

Financial literacy: Mathematics and money improving student engagement



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A case study from a Year 6 classroom involved in an action research project based around *MoneySmart* and the *Framework for Engagement with Mathematics* is described. The process for developing a new unit of work in financial literacy is explained.

The low levels of student engagement with mathematics has been of significant concern in Australia for some time (Attard, 2013). This is a particularly important issue in mathematics education given the current attention to science, technology, engineering and mathematics (STEM) education to ensure “the continued prosperity of Australia on all fronts—socially, culturally and economically—for all our citizens and for our place in the world” (Office of the Chief Scientist, 2013, p.3). One of the most common reasons for students to disengage with mathematics is the issue of relevance. Many students fail to see how the mathematics they learn in the primary classroom is applied in their day-to-day lives. Financial literacy appears to be a natural solution to this issue because all students have some familiarity with money related matters. This article presents a case study of one class from Fairfield Public School that successfully addressed this issue through their participation in a research project. The aim of the project was to explore if combining financial literacy education and mathematics, through the use of student-centred units of work, could improve engagement with mathematics and provide a foundation of financial literacy to positively impact children’s lives (Attard, 2016).

Financial literacy, mathematics, and engagement

Financial literacy is a broad concept that has been defined in a variety of ways. Although commonly considered to include basic money management such as budgeting, saving, investing and insurance (Hogarth, 2002 as cited in Worthington, 2006), the Australian Association of Mathematics Teachers (AAMT) (2012) also add the dimension of ethics and civic responsibility.

AAMT claim consumer and financial literacy are closely connected to numeracy, and people must draw on their literacy and numeracy to achieve the best personal and community outcomes:

Consumer and financial literacy is more than just knowing about money and financial matters and more than having the skills to work with this knowledge. It also requires the confidence and capacity to successfully apply the necessary knowledge and skills in a range of contexts and for a range of purposes (p.1).

If financial literacy is so closely aligned with numeracy, then it makes sense that it could be used as a vehicle to improve student engagement with mathematics. After all, we can assume that most children have some idea of the relevance of money to their day-to-day lives and most have experience handling money. How can we take the context of money to improve student engagement, and what do we actually mean when we talk about student engagement?

We can define engagement as the actions and behaviours that are the result of a student’s motivation linked to school, curriculum and pedagogy. Engagement is multi-faceted, operating at cognitive, affective, and operative levels. For this project, engagement is defined as the coming together of all three facets: cognitive, operative, and affective, leading to students valuing and enjoying school mathematics, and seeing connections between school mathematics and their own lives beyond the mathematics classroom (Attard, 2014).

Research by Sawatzki (2014; 2015) indicates that the blending of money and realistic mathematical problems can engage students. However, this project sought to move from hypothetical realistic problems

to actual real-life problems, using real money and involving active participation in a student-centred approach. The research question explored in the study was: Can the integration of financial literacy education improve engagement with mathematics for students from low socio-economic backgrounds?

The research

The research project took place at four schools, all in low socio-economic areas. One of those schools, Fairfield Public School in NSW, is the focus of this paper. At the time of the project, the school, located in southwest Sydney, had a population that included 59% from diverse cultural backgrounds, with 60 languages represented. Thirty-five percent of the school's students were refugees, many of whom had a background of trauma and limited prior education. Twenty-five percent of the students were transient. The classroom that is the focus of this paper was a Year 6 group whose teacher, Jacqui, had over ten years of teaching experience.

A participatory action research approach was undertaken as a way for the school and its teachers to work alongside the research team. The project began with an introduction to the *MoneySmart* teaching resources (www.moneysmart.gov.au/teaching) as an introduction to financial literacy concepts and teaching ideas. The teachers were then asked to select a *MoneySmart* unit of work that they would implement as a way of introducing their students to the concept of financial literacy and to spark their curiosity. This would then lead to a new unit to be developed and implemented as a result of the students' questions and interests, culminating in a showcase activity that included members of the wider school community. *A Framework for Engagement with Mathematics* (FEM) (Attard, 2012) that details the elements of teaching and learning that directly influence student engagement was provided to assist the planning of the new units of work. The FEM was also used as an analytical lens to determine if and how the students were engaged with mathematics as a result of their work on financial literacy.

Data informing the project consisted of semi-structured teacher interviews at the start, middle, and end of the project. Student focus groups consisting of between four and six students from each participating class group were also conducted at the start, middle, and end of the project. The finalised documentation of the student-centred units of work were also collected as data. The focus of this article is the unit of work that evolved from the Year 6 class at Fairfield Public School.

Fairfield Public School and MoneySmart

The Year 6 class consisted of 26 students, many of whom came from a non-English speaking background. Prior to the project, Jacqui's students had a fear of mathematics and experienced high levels of anxiety as a result. Jacqui had been working on building trust with her students to enable her to engage more with their learning.

Jacqui began the project by choosing the Unit *It's Raining Cats and Dogs...and Chickens?* (https://www.moneysmart.gov.au/media/559088/mst_primary_maths6.pdf). She thought the unit would address the students' interests as they had recently been asking for a class pet. Jacqui found that the mathematics involved in the design of an animal enclosure was appealing to her students. However, the financial literacy aspect wasn't. Instead, Jacqui changed course and had her class design a budget for a fantasy holiday. To build their understanding of financial literacy concepts, Jacqui found some videos about credit cards on the *MoneySmart* website which she showed to her class. She was surprised that her students were intrigued by the concept of credit card interest, and the long term financial repercussions of repayment decisions.

Following the conclusion of their *MoneySmart* unit and their budgeting work, a group of the Year 6 students participated in a focus group discussion. When asked about what they had learned, the conversation turned immediately to credit cards. The students were able to explain how credit cards work, to the extent that they could also discuss interest, bank fees, and taxes. One of the students talked about how he had heard about interest rates from watching the news on television. It appeared that their work at school had made these students more aware of financial literacy concepts in their lives outside the school. Addressing the issue of relevance is a critical aspect for promoting student engagement.

The students continued their conversation about money, "We've been thinking of how to be moneysmart and how good it would be if we had a budget...instead of spending over the money and paying more than you borrow". When asked if they could define what a budget is, another student provided this example to illustrate his understanding: "like if you go to a restaurant, you spend money but you don't spend over the amount that you have. Otherwise you'll pay more than you intend." Another student made this comment in regard to their learning about credit ratings: "we learnt how they can keep a record of your credit...and it's like a police record but different". It seemed that the students at Fairfield had already begun to direct their own learning according to their interests and curiosity.

Market Day—a unit of work

The next stage of the project was the design and implementation of a new and contextualised unit of work. One unit was driven by the students' interests. The Year 6 unit of work involved the planning and running of a market day at the school. This idea evolved from the students' original idea of running a school café. Rather than developing one single business, the students split into teams to run a collection of individual businesses on market day. To do this, Jacqui required the students to conduct market surveys, analyse information, and devise business plans that allowed the students to calculate running costs and break-even points for their businesses prior to earning a 'trading certificate'. Amidst the range of mathematical concepts being addressed, there were critical discussions relating to financial and consumer literacy, such as the cost of purchasing popular brands as opposed to generic supermarket brands.

A highlight of the unit of work for Jacqui was the way the learning extended beyond the market day. As the students had all made profits from their businesses, they then engaged further with financial literacy concepts in their decision-making regarding the donation of gifts to other, less fortunate children. The following list is a summary of the sequence of ideas and questions that formed the unit of work. Although the mathematics content and processes are not detailed here, when expanded into full lessons, the questions have potential to address many aspects of the mathematics curriculum long with strong links to other subject areas.



Figure 1: Students at work during market day.

Market Day: Summary and sequence of ideas and questions

1. Introduction to the concept of fundraising.
2. Brainstorming session: How can we raise money?
3. Making a decision based on brainstorming session ideas.
4. Exploring possible business ideas to raise money.
5. Introduction to market research and product testing.
6. Conducting surveys to investigate market demands.
7. Analysing survey data and creating financial requirements for prospective small businesses.
8. What do we need to know about running a business?
9. What exactly is money?
10. How do we work out how much money we need to borrow?
11. How can we promote our businesses?
12. What makes a successful advertisement? Are ours likely to be effective?
13. Applying for our small business loan
14. How can we organise our businesses for success on Market Day?
15. Let's spend our approved loan!
16. Market Day Eve: Getting ready to launch our businesses!
17. Market Day: Open for business!
18. How much profit were we able to make?
19. Were we successful?
20. Giving back to charity

Mathematics and financial literacy = student engagement

As a result of their participation in the Market Day unit of work, the Year 6 students at Fairfield Public School improved their engagement with mathematics and decreased their anxiety towards the subject. Almost all of the aspects of the *Framework for Engagement with Mathematics* (Attard, 2012) were addressed within the unit. Students appeared to be cognitively, operatively and affectively engaged with their learning. Their understanding of mathematical concepts linked with financial literacy improved, as did their knowledge of financial literacy concepts.

I think they've seen that the maths that we've done is useful in helping them. It helps them to be able to be really successful at something they really care about...that thinking hard and working hard can lead to this feeling of achievement for them as people but that then it can give back to a community. (Jacqui)

The mathematics that emerged from the unit was purposeful and relevant to the students' lives. They were engaged in problem solving in a real-life context, rather than hypothetical situations. The Proficiencies and General Capabilities featured heavily in the unit of work, and the ability to raise money to assist other, more vulnerable members of their community provided students with a strong sense of agency.

The sequence of ideas provided in this article were specifically suited to the students at Fairfield Public School. They were presented here to demonstrate the value of contextualised learning driven by students' interests, and the ways financial literacy education can be combined with mathematics to improve student engagement. Although the ideas can be replicated in other school contexts, authenticity is critical. To engage your students, tasks must be driven by their curiosity and interests, rather than the interests of others.

This project was funded by Financial Literacy Australia. The full unit of work can be accessed from: https://www.moneysmart.gov.au/media/560516/moneymathematicsengagement_final_report_14_september_2016-assoc-prof-catherine-attard.pdf

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