

# MATHLETICS

by 3P  Learning

## Mathletics White Paper

### Table of contents

- **Executive summary** p 2
- **What is Mathletics?** p 3
- **Terminology explained** p 4
- **Mainline stats** p 5
- **Results for teachers** p 6
- **Results for parents** p 9
- **Conclusion** p 10
- **Future developments** p 11

## **Executive summary**

This report is a general introduction to the key findings from the 2011 and 2012 Mathletics surveys, prepared after analysing the feedback of teachers and parents for the Victorian Department of Education and Early Childhood Development (DEECD). It confirms that this online learning platform is both hugely popular and effective. More information can be found in the full body of the report.

The statistical evidence of this report was derived from three sources: a teacher survey that was sent to just over 10,000 teachers (eliciting 1100 responses), over 700 completed parent surveys, as well as student and teacher usage and results data from the Mathletics database.

We have found that Mathletics inspires students to learn and improve in mathematics while enabling teachers to easily track their progress through developing levels of competence in activities corresponding with state and national curriculum standards. As student work is corrected immediately, real-time information is available for formative assessments by teachers, better informing their lesson planning and curriculum revision.

All the results from these surveys show how Mathletics is both a support tool for teaching and learning, and an engaging student resource. Parents are also reporting positive improvements. As one parent stated:

“It takes the stress out of encouraging our children to be active in an educational task – other than their weekly homework. They want to log on at home, and knowing this program is safe and beneficial for them, I am more than happy for them to use Mathletics at home. I know they love it and find it loads of fun – their words!”

One of the many reasons teachers rate the popularity and effectiveness of Mathletics is the ability to personalise the experience and encourage self-direct learning in their classes without attenuation of rigour or depth of content.

While it is too soon to make assertions about the long-term improvements in external and school-benchmarked assessments, teachers have overwhelmingly indicated that Mathletics has benefited their student-learning outcomes.

## **What is Mathletics?**

Mathletics is a customisable e-learning resource that improves numeracy outcomes by complementing and extending classroom practice. The success of the program can be attributed to striking the right balance between its intuitive, user-friendly interface and the cognitive 'stretch' required by students to move through achievement levels.

The opportunity to tailor to an individual's learning makes it personally motivating and therefore more likely to affect permanent learning. For each question, step-by-step examples and animated solutions are provided for students, empowering them to direct their own learning, simultaneously supporting differing learning styles.

As the program is web-delivered rather than locally supported, upgrades do not require technical support; new features and improvements are seamlessly introduced. Mathletics is not only an excellent learning and teaching tool that is user-friendly for teachers, students and parents, it is continuously developed and adapted in response to user feedback.

With an adaptive anytime, anywhere approach, Mathletics does not cater solely to one theory of learning. Rather, it supports skill practice, problem solving, working mathematically and the mastery of learning at both school and home.

Instant feedback enables real-time formative assessment and the opportunity to adjust teaching and learning as a result. Being able to see whether a new concept has been understood and applied immediately, rather than at the end of a term or semester, enables teachers to adapt and revise their teaching accordingly. By making real-time formative assessment easier, Mathletics helps teachers deliver more effective classes.

## Terminology explained

**Live Mathletics:** A game-like arena where students can compete in real time to master basic maths skills against students from all over the world. An intelligent ranking system ensures that students are challenged, but not discouraged, and a personal best bar is always displayed to motivate students to improve further. A 'three strikes and you're out' system reinforces the need for accuracy as students develop greater speed and mental computational ability. One point per correct question answered provides ongoing rewards and helps to balance student activity between fun, basic maths skill-building activities and Curriculum Content.

**Curriculum Content:** This is where Mathletics activities match the teaching syllabus. Teachers can choose to provide students with state, national, or their own custom-made curriculum. As more points are awarded for a Correct Curriculum content answer, students are better motivated to work through Curriculum Content in Mathletics.

**Points:** Awarded to students as they successfully complete Live Mathletics and Curriculum Content within Mathletics. The points contribute to their earning of certificates and a place in the Hall of Fame.

**Credits:** These are earned by participating in Live Mathletics and the Curriculum Content. These credits allow students to purchase items for their online avatar. This is a fun and engaging way for students to personalise their experience, encouraging a greater investment in their efforts and results.

**Hall of Fame:** Allows students, classes and schools, both nationally and internationally, to be recognised for their success on a public leaderboard. A student Hall of Fame updates daily, allowing for more students to have the opportunity to appear, while the class and school Hall of Fame resets each week.

**Star Improvers:** Records the number of times a student achieves real improvement within the Curriculum Content. Students attain recognition as Star Improvers when their results improve by more than 10% on any activity, after a minimum of two attempts. Please note though that if a student attempts an activity more than once, they receive a new set of questions.

**Certificates:** Granted when a student earns 1000 points or more within one week. This encourages students to complete a healthy amount of work each week and rewards students for every week they practice. Students initially earn a Bronze Certificate, then a Silver Certificate once five Bronzes have been earned. With four Silver Certificates, a student then receives the much-coveted Gold Certificate, demonstrating their long-term commitment and developing ability.

**Activities:** A set of 10 questions based around a single topic that forms part of a curriculum course. These questions infinitely regenerate to provide ongoing content, with the difficulty adjusted to allow for intelligent support and extension for each student. Students build confidence and are continually challenged.

**Teacher console:** The interface within Mathletics from which all of the teacher functionality is available. This area is accessed through a unique teacher login and is accessible from any computer with an internet connection.

## **Mainline stats**

The following data is taken from a comparison between teacher and parent feedback in the Usage and Improvement Survey 2011 and 2012. Of teachers surveyed in 2012, 1100 responded – a remarkable result given the time pressures on teachers today – while more than 700 parents responded.

- An increase in Curriculum (up 17%) over Live Mathletics (down by 18%).
- Star Improvers up by 72%.
- Courses created by teachers up by 667%.
- 96% of teachers agreed that Mathletics has been effective in improving student-learning outcomes.
- 94% of teachers agreed that students were more engaged when using Mathletics.
- 96% of parents said Mathletics had improved their child's understanding of mathematical concepts.
- 89% of parents said their child was more engaged when using Mathletics at home.

## **Main body of results: Teachers**

Of the 1100 surveyed teachers, 70.9% reported they use Mathletics for group activities in class. 68.6% also use it as a homework activity, 58.7% use it as a whole-class activity and 41.3% use it as an explicit teaching tool.

“I love Mathletics and its many applications,” said one of the teachers. “The students engage with it and I can adapt it for homework and class tasks. I use it to assist me in assessing student achievement in areas, which I report on. It is fantastic for multi-age and multi-level classes.”

From the Mathletics database, a growth of 325% in the number of activities directly set by teachers was observed. Mathletics is now being used more extensively as a teaching consolidation tool in 2012 rather than for competition or math-based ‘play’.

This change can be attributed to the developing confidence of users (35% of teachers have been using Mathletics in their classroom for two years, while 30% have been using it for three or more years), as well as improvements made by the program. For example, the Course Creator tool was moved from the Admin Centre to the Teacher Console, resulting in a huge jump in course customisation by individual teachers in the most recent survey results.

A growth of 17% in the number of Curriculum questions correctly answered (that is questions customised by teachers to directly reflect classroom learning) was also noted in the most recent survey compared with 2011. This is a significant improvement, given it reflects an almost identical number of students and schools.

A corresponding reduction by 18% in the Live Mathletics questions answered suggests the switch in emphasis to Curriculum activities over Live Mathletics has been successful. As one respondent noted:

“Our kids love Mathletics. We have reduced the Live aspect at school so each student can concentrate on the areas we would like them to master or consolidate. Mathletics is very motivating for all our students.”

Essentially, users are better tailoring the platform in their second or third year.

The teacher survey responses confirm that it is an excellent pedagogical tool that complements classroom practice and has had a noticeable impact on students’ enjoyment of maths, while bolstering their knowledge and skills.

From Term 4 2011, 976 Victorian teachers attended 107 workshops on Mathletics, which no doubt underlines their increased confidence using the program and its full functionality. This increased expertise would no doubt also be contributing to the significant increase in curriculum activities being set by teachers and completed by students.

### **Key stats explored**

*There was an increase in the use of Curriculum (up 17%) over Live Mathletics (down by 18%)*

The global competition of the Live Mathletics functions captures the imagination and competitive spirit of many students, playing in real time with their peers from across town, or the other side of the world. However, in 2012 teachers have been focusing

on core competencies and have increased the classroom application of Mathletics, rather than using it solely as a fun activity after mathematics tuition is completed. Many use it both for classroom learning, homework and competition.

*The number of Star Improvers increased by 72%*

Aiming to improve your correct answers by 10% is no small goal, and the increase in Star Improvers by an impressive 72% from 2011 demonstrates the level of engagement in Mathletics and its unique rewards-based system.

*Courses created by teachers improved by 667%*

A small change to the functionality of Mathletics has seen a staggering leap in the customisation of the program by teachers. Customisation means local curriculum content can be replicated and reinforced by Mathletics. It also means teachers can differentiate according to student achievement levels within one cohort, so students working individually or in groups are working on content that is targeted at the appropriate level for their skills and knowledge.

*96% of teachers agreed that Mathletics has been effective in improving student-learning outcomes*

Mathletics has been effective in improving student learning outcomes	Response percentage	Response count
<b>1 - Strongly Agree</b>	<b>40.4%</b>	<b>434</b>
<b>2 - Agree</b>	<b>55.7%</b>	<b>598</b>
<b>3 - Disagree</b>	<b>1.4%</b>	<b>15</b>
<b>4 - Strongly Disagree</b>	<b>0.8%</b>	<b>9</b>
<b>5 - Not applicable to their use of the program</b>	<b>1.7%</b>	<b>18</b>

Teachers are seeing improvements in their students' learning as a result of using Mathletics to complement their teaching. Standardised testing administered by the national curriculum authorities should confirm these improvements over time, as data becomes available.

*94% of teachers agreed that students were more engaged when using Mathletics.*

My students are more engaged in mathematics when they use Mathletics	Response Percent	Response Count
<b>1 - Strongly Agree</b>	<b>56.2%</b>	<b>600</b>
<b>2 - Agree</b>	<b>38.1%</b>	<b>407</b>
<b>3 - Disagree</b>	<b>3.7%</b>	<b>39</b>
<b>4 - Strongly Disagree</b>	<b>0.5%</b>	<b>5</b>
<b>5 - N/A</b>	<b>1.5%</b>	<b>16</b>

Learning is not a one-off event, but a process that requires repetition and reinforcement. Maintaining interest in problem-solving and skills practice in a classroom environment where students are working at different levels either in groups or alone is challenging at the best of times. Mathletics enables teachers to set curriculum and track students' progress in real time. Through their formative

assessments, teachers can then revise instructions or tailor work to particular needs within their classes.

The fact that students are more engaged using Mathletics gives teachers the time to assess and revise, and students the opportunity to work through enough mathematics problems to enable the learning to stick.



## Main body of results: Parents

In 2012, 700 Victorian-based parents were surveyed. 87% of respondents were based in metropolitan areas.

*96% of parents said Mathletics had improved their child's understanding of mathematical concepts*

Mathletics improves my child(ren)'s understanding of mathematical concepts	Response percentage	Response count
<b>1 - Strongly Agree</b>	49.2%	335
<b>2 - Agree</b>	46.7%	318
<b>3 - Disagree</b>	2.6%	18
<b>4 - Strongly Disagree</b>	1.5%	10

By complementing classroom instruction, Mathletics is useful for parents wanting to better support their children's learning at home. By bringing the curriculum work into the home through a fun web-based e-learning platform, parents have also been able to engage with their children's learning, making the revision of mathematics concepts an enjoyable experience for parents, as well as helping them to see improvements in their children's understanding.

"Mathletics has definitely helped me as a parent to understand the age-appropriate mathematical concepts and then explain them to my children," said one parent. "Also, it provides lots of practice for them. At the same time they have fun and enjoy doing the sums – a brilliant combination of fun and encouragement in learning this otherwise dry subject."

*89% of parents said their child was more engaged when using Mathletics at home*

My child(ren) has become more engaged in maths since using Mathletics	Response Percent	Response Count
<b>1 - Strongly Agree</b>	42.1%	287
<b>2 - Agree</b>	47.3%	322
<b>3 - Disagree</b>	8.7%	59
<b>4 - Strongly Disagree</b>	1.9%	13

One of the challenges of contemporary parenting is maintaining a child's enthusiasm for learning, especially with so many competing demands on their time and attention.

The game-like environment, and the opportunity to compete for points and certificates keeps the rewards for improving coming, which has a tangible impact on students' engagement in learning at home. One parent comments: "I think Mathletics has been integral in improving my children's enthusiasm and ability in maths."

## **Conclusion**

In the fast-changing environment of the 21<sup>st</sup> century, where the latest fads are continually being replaced, it is interesting to note that the enthusiasm for Mathletics from teachers, parents and students has not abated from 2011 to 2012.

For almost one third of those surveyed, this was their third year using the platform, and the largest constituents are in Level 3 and 4 in maths. The fact that the platform is customisable and its functionality is improved over time, Mathletics remains appropriately demanding and adaptable for different classes and skills levels. The on-demand explanations that support answers makes learning as much a part of the process as scoring points.

From those surveyed, 96% of parents whose children used Mathletics in 2012 reported that the program has improved their child's understanding of mathematical concepts. Coupled with excellent classroom teaching practice, we will no doubt see improvements in numeracy rates when tested against national averages.

## **Future developments**

3P Learning listens to users, responds to feedback and is committed to continuous improvement, which is why there are, of course, further developments earmarked for Mathletics in 2012 and 2013. Audio will be added to the Student Centre to better support students with difficulties in reading, improvements to the user interface are coming online and, continuing with the anywhere, anytime theme, Mathletics will be soon be available on the iPad and Samsung Galaxy Tablet.

More training documents, webinars and how-to videos will continue to support teachers and best practice using Mathletics, with a community of Mathletics Leading Educators to be recruited to assist colleagues. A drop-and-drag facility for teachers to select and arrange Mathletics teaching resources, in a suitable presentation sequence, will make the program even easier to work with.