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Evaluation of the McDonalds' Activity
Socially Responsible Mathematics Project 2008-09

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Introduction

The McDonald's Activity was designed by Mei Ling and implemented over a period of 8 weeks in her Year 9 all-girls 'lower level' Maths class, during Term 2 2008. She describes her students as believing that "they will not need [maths] or use it in their life after school", and describes the school as having a number of students who "don't place education as a high priority and will mostly enter a trade-based occupation or apprenticeship. Very few go to university".

The McDonald's Activity, comprising 9 discrete, staged learning activities, is presented as a series of worksheets collated into a booklet (see Appendix A). The 9th activity, which involved students in designing a poster to make a case 'for and against' McDonalds, took place over a period of 7 weeks in the Year 9 English class, during Term 3. This evaluation focuses on student learning during the first 8 activities in Mei Ling's Maths class.

The McDonalds' Activity, which addresses the Number and Chance & Data Strands of the Western Australian Mathematics Curriculum, was designed to engage students in socially responsible mathematics learning. Students used available data and data they collected to investigate whether or not food sold at McDonalds is value for money and constitutes a healthy diet. The emphasis on social world learning involved students in discussing and calculating their personal energy and fat intake, types of fats and how they contribute to high cholesterol levels and heart disease, and eating healthy food and exercising regularly to prevent blocked blood vessels. As the need arose, Mei Ling taught basic mathematical concepts and skills such as percentages, significant figures and graphing.

This evaluation sits largely within the post-positivist paradigm of survey research, drawing on the interpretivist paradigm for analytical methods; survey data are supplemented with qualitative data obtained from a number of sources. A questionnaire was designed to obtain measures of students' perceptions of key aspects of a socially responsible mathematics classroom environment - *Learning About the World*, *Learning to Work Together*, *Learning to Think* [i.e., critical self-reflection] – as well as students' attitudes to the McDonalds' Activity - *How I Felt* (see Appendix B). The questionnaire, administered in Term 4 2008, was used to identify a sample of students for interview and served as a semi-structured interview protocol. Student interviews were conducted in their maths classroom during a spare period and were tape recorded. Mei Ling completed a teacher version of the questionnaire, wrote an impressionistic report of her classroom observations and reflections, and was interviewed. The following analysis uses the structure of the questionnaire but omits results of the *Learning to Work Together* scale as it was not a pedagogical goal of the teacher.

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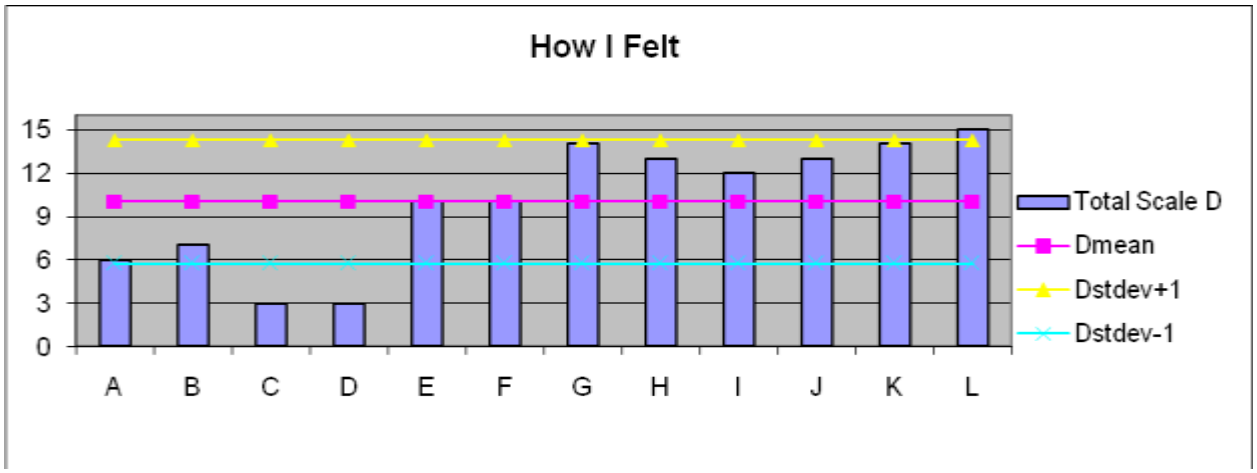
How I Felt

One of the most effective indicators of students' engagement in meaningful learning is their attitude towards the subject. Given the high-level aspiration of this project - to raise students' awareness of social issues in their lives and to examine these issues critically with the tool of social mathematics - it was essential that Project teachers designed learning activities that interested their students, seemed relevant to their personal lives, excited their imaginations, and helped develop their agency as critical participants in social processes and as critical consumers of social products. And so we included an attitude scale in the questionnaire to provide a measure of the affective dimension of student learning. This scale comprises 3 items designed to enable us to inquire into students' levels of interest in, enjoyment of, and enthusiasm for the project activity.

- I was interested in the activity
- I enjoyed the activity
- I was keen to get involved in the activity

A summary of Mei Ling's students' responses to the attitude scale are represented by the following graph which shows each student's total score (3 items), with class mean score and standard deviations (+/- 1sd) superimposed. The y-axis represents strength of agreement, with 15 representing strongly agree, 12 agree, 9 unsure, 6 disagree, and 3 strongly disagree.



Given Mei Ling's description of the low level academic ability and aspirations of her Year 9 Maths class, it is heartening that at least half of the class (6/12) indicated high levels of engagement in the McDonalds' activity, agreeing or strongly agreeing that it was interesting and enjoyable, with another two students (E, F) indicating positive but mixed feelings. Only four students indicated unfavourable attitudes (A, B, C, D).

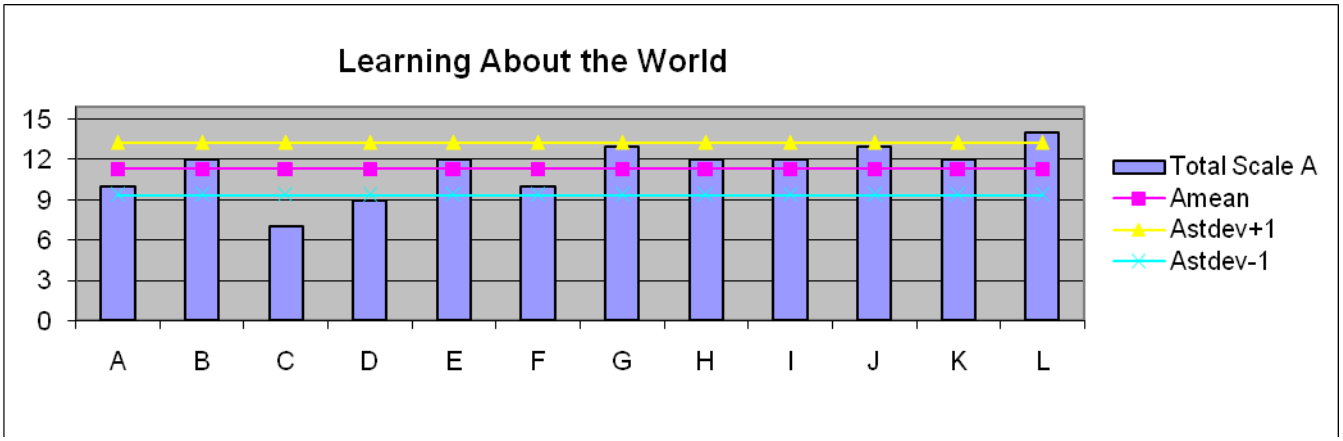
We used these results to select a sample of students for interview. We chose six students, two with very positive attitudes towards the McDonalds' activity (G, L), two with consistently positive attitudes (H, J), and two with positive but mixed attitudes (E, F).

Learning About the World

Mei Ling was keen to raise the consciousness of her class about the health hazards of their "sedentary lifestyle coupled with their eating habits…During recess, most of the students were seen eating wedges, chips and other deep fried food….most of the girls in my Maths class do not have an active lifestyle. Their weekend is usually spent watching TV, playing computer games etc." In designing the McDonalds' activity, Mei Ling's aim was "to provide real statistics to them…empower them to make better food choices". Thus it was important for Mei Ling that the McDonalds' activity form a bridge between the mathematics classroom and students' social worlds. And so we designed the *Learning About the World* scale to obtain a measure of the perceived relevance of the McDonalds' activity to the world students inhabit outside school. It comprises 3 items.

- I learned how to investigate a problem about the world outside school
- I learned how maths can be part of my life outside school
- I got a better understanding of the world outside school

A summary of Mei Ling's students' responses to this scale are represented by the following graph which shows each student's total score (3 items), with the class mean score and standard deviations (+/- 1sd) superimposed. The y-axis represents strength of agreement, with 15 representing strongly agree, 12 agree, 9 unsure, 6 disagree, and 3 strongly disagree.



The graph indicates a very positive result overall, with the majority of students' responses (8/12) lying in the range of agree to strongly agree, suggesting that the McDonalds' activity was perceived generally by students as being connected meaningfully to their lives. Several students were unsure (A, D, F) that they had developed a better understanding of the world outside school, and one disagreed (C) with this proposition. Two of these students (A, C) indicated unfavourable attitudes to the McDonald's activity.

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We interviewed two students with positive survey results. Student J explained that she usually enjoys mathematics and nearly always sees it as being connected to the world outside school. Despite Student J's recent arrival in Australia and an ongoing struggle with the English language, she likes mathematics. Both claimed to have enjoyed the McDonalds' activity. We then interviewed students with mixed survey results. Student L (who dislikes maths) and Student G (only likes it 'a bit'), who don't usually see mathematics lessons connected to their lives, stated that the McDonalds' activity was a positive experience for them. A less positive student, Student F, explained that she struggles with maths and does not much like doing maths classes, however she found aspects of the McDonalds' activity to be interesting, although she did not like filling in tables and performing calculations.

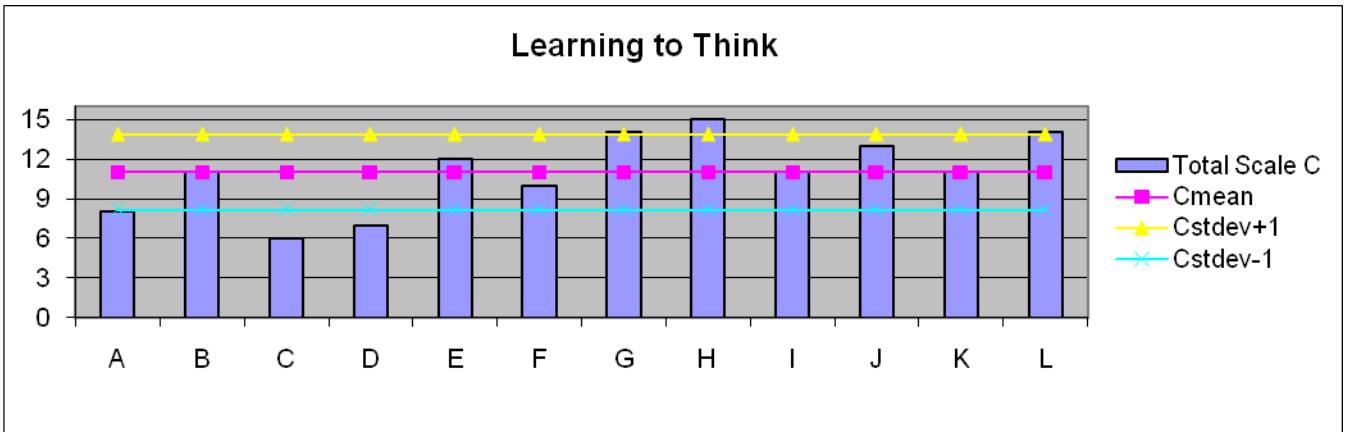
Mei Ling explained that "I found the level of engagement of students during the McDonald journey was relatively high compared to the past 2 terms. They were quite keen to do the booklet and were sometimes disappointed in some lessons when I decided to teach them something else. Students who usually do not participate well in lessons were having no problem following the McDonald journey".

Learning to Think

Raising students' consciousness (Freire's *concientization*) about social issues and ultimately affecting transformations in their values and personal behaviour - the chief goal of this socially responsible mathematics project - is likely to be experienced as a very challenging goal by teachers of mathematics driven by curriculum imperatives to cover set amounts of content in fixed time periods in preparation for standardised academic examinations. Although Mei Ling's teaching was not constrained by such imperatives – she enjoys a uniquely high degree of curriculum and assessment autonomy – she did face the challenge of a combination of militating factors working in concert: students' academic underachievement in maths, unfavourable attitudes to learning maths, and low academic aspirations. As indicated, the McDonalds' activity seems to have overcome much of the traditional resistance to engaging in learning maths that is endemic amongst lower achieving students. But what about students' attainment of the elusive goal of higher-level self-learning? To obtain a measure of this we designed the *Learning to Think* scale, comprising 3 items.

- I began to think carefully about my own ideas
- I began to question my own views
- I became more aware of what is important to me

A summary of Mei Ling's students' responses to the *Learning to Think* scale are represented by the following graph which shows each student's total score (3 items), with class mean score and standard deviations (+/- 1sd) superimposed. The y-axis represents strength of agreement, with 15 representing strongly agree, 12 agree, 9 unsure, 6 disagree, and 3 strongly disagree.



A large majority of the class (9/12) indicated that engagement in the McDonalds' activity had stimulated thinking about their personal values. Five students (E, G, H, J, L) agreed or strongly agreed that they had reflected on their values. Another 4 students (B, F, I, K) seemed to have engaged to a degree in self-reflective thinking. Only 3 students (A, C, D) indicated little or no higher-level thinking activity; notably those who also reported lack of interest and enjoyment in the McDonalds' activity.

During interview, several students mentioned how their views had changed and how they had attempted to influence the behaviour of their families. Students G and L, both of whom reported very positive engagement in the McDonalds' activity, explained how they had taken home the issue of a healthy diet and discussed it with their respective mums' in relation to the need for weight loss/control (!) The following exchange occurred with Student J, who had indicated a positive attitude to the McDonalds' activity and a positive perception of its connection to her personal life.

I: Do you remember why you said 'strongly agree?'

J: You have to think about your health. If you don't really think about it then you can be overweight and live your life really badly

I: Is that the first time you've thought about these issues?

J: Yes

I: And you haven't thought about them before in any other class or subjects?

J: Not really

And in a conversation with Student E, who had indicated positive but mixed feelings about her engagement in the McDonalds' activity, there is evidence of the impact of her learning on her personal behaviour within the family:

I: Did you discuss this at home?

E: We watched it at home

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I: The movie [Supersize Me] – what did the family say?

E: I made my little cousins watch it.

I: Oh you made them watch it. Why did you do that?

E: Because they eat McDonalds every second day

I: And you wanted to warn them!

E: Yes

Mei Ling noted that the majority of her students participated in class discussions about "what is the recommended energy and fat intake and why it is important to know that", and also noted many students raising questions "about the type of meat used in nuggets and why there are people who eat but never seem to get fat". She found the combination of "working with real statistics and data, and the discussion of social issues of healthy eating and obesity, made the program successful."

Although these indications of modest change in students' personal behaviours are slight they are also very promising given the challenging academic environment in which this socially responsible mathematics activity was implemented and the one-off nature of the learning experience. At the end of the Project Mei Ling remains both enthusiastically optimistic and pragmatically sanguine about the prospects of the McDonalds' Activity affecting change in her students' personal values and behaviour.

> At the end of the McDonald journey, even though kids will still do whatever they want to do, no matter what the consequences are, some of the more sensible ones will change the type of food they eat, and for the others, maybe the risk of getting heart attack or stroke will put them off fast food for a while. Who Knows?