	3	4	5	6	7	8	9	10	11	12
Class A	15	6	3	6	17	6	n.a.	9	21	15	2	0
Class B	20	2	2	5	54	7	n.a.	10	0	0	0	0
Class C	6	0	0	0	62	0	n.a	0	14	0	0	8

Note: Percentages have been rounded to nearest whole number.

So what can we glean from these initial results? Both high school teachers spent considerable amounts of time on material related classroom management (15%, 20%). There were considerable differences in the time spent with individual students between classes (17%, 54%, 62%). That the pre school teacher spent 62% of her classroom time with individual students was expected but that in one high school (a technology rich environment) a class can get close to this figure was interesting. This leads us to consider

investigating in detail, in future work, the influence computers can have on the individualisation of instruction. Also of interest was that the preschool teacher spent 8% of her time talking with parents, in class time, a seemingly normal event.

Of similar interest is the considerable time spent in the high school classroom where computers were not available (Class A) on lecturing or explaining the worksheet (36%). Combined with other time grabbing tasks involved with classroom management this left only 23% of the time available to students to actually work on their own on the set task (codes 4 and 5) in this class. This factor will also be investigated in detail in our subsequent research.

On a related topic, if we accept that a lesson has a beginning, middle and end then other differences are apparent between classes (it was very easy to detect these phases in the classes photographed). In classroom B only 5 minutes of the hour was spent on beginning and end phases of the lesson. In classroom A, 11 minutes were spent on these phases, a significant amount of time and in Class C only 6% of the time was spent on this.

Only 6% and 7% of teachers A and B's time was spent directly managing student behaviour, as a class. It will be interesting how this figure compares to less experienced teachers' time. In class C no time could be detected being spent on this task.

Conclusion

Our beginning foray has shown that this technique can provide detail as to what teachers do in their classrooms. As a result of this pilot work we are encouraged to continue our research as it appears to have the potential to help us understand the classroom life of a teacher and to elicit differences between different classes. This is important work because as whole systems recommend that teachers adopt constructivist teaching approaches then we need techniques which enable us to detect the classroom changes involved in such a change in pedagogy. Similarly we need techniques which enable us to quantify the changes that might occur as teachers begin to use ICT in their classes. We are satisfied at this stage that this technique can prove useful in both these situations. Finally this technique can help us understand what teachers actually do in the classroom and how much classroom time is learning time.

Carroll, J. B. (1963). A model for school learning. *Teacher's College Record*, 64(8), 723-733.

Carroll, J. B. (1985). The model of school learning: Progress of an idea. In C. W. Fisher & D. C. Berliner (Eds.), *Perspectives on instructional time* (pp. 29-28). White Plains, New York: Longman.

Cook Sather, A. (2001). Unrolling roles in techno-pedagogy: Toward new forms of collaboration in traditional college settings. *Innovative Higher Education*, 26(2), 121-139.

Cooley, W. W., & Mao, B. (1981). The sample of classroom time observed. *Journal of Classroom Interaction*, 17(1), 31-36.

Flanders, N. A. (1970). *Analyzing teaching behavior*. Reading, Massachusetts: Addison-Wesley Publishing Company.

Hall, R. V., Hawkins, R. P., & Axelrod, S. (1975). Measuring and recording student behavior: A behavior analysis approach. In R. A. Weinberg & R. H. Wood (Eds.), *Observation of teachers in mainstream and special education settings*. Reston VA: Council for exceptional children.

Karewit, N. (1989). Time and learning: A review. In R. E. Slavin (Ed.), *School and classroom organisation*. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Roelofs, E., & Veenman, S. (2000). Classroom heterogeneity and the use of instructional time in Dutch secondary schools. *Journal of Classroom Interaction*, 35(2), 15-24.

Rowley, G. L. (1976). The reliability of observational measures. *American Educational Research Journal*, 13, 51-59.

Rowley, G. L. (1978). The relationship of reliability in classroom research to the amount of observation: An extension of the Spearman-Brown formula. *Journal of Educational Measurement*, 15(3), 165-180.

Slavin, R. E. (1989). A Theory of School and Classroom Organization. In R. E. Slavin (Ed.), *School and Classroom Organization* (pp. 3-18). Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Walberg, H. (1988). Synthesis of Research on Time and Learning. *Educational Leadership*, 45(6), 76-85.

Zielinski, T. J., Brooks, D. W., Crippen, K. J., & March, J. L. (2001). Time and teaching. *Journal of Chemical Education*, 78(6), 714-715.