

## **Translanguaging with Maltese and English: The Case of *Value, Cost and Change* in a Grade 3 Classroom**

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**Abstract:** This paper describes how a Primary school teacher in Malta used Maltese and English to teach her 8-year-old pupils meanings for the money-related English words *value, cost* and *change*. Classroom interaction data is presented to illustrate how the teacher drew on the pupils' previous knowledge of money, using related Maltese vocabulary and then introducing the English translations. My observations support international evidence of the richness of bilingual educational contexts. The translanguaging is discussed in relation to whole-class scaffolding strategies as conceptualised by Anghileri, and by Smit, van Eerde, and Bakker. I conclude that while the observed teacher appeared to be successful in her aims, her teaching style appeared to limit the potential generation of conceptual discourse on the part of the pupils. I highlight the need for research to be carried out on how scaffolding through translanguaging might pan out in learning contexts that aim to increase pupil engagement with mathematical discourse

**Keywords:** primary mathematics education; scaffolding; translanguaging; bilingualism in Malta

### **Introduction**

Baker (2011) defines code-switching as a switch between languages at word or sentence level or at the level of blocks of speech. Traditionally, code-switching has tended to be viewed through a deficit perspective based on the assumption on the value of monolingualism (García, 2009). However, as explained by García, this view is being strongly challenged today, as it is being recognized that bilingualism is not a deviation from a norm but, rather, a communicative method used by many people in the world. Indeed, drawing on more than one language is commonly found in classroom

contexts where two or more languages are represented. For example, Amin (2009) reflects on the shifts from Modern Standard Arabic to English or French in the Arab region; Fu (2003) and Manyak (2001) describe respectively Chinese/English and Spanish/English switching in the U.S.; Palviainen and Mård-Miettinen (2015) discuss Finnish and Swedish in Finland; and Then and Ting (2011) write about Bahasa Malaysia and English in Malaysia. With specific reference to *mathematics* classrooms, various researchers have discussed the use of two or more languages in teaching/learning situations, including Bose and Clarkson (2016), Halai (2009), Jones (2009), Norén and Andersson (2016), and, Setati, Adler, Reed, and Bapoo (2010). In the situations discussed by these researchers, the ultimate aim of the teachers observed was effective pupil learning.

As part of his doctoral project carried out in Wales, Williams (1994) coined the term 'translanguaging'. By this he meant the planned and systematic use of two languages, for example, switching from English for reading/listening, to Welsh for speaking/writing. Subsequently, the term 'translanguaging' has gained ground in academic circles, but has taken on a wider and more flexible meaning. García and Kleyn consider 'translanguaging' to be the "deployment of a speaker's full linguistic repertoire" (2016, p.14). They highlight the relevance of translanguaging in post-colonial education contexts where the medium of instruction is often different from the language spoken by the students. In these situations, the use of the students' language(s) may be used to aid comprehension, resulting in a mix of two (or more) languages as part of the teaching/learning process.

Notably, the term 'translanguaging' is associated with a positive view of the mixing of languages. This is in contrast to the traditional association of the term 'code-switching' with negative perceptions, for example, when one views code-switching as language deficit. García and Li Wei (2014) explain that translanguaging focuses attention not on the languages *per se*, but on the *practices* of bilinguals, which may include original and complex constructions (verbal and written) on the part of the speakers. In this paper, I choose to use the term 'translanguaging' to highlight that the use of Maltese and English is an established practice in Maltese classrooms, a practice that appears to be a beneficial pedagogical tool (Camilleri, 1995). Hence, I view the practice positively.

The aim of this paper is to present data that shows how a Primary school teacher in Malta translanguaged using Maltese and English during a series of lessons on the topic 'Money'. The main focus of her lessons was to teach the children the meaning of the words *value*, *cost* and *change*. The teacher's use of the languages will be considered in terms of 'scaffolding' strategies as described by Anghileri (2006) and Smit, van Eerde, and Bakker (2013). The paper begins with an outline of the Maltese bilingual educational context.

This is followed by a description and discussion of the observed teacher's language strategies. I end the paper by recommending further related research.

## Bilingual Education in Malta

Malta enjoys two official languages. One is the national language Maltese which, according to a recent self-report census, is spoken by 90% of Maltese citizens (National Statistics Office, 2014). The other official language is English, a legacy of 164 years of British colonial rule (1800 – 1964). Both languages play an important role in Maltese people's lives. Maltese enjoys respect nationally and internationally, while English is recognized as an important global language and is crucial for the local tourism industry (Camilleri Grima, 2015). Research (see, for example, Camilleri, 1995; Camilleri Grima, 2015; Gauci, 2011; Sultana, 2014) and much anecdotal evidence suggest that the vast majority of teachers use both languages to varying degrees. This is because whereas Maltese is usually the language of the teacher and students, English is considered to be the 'standard academic language' (García and Li Wei, 2014) of many school subjects, including mathematics. This situation often results in English words being embedded into stretches of Maltese speech. For example, it is customary to retain 'technical' or subject specific words in English even if Maltese equivalents exist (Camilleri, 1995)<sup>1</sup>. This certainly applies to mathematics, for example, one might say "**Illum ser nitkellmu fuq il-quadrilaterals**" [**Today we're going to talk about** [the] quadrilaterals].

Initial teacher education has had a role to play in the development of the dominance of English in education. From 1881 up till the 1960s, that is, for a good part of the British colonial period, school administrators received their training in the U.K. (Zammit Mangion, 1992). Furthermore, between 1944 and the late 1970s, teacher training was run by British Catholic religious orders in residential programmes (Camilleri Grima, 2013). Thus, educators were traditionally enculturated into the practice of schooling through English<sup>2</sup>. Certainly, one factor that prompts translanguaging in classrooms is the pervasion of English as the language of written texts. For a number of subjects, textbooks – even when produced locally – are written in English.

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<sup>1</sup> Here I am not referring to mathematical words such as *computer* and *graph* that have been wholly assimilated into written and spoken Maltese (**kompjuter**, **graff**) and are to be found in a respected dictionary (Aquilina, 1990). Rather, I refer to words like *multiplication* and *square*, for which Maltese equivalents (**multiplikazzjoni**, **kwadru**) are found in the dictionary, and may indeed be heard in other contexts, but are not commonly used in class.

<sup>2</sup> Teacher-training moved to the University of Malta in the late 1970s.

The subjects include science and mathematics at primary level and the natural sciences, mathematics, ICT, economics, accounts, amongst others, at secondary level. Other written texts include examination papers, software, whiteboard work, worksheets and pupils' notes. As teachers and children shift between verbal interaction and written texts they tend to shift between languages, and this accounts for a good amount of the translanguaging that occurs.

Policy documents have periodically offered guidance on language use. The 1999 National Minimum Curriculum (Ministry of Education, 1999) had recommended that schools should develop their own language policies according to their own needs. However, it also recommended that mathematics, science and technology at primary level, and other subjects such as biology and economics at secondary level, be taught through English. According to the writers of this document, code-switching should only be used in cases when using English poses problems. The more recent National Curriculum Framework (Ministry for Education and Employment, 2012) recognises the need for clear direction on the language of instruction, and repeats the recommendation for school based policies. With respect to mathematics, the National Curriculum Framework is less prescriptive than the 1999 document, giving the general guideline that "mathematics concepts and language are [to be] inculcated through systematic teaching and learning activities" (p.51).

Anecdotal evidence shows that, irrespective of policy documents, the mixing of Maltese and English is an ingrained practice. Given this common language practice, I wished to study how teachers might use Maltese and English to support students' learning of mathematical ideas. In particular, I focus on the role of translanguaging. International research in mathematics education spanning over forty years suggests that for multilingual students, purposeful use of all their language resources can be beneficial; this has been pointed out by Barwell et al., (2016). In particular, García and Li Wei (2014) state that teachers can use translanguaging strategically as a scaffolding approach to ensure that emergent bilingual students engage with rigorous content, access texts and produce new language practices and new knowledge. Hence I ask the question: *Given the common use of Maltese and English in Maltese mathematics classrooms, how might a teacher's translanguaging support young students' learning of mathematical ideas?* In order to address this question I draw on the theoretical construct of scaffolding.

## **Scaffolding**

Wood, Bruner, and Ross (1976) define 'scaffolding' as adult support which is adjusted over time until this help is removed when the learner can manage

alone. Wood et al. list six key elements that they believe scaffold learning, which include demonstration, marking critical features of the task and controlling frustration. Tharpe (1993) also suggests strategies for supporting students' learning, including feedback, questioning and cognitive structuring (e.g. explanations). The notion of scaffolding was originally conceptualised in relation with a child's Zone of Proximal Development (Vygotsky, 1978) and was related to adult-to-child interactions (Cazden, 1979; Wood et al., 1976). However, Smit et al., (2013) make a case for extending the idea to whole class contexts. They affirm that the social setting in which learning takes place fits in well with Vygotsky's work that stresses social settings, and that one can consider the ZPD of the class as a whole.

In this paper I use two interpretations of the notion of scaffolding. The first is that proposed by Anghileri (2006). Based on classroom observations, Anghileri drew up a hierarchy of scaffolding strategies used by the teachers observed. Level 1 consists of *environmental provisions* which includes the class organisation, structured tasks and artefacts. Anghileri considers this level to be the most basic one, since the provisions enable learning to take place without teacher intervention. Emotional feedback, such as drawing attention or encouragement, is also included at this level. Level 2 involves *explaining, reviewing* and *restructuring*. More specifically, this level includes teacher strategies such as modelling, prompting and probing, providing meaningful contexts, rephrasing students' talk and simplifying problems. The highest level, Level 3 involves *developing conceptual thinking*. At this level, the teacher uses strategies that encourage students to make connections, develop representational tools and to generate conceptual discourse. Here, scaffolding is more complex. As an example of scaffolding the development of representational tools, Anghileri gives the idea of using symbolic records as tools for thinking. As an example of making connections, Anghileri mentions the use of the expression 'double 6' instead of '6 add 6' in paraphrasing a pupil's suggestion. With regard to conceptual discourse, Anghileri explains that the teacher goes beyond explanations and justifications; rather, by initiating reflective shifts, what is said and done in class is rendered an explicit topic of discussion.

Another model for scaffolding is offered by Smit et al., (2013). They identify three key characteristics in the scaffolding process. One characteristic is *diagnosis*, or establishing the students' present state of knowledge. Another characteristic is *responsiveness*, which implies adapting to students' learning; Smit et al. consider this to be the heart of the scaffolding process. The third characteristic is *handing over to independence*, whereby students are able to achieve or carry out a targeted aim unaided. It is this characteristic that is the ultimate aim of the scaffolding process. Smit et al. state that successful handing over includes the fading of teacher support. Smit et al. also make a distinction between "*off-line*" and "*on-line*" application of three characteristics they identify, by which they mean the application of the strategies outside the

classroom (off-line) and as part of the classroom interaction (on-line). From their research, Smit et al. also note that in the whole-class context, the process of scaffolding is *layered, distributed* and *cumulative*. *Layering* refers to the interweaving of diagnosis, responsiveness and handover, in, and outside, classroom interaction; *distribution* refers to the fact that scaffolding occurs in a “scattered way” (p.830), that is, in various episodes over time; *accumulation* refers to the fact that students’ learning processes represent the cumulative effect of scattered diagnosis, as well as online and offline responsiveness over time.

While Anghileri’s model includes specific strategies, Smit et al.’s characteristics are more generally phrased. Since I will be referring to both models in my analysis of data, I have found it helpful to line up the two models as presented in Table 1 in order to highlight how they overlap.

Anghileri (2006)	Smit et al. (2013)	
<p><u>Level 1: Environmental provisions</u> Classroom organisation, sequencing and pacing, free play, structured tasks, self-correcting tasks, artefacts, peer collaboration, emotive feedback</p>	<p>[No parallel can be found here since Smit et al., (2013) believe that considering aspects such as classroom organisation, artefacts and so on, is stretching the notion of scaffolding too far from its original conception].</p>	
<p><u>Level 2: Explaining, reviewing &amp; restructuring</u> Reviewing: parallel modelling, prompting &amp; probing, interpreting students’ actions and talk  Explaining &amp; justifying, showing &amp; telling  Restructuring: providing meaningful contexts, rephrasing students’ talk, simplifying the problem, negotiating meanings</p>	<p>Diagnosis (establishing the students’ present state of knowledge)  Responsiveness (adapting to students’ learning)</p>	<p>Online / Offline</p>

<p><u>Level 3: Developing conceptual thinking</u></p> <p>Making connections</p> <p>Developing representational tools</p> <p>Generating conceptual discourse</p>	<p>Handing over to independence (students carry out a targeted aim unaided)</p>	
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Table 1: Comparison of two scaffolding models (Anghileri, 2006, and Smit et al., 2013).

I now explain the context and design of my study, following which I use the afore-described models of scaffolding to interpret a primary teacher’s approach to teaching ideas related to money.

**The Context and Design of the Study**

The reflections offered in this paper are based on a case study of one classroom. Yin (2014) suggests that case studies are a particularly suitable research method to answer ‘how?’ type of research questions. As Stake (1995) explains, the purpose of a case study is to understand well a particular context; case studies bring to light that certain situations and learning experiences can—and do—happen or exist. My aim is to contribute to understanding the relationship between language and mathematics and hence, although conclusions from my study cannot be generalised, they can add to our understanding of this relation. The classroom observations were carried out in 2002 and served as a pilot study for a larger research project through which I was to study the use of language in elementary mathematics classrooms (see, for example, Farrugia, 2007, 2009 and 2016). The focus of the piloting was mainly the practical elements of the data collection process, but the classroom interaction itself suggested interesting points, thus prompting me to revisit it at this later date.

My choice of teacher was opportunistic (Wellington, 2000): I knew Anita (pseudonym) professionally and was aware that she was a highly motivated teacher. I approached her with a request to observe her teaching mathematics, in order to collect data about translanguaging practices. Anita taught a Grade 3 class (8-year-olds), whom I refer to as ‘pupils’ due to their young age. The home language of all the pupils was Maltese. I observed seven lessons on the topic ‘Money’, each of duration 30 – 45 minutes. I took the role of observer-as-

participant (Cohen, Manion, and Morrison, 2000) since my interest was simply to observe and reflect, and thus I did not influence the design or implementation of the lessons. The lessons were video-recorded to allow for later transcription and analysis.

Prior to the lessons, Anita informed me that the school administration recommended that English be used to teach mathematics; this was the official policy recommendation at the time (Ministry of Education, 1999). However, Anita said that she tended to use both English and Maltese. In our informal conversations prior to the series of lessons, and as the days progressed, she explained that although she tried to use English as much as possible, she felt that she needed to use Maltese to make sure that the children understood the mathematics at hand. This reasoning is similar to that of the Austrian teachers studied by Gierlinger (2015); these latter teachers taught a variety of subjects through English and for them it was the subject – rather than the language – that was priority. Anita used a whole-class teaching approach, whereby the lessons were teacher directed, and the pupils worked on the same tasks at roughly the same pace. Their desks were set in pairs in a rows-and-columns arrangement and Anita tended to stand at the front of the classroom, unless she was monitoring the children’s work during a written exercise. The textbook in use was a local publication written in English, and Anita provided the children with occasional worksheets, also written in English. The interaction observed was that described by Sinclair and Coulthard (1975) as ‘IRF’ (initiation-response-feedback), and thus the children tended to give very short, often one-word, answers to Anita’s questions or prompts. For example:

- Teacher:           (Referring to a number of priced grocery items set out on the desk). What costs 12 cents? Which one costs 12 cents?
- Pupil:             The juice.
- Teacher:           The juice. Which one costs 40 cents?
- Pupils:            (In chorus). The soup.
- Teacher:           The soup, OK.

Anita assumed children’s prior knowledge of some topic related words, namely *cents*, *10c* (and similar), *amounts*, *shopping*, *money*, *coins*, *addition*, *subtraction*, *how many* and *how much*. This assumption was based on her knowledge of what had been covered in the previous grade, from her general relationship with the children as their class teacher, and also, through the periodic classroom experience of collecting money for outings and charities. Indeed, during the lessons, I noted that Anita used the afore-mentioned words without stressing them or drawing attention to them in any particular way. On the other hand, the words *value*, *cost* and *change* were assumed to be new ‘key’ English mathematical words that Anita stated she needed to focus



on. She believed that although the children were likely to be already familiar with such notions thanks to their life experiences (and therefore, with the associated Maltese terminology), she felt confident that the *English* terminology would be new to them. In order to introduce these new words, Anita made use of shopping contexts, utilising grocery items, cardboard laminated coins, role play, and handouts that depicted everyday money-related contexts. This is in line with Mercer's (2000, p.35) suggestion that "teachers can help learners make sense of technical terms by introducing them into dialogues with pupils in situations where the context helps makes meaning clear".

### Using Maltese and English to Teach the Topic 'Money'

In this section I describe the approach taken by Anita to address the ideas of *value*, *cost* and *change* over the seven observed lessons. Transcripts are provided as illustrations.

#### *Value*

As Anita had anticipated, the pupils were already familiar with the coins and their values and could talk about them in Maltese. Anita started the first lesson by holding a twenty minute discussion about the coins in use, during which she asked individuals to mention amounts for which a coin existed (e.g. 2 cents) and amounts for which no coin was available (e.g. 3 cents). (NOTE: the currency in use at the time was the Maltese Lira. 1 Maltese Lira was equivalent to 100 cents). As the discussion progressed, Anita sketched existing coins on the whiteboard in the form of a circle with, for example, *1c* written within it. This conversation was held mainly in Maltese, with coin values stated in English (e.g. "ten cents"); this is a common practice locally, even outside the classroom.

Following Anita's prompts or questions, the children commented that one could buy more with a coin that had a bigger number shown on it, and that they would prefer their grandmother to give them a Maltese Lira rather than a 1 cent coin. At one point in this discussion, one of the pupils, James, stated that he would prefer one coin to another because "**tiswa hafna**" (**it's worth a lot**) and this was promptly followed by Kenneth's suggestion "**in-numru ikbar**" (**the number is bigger**). It was at this point that the word **tiswa** was first used by a pupil named Fiona. This word is grammatically a conjugated intransitive verb and translates into '*what it's worth*'. As a conclusion to the discussion, Anita stated that she was going to ask questions, which she would write on the whiteboard. The interaction is reproduced below. In the transcription, the original speech is shown in the left-hand-side column, while I offer a translation in the right-hand-column. Any speech that was uttered in

Maltese is given in a **bold** font, and similarly for its translation. Pupils' names are pseudonyms, although in the first transcript below, pupils are numbered since they were out of camera view and hence unidentified.

Teacher:	How many Maltese coins are there? ( <i>Writes this question on the whiteboard.</i> )	How many Maltese coins are there? ( <i>Writes this question on the whiteboard.</i> )
Pupils:	Seven.	Seven.
Teacher:	There are 7 Maltese coins. ( <i>Writes this statement on the whiteboard.</i> ) Which coin has the smallest value? ( <i>Writes this on the whiteboard.</i> ) What am I asking? <b>X'qed nistaqsi hawn?</b> Which coin has the smallest value?	There are 7 Maltese coins. ( <i>Writes this statement on the whiteboard.</i> ) Which coin has the smallest value? ( <i>Writes this on the whiteboard.</i> ) What am I asking? <b>What am I asking here?</b> Which coin has the smallest value?
Pupil 1:	<b>L-izghar.</b>	<b>The smallest.</b>
Teacher:	<b>Kif tidher?</b>	<b>As in the way it looks?</b>
Pupils:	( <i>In chorus</i> ). <b>Le.</b>	( <i>In chorus</i> ). <b>No.</b>
Teacher:	OK. <b>Mela x'inhu? Liema hi dik il-kelma li qalet Fiona,</b> the magic word? Which coin has the smallest value? <b>X'qed nistaqsikom?</b>	OK. <b>So what is it? What's that word that Fiona mentioned,</b> the magic word? Which coin has the smallest value? <b>What am I asking? What it's worth (its value).</b>
Pupil 2:	<b>Kemm tiswa.</b>	<b>Well done.</b>
Teacher:	<b>Prosit.</b>	

The teacher went on to write the answers to this question (1 cent) on the whiteboard. She then asked and wrote '*Which coin has the largest value?*' below which she wrote the answer given by the children.

In the above stretch of interaction, translation from one language to another was used in a manner that Camilleri Grima (2013, p.563) calls 'non-explicit translation through elicitation'. This part of the lesson marked a clear shift to English as the language of the written - and more formal - text of mathematics, exemplifying one of the languages routes possible in bi/multilingual classrooms as described by Setati and Adler (2000):

Informal spoken main language → formal spoken English → formal written English

The whiteboard work also served as a bridge between the initial discussion and the written textbook exercise that was to follow immediately afterwards. In the written exercise, various sets of coins were shown and the printed text stated “Here are some sets of coins. What is the value of each set?” Here the word *value* was used in a different sense since it was used in relation to a total value of a set of coins, rather than in relation to ONE coin. The class worked out the exercise together, and Anita guided them to consider the set of coins collectively through verbal expressions that included: *altogether, add, Kemm jiswew kollha flimkien? [How much are they worth altogether?]*.

Anita used the word *value* only briefly in the following two lessons as part of a short introductory review. The word was given importance once again in the fourth lesson, now in relation to the equivalence of two sets of coins. As in the first lesson, a class discussion was used to focus on the word *value*. The following is a snippet of Anita’s questioning, where ‘they’ refers to two sets of coins and the capitalisation of the word ‘value’ indicates that Anita stressed it with her tone of voice.

“**Jiswew l-istess? [Are they worth the same?]** ...So my question in English is this: do they have the same VALUE?”

The discussion was followed by a worksheet showing sets of coins and entitled “Match the same value”. In the fifth lesson, Anita set a task on the whiteboard entitled “Draw coins to make up these values: 5c, 7c, 18c ...” In the sixth and seventh lessons the word *value* was not used.

### Cost

The word *cost* was introduced in the third lesson. The word used in Maltese for *cost* is also **tiswa**. In order to introduce the word *cost* Anita now used the word **tiswa** in relation to priced objects (that is, in relation to what the object is worth rather than in relation to the value of a coin). She did this through organized role-play shopping. Groceries were placed on a table at the front of the room, with prices attached to them. The teacher called out children and instructed them to buy an item, and to give the exact amount using their set of sample coins. A pupil had picked up a packet of Chicken Soup.

- Teacher:       **Kemm jiswa ċ- Chicken Soup? [How much does the Chicken Soup cost?]**
- Pupils:        *(In chorus)* Forty.
- Teacher:       Forty cents. How much does it COST?
- Pupils:        *(Silence).*
- Teacher:       *(Waving the priced packet of Soup).* How much does it cost?

Pupil 1           Forty cents.  
Teacher:         (Nods). Forty cents.

During the next purchase the word *cost* was not used, but Anita used the Maltese **tiswa** instead while showing up a newspaper:

**Kemm tiswa l-gazzetta? (How much does the newspaper cost?)**

In the third example, Anita switched back to English and the children pre-empted the question, seeming to anticipate what the teacher was about to request.

Teacher:         (Holding up the priced carton of juice). How much does the juice...?  
Pupils:         (Several pupils interrupt in chorus) Twelve cents!  
Teacher:         First listen to the question so that you know what I am asking. How much does the juice cost?  
Pupils:         Twelve cents!  
Teacher:         **Mela [So]**, the juice costs twelve cents.

I found this stretch of interaction to be particularly interesting since, thanks to the repetitive form of the role-play structure, pupils were now able to fulfil the required interaction even before the teacher had finalised her question. Still, Anita insisted on using the word *cost* as originally intended and so she repeated - and completed - her question ("First listen to the question, so that you know what I am asking. How much does the juice cost?"). She appeared to be attempting to help the children 'glue' the new word to the related concept (Hewitt, 2001), especially since the first time Anita had used the word *cost* the pupils had remained silent. Once again, a worksheet marked a clear shift to written English. The worksheet dealt with buying fish, with the general instruction being: "*Buy some fish. How much do they cost?*" Hence the word *cost* continued to be linked with the purchasing power of money through written English.

The word *cost* was not used in the fourth and fifth lessons. In the sixth lesson, the word was used in discussion to support the meaning for the word *change*, which was the focus of attention. Hence, during this lesson the word *cost* appeared to be subordinated (Hewitt, 1996) to the new word *change*. The word *cost* was not used in the last lesson, which was also dedicated to the idea of change.

## Change

The word *change* was also introduced through role play. Children were invited to approach the 'shop' with a 50c coin in order to buy something. Similarly to the introduction of the word *cost*, Anita waited for a child to use the Maltese word for change – **bqija** – and then started substituting it in the course of the interaction. For example, when Daniel was shopping, Anita used translation without a metalinguistic marker (Camilleri Grima, 2013) as indicated below.

Teacher:	<b>X' irrid naghtik?</b>	<b>What should I give you?</b>
Daniel:	<b>Bqija.</b>	<b>Change.</b>
Teacher:	Change. Very good. Change, <b>bqija veru?</b>	Change. Very good. Change, <b>change right?</b>

Once again, Anita used both languages to establish the meaning of the word, as when Derek chose to buy a carton of juice:

Teacher:	How much money does Derek have?	How much money does Derek have?
Pupils:	Twenty-five [cents].	Twenty-five [cents].
Teacher:	Can he buy it [the juice]?	Can he buy it [the juice]?
Pupils:	Yes.	Yes.
Teacher:	The juice is twelve cents. How much money does he [Derek] have left? <b>Kemm għad fadallu?</b> What is his CHANGE? <b>Il-flus tiegħu qed jonqsu jew jizdiedu?</b>	The juice is twelve cents. How much money does he [Derek] have left? <b>How much has he got left?</b> What is his CHANGE? <b>Is his money decreasing or increasing?</b>
Pupils:	<b>Jonsqsu.</b>	<b>Decreasing.</b>
Teacher:	<b>Jonsqu. Mela rridu naghmlu...?</b>	<b>Decreasing. So we need to work out ...?</b>
Pupils:	Minus.	Minus.

The role-play activity was followed by an individual worksheet related once again to buying fish at a market, this time prompting subtraction to find the change. The word *change* was not printed on the sheet.

The final lesson was dedicated to written word problems of the type: "*Anna has 42c. She spends 20c. What is her change?*" During this lesson, the words *value* and *cost* were not used, but *change* was used frequently. Anita wrote the problems on the whiteboard, each one ending in a different way: *What is*

her/his change? How much money does she/he have left? How much money has she now? For one of the problems – “John has 50c. He spends 20c” – Anita asked the pupils to finish off the story themselves in a full sentence. Different pupils offered the following endings (here reproduced as uttered by the pupils):

*John has thirty cents now.*

*His change is thirty cents.*

*John has thirty cents.*

*The shop gave John thirty cents.*

*John change is thirty cents.*

*John has thirty cents change.*

*John is thirty cents.*

Anita accepted these suggestions, and rephrased any that contained grammatical mistakes. For example after the suggestion “John is thirty cents”, Anita said “Yes, John HAS thirty cents”. This task was in contrast with previous ones, in the sense that here Anita gave the children the opportunity to express themselves using more language, including the key word *change*. This is in line with Lee’s (2006) suggestion that it is important for pupils to use language themselves so as to get used to the way expressions are used and to express the concepts and ideas that are encompassed by the mathematical terms.

### **Discussion: Scaffolding through Translanguaging**

The interweaving of Maltese and English in Anita’s class supports the point that in practice it is difficult to identify boundaries between languages, a point made by Barwell et al., (2016), and one which is in line with adopting a translanguaging perspective. Hence, in Anita’s classroom, a ‘translanguaging space’ was created wherein the children’s language practices were brought together (García and Li Wei, 2014), creating what Canagarajah (2011) considers to be an integrated system. For example, the children generally used Maltese in verbal interaction, but stated numbers, prices and other topic-related words in English within the same sentence. They also referred to grocery items in English and suggested *yes* and *no* in English. The children sometimes attended to both languages simultaneously as in the case of when a written exercise was being worked out alongside a class discussion. In these situations, the written text was in English, while the verbal interaction was mixed. The children appeared to take the ‘movement’ between languages in their stride.

At Anghileri’s (2006) first level of scaffolding, one finds environmental provisions. In the observed classroom, these consisted of worksheets, sample

coins and priced items, which helped to create the context to be discussed and/or worked on. Anita first diagnosed the children's present state of knowledge 'off-line' (Smit et al., 2013, p.825) by drawing on her daily experience with the children in order to approach the lessons with certain assumptions. During the unfolding of the lessons, Anita used 'on-line' (ibid, p. 825) diagnosis as part of the process of classroom interaction. This was achieved by probing during which translanguaging played a role. One example is when Anita probed whether children were using size to determine the value of a coin. The ongoing interpretation of pupils' actions and talk, a Level 2 strategy, can also be considered to be a diagnostic strategy.

Much of the scaffolding noted was of the 'on-line' responsive type (Smit et al., 2013). I will break this down using Anghileri's (ibid) strategies at Level 2. Anita provided meaningful contexts in the form of shopping and used language with purpose in relation to this context; she frequently used explaining and reviewing. According to Anghileri (2006), probing and prompting are two strategies commonly used as part of the IRF pattern of interaction. Anita also used rephrasing, for example, when she corrected pupils' English.

One notable feature of Anita's input was the use of translation. Anita used translation to explain or to rephrase pupil talk, and even to negotiate meaning. García (2009) states that there is no simpler translanguaging than translation, and Anita used this strategy for single words or also for whole sentences or questions. Through this, Anita attempted to alter the pupils' everyday shopping experience (expressed in Maltese) into one expressed through English. I can consider this to be a scaffolding strategy in itself, one that is potentially available in a bilingual classroom. Thus in a bilingual classroom this scaffolding strategy might be added to Anghileri's model at Level 2 or to Smit et al.'s category of on-line responsive strategies. It should be noted, however, that the strategy of translating the key words *value*, *cost* and *change* was possible since the work at hand was the 'everyday' topic of Money. Thus, the pupils were already familiar with the ideas being addressed and with the Maltese vocabulary that is used to express them. Other school topics for which familiar Maltese vocabulary may be helpful are addition and subtraction, measurement and space. Possibly, for these school topics, translation might also be used as a scaffolding strategy. On the other hand, if a Maltese mathematical word and/or concept is not familiar to the pupils - as might be the case for **multiplikazzjoni** (multiplication) for young children - then translation is not helpful, since the Maltese word may be as unfamiliar as the English one. Translation is also not possible in the case of words for which no standard Maltese translation as yet exists (e.g. *square root*).

Handing over to independence (Smit et al., 2013) is a key feature of scaffolding. Anita's translanguaging from a verbal mixed code (Maltese and

English) to verbal English as part of the scaffolding processes of showing, telling and explaining clearly served as preparation for written English worksheets. The worksheets combined everyday English with ideas expressed by the new mathematical words. By the time a written exercise was set, adult support could be removed and the learners could carry out the task without assistance (Wood et al., 1976). That is, the children were able to engage with the new English mathematical words *value*, *cost* and *change* as intended by the teacher. Another strategy that aided the process of handing over was that of parallel modelling. Anita used this strategy when she expressed word problems in English herself, then asked the pupils to provide the ending to a problem. Here she offered the pupils an opportunity to 'walk alone' with the mathematics; in particular, with (English) mathematical expression. Thus I noted an element of handing over to independence with respect to Anghileri's Level 3 features *developing representational tools* (children using paper coins and symbols) and *making connections* (children linking the Maltese words to English one).

However, the teacher-directed pedagogy appeared to limit learning to aspects specifically planned by the teacher, rather than enabling an independence that provides for experimentation or innovative thinking. The fact that the tasks were structured and closed meant that the pupils themselves rarely used the new English mathematical words themselves, nor participated in lengthier discussions. Hence, the *generation of conceptual discourse*, another of Anghileri's Level Three characteristics, was very restricted. Ideally, mathematics lessons should include a stronger element of discourse in order for pupils to take ownership of ideas and to develop a sense of power in making sense of mathematics (Van de Walle, Karp, and Bay-Williams, 2013). This may be achieved through a pedagogy that requires pupils to engage in group discussion, and in lengthier discussion with the teacher, thus enriching the pupils' language input. In this scenario, the teacher's input, and hence scaffolding strategies, would be "responsive ... flexible and dynamic" (Anghileri, 2006, p.51). Possibly, a different desk arrangement would be more suitable for such activities; the traditional rows-and-columns arrangement, with all pupils facing the front of the room, was an environmental provision that was perhaps not so conducive to encouraging pupil-pupil communication; changes in seating would need to be carried out prior to any task that required discussion.

Smit et al., (2013) explain how scaffolding in whole class settings is layered, distributed and cumulative. I noted layers (diagnosis, responsiveness and handing-over) across the 7 lessons; accumulation can be considered to be the building of knowledge as the week progressed (recognition of single coins, value of sets of coins, role play using exact coins, requiring change and so on). However, systematic distribution was not so evident. Anita's use of the new words was not sustained throughout the week, so generally, the concepts



appeared to be tackled separately from each other. The only exception was when the word *cost* was used to support the learning of the word *change*. Table 2 outlines when the target words were used by the teacher over the seven lessons. In the Table, 'introduced' and 'brief mention' refer to verbal utterances; the latter indicates a quick reference by the teacher at the start of a lesson by way of linking the lesson to the previous one. By 'sustained' I mean that the word continued to be given importance in the lesson, either in the verbal interaction or through written text.

<i>Lesson</i>	<i>Key Word</i>			
	<i>Value (of a coin)</i>	<i>Value (of a set of coins)</i>	<i>Cost</i>	<i>Change</i>
1	<i>Introduced Sustained (oral/written)</i>	<i>Introduced Sustained (written)</i>		
2	<i>Brief mention</i>	<i>Brief mention</i>		
3	<i>Brief mention</i>		<i>Introduced Sustained (written)</i>	
4		<i>Sustained (written)</i>		
5		<i>Sustained (oral/written)</i>		
6			<i>Sustained (oral) Subordinated to Change</i>	<i>Introduced</i>
7				<i>Sustained (oral/written)</i>

Table 2: The use of the words *value*, *cost* and *change* over the seven lessons

As can be seen from Table 2, the word *value* in relation to one coin was not revisited from Lesson 4 onwards, and *value* was not used at all in the last two lessons. The use of *cost* was introduced, dropped, and picked up again in Lesson 6. While it is not practical to expect that every new word learnt will

continue to be used in each lesson that follows, Oxford (1990) suggests that reviewing material at spaced intervals is one strategy to help learners memorise new word meanings. According to Anghileri's hierarchy, reviewing is a Level 2 strategy. An increase in the frequency of word use would take into account learners' sensitivity to frequency of word use, a sensitivity noted by Hatch and Brown (1995) and by also myself (Farrugia, 2016).

## **Conclusion**

The data collected as part of this study supports other international research that shows that the use of two or more languages can support teaching and learning. It was quite evident that Anita's use of translanguaging was not random or careless, but served as a valuable communicative tool (Baker, 2011). In this classroom, there was the advantage that both teacher and children shared the same two languages and general cultural background, and through my observations I concluded that all participants appeared comfortable with the language experience. I suggest that translation from Maltese to English, or vice versa, serves as a scaffolding strategy, and may be placed at Level 2 of Anghileri's (2006) strategies. Translation may be a useful strategy for some mathematics topics, in particular topics that draw on pupils' everyday experiences.

Perceiving translanguaging as a positive practice and appreciating its pedagogical benefits is something worth stressing in Malta since, locally, it is still common to find English, as a world language, being favoured amongst some educators and also policy makers. With regard to the latter, this concurs with what Barwell et al., (2016, p.21) call the "simple default position" often taken by politicians and bureaucrats. More research on translanguaging in mathematics classrooms may help to promote awareness in this regard and to highlight the benefits of what Blackledge and Creese (2010) call a flexible bilingual pedagogy.

Handing over to independence of mathematics learning was somewhat limited in the classroom observed, since the activities were very teacher directed. If pupils are to independently make connections, develop representations and generate conceptual discourse, then a more open ended, possibly investigative approach to the subject may need to be taken. Presumably, translanguaging would play a role in teacher-pupil and pupil-pupil interactions. With regard to conceptual discourse, one would need to

take into consideration the academic language of mathematics. As stated earlier in this paper, the language of written mathematics in Malta, including school and national assessments, is English. Thus, there is also the need, as explained by Setati et al., (2010), for the pupils to learn to speak and write the more formal (English) mathematical language. Even García and Li Wei (2014), who value so highly translanguaging as a tool for learning, admit the necessity of pupils engaging in certain practices required by society, such as the mastery of the dominant language practice. Such mastery can be achieved through *explicit* attention to language, something strongly recommended by mathematics educators and researchers including Murray (2004), Melanese, Chung, and Forbes (2011), and Gibbons (2015), and recently attempted by myself in another local classroom (Farrugia, 2017).

It would certainly be interesting – and important – for further research to be carried out to explore how teachers and pupils might use translanguaging in Maltese mathematics classrooms wherein pupils are given increased independence with respect to developing mathematical ideas.

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