



Exploring the classroom practices that may enable a compassionate approach to financial literacy education

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Abstract From an early age, children are faced with financial dilemmas and are expected to make effective financial decisions about money. In this paper, we explore the classroom practices that may enable a compassionate approach to financial literacy education. We observed an inquiry-based mathematics lesson in a Year 4 primary school classroom. The financial maths task asked students to decide on the best fundraising option for the school. We used the theory of practice architectures to analyse the interactions in the classroom in order to understand what may have enabled and constrained classroom practices. We found that classroom practices such as engaging with peers through positive and collaborative learning opportunities, making ethical, social and mathematical connections of the task, and considering the impact of financial decisions on others may enable a compassionate approach to financial literacy education.

Keywords Financial literacy · Financial maths · Social justice

How financial literacy is taught remains an important focus for educators working on social justice issues. Of concern is the focus on financial worth and the potential to equate it with self-worth. When financial worth is the focus of financial education, students from low-income households may be *blamed* and/or feel *shame* about the

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financial circumstances of their family (Blue 2016a; Lucey et al. 2015). Therefore, careful and compassionate adjustments to the curriculum may be required as having discussions about money could further stigmatise students from low socioeconomic backgrounds (Appleyard and Rowlingson 2013). Calls have been made for awareness of social justice issues to be reflected in the teaching practices of mathematics teachers (Atweh et al. 2014; Vale et al. 2016) and in the financial education practices in compulsory school settings (Appleyard and Rowlingson 2013). Sawatzki (2017) argues that designing financial literacy tasks requires knowledge of the content and the context and recommends that the task connects with the students' experiences and interests.

In the article, we explore the classroom practices that may enable a compassionate approach to financial literacy education. In this Year 4 inquiry-based mathematics lesson, we observed the classroom practices (including developing students' positive learning identities) used by the teacher, and the student interactions. We were interested in how primary students approach financial decision-making with care and concern for others. Thus, the aim of the article is to explore the classroom practices that may enable a critically compassionate approach to financial decision-making.

Background

Around the world, governments and policymakers have embraced the importance of increasing the financial literacy levels of their citizens (Organisation for Economic Cooperation and Development International Network on Financial Education (OECD INFE) 2012). A strong push for improved financial management for all citizens emerged as a priority following the global financial crisis of 2008. Adding financial education to the curriculum in compulsory school settings has been viewed as an effective way of reaching all students, especially those who may not receive financial education at home (Lusardi and Mitchell 2014). However, the effectiveness of financial literacy education globally (Willis 2011) and in Australia (Worthington 2013) has been questioned. Of concern is how educators are teaching financial literacy, as there is a potential to marginalise already vulnerable students (Blue et al. 2014). The hypothesis for offering financial education to children is based on the premise that acquiring financial skills and knowledge may shape behaviour and thus result in positive impacts on financial decision-making later in life (Berry et al. 2015). However, Peng et al. (2007) reported no significant difference between high school students who had received financial education and their knowledge about investing. Likewise, Mandell and Klein (2009) found that high school students who had completed a financial education course between 1 and 4 years prior 'were no more financially literate than those who had not' (p. 15). However, although financial literacy has been found to positively influence behaviour (Hilgert et al. 2003), the effects of financial education on increasing financial literacy and then on behaviour are less certain (Mandell and Klein 2009) as are the instruments used to measure financial literacy (Worthington 2013).

Globally, the importance of including social education in conjunction with financial education is also advocated. In Ghana, social education in combination with financial education is important to protect children from child labour (Berry et al. 2015). Geiger et al. (2015a) argue for the importance of numeracy (which includes financial literacy) being taught across the curriculum in various subjects, as Steen (2001) asserts that is how numeracy

is most effective. Lucey (2007) advocates ethical dimensions of financial decision-making to ensure that children are guided towards moral decision-making rather than making decisions from a purely economic basis. With continued calls for mathematics educators to be concerned about social justice (Gates and Jorgensen 2009) and for primary and high school educators to be brought into the financial education dialogue (McCormick 2009), we report on a primary school age mathematics lesson where children approach financial decision-making with care and concern for others. We highlight this lesson as it offers an alternative approach to the conventional (and dominant) individual wealth accumulation approaches because the social and ethical components of financial decision-making are also attended to in the lesson. These components are often ignored in conventional financial literacy education resources offered by financial institutions (i.e. banks) promoting financial advice, products and/or services.

Literature review

Financial mathematics and its connection to numeracy

Financial literacy is a twenty-first-century skill (Lusardi 2015). The mathematical calculations an individual makes mentally, with pen and paper, and/or with digital technologies when faced with financial decisions and/or dilemmas (Sawatzki 2014a, 2017) are aspect of financial literacy. Within mathematics, financial literacy is connected to numeracy, which is one of seven general capabilities within the Australian Curriculum (2016). The other general capabilities include literacy, Information and Communication Technology (ICT) capability, critical and creative thinking, personal and social capability, ethical understanding, and intercultural understanding (Australian Curriculum 2016). Consumer and financial literacy are also taught explicitly in humanities and social sciences (Australian Curriculum 2017). In Australia, consumer and financial literacy was added to the mathematics curriculum in 2011 as a sub-strand of number and algebra, called money and financial mathematics. Competing with (or perhaps working alongside) the national curriculum is the national financial literacy framework developed by the Australian Security and Investment Commission Australian Securities and Investments Commission (ASIC) (2011a). ASIC is responsible for financial literacy initiatives, including policy, in Australia (Australian Securities and Investments Commission (ASIC) 2011a, b) and offers professional development for educators (see MoneySmart Teaching in Australian Securities and Investment Commission (ASIC) 2012). A plethora of financial literacy resources is available mostly from financial institutions (e.g. Start Smart Commonwealth Bank) and financial regulators (e.g. ASIC). Educators are therefore challenged with identifying authentic learning experiences for students that do not simply promote financial products and/or services (i.e. financial planning and investing) and that include the social and ethical aspect of financial decision-making (Blue et al. 2014).

Defining and redefining financial literacy

Financial literacy has been defined in various ways by academics (e.g. Hung et al. 2009). The Organisation for Economic Cooperation and Development (OECD) uses the following definition in the 2012 Programme for International Student Assessment (PISA) financial literacy framework:

Financial literacy is knowledge and understanding of financial concepts and risks, and the skills, motivation and confidence to apply such knowledge and understanding in order to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life. (Organisation for Economic Cooperation and Development (OECD). 2012, p. 13)

From the OECD's definition above, financial literacy is about an individual's ability to make effective financial decisions throughout one's life, eventually leading to improved financial well-being. We argue that the alignment between effective financial decisions and improved financial well-being places the focus on individuals instead of wider societal impacts and thus needs further development. The definition above overlooks the impact of social structures that continue to perpetuate inequities both socially and economically (Lucey et al. 2015; Pinto and Coulson 2011). Frankenstein (1990) argues that it is the teaching of 'taken-for-granted assumptions about how a society is structured' (p. 336) that enables students to understand, speak and act from a more informed position. Thus, it is these societal inequities that are essential to consider when thinking about what financial literacy is and how individuals (financially literate or not) achieve financial well-being (Arthur 2014; Blue 2016a).

For the purposes of this article, we use the following definition for financial literacy. We argue that financial literacy

is more about an individual's capacity to acquire financial knowledge and apply this to the financial dilemmas faced at various life stages. It also involves critical reflection about the impact of an individual's financial decision-making and how this affects others while considering what influenced their financial decision (i.e. socioeconomic status, education level, personal and cultural values, life stages, social standing and professional associations, media and marketing, and/or the environment). (Blue 2016b, p. 5)

This definition of financial literacy embraces the importance of being concerned and reflective citizens (included in the definition of mathematical literacy; see Organisation for Economic Cooperation and Development (OECD) 2009, p. 14) and removes the unfortunate connection of financial literacy to financial well-being. In similar vein, Geiger et al. (2014) argue that becoming numerate involves much more than acquiring mathematical skills: it involves connecting mathematics to real-world contexts that require critical thinking and problem solving. We argue that this perspective is much the same in a financial context; however, the societal impacts and economic structures may exert greater influence on becoming financially literate. However, educators being able to recognise when an 'across-the-curriculum' 'numeracy opportunity arises and [having] the skill and disposition' (Geiger et al. 2015b, p. 540) to act is critical for the social and ethical component of financial decision-making to be included. By acting in a social, ethical and financial way, a more critical and compassionate approach to financial literacy education may be possible (Lucey et al. 2015).

Critically compassionate approach to financial literacy education

The importance of a critical stance on educational practice was advocated by Carr and Kemmis (1986). Skovsmose (1994) argues that ignoring the criticality required in education would mean 'that education does not have a role to play as a critical social

force' (p. 38). Nolan (2009) further contends the importance of teaching social justice in mathematics courses for pre-service teachers. Frankenstein (1990, p. 345) warns educators that students may 'initially resist the incorporation of economic, political, social and cultural issues into the basic mathematics curriculum'; however, persisting with this approach may enable students to see the world from a more critical perspective.

A critically compassionate approach to financial literacy education emphasises the need to care for others (Lucey et al. 2015) and examines the hidden consequences of wealth-driven financial decisions (Arthur 2011). Lucey et al. (2015) argue that conventional approaches to financial literacy

equate self-worth with the ability to control material objects, including other people. In other words, conventional financial literacy supports a system that defines the socially marginalised in terms of their economic worth to the financial elite, rather than in terms of life conditions and stories that they experience. (p. x)

Under the conventional approach to financial literacy education, individuals from low socioeconomic backgrounds are often *blamed* for their ineffective financial decision-making, financial circumstances and lack of ability to control resources (Blue and Pinto 2017; Lucey et al. 2015; Willis 2008), whereas individuals from middle- and high-socioeconomic backgrounds are rewarded for their ability to control resources (Lucey et al. 2015) and effectively make financial decisions without care and/or with unconcern about their financial literacy level (Blue 2016a). Teaching students the conventional or *thin* approach to financial literacy education may result in students from low-socioeconomic families placing *blame* on their parents (or guardians) for their inability to make *effective* financial decisions. Therefore, the moral and ethical aspects of teaching financial literacy or the praxis (moral, ethical and caring aspects of teaching) (Grootenboer 2013) must be thoroughly considered (Blue et al. 2015). Thus, teaching financial literacy for social justice starts with allowing students to consider the impact of their decisions on others, including the social, ethical, environmental, cultural and financial consequences.

Components of financial literacy and possible influences of financial decision-making

Financial education focuses on only knowledge acquisition, whereas financial literacy is reported to have two components—a knowledge dimension and an application dimension. The knowledge dimension includes the knowledge that an individual acquires through education and/or experiences relating to personal finance. The application dimension requires 'that an individual must have the ability and confidence to use his/her financial knowledge to make financial decisions' (Huston 2010, p. 307). Huston (2010) defined financial literacy 'as measuring how well an individual can understand and use personal finance-related information' (p. 306). Financial literacy education has previously been defined as the teaching of personal finance with an aim to increase financial literacy through the acquisition of personal financial knowledge (Blue et al. 2014). However, having the ability to *apply* (the second dimension of financial literacy) personal financial knowledge is dependent on many factors including socioeconomic status (Blue 2016a; Huston 2010). Based on research findings (see Blue 2016a) that highlighted the misguided efforts of increasing financial literacy levels of

Aboriginal people with the *hope* that it would lead to improvements in financial well-being, Blue (2016a) has expanded on Huston's (2010) definition of financial literacy to include Arthur's (2011) notion of critical financial literacy (see Fig. 1). Arthur (2011) argues, 'critical financial literacy must provide information which punctures the myth that prosperity for all is to be had by neoliberal financial literacy and neoliberal policies which increase wealth inequality' (p. 210). He argues, 'critical financial literacy contains a criticalness that implies a caring and ethical aspect' (Arthur 2011, p. 211). Fig. 1. Concept of critical financial literacy (Blue 2016a)

This expanded concept of financial literacy from two dimensions (knowledge and application) (Huston 2010) now includes a third dimension—the critical dimension, which is where the individual critically evaluates and analyses the 'financial dilemma' (as coined by Sawatzki 2014a) that they are facing against possible influences on financial decision-making. The critical dimension's placement, between the knowledge and application dimension, is deliberate, as this component enables discussions and understandings about why an individual is able to apply the financial knowledge or not. When an individual acquires personal financial knowledge through education and/or through experience, the ability to critically reflect, evaluate, analyse and consider influences that may affect their financial decision-making becomes a necessary component of critical financial literacy. Not all individuals who acquire financial knowledge or critically reflect, evaluate and analyse the financial dilemma they are facing will be able to *apply* their financial knowledge (Blue 2016a); an inability to *apply* financial knowledge may be constrained by one or more of the influences on financial decision-making (see Fig. 2). Fig. 2. Possible influences on financial decision-making (Blue 2016a)

These influences on financial decision-making include those that an individual may encounter when faced with a financial dilemma such as personal and cultural values, life stages, social and professional circumstances, education level, environmental impact, media/marketing pressures, psychological state, and socioeconomic status (see Fig. 2) (Blue 2016a). For each of the influences, the three dimensions (knowledge, criticality and

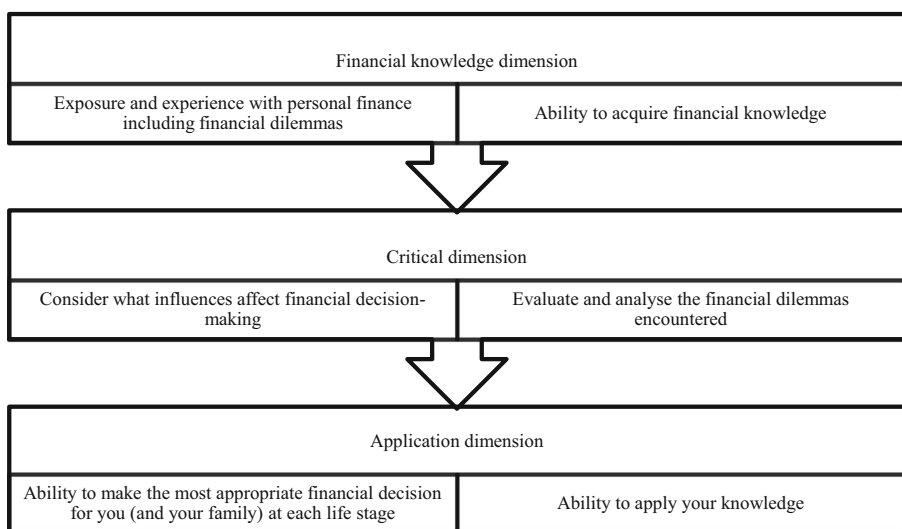


Fig. 1 Concept of critical financial literacy (Blue 2016a)



Fig. 2 Possible influences on financial decision-making

application) of financial literacy (see Fig. 1) depend on the circumstance of each and every individual. As an example, an individual with a concern for the socioeconomic status of the participants attending a school fundraiser would consider the impact of the price set for each item available for sale. Moreover, being concerned about how others may be impacted by the price set for each item is the compassionate focus to financial decision-making that moves beyond the wealth accumulation focus of conventional approaches to financial literacy education. Teaching financial literacy in a mathematics classroom, therefore, is not just about achieving the *highest profit* and/or the *largest sum of money saved/invested*; it also involves a social and ethical element. Boylan (2016) argues that ‘relationship[s], practice and action [are] sites for ethical reflection’ (p. 400), and this may include the relationships formed both inside and outside the classroom, education practices and action/approaches advocated for in the classroom. Taking these considerations into account, the research question guiding this study is: What classroom practices may enable critically compassionate approaches to financial decision-making?

Theoretical framework

We used the theory of practice architectures (Kemmis and Grootenboer 2008; Kemmis et al. 2014) as a lens to analyse practices that may enable a critically compassionate approach to financial decision-making. A practice is defined as

a form of socially established cooperative human activity in which characteristic arrangements of actions and activities (doings) are comprehensible in terms of arrangements of relevant ideas in characteristic discourses (sayings), and when the people and objects involved are distributed in characteristic arrangements of relationships (relating), and when this complex of sayings, doings and relating ‘hangs together’ in a distinctive project. (Kemmis et al. 2014, p. 31)

MacIntyre (1981) and Schatzki’s (2002, 2010) views of practice influenced Kemmis et al.’s (2014) definition above. However, it is beyond the scope of this article to describe their views of practice. It is important to comprehend that the theory of practice architectures permit a view of practice by understanding the conditions that are enabled and constrained by the cultural-discursive (sayings), material-economic (doings) and social-political (relatings) arrangements (Kemmis et al. 2014) (see Fig. 3). These arrangements are referred to as practice architectures (Kemmis and Grootenboer 2008).

We were interested in exploring what practices may enable a critically compassionate approach to financial literacy education. This theoretical lens was used to identify the sayings (the language that considered other people’s needs), doings (activities that allowed for multiple solutions) and relatings (how relationships were formed to foster compassionate and caring ways of being) in the mathematics classroom. By analysing the data through this theoretical lens, we were able to identify the arrangements that may enable the students to consider how their financial decisions could impact others. Fig. 3. The theory of practice architectures (Kemmis et al. 2014, p. 38)

Practices are composed of sayings, doings and relatings which occur in particular sites (such as classrooms) amid particular arrangements in three kinds of intersubjective spaces (Grootenboer and Edwards-Groves 2013; Kemmis and Grootenboer 2008). These spaces include *semantic space* (through shared language), *physical space-time* (during activities) and *social space* (in the classroom) (Grootenboer and Edwards-Groves 2013). In these spaces, individuals (i.e. the students, the teacher and the researchers) encounter one another (and things) through interaction and interrelationships (Kemmis et al. 2014). The practices are held in place amid arrangements of three kinds of practice architectures—*cultural-discursive*, the *material-economic* and the *social-political*—which are all found in a site (i.e. a school and/or classroom). The

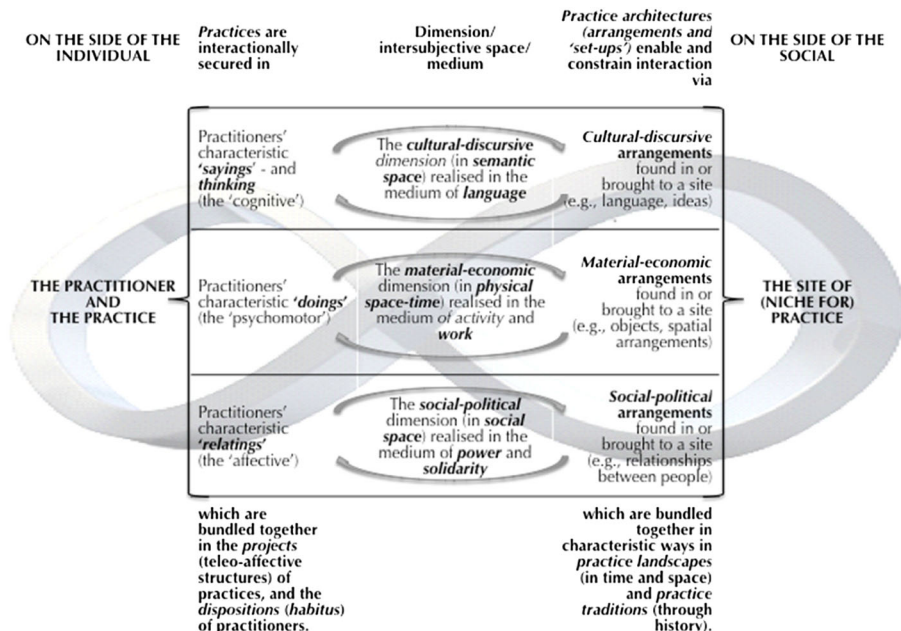


Fig. 3 The theory of practice architectures (Kemmis et al. 2014, p. 38)

cultural-discursive arrangements refer to the technical language of finance that has particular meanings attributed to it in financial mathematics lessons. The *material-economic* arrangements are about how the resources are arranged in an inquiry mathematics classroom so that particular activities can occur. Last, the *social-political* arrangements found in the classroom are how the students, teachers and researchers relate to one another. Therefore, practices are held together by the language, activities and relationships formed through the interactions between the individuals, object and site. As practices are both individual and social, when the practice of financial decision-making moves from an individual practice to a social (or collective) practice, an evolving dance of interactions occurs (Kemmis et al. 2014). This results in certain practices *stepping in* and other practices *stepping out* as the arrangements brought into the site are enabled and constrained by the practice architectures (Kemmis et al. 2014).

In our analysis, we identify the practice architectures by examining the cultural-discursive arrangements, material-economic arrangements and social-political arrangements in the classroom. These arrangements and set-ups both enabled and constrained interactions of the students, teachers and researchers and practices within the classroom (Kemmis et al. 2014). We use this theoretical lens to analyse the students and the teacher's *sayings*, *doings* and *relatings* in the financial maths lesson.

Methodology

In this section, we describe the study design, research context, the participants, the lesson—including fostering mathematical mindsets (Boaler 2016) through inquiry-based mathematics (Makar 2012)—growth mindsets (Dweck 2006), teachings, the task, and how we collected and analysed the data.

Study design and research context

We used a case study as described by Stake (1995) to explore classroom practices that may enable a critically compassionate approach to financial decision-making. Yin (2009) stated that participants and time are bounded in case studies. This case was bounded to the Year 4 students and the teacher and is also bounded in time to this lesson.

The lesson reported in this article was part of a larger Australian Research Council (ARC) research project investigating relationships between students' positive learning identities and their learning of mathematics through inquiry. The term *learning identity* is used to refer to 'the self-perceptions, personal values, psychological dispositions, and affective orientations, as well as the personal knowledge and academic capabilities, that the learner brings to bear in order to participate in, and make meaning from, a specific learning setting' (O'Brien 2017, p. 256). This term was developed from recent research with primary and middle years school students (O'Brien and Blue 2017; O'Brien et al. 2017). Fostering positive learning identities in mathematics classrooms may help to change students' beliefs about their capabilities in mathematics classrooms. We focused on the positive aspects of learning identities and how language (sayings), activities (doings) and relationships (relatings) may help to build caring and compassionate students through classroom practices that value concern for others.

The participants and the context of the lessons

We report on an inquiry-based mathematics lesson that focused on money and financial mathematics. The lesson we observed and are reporting on was from a Year 4 classroom in a primary school located in rural Queensland. The school has 29 Year 4 students and an index of community and socio-educational advantage (ICSEA¹) lower than the average value. This value means that the performance levels of the majority of the students are in the lowest quarter for achievement (low performing). The students in this study were working in small groups of three to four to determine the best fundraising option for the school. The importance of building positive learning identities in mathematics was fostered through the use of positive language to develop and build the classroom norms.

This school has adopted a whole-school approach to developing positive agile learners (PALs) (see O'Brien and Blue 2017) and used common language to focus the students' attention to five main areas for growth and improvement in the classroom. PALs 'articulate key learning-related behaviours identified in the literature as being correlated with, and characteristics of, people responding positively and productively to life's challenges' (O'Brien and Blue 2017, p. 10). The five PALs focus areas included

1. performing in the classroom;
2. being innovative;
3. taking risks;
4. reflecting; and
5. overcoming roadblocks/challenges.

The teacher of the Year 4 class was an experienced inquiry mathematics teacher who used PALs language in the classroom. By experienced, we mean that she has been involved in the larger research projects about inquiry mathematics for several years. This involvement included multiple cycles of professional development with other teachers teaching inquiry mathematics, followed by observing and providing feedback on inquiry mathematics lessons. Observations with the inquiry-based teachers involved in this larger research project took place approximately each term and/or when requested by the teachers during the school year.

In the lesson, we observed the teacher provides students with an ill-structured inquiry mathematics question and asks the students to work in small groups of three or four to solve the question that will have multiple pathways to investigate and several correct ways of solving the problem (Makar 2012). The inquiry teacher scaffolds the students' learning by having both whole-class discussions and individual discussions with the small groups during the lesson. Students are also expected to follow the PALs norms explicitly taught in the classroom during the inquiry lesson: using specific language such as *performing* which includes phrases such as paying attention, following directions, working hard with self-control, leading and helping others and staying motivated and completing tasks (O'Brien

¹ Index of Community and Socio-Educational Advantage (ICSEA) was developed to make meaningful comparisons with other schools on National Assessment Program—literacy and numeracy (NAPLAN) achievement tests. A student's family backgrounds and geographical location, and the number of Indigenous students in the school, are all factors in this index.

and Blue 2017). Asking questions, finding different ways to do things, brainstorming and creating, and overcoming roadblocks are phrases used under the *innovate* PALs category and are also explicitly used and taught in the classroom. The third PALs focus area, *taking risks*, includes language such as having a go, trying something—even when unsure—experimenting and developing solutions. The *reflection* area of PALs includes phrases such as thinking about your own learning, learning from mistakes, looking at the big picture and remembering to be your best self. The last PALs area focuses on *overcoming roadblocks* and the language used includes accepting feedback, being open and flexible, changing tactic and joining in and talking to the teacher (O'Brien and Blue 2017).

In the first term, the teacher spent time working with students to develop the expected performance PALs norms for working individually and in groups (see description above). Students understood what was expected of them by becoming familiar with the use of positive language in the classroom, the expectations set and establishing inquiry-based mathematics classroom norms. Video from one of the inquiry lessons in Term 2 (middle of the year) formed the main source of data for this article.

Inquiry-based mathematics and fostering growth mindsets

Makar (2012) describes inquiry mathematics as a process of solving ill-structured problems (Reitman 1965) with mathematical evidence that requires students to use negotiation to solve. Most problems in mathematics classrooms are well structured with a limited number of pathways to follow to reach the answer. In contrast, inquiry-based mathematics contains ambiguities that must be negotiated to solve the problem. As such, in inquiry-based mathematics tasks there is no single correct answer; instead, the students work in small groups to determine what their best answer is and provide evidence to support their claims. By way of an example, consider the question ‘Which bubble gum is best?’ Students in an inquiry-based mathematics classroom would identify and define the ambiguous word ‘best’ in the problem statement and determine the evidence required to support a conclusion (Makar 2012). Next, the students would design the method they would use to provide evidence that supports their conclusion. This could include identifying measureable ways to obtain data to support their claims. These methods may include conducting experiments to capture data about evidence deemed important (perhaps taste, and size of bubbles) using rating scales. Teaching guided inquiry mathematics lessons allow the educator to scaffold the learning and determine when collaboration and decision-making is required.

Inquiry mathematics may have the potential to foster growth mindsets (O'Brien et al. 2015). A growth mindset has been described as an individual's ability to embrace challenges, persist despite setbacks, understand the importance of effort, learn from feedback and see others' success as opportunities to learn from (Dweck 2006; Press 2014). Individuals with a growth mindset are more likely to be persistent, take risks, share mistakes² and embrace challenges (Dweck 2006, 2010), whereas students with a fixed mindset tend to believe that individuals are born with intelligence and view effort as evidence that they are not ‘smart enough’. Students will often have both a growth and a fixed mindset, depending on the subject (Dweck 2006). This Year 4 teacher taught her students about mindsets and the importance of effort and persistence. The teacher also attended professional development

² We are using the word ‘mistake’ in the mindset (Dweck 2006) and mathematical mindset (Boaler 2016) context of sharing mistakes.

about fostering growth mindsets in inquiry-based mathematics classrooms. Having a mathematical mindset, on the other hand, incorporates both growth mindset and inquiry-based pedagogies (Boaler 2016). An individual with a mathematical mindset ‘know[s] that math is a subject of growth and their role is to learn and think about new ideas’ (Boaler 2016, p. 34). We argue that inquiry mathematics lessons may have the ability to allow students to associate positive feelings with mathematics, resulting in an increased desire to take risks and persist with problem solving (i.e. growth mindset characteristics).

The task and curriculum requirements

In the Australian Curriculum, students in Year 4 were expected to have the ability to make connections to mathematical concepts, and solve simple problems including those involving purchasing with and without digital technologies (Australian Curriculum 2016). The task for the Year 4 students in this study involved planning for a school fundraiser that was to be held in the last week of term. The students were told that they could borrow \$400 from the school to purchase their supplies. In small groups of three or four students, they were required to figure out the ‘best’ fundraising option for the school. The students were provided with some possible ideas such as a sausage sizzle, pizza meal with a drink, popcorn or frozen dessert ‘ice cups’. Students were also told that they needed to explain revenue (total sales) and expenses (total costs) and show how they could make a profit. The groups had to determine what the best option was for their fundraiser. Each group had a leader, a spokesperson, a timekeeper and a writer.

Data collection and analysis

For this article, we video recorded the inquiry mathematics lesson outlined above. The video camera was set up in the back of the classroom and captured the larger context of the lesson during whole-group sessions. When students worked in small groups, the cameras (two were used) were positioned with one group for a few minutes and then moved to the next group. Not all groups could be videotaped because some students did not return their consent forms. Research notes, including informal discussions with the teacher, also served as a source of data.

Video analysis involved following a modified version of Powell et al.’s (2003) stages of analysis. The first stage of video analysis included making a record of the number of video files, their length and a brief summary of the content. After the videos were downloaded, each video was watched to identify how the classroom practices may have enabled a critically compassionate approach to financial literacy education. To identify these episodes, specific sections that appeared to identify classroom practices (e.g. the sayings, doings and relatings) were flagged.

The second phase included transcribing the flagged episodes. Next, we focused on practices such as particular ways of speaking (*sayings*) including using PALs language, particular ways of *doing* such as the resources made available to students, and particular ways of *relating* such as the positive social interactions. Once we identified these practices, we then highlighted sections of the transcript that related to classroom practices.

During the third phase, the episodes were rewatched to determine how classroom practices were enabled and constrained by the practice architectures (cultural-discursive arrangements, material-economic arrangements and social-political arrangements). This stage also included reflection on the classroom practice and context of the conversation that occurred.

The final stage of this analysis included reviewing the literature to ensure our understanding of compassion and care in a financial context were captured by the practices identified. Once the analysis was completed, it was reviewed and further discussions and/or clarification of the process occurred (this also included discussions with the teacher before and after a conference paper was presented).

In the next section, we describe how the classroom practice was enabled and/or constrained by the practice architectures found within the site (classroom).

Findings and discussion

In our analysis of the Year 4 lessons, we identified three practices that may enable a compassionate approach to financial literacy education. These findings included the practice of

- Engaging with peers through positive and collaborative learning opportunities (sayings—the language used through the cultural-discursive arrangement);
- Making ethical, social and mathematical connections to the task (doings—the activities and resources available—material-economic arrangement); and
- Considering the impact of financial decisions on others (relatings—relationships with others during the lesson and in anticipated future encounters—social-political arrangement)

Engaging with peers through positive and collaborative learning opportunities

In the excerpt below, a group of students were deciding whether or not they had enough items in their ‘snack pack’ for the school’s fundraising event. A student we named Ali was fairly quiet during this decision-making process until he suggested an idea, as shown below.

Monika: We still need another thing.

Ella: Do you think we should have yogurt?

Monika: With M&Ms. or something in it?

Ella: What is it called? Split pops? Do you think we should have split pops?

Ali: Oh I know, I know, we should get some juice.

Ella: Yeah juice!

Tomohiro: Yeah, juice that’s actually a good idea.

Monika: That would be a good with a popper.

Ella: Oh yeah.

Monika: So basically it will be a popper.

Ella: But good one.

Tomohiro: You did help us.

Ali: Yeah.

Tomohiro: That was a good one.

This positive reception from his peers resulted in his suggestion being accepted and being acknowledged as a ‘good’ idea. This recognition resulted in Ali continuing to offer suggestions throughout this lesson instead of disengaging from the task in

mathematics classes (and may contribute to his acquiring a positive learning identity). Ali's teacher confirmed that his participation in group activities throughout the year increased because he felt valued by his peers. Through the sayings outlined above, the students are including others in the decision-making process. On the side of the social, it is the discourse of inclusion and collaboration that may have enabled students to form positive learning relationships with their peers. Showing concern for others may have enabled the students to engage with one another in a positive and inclusive manner. It was the sayings and thinking (cultural-discursive arrangements) that each individual brought to the conversation in the social space that may have enabled the group to work well together. This included encouraging peers to follow through on their assigned role and building on each other's ideas. Through the use of positive language, collaborative group learning was enabled and working silently was socially discouraged (i.e. constrained). Indeed, being a part of a positive learning environment that included a common language of encouragement, inclusivity and kindness were the established norms that were formed in the classrooms. This positive learning environment where students felt valued by peers may have encouraged students to consider the thoughts, feelings and implications of their actions on others.

The classroom practices expected students to take risks, working in small groups and sharing their thinking and incomplete ideas with other students during inquiry lessons. Cheeseman and Mornane (2014) report that creating a positive learning mathematics classroom has many benefits, and that primary school children showed greater persistence in mathematics when they had positive emotions about the topic. In a noncompetitive learning environment, students are able to engage in the task without the pressures and anxiety that are often associated with mathematics classrooms. We believe that the facilitation of growth mindsets (Dweck 2006) and mathematical mindsets (Boaler 2016) may be possible when affective qualities such as 'care, empathy, respect and understanding' (Grootenboer and Marshman 2016, p. 22) towards each other are demonstrated in inquiry mathematics lessons. We observed students engaged with each other in positive ways that may have been enabled through the use of PALs language. The norms established in the activity of inquiry mathematics meant that certain behaviours were also encouraged (i.e. working together, having a go, overcoming challenges) and others were constrained (i.e. working independently, giving up, not participating). The teacher also allocated certain roles to each student in the group to ensure that their relationships were fostered in a positive, socially conscious way instead of in a domineering, personally controlling way. These roles were described as follows by the teacher:

Our leader is to make sure that everyone stays on track. So they are the ones who are going to make sure that everyone is sharing, that everyone is on track and that everyone is participating. And they are also the one who can go and get things like this copy of the sheet so you can write stuff down on it. [The information] will be up on the board but you can also have the sheet in front of you. [The spokesperson is] going to be the lead speaker of the group. They are going to be the one who is going to present the findings. They are on the ones who are going to start the conversation off. They do not need to be the only one who speaks. We still take turns. [The writer's job is] to write down information and do all of the jotting down and points and all the scribbling working sort of stuff [the rough work]. So the writer is the one who makes all the notes and puts all the things down on paper before you start [entering information on] this

paper on your own. [The time keeper's role is] to make sure that we are all on track and that we get our jobs done on time. So they have to be the ones with their eye on the time that's on the board. Because I need to make sure that you get to an answer before that time is up. So you are not sitting there going 'we do not know what we are doing'.

In this excerpt, the teacher's emphasis constructed the idea of leadership as looking after others—such as making sure everyone is participating, taking turns, annotating the ideas of the group and ensuring the group completes their tasks in the allotted time. In this way, everyone was socially accountable to enable the group to be productive.

Therefore, the practice architectures that enabled positive and collaborative learning opportunities included the language of PALs used in the classroom (cultural-discursive arrangement), the norms established in an inquiry mathematics classroom (material-economic arrangement) and the type of respectful, caring and positive relationships promoted (social-political arrangement).

Making ethical, social and mathematical connections to the task

In this lesson, some of the Year 4 students struggled with understanding the concept of profit. During our analysis, we identified various times that the teacher scaffolded their learning to ensure they were considering the cost to purchase the goods. For example, the teacher reminded the class 'to start thinking about [profit]. How much can I sell it for that is still reasonable [price wise] but I can make more profit? And profit is the difference between how much it costs you and how much you sell it for'. As the students began deciding on a price to sell the goods that would cover the costs and make a profit, we identified students connecting the task to mathematical calculations (i.e. calculating costs and staying within their budget). In this excerpt, the students are discussing at what price to sell their family meal deal. During the discussion, a student announced that they would need to calculate the costs to determine if the selling price was appropriate.

Tomohiro: What should the price be now?

Ella: I think the price should be...

Monika: Back to \$10.

Ella: Okay so add all that up.

Tomohiro: Oh my budget!

Monika: Wait not yet!

Tomohiro: That's a lot of stuff!

Ella: Maybe we should have cookies or something?

Monika: No, because that will go with the sweets.

Ali: Let us make it a family meal so then everyone gets something.

Ella: A family meal would cost \$10 would not it?

Monika: No a little bit more.

Tomohiro: Like \$15.

Monika: Just a little bit more than \$11.

Ella: \$12.99.

Ali: How about \$13.

Students: Yeah \$13!

Monika: But we have to add all of this up so we need a sum on the side.

Some students began to demonstrate that the price they came up with for their item had to cover the costs to purchase the item and allow for some money to be made. Their

ability to come up with a price and then state that they had to do some calculations before confirming the price demonstrated the students' ability to connect this 'real-life' problem to mathematical concepts. By using a real-life problem for students to solve in a mathematical lesson, there was potential for students to understand the importance of mathematics outside the classroom. Through this inquiry activity, the students encountered interactions that required them to consider financial decision-making from the side of the individual (i.e. what they might prefer to purchase and consume) and as a collective group fundraising for the school (i.e. remembering to cover the costs and make a profit for the school). Students' interactions with each other may have been enabled through small-group discussions and whole-class discussions during this problem-solving activity.

One example of a whole-class discussion occurred when a group shared the price of their item with the teacher. This price appeared to be too high so the teacher asked the students to show her how they calculated the price.

Ms. Ferguson: What did you guys have a problem with that one for? What did you tell me was the original price for your item? Owen what was the original price you told me?

Owen: We found out the cost.

Ms. Ferguson: This group originally told me that the cost of \$10 for their deal and then when we look at the items we worked out that it was \$2. So who thinks they can work out why that had that problem? Sophia, why do you think they might have had that problem?

Sophia: Maybe because they were thinking about if they put it up they wouldn't have to buy so many?

Ms. Ferguson: They said the cost to buy the item was \$10 and that was before they were going to charge anyone a price. And when we look at the cost it was \$2. So why do you think there was that different in price?

Angus: Because they didn't ... have as much stuff?

Ms. Ferguson: So they reduced their items? Actually they didn't reduce their items? Why do you think they might have had a difference in price Brett?

This conversation continued with various students until it was discovered that the mistake was including the cost of the whole pizza instead of the cost of just one slice of pizza. Students in this class were used to sharing mistakes and/or challenges and were not discouraged by this whole-group discussion. Instead, the students persisted and tried to figure out how this mistake could have occurred, checked their group's calculations and made sure that they had not made the same mistake.

The classroom practice of allowing students time to persist with ambiguous problems may have enabled students to think, to act and to relate to each other without certainty and without an answer. The language students used about how profits, expenses, budgets, sales and discounts factored into financial decision-making was realised in the cultural-discursive dimension enabled or 'set up' through the compassionate ways of being and inclusion. The *material-economic* arrangements included flyers from supermarkets and local food shops. These items enabled certain conversations about prices and products and constrained other conversations about products not included in these flyers (such as purchasing items from markets). Last, the *social-political* arrangements found in the classroom were how the students, teacher and researchers related to one another. These relationships were strongly influenced by the

use of PALs language, so much so that all parties would without hesitation ask if a student was ‘having a go’. The classroom practices that may enable a critically compassionate approach were held together by the sayings, doings and relating that were formed through the interactions between the people, resources and the classroom. Moreover, by working in groups instead of independently, the students considered the ‘social’ by designing a ‘family’ meal that had something for everyone. The students also demonstrated the ethical aspect of determining a ‘fair’ price for their items instead of a price that would ensure the highest profit for the school. Most students at this school are from a low-socioeconomic background and some students were very cautious about borrowing funds from the school to reduce risk.

Considering the impact of financial decisions on others

During this lesson, the Year 4 students demonstrated their concern for others. The first concern was about their ability to repay the available loan of \$400 provided by the school to purchase supplies. One group suggested that they would only borrow half of the available funds because they were worried about their ability to repay such a large amount. Another consideration about others occurred when a group of students were determining what to sell and to whom it might appeal.

Sophia: We have decided to do hot dogs. So far we have not went through drinks or anything. We have just went through how much it will cost.

Ms. Ferguson: So you have already started to work out your pricing?

Sophia: Yes.

Ms. Ferguson: And why did you think hot dogs would be best?

Sophia: Because this term has been really cold so we thought not ice cups because no one will really buy them and really icy cups are only for kids. So we thought hot dogs, like teachers would buy them and so would parents and kids.

Ms. Ferguson later explained that the students were thinking if they could provide an item that would appeal to many that they would be able to keep the cost of the item down. The importance of affordability for teachers and families illustrated the students’ compassion for others in the financial decision-making process, as did the change of item to something that had a larger appeal. The students and teacher were relating with each other in ways that were set up through the use of positive language and through the act of inquiry learning. You could say that their interaction with each other may have been enabled by the underlying care and concern for positive and engaging experiences in mathematics lessons.

Lucey et al. (2015) advocate for a critically compassionate approach to financial literacy education rather than the conventional approach that focuses on *effective* individual, wealth-accumulating financial decision-making. Thinking beyond oneself enables care and concern for others when making financial decisions. Considering others in the financial decision-making process often involves more criticality and compassion about where the item was made, the wage received and the environmental footprint of the item, for example. In some regards, we could argue that these compassionate approaches to financial decision-making may enable praxis. By praxis, we are referring to ‘when an educator, through her or his practice, takes into account not only her or his own interests, but also the long-term interests of each individual student, and the long-term interests of society and the world at large’ (Kemmis and Smith 2008,

p. 4). In the primary school context, the importance of valuing a more compassionate approach to financial decision-making meant that the students were taught to think beyond themselves and to show concern about the impact the price set has on the individuals purchasing these goods at the school fundraiser. This was particularly important in a site (or schools) of disadvantage.

Sawatzki (2014a, 2014b) and Jorgensen and Sullivan (2010) highlighted the importance of creating tasks that are meaningful to students, critiquing one-size-fits-all approaches to mathematical problem solving. The financial literacy tasks the students worked on in this lesson incorporated social, ethical and mathematical problem-solving skills. The social aspect of this task had to do with the group-work aspect of the task and how each task involved working with others. The ethical aspect of the task was time and space to consider the needs of others. Last, the mathematical problem-solving component involved how students determined a fair price after covering the costs to purchase the items. The consideration of others was essential in enabling a more compassionate approach to financial literacy education. The classroom practices of expressing care, empathy and compassion may have been enabled by the sayings (use of PALs language), doings (inquiry-based mathematics) and relatings (in a supportive and encouraging growth mindset/mathematical mindset way with each other) in this mathematics lesson.

Concluding remarks and implications for future research

This research contributes to our understanding of how students make financial decisions with care and concern for others. We identified the classroom practices that may enable a critically compassionate approach to financial literacy education in a primary school inquiry-based mathematics lesson. These practices included engaging with peers through positive and collaborative learning opportunities (this allowed for all voices to be heard in the financial decision-making process); emphasising social, ethical and mathematical connections to the task (to ensure financial decision-making is taught as multi-dimensional); and considering the impact of financial decisions on others (this ensured financial decision-making was not based purely on an economic basis). This case study offers an alternative approach to the dominant and conventional individualistic wealth-accumulating approach to financial literacy education (e.g. Start Smart and MoneySmart) that often ignore concern for others. Lucey et al. (2015) argue that teaching financial literacy from a critically compassionate approach involves allowing time for the students consider the social, environmental, cultural and financial contexts. With this task, it was the kind and compassionate interactions the Year 4 students had with their peers while working on real-world financial maths problems that we focused on because this aspect is often ignored in conventional financially focused approaches to decision-making.

In this lesson, we observed that students working on guided inquiry mathematical lessons demonstrated persistence when they continued with problems (i.e. even when the price of a slice of pizza was too high) and when they maintained their effort and interest in solving the problem (i.e. even when it was determined that the cost of a whole pizza was included). We also observed that students persisted with tasks because they deemed the task relevant, relatable and meaningful. Indeed, the importance of

‘[m]aking links to the students’ cultural and social experiences within problem contexts and activity in mathematics has the potential to support powerful engagement’ (Hunter et al. 2016, p. 225). Furthermore, Sawatzki (2014a) argued that an effective approach to teaching financial literacy is to incorporate age-appropriate financial dilemmas that involve social, ethical and mathematical problem solving, and this was illustrated in the case we presented. Thus, we found that through group-based learning in inquiry-based mathematics lessons (see Fielding-Wells et al. 2014), it was possible for students to experience age-appropriate financial dilemmas (Sawatzki 2014a) and to consider, through discussion, how their financial decisions affected others (Lucey et al. 2015).

Implications for future research include determining if inquiry mathematics classes have the ability to foster growth mindset traits (such as persistence and effort) (Dweck 2006) and/or a mathematical mindset (Boaler 2016). As classroom practices have an influence on students’ attitudes towards mathematics, positive pedagogical practices are required to combat negative attitudes (Hubbard 2001; Larkin and Jorgensen 2015; Swars et al. 2007). Thus, the potential to positively transform students’ attitudes about mathematics is possible if students experience ‘joy and excitement’ instead of ‘panic, boredom and frustration’ in the classroom (Grootenboer and Marshman 2016, p. 21). This is particularly relevant for students from low-socioeconomic backgrounds (such as the students in this research) as their beliefs about their abilities to achieve in mathematics are related to the opportunities they experience; these students often demonstrate higher levels of maths anxiety (Grootenboer and Marshman 2016). In this article, the students we observed were primarily from low-socioeconomic backgrounds and thus the importance of providing positive learning experiences was essential.

Last, the findings highlight more broadly the importance of thinking beyond monetary gains in financial literacy tasks by considering how others may be affected by the financial decisions made and/or imposed by another individual. We advocate for critically compassionate approaches to financial literacy education in inquiry-based mathematics lessons in primary school classrooms that include collaboration, group work, taking risks, sharing ideas and allowing for multiple solutions, approaches founded on kindness and care to each other instead of the conventional individual wealth-accumulating approach.

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