Numeracy Buddies

Program Evaluation

Completed for Ardoch Youth Foundation
by Alison Peipers Consulting

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YOUTH FOUNDATION
MAKING EDUCATION A REALITY

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Executive summary

Numeracy Buddies is an interactive, on-line numeracy program that has been piloted by Ardoch Youth Foundation since 2013, with the support of the William Buckland Foundation. The program connects classes of primary school students (Little Buddies) with groups of volunteer mentors (Big Buddies) - usually employees from a common workplace. 'Buddies' communicate through a blog forum and together, solve a range of numeracy problems set by the class teacher. Over two terms the Buddies interact and complete the problems through weekly/fortnightly blog communication. The Big Buddies are trained to support and encourage the Little Buddies' skills development whilst sharing how they use numeracy in their lives and careers. As one-on-one relationships are formed, Big Buddies become positive role models who encourage learning and contribute to the children's social development by building their confidence and self esteem.

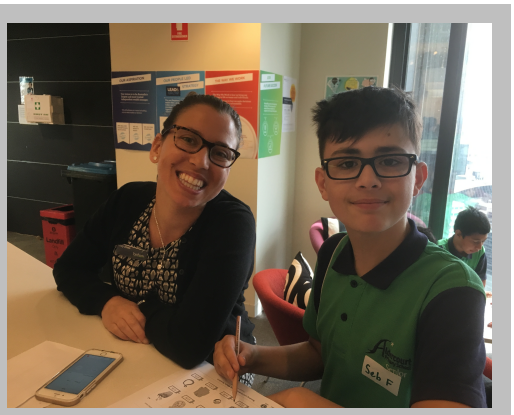
This Evaluation Report forms the final evaluation of the three-year Numeracy Buddies Pilot. It presents results from a mixed-methods evaluation that drew together data from surveys, interviews and observations. The evaluation focused on programs conducted in 2015 where a total of 113 Grade 4, 5 and 6 students from five primary schools across Melbourne, and 104 corporate volunteers, participated in Numeracy Buddies.

There was good evidence to show that students and volunteers embraced the program and found it to be a fun and engaging experience. Most teachers found the program added value to the curriculum and provided their students with access to positive role models who reinforced the many ways numeracy is used in adult life. Overall, the program was effective in meeting its objectives.

Program stakeholders shared their opinions on how the program could be enhanced. Their recommendations were to:

- Continue to engage and support the teachers as program drivers
- Include more interactions between Buddies – ensure regular blog posts, include two visits
- Consider different technology options – assess other blog platforms, include supplementary technology such as Skype
- Extend the focus beyond numeracy – perhaps to encompass science, technology, engineering and mathematics (STEM) initiatives
- Scale-up the program to reach more schools and workplaces

Regardless of the curriculum focus, there is merit in continuing and expanding a program based on the Numeracy Buddies model. By using on-line technology to facilitate interactions between students and corporate volunteers, we open up children's worlds to new relationships, role models and possibilities whilst providing a very efficient way for time-poor corporates to make a meaningful community contribution.



Big and Little Buddies meeting at a workplace visit

Purpose of this report

This Evaluation Report forms the final evaluation of the Ardoch Youth Foundation's Numeracy Buddies Program – a three year pilot program funded by the William Buckland Foundation. A blog-based numeracy program, Numeracy Buddies links primary school students from disadvantaged schools (Little Buddies) with corporate volunteers (Big Buddies) as mentors. Together they undertake numeracy-based problem solving across two terms, during which time the Big Buddies share experiences of how they use mathematics in their everyday lives.

The program's aim is to:

- promote long-term positive engagement in numeracy by engaging children from disadvantaged schools in unique, one-on-one numeracy experiences with corporate volunteers

Ardoch's goal at the conclusion of the Pilot was to have a sustainable, evidence-based program that could be replicated and delivered in more primary schools across Victoria (and Australia).

This evaluation has been has been completed by Alison Peipers Consulting; an independent consulting business specialising in program evaluation. It focuses on outcomes from programs conducted in 2015.

Background

Ardoch Youth Foundation

Ardoch Youth Foundation is a charity that has provided education support for children and young people experiencing disadvantage for over 25 years. During this time Ardoch has helped thousands of children and young people to stay at school, receive a helping hand with their education and have access to more choices and opportunities in life.

Ardoch works in schools and early childhood centres across Victoria, Queensland and Western Australia to address barriers to education, develop the basic foundations of learning and broaden horizons for children and young people. Its programs support the school curriculum by providing enhanced learning opportunities and positive role models.

Numeracy Buddies

Numeracy Buddies is an interactive, on-line numeracy program that connects classes of primary school students (Little Buddies) with groups of volunteer mentors (Big Buddies), usually employees from a common workplace. 'Buddies' interact through a blog forum and together, solve a range of numeracy problems set by the class teacher. Over two terms the Buddies complete the problems through weekly/fortnightly communication. The Big Buddies are trained to support and encourage the Little Buddies' skills development whilst sharing how they use maths in their lives and careers. As one-on-one relationships are formed, Big Buddies become positive role models who encourage learning and contribute to the children's social development by building their confidence and self esteem.

Numeracy Buddies is coordinated by a Program Coordinator at Ardoch, and supported by Ardoch's Education Partnership Coordinators responsible for the schools in their region. Ardoch staff recruit and train the teachers and workplace volunteers

and support program implementation. They monitor all on-line communication through the secure blogging platform to ensure it is appropriate.

An important component of Numeracy Buddies is the workplace visit conducted at the end of the program. It gives Buddies the chance to meet in person and exposes the students to an office-based work environment.

Numeracy Buddies was designed and developed by Ardoch Youth Foundation in 2013, following the success of its Literacy Buddies® program. It was initiated in response to feedback from schools indicating interest in a similar program designed to increase students' engagement in numeracy.

The program has five key objectives:

1. To provide students with fun, positive and engaging numeracy experiences
2. To increase students' awareness of the relevance and importance of maths in everyday life
3. To connect students with new role-models who can support their learning and help build their communication skills
4. To support schools to develop engaging numeracy curriculum
5. To provide time-efficient, meaningful corporate volunteering opportunities

Development was supported by an external reference group of education professionals. In 2014, Numeracy Buddies was piloted in two schools. An internal evaluation undertaken at the time showed that the program model and on-line platform had a positive impact on learning and enhanced the curriculum. In 2015 the Pilot was expanded to four primary schools across Melbourne.

(See Appendix A – Aims and objectives and Appendix B - Program logic).

The importance of numeracy

Literacy and numeracy are considered to be the cornerstones of all learning. It is widely accepted that children need to develop basic numeracy skills early in their school lives in order to achieve their full potential.

The terms numeracy and mathematics are often used interchangeably. Whilst inter-related, they have different meanings. Numeracy is considered a 'capability' whilst mathematics is a 'body of knowledge'. Numeracy has been defined as 'the ability, confidence and disposition to use and apply mathematics in a range of contexts'. [1]

Unfortunately, an unacceptable proportion of Australian students are not achieving acceptable levels of numeracy proficiency.[2] Many students lack confidence in the subject, do not enjoy or see personal relevance in it and are unlikely to continue its study voluntarily.[2] The mathematics and reading skills of Australian 15 year-olds have slipped backwards over the past decade.[3]

Children from disadvantaged areas face the largest academic challenges. A difference equivalent to 2 ½ years of schooling separates the mathematical, reading

[1] Australian Association of Mathematics Teachers (1997) Numeracy = everyone's business. The Report of the Numeracy Education Strategy Development Conference, May 1997, Adelaide: AAMT
[2] National Numeracy Review Report 2008 – Commissioned by COAG https://www.coag.gov.au/sites/default/files/national_numeracy_review.pdf
[3] Sue Thomson, Lisa De Bortoli, Sarah Buckley, 2013, PISA 2012: how Australia measures up, Australian Council for Educational Research, viewed 15 December 2015, <http://apo.org.au/node/37018>.

and scientific literacy scores of students in the highest socio-economic quartile and the lowest socio-economic quartile. [3]

The development of numeracy requires experience in the use of mathematics beyond the classroom. Students need to learn mathematics in ways that enable them to recognise when their skills might help to interpret information or solve practical problems. They need to develop their skills and reasoning so that they can choose mathematics that makes sense in the circumstances and helps them to resolve ambiguity and judge what is reasonable.[1]

The Coalition of Australian Governments recommend that from the earliest years, '*greater emphasis be given to providing students with frequent exposure to higher-level mathematical problems rather than routine procedural tasks, in contexts of relevance to them, with increased opportunities for students to discuss alternative solutions and explain their thinking.*'[2]

Evaluation methodology

A mixed-methods, process evaluation was be undertaken to evaluate Numeracy Buddies and inform future decision making. The evaluation design was structured around the five program objectives, with each objective broken down to a series of evaluation sub-questions. Indicators of progress towards each objective were determined and a range of data sources was used to assess the evaluation sub-questions. (See Appendix C – Evaluation design).

Data collection tools

Survey tools were used to collect input from students (pre and post), teachers (post) and volunteers (post).[4] Semi-structured interview questions were used to gather insights from Ardoch staff, Workplace Coordinators and school principals. Anecdotal evidence was also gathered from volunteers, students, teachers and Workplace Coordinators during the face-to-face visits.

To add an external perspective and collect ideas on potential applications of the program model, two 'experts' from the education sector were also interviewed. One was a Numeracy Lead Teacher with a Masters in Education specialising in numeracy and the other was a Professor in Mathematics Education.

Limitations

As this is a process evaluation it does not have the means to assess any behaviour change, or change in education outcome resulting from the program. Although it would be desirable to report on academic achievements, the program must be seen within the context of a wider education experience. Numeracy Buddies has been designed to add-value to the numeracy curriculum and may be a contributing factor to improvements, or not, in numeracy skills. However, it is not possible to isolate any impact the program may have on educational outcomes.

A further limitation has been participation in the post-program surveys. With relatively low participation rates, particularly for the volunteer survey, the information gathered is considered indicative of participant sentiment but may not accurately reflect the feelings of the wider group. This has been somewhat compensated by the mixed-methods design of the evaluation and the collection of data from other sources, plus the fact that feedback was received from all teachers.

[4] Survey tools are available on request.

Evaluation findings

Participation

A total of 113 students from Grades 4, 5 and 6, and 104 corporate volunteers participated in Numeracy Buddies in 2015. The students came from five primary schools across Melbourne.

As shown in Table 1, 80 students (71%) completed the pre-program survey and 55 students (47%) completed the post-program survey. Surveys (and verbal feedback) were received from all five teachers, and from 23 of the 104 Big Buddies (22%).

Participant location/type	# Participants	Pre-program survey	Post-program survey
Schools			
Mahogany Rise PS	25	19 (76%)	16 (64%)
St Brendan's PS	21	20 (95%)	21(100%)
Mother of God PS	27	27 (100%)	17 (63%)
Richmond West PS	16	14 (88%)	1 (6%)
Aldercourt PS	24	0	0
Student totals	**113**	**80 (71%)**	**55 (47%)**
Businesses			
Fordham Business Advisory	24		7 (29%)
NAB	16		6 (38%)
Intrax Consulting Engineering	27		8 (30%)
ANZ[5]	12		0
Link Group	25		2(8%)
Volunteer totals	**104**		**23 (22%)**
Teachers	**5**		**5 (100%)**

Table 1 – 2015 Survey participation

To assist future monitoring and evaluation activities, additional strategies should be used to increase participation in feedback surveys. This may include allowing time during the workplace visit for paper-based surveys to be completed by students and volunteers.

Objective 1

To provide students with fun, positive and engaging numeracy experiences

- Did students enjoy the program?

The Little Buddies appeared to really enjoy Numeracy Buddies. After the program 85% who completed the post-program survey said they had enjoyed the program, with the highlights of the face-to-face visit and getting to know their Big Buddy featuring strongly in their comments.

Four of the five teachers felt that the students enjoyed the program.

There were overwhelmingly positive comments about the workplace visit, which appeared to be the highlight of the program for both the Big and Little Buddies.

[5] As ANZ had only a small group of volunteers, some worked with two or three Little Buddies.

- Did students experience success in solving the puzzles with their Big Buddy?

On the whole, it appeared that most students experienced some level of success with problem solving on the blog platform. As shown in Figure 1, 58% said they were able to solve all problems and a further 35% solved some.

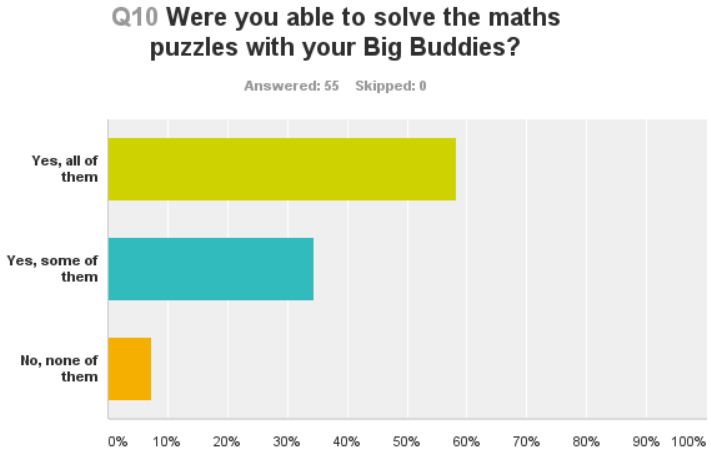


Figure 1 – Little Buddies experience of success

When asked how many of their students experienced success with the problem solving, three of the teachers (60%) said most had and two (40%) said some had. Given the range of abilities within a class, these levels of success may be comparable to general numeracy experiences.

- Did the program help make maths more interesting and fun?

From the responses received it was clear that blogging with a Big Buddy helped engage the students with numeracy. Eighty-two percent of the Little Buddies said Numeracy Buddies helped make maths more interesting and fun and 77% found the puzzles interesting. The students also appreciated the mentoring support provided by the Big Buddies, with 75% reporting that their Big Buddy helped them with their maths.

The teachers largely agreed with the students' perceptions, with four (80%) reporting that the program helped make maths more interesting and fun for their students.

- Which elements of the program did students like or dislike?

When the Little Buddies were asked an open-ended question about their favourite thing about Numeracy Buddies the most common responses in order of frequency were:

1. Getting to know/meet their Big Buddy (most common response by far)
2. The excursion
3. Blogging
4. Completing puzzles
5. Learning new things

Figure 2 shows the popularity of certain program elements and reinforces that developing a relationship with a Big Buddy rated highly.

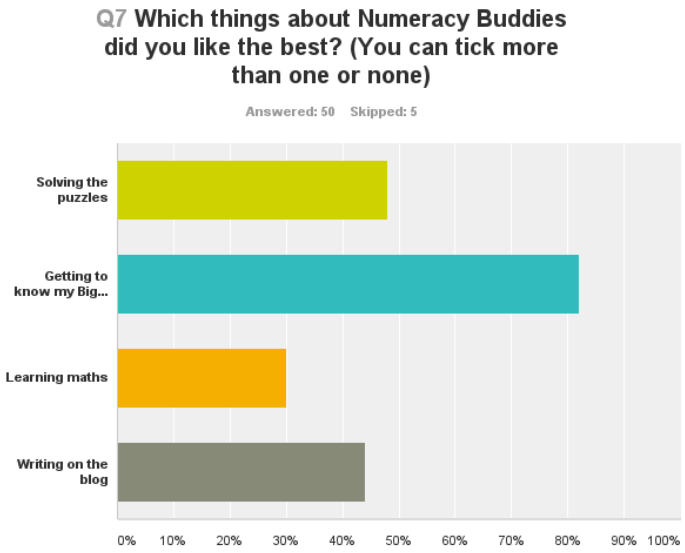


Figure 2 – Things the Little Buddies liked about the program

When asked what they liked the least about the program, most comments from the Little Buddies centred around having to wait too long from blog responses, and in several cases, not getting to meet their Big Buddy during the excursion. When Big Buddies missed the face-to-face meeting their Little Buddies were very disappointed and this seemed to detract from positive experiences they may have had throughout the program. This could be mitigated by having two visits per program, one at the school and one to the workplace, to maximise the opportunity for buddies to meet each other. The use of other technologies, such as Skype, would also help build connections.

Seven Little Buddies commented that they did not receive any communication from their Big Buddies and they were very disappointed by this. It was unclear why this had not been identified and rectified during the program.

Objective 2

To increase students' awareness of the relevance and importance of maths in everyday life

- Did students learn about the ways their Big Buddies use maths?

By monitoring the blog conversations it was clear that most Big Buddies were good at incorporating information about the ways they use maths in their jobs and lives. Many of the Little Buddies were able to simply explain how their Big Buddies use maths, although some were unable to articulate examples within the survey.

Anecdotal evidence from teachers supported the need for students to be regularly exposed to real-life numeracy experiences.

> *'Many of our students thought that mathematics was a stand alone subject until we started talking about some of the jobs that could entail mathematics.'*
>
> *Teacher*

- Was there a change in students' appreciation for the use of maths in real-life situations?

The students' appeared to gain a deeper appreciation for the ways adults use maths. They were asked to list the ways adults use maths in their everyday lives before and after the program. At both times they were able to list many usages but after Numeracy Buddies the students gave more examples and their responses were more detailed and more specific to workplace applications.

Objective 3

To connect students with new role-models who can support their learning and help build their communication skills

- Did students look forward to blogging with their Big Buddies?

The students were excited about beginning the program, with 91% of reporting that they were looking forward to blogging with their Big Buddies. Numeracy Buddies was the first blogging experience for two-thirds of the students.

Four of the teachers (80%) felt that all or most of the students looked forward to blogging with their Big Buddies.

- Did Buddies get to know each other through the blog conversations?

There were mixed responses to this question. Many Buddies formed positive on-line relationships which were strengthened by the face-to-face visit. However, some Big Buddies felt that inconsistent communication prevented the building of rapport and created a somewhat disjointed experience. This was particularly evident when teachers did not consistently post problems and the numeracy focus was lost. This appeared to have happened in two of the five schools.

Sixty-five percent of Big Buddies felt they got to know their Little Buddy through the blog conversation, but 43% found it difficult to build rapport. Only 56% of the Little Buddies felt they got know their Big Buddies.

Several participants commented that they felt relationships would have been strengthened if there had been an additional face-to-face meeting at the start of the program. Anecdotal evidence showed that the more regular the blogging, the better the rapport between Buddies.

In reviewing posts between the Big and Little Buddies there appeared to be a good mix of numeracy discussion and social interaction. The Buddies were interested in each other's lives and were willing to share information about their own.

- Was there any change in the quality of student communication within the blog?

This was a difficult area to assess, particularly through weekly/bi-weekly communication. Any improvements across the board were perhaps related more to increased confidence than improved skills.

As Buddies became more and more comfortable with each other the posts tended to get longer and included more social interaction. Many Little Buddies became more confident in asking questions and in sharing information about their lives, although the quality of some student communication remained poor throughout the program.

Of the 23 Big Buddies who completed the post-program survey, 35% reported noticing an improvement in their Little Buddy's communication skills. Most (48%) were unsure and some (17%) reported no difference.
Three of the teachers (60%) noticed an improvement in their student's communication skills but the other two (40%) were unsure.

> *'So many of our students do not have the communication skills to hold an ongoing conversation, so this was a great way for them to talk to someone.'*
>
> *Teacher*

Objective 4

To support schools to develop engaging numeracy curriculum

- Did teachers feel that the program enhanced the curriculum?

Most teachers were very positive about the program and felt it worked well in their class. Several commented that it was an excellent program that really enhanced the curriculum. In the survey, four of the teachers (80%) felt that the program offered a valuable addition to the curriculum. Several commented on the dual benefits of reinforcing real-life maths and their students meeting professionals. For example:

> *'It's much more than just about maths – brilliant for the students' social skills and personal development.'*
>
> *Teacher*

> One of the most significant benefits was ……*'the ability to not only see how maths is relevant in the real world, but also to meet with professionals and have them see some of the things the world has to offer.'*
>
> *Teacher*

All teachers believed the program provided positive role models for their students. This was particularly important in the context of disadvantaged schools where students may have limited exposure to adults employed in diverse occupations.

> *'Meeting university educated, working adults is so good for our kids – showing them that if they're interested and good at maths then anything is possible.'*
>
> *Teacher*

Four of the five teachers (80%) said they would choose to participate in Numeracy Buddies again, while the fifth was undecided.

- Were teachers willing and able to prioritise the program within their weekly timetable?

This was a difficult question to assess as there seemed to be some disconnect between intention and practice. A crowded curriculum and busy school week certainly made it difficult for some teachers to commit the time to Numeracy Buddies they had originally hoped to. Teachers told us they dedicated up to an hour to the program each week, usually on a Friday. In the survey, three of the teachers (60%) said the program was difficult to prioritise, but the other two (40%) did not find it difficult. The teacher who found the program the most challenging was a first year graduate teacher with many transient students.

In reviewing the blogging history and in speaking to students and volunteers, it appears that some Buddies had quite irregular communication. There were several

contributing factors including; computer problems at a school; a significant change in the Kidblog platform, school camps and holidays, and; volunteer leave blocks. When blogging was irregular the motivation of both Buddies was impacted.

- Which students did the program suit best and least?

There were mixed responses to this question. Some people were of the opinion that the right numeracy problem would suit all abilities, whilst others found it hard to choose problems that offered sufficient scope for all learners. One teacher reported that some students, particularly those with limited English skills, found it difficult to communicate through the blog and to ask the right questions.

> *'This program would suit students who are of an average to high ability in maths as it helps them see a purpose in what they are learning in school. It was less suited to low ability students as they tended to get overwhelmed with the situation and at times could not see the point.'*
>
> *Teacher*

> *'I believe this program suits any students. It is interactive and the best part is they actually get to meet their buddies. Students with limited capability are also able to contribute to the best of their ability which is wonderful to see.'*
>
> *Teacher*

The 'numeracy experts' both reinforced the value of problem solving with children of all abilities.

> *'There's great value in any investigations with challenges attached. We need to let kids fail. We should be building up there perseverance. I'd recommend problems that are an open-ended, with scaffold stages so that all kids can achieve something from them, and then extensions for brighter kids. '*
>
> *Numeracy Lead Teacher*

Objective 5

To provide time-efficient, meaningful corporate volunteering opportunities

- Did volunteers enjoy the program?

Given the low completion rate of the post-program survey it is not possible to make definitive statements about volunteer engagement. However, the majority of volunteers who completed the post-program survey reported having enjoyed the program (78%).

Positive comments were also shared at the face-to-face visits.

An important measurement of satisfaction is willingness to be involved in the future. As shown in Figure 3, 78% of volunteers would be willing to be a Big Buddy again and 72% said they would recommend the program to others.

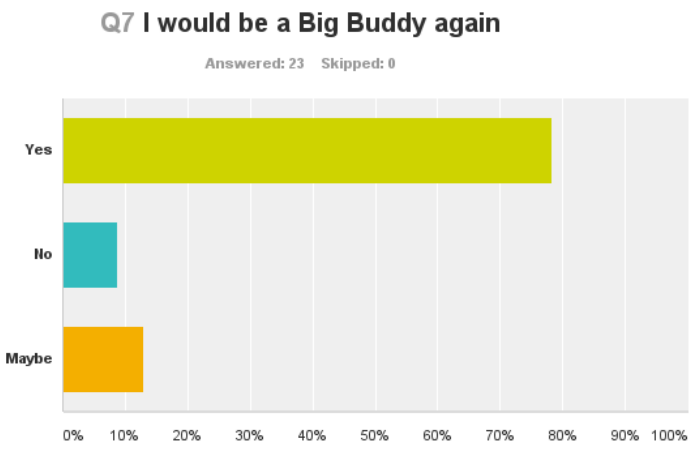


Figure 3 – Volunteer willingness to be involved in future programs

- Were volunteers willing and able to prioritise the program within their weekly schedule?

Again, it is difficult to answer this question without input from more participants, but of the 23 volunteers who completed the survey, 87% said they were easily able to fit communication into their schedules.

> *'I've got a busy workload but it really only took 15 mins once a fortnight so was quite manageable.'*
>
> *Big Buddy*

The number of posts made by Big and Little Buddies, a potential indicator of available time, varied between schools and between Buddies. Many diligently corresponded each week but some had lapses of up to a few weeks.

- Did volunteers feel they had made a valuable contribution to their Little Buddies' learning?

On the whole, those volunteers who responded believed their contribution to the program was worthwhile. Seventy-four percent of the volunteers who completed the survey reported that they felt they had made a valuable contribution to their Little Buddy's learning. Most (78%) felt that the training prepared them for their role.

Some Big Buddies commented that sporadic blogging made it difficult to build rapport and to feel that they had really helped their Little Buddy.

> *'Blogging was very off and on. I did enjoy the blogs that came through from my Buddy when I did receive them though. More regular blogs would be great.'*
>
> *Big Buddy*

Recommendations

Program stakeholders shared their opinions on how the program could be enhanced. Suggestions have been grouped as five key recommendations. Uptake of any/all these recommendations will depend on Ardoch priorities and resources.

1. Continue to engage and support the teachers as program drivers

At the school-end the teachers are integral to the success or failure of the program. Numeracy Buddies appeared to work best when the teacher was fully engaged with the program from the beginning. In instances where principals or other staff were the primary contacts there was less teacher buy-in, and in turn, less program engagement. It is important to fully brief teachers about the program and the class-time expectations so they can plan the problems as part of their maths unit planning. This could be done through an interactive webinar.

The idea of Ardoch centrally setting numeracy problems was quickly discounted. Teachers, numeracy experts and Ardoch staff believed problems should support current units of study and that teachers are the best placed to know their students' abilities. Although no teachers requested assistance with problem setting through the survey, some irregular problem postings suggested there may be benefit in building a resource bank of stimulating problems which could inspire ideas or be adapted to suit different classes. It may also save the teachers time and increase the likelihood of lessons being scheduled. Options for linking teachers so their could share their ideas and experiences should also be explored, as could involving teachers in the Big Buddy training.

To further engage and support teachers in developing the curriculum, and to provide additional incentives for them, Ardoch could explore professional development training in conjunction with a university. This include might include numeracy training or training in other relevant topics/new approaches.

2. Include more interactions between Buddies

To help the Buddies develop a rapport early in the program, many stakeholders thought it would be beneficial to schedule two opportunities for the Buddies to meet. The first could at the school near the beginning of the program or conducted via a Skype link up if the school and workplace were large distances apart. Everyone agreed that the workplace visit at the end of the program should remain as it was key to the program's success. Participation of all Big Buddies in the visit is really important as the Little Buddies who did not get to meet their Big Buddies were deeply disappointed. If volunteers are not available alternative means of meeting should be explored.

Irregular blogging (due to excursions, camps, technology issues, workplace absences etc) caused frustration for Big and Little Buddies. For the program to work well, schools and workplaces must commit to weekly communication. Stricter timelines for responses should be required and participation monitored to ensure correspondence doesn't lag. In some instances the Workplace Coordinator was very proactive in monitoring communication and issuing reminders. This seemed to be effective although created a significant administrational burden.

3. Consider different technology options

Kidblog was the blogging platform used for Numeracy Buddies. It has the benefit of a being a secure site that allows a moderator to review all correspondence and assess its appropriateness before posts go live. Unfortunately, half way through the 2015 program Kidblog underwent considerable changes which delayed correspondence and confused students and volunteers.

There was mixed feedback on Kidblog. Some participants liked it but others found it difficult to use, perhaps due in part to the unexpected changes. Before committing to using Kidblog again it would be worth investigating other options such as the two alternative platforms that were suggested – Global2 and Googleaps, plus any new products.

Ideally, any platform should:

- Be easy to use
- Be secure and able to be monitored for appropriateness
- Include a notification system so participants are alerted to postings
- Allow administrators, teachers and Workplace Coordinators to easily keep track of participation
- Have the ability to include internet links and images uploads

Supplementary technology should also be considered, such as the use of Skype or FaceTime. Skype was used successfully at a workplace visit when the Big Buddy was interstate. It gave the students exposure to another communication medium and could be a useful tool for an initial meeting if a visit was not possible, or if participants are unavailable for the visit. One teacher also suggested linking Buddies into Mathsletics: a maths website used by over three million students around the world that supports skills development and includes interactive maths games.

4. Extend the focus beyond numeracy

As the benefits of Numeracy Buddies extended beyond numeracy outcomes to include social and communication outcomes, thought should be give to broadening the scope of the program. With increased Government interest in restoring the focus on science, technology, engineering and mathematics (STEM) within schools, there would be benefits in extending the program to include a wider range of problems and tasks that Buddies could tackle together. This might include gaining the Big Buddy's input into enquiry units. As student reflections are also a current curriculum focus, a greater emphasis could be put on getting the students to reflect on how they have solved problems and what they have learnt in class.

If the focus was expanded to encompass STEM the program would need to be renamed (e.g. Challenge Buddies, STEM Buddies, Puzzle Buddies, Study Buddies etc.). It would be worth asking students for their ideas.

5. Scale-up the program to reach more schools and workplaces

The foundations are now in place for Numeracy Buddies (or another name) to increase in scale. The program model has been embraced by participating schools and was effective in meeting its objectives. Corporate volunteers are willing to participate and report satisfaction in doing so. With some systems changes to help ensure regular blogging occurs across all classes and workplaces, there should be even greater levels of satisfaction.

There will always be a need for Ardoch to invest resources into the recruitment phase (Term 1). This stage requires significant relationship building. Ardoch staff must work

closely with workplaces and schools to explain the benefits and expectations of the program and to build trust. It is common for schools to change their minds regarding participation due to competing demands.

If the program is to be expanded a marketing plan will be required to engage additional schools across more locations. The plan should highlight the benefits achieved and the positive feedback gathered from teachers, volunteers and students. There was strong support for running and containing the program within Terms 2 and 3.

Conclusion

The Numeracy Buddies Evaluation has shown the program to be effective in meeting its objectives. There is good evidence to show that students and volunteers embraced the program and found it to be a fun and engaging experience. Most teachers found the program added value to the curriculum and provided their students with access to positive role models who reinforced the many ways numeracy is used in adult life. Although the focus has been on numeracy, the social and communication outcomes from the program have been equally important.

Some challenges remain in supporting and fine-tuning the program so that it works equally well in all settings. If regular blogging does not occur the flow of interactions loses momentum and students and volunteers become frustrated and lose motivation. The engagement and full commitment of teachers is therefore critical to the success of the program. Every effort should be made to support the teachers and make the program as easy as possible to implement. This includes consideration of technology advances, alternative blogging platforms and resource sharing.

Although numeracy education has been a very worthwhile program focus, the Numeracy Buddies model could easily be applied to other subject matter. The communication and role model benefits of the program model would apply regardless of the curriculum focus. Broadening content scope to encompass STEM initiatives and using the Buddy interactions to reflect on learnings and support enquiry units may be attractive to schools and is worth consideration.

Regardless of the curriculum focus, there is merit in continuing and expanding a program based on the Numeracy Buddies model. By using on-line technology to facilitate interactions between students and corporate volunteers, we open up children's worlds to new relationships, role models and possibilities whilst providing a very efficient way for time-poor corporates to make a meaningful community contribution.

Appendices

Appendix A – Aims and objectives

Aim

To promote long-term, positive engagement in numeracy, by providing children from disadvantaged schools with unique, one-on-one numeracy experiences with corporate volunteers

Objectives

Objectives	Why
1. To provide students with fun, positive and engaging numeracy experiences	Because we know that academic engagement is strongly associated with children's learning outcomes and that children perform to a higher level when they enjoy their learning. [6] And we know that students from low socio-economic backgrounds have considerably lower levels of academic engagement. [6]
2. To increase students' awareness of the relevance and importance of maths in everyday life	Because we know that to develop numeracy skills, students need to be exposed to the real life situations and contexts within which numeracy skills are applied. [7] And because we know that mathematics that is used in context is better understood that mathematics taught in isolation. [8,9]
3. To connect students with new role-models who can support their learning and help build their communication skills	Because we know that communication skills improve with practice and interactions with others. [10]
4. To support schools to develop engaging numeracy curriculum	Because we know that students learn better when they 'connect' with the subject. [6]
5. To provide time-efficient, meaningful corporate volunteering opportunities	Because we know corporate volunteers want to make a positive contribution to the community but are often time-poor. [11]

[6] Australian Institute of Family Studies. (2014). The Longitudinal Study of Australian Children Annual Statistical Report 2013. Melbourne: AIFS. http://www.growingupinaustralia.gov.au/pubs/asr/2013/asr2013.pdf
[7] Council of Australian Governments 2008, *National Numeracy Review Report*, Commonwealth of Australia, Barton, ACT
[8] Carraher, T., Carraher, D. & Schliemann, A. 1985, 'Mathematics in the streets and in schools', *British Journal of Developmental Psychology*, 3, pp. 21–29.
[9] Zevenbergen, R. & Zevenbergen, K. 2009, 'The Numeracies of Boatbuilding: new numeracies shaped by workplace technologies', *International Journal of Science and Mathematics Education*, vol. 7, no. 1, pp. 183–206.
[10] http://www.australiancurriculum.edu.au/GeneralCapabilities/Pdf/Literacy
[11] http://www.volunteeringaustralia.org/wp-content/uploads/VA-Key-statistics-about-Australian-volunteering-16-April-20151.pdf

Appendix B – Program logic

RATIONALE *The problem the program is seeking to address*	**INPUTS** *Resources needed to run activities*	**ACTIVITIES** *What you do*	**OUTPUTS** *What gets produced as a result of what you do (Program Deliverables)*	**OUTCOMES** *What changes as a result of what you do (Immediate; Long-term)*	**PURPOSE** *Contribution your program is making towards a broader problem*
Maths and reading skills of Australian 15 year-olds have slipped backwards in the last decade (PISA, 2012) 55% of Australian adults have low-level maths skills (Productivity Commission, 2013) Difference equivalent to 2.5 years schooling separates the mathematical, reading and scientific literacy scorers of students in the highest SE quartile and in the lowest (PISA, 2012) Networks between schools, community organisations, philanthropy business and parents are vital for schools in areas of concentrated disadvantage… in 'positively changing students' desire to learn, providing support for teachers and overcoming social disadvantage' (Black, 2008)	Ardoch Staff & Expertise *(Program Coordination & Delivery; Volunteer Management; Financial Management; Program Development & Research)* Primary Schools (ICSEA <1000) & Numeracy Teachers Corporate & Community Partners / Volunteers Offices / Equipment / Technology (including ICT support & blog platform (Kidblog) Funding	Marketing & Communications to secure partners (schools and corporates) Recruitment and training for teachers and volunteers Match volunteers with students Facilitate (and supervise) experiences for students & volunteers, including: blogging, visits Monitoring & Evaluation	# programs # children # volunteers # volunteer hours # blog posts # visits Donor reports Program Evaluation	**Children** Increased engagement with numeracy Increased enjoyment and interest in maths Increased awareness of the relevance and importance of maths in everyday life Improved communication, I.C.T. skills and confidence with numeracy through connection with adult role models **Schools** Numeracy Buddies provided schools with more engaging curriculum **Volunteers** Sense of making a positive contribution to the community in a meaningful and purposeful activity	We know children are more likely to succeed when they enjoy their learning, so we will help make maths fun, relevant and engaging. We know that students from low SES backgrounds need more assistance to reach optimal educational outcomes, so they are our target group. We know that adult mentoring has proven benefits for the educational outcomes of students from low SES backgrounds, so we will engage corporate volunteers to work with students from disadvantaged schools.

Assumptions

Corporates will engage (and pay to participate) in Numeracy Buddies; Schools will engage, and teachers will find space for the program in curriculum; Volunteers & students will blog regularly.

Appendix C – Evaluation design

Aim	Objectives	Evaluation sub-questions	Indicators/data sources
To promote long-term positive engagement in numeracy by engaging children from disadvantaged schools in unique, one-on-one numeracy experiences with corporate volunteers	1. To provide students with fun, positive and engaging numeracy experiences	6. Did students enjoy the program? 7. Did students experience success in solving the puzzles with their Big Buddy? 8. Did the program help make maths more interesting and fun? 9. Which elements of the program did students like or dislike?	10. Pre and post-program student surveys 11. Coordinator blog observations 12. Post-program teacher survey
	2. To increase students' awareness of the relevance and importance of maths in everyday life	13. Did students learn about the ways their Big Buddies use maths? 14. Was there a change in students' appreciation for the use of maths in real-life situations?	15. Pre and post-program student surveys 16. Post-program teacher survey
	3. To connect students with new role-models who can support their learning and help build their communication skills	17. Did students look forward to blogging with their Big Buddies? 18. Did Buddies get to know each other through the blog conversations? 19. Was there any change in the quality of student communication within the blog?	20. Post-program student survey 21. Coordinator blog observations 22. Post-program volunteer survey
	4. To support schools to develop engaging numeracy curriculum	23. Did teachers feel that the program enhanced the curriculum? 24. Were teachers willing and able to prioritise the program within their weekly timetable? 25. Which students did the program suit best and least?	26. Post-program teacher survey 27. Principal opinion 28. External expert opinion 29. Literature scan
	5. To provide time-efficient, meaningful corporate volunteering opportunities	30. Did volunteers enjoy the program? 31. Were volunteers willing and able to prioritise the program within their weekly schedule? 32. Did volunteers feel they had made a valuable contribution to their Little Buddies' learning?	33. Post-program volunteer survey 34. Literature scan