

Bringing science and maths to today's youth

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Introduction

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) produces a number of educational science and maths publications for a youth audience. These are the magazines *The Helix* and *Scientriffic*, as well as the newsletters *Science by Email* and *Maths and Stats by Email*. To help understand and maintain the audience and appeal of these publications, a range of evaluations including surveys are carried out. These studies have revealed that although the magazines and emails are written for school-aged students, they also reach and have broad appeal for teachers, parents and carers. As such, the audience is split into many segments, requiring contributors to work across the borders that define each publication. However, working across demographics with these publications may not be as challenging as initially anticipated, with a number of strategies that are able to straddle the age divide to engage youth, as well as an older audience of teachers and parents.



About the author

Jasmine is the Editor of CSIRO's Double Helix publications. She oversees the production of *The Helix* magazine, *Scientriffic* magazine, *Science by Email* and *Maths and Stats by Email*. Jasmine has a Bachelor of Science with a major in genetics and a Bachelor of Arts with honours in history and philosophy of science. She also has postgraduate certificates in writing and marketing communications.

Discussion: who is the real audience?

The Helix was first published as a science club newsletter by CSIRO in 1986, before growing into a larger magazine. The target audience for this magazine is Australian students aged 10–15 years and surveys reflect this target audience in their responses.¹ In 2009, most respondents to *The Helix* survey² were students (84%) and were aged 11–14 (70%). Three years later in our 2012 survey³, almost all respondents were students (98%), although the 11–15 demographic decreased (61%), with more readers aged 7–10 (28%). As may be expected with a youth audience, few of the respondents had bought the magazines for themselves (8%), with most receiving the magazines from their parents (65%) or a friend/relative (22%). These survey results indicate that *The Helix's* target audience of students are the ones that receive this print publication, even if they are not responsible for its purchase.

A similar pattern can be seen with *The Helix's* sister magazine, *Scientriffic*, which was launched in 1999. Its target audience is Australian students aged 7–10 years. Respondents to our 2009 survey⁴ typically belonged to this demographic. Most respondents were

1 Note that our surveys are self-selective with a sample size typically less than one percent of the readership. This may be because it requires readers to take a proactive step to engage with web content after reading a print publication (or before that to return survey results by mail), which may not be convenient. Although prizes are offered, such as iPods, it does not seem to be a great incentive to switch between media to carry out the activity.
 2 n=170, printed copies=21 000, survey by CSIRO
 3 n=54, printed copies=13 975, survey by CSIRO
 4 n=111, printed copies=19 100, survey by CSIRO



students (85%) and most were aged 7–11 (86%). In another survey in 2012 (n=36, of 12 500), all respondents were students (100%) with most being aged 7–10 (81%). None of the respondents had bought the magazines for themselves (0%), with most receiving the magazines from their parents (62%) or a friend/relative (27%). Again, survey results suggest that the target audience is primarily the audience receiving the publication, even if they are not purchasing *Scientriffic* for themselves.



Discussion: across the digital divide

For more than 10 years, CSIRO has worked across the print and digital divide, delivering both print magazine and email newsletters. Email is now an established digital medium by which to provide content to readers. Compared with the print publications, *Science by Email* and *Maths and Stats by Email* are shorter, published more frequently and provided free to their audiences with the support of sponsors. Although the type of content produced for these publications is similar in tone and pitch to that in the magazines, they have a much wider range of audience ages.

Although the email newsletters are written for school students aged 9–13, they also have broad appeal for teachers, parents and carers. As such, the audience of the email newsletters includes many adults, and this is reflected in responses to our surveys. Readers of *Maths and Stats by Email* (under the title *Maths by Email*) completed a survey in 2010⁵ carried out by Murdoch University in Western Australia. Of the 741 subscribers who answered the relevant survey question, a majority were teachers (52%) with far fewer students (16%). Many respondents reported their primary roles as teachers, parents, homeschooling parents, or other. These results suggest that the true audience is broader in age than the target audience.

In the 2011 *Science by Email* survey by Renshaw-Hitchens & Associates⁶, most respondents were adult subscribers (67%) even though it was estimated that youth made up more of the actual subscriber population than was indicated by these responses (estimated 41%). The

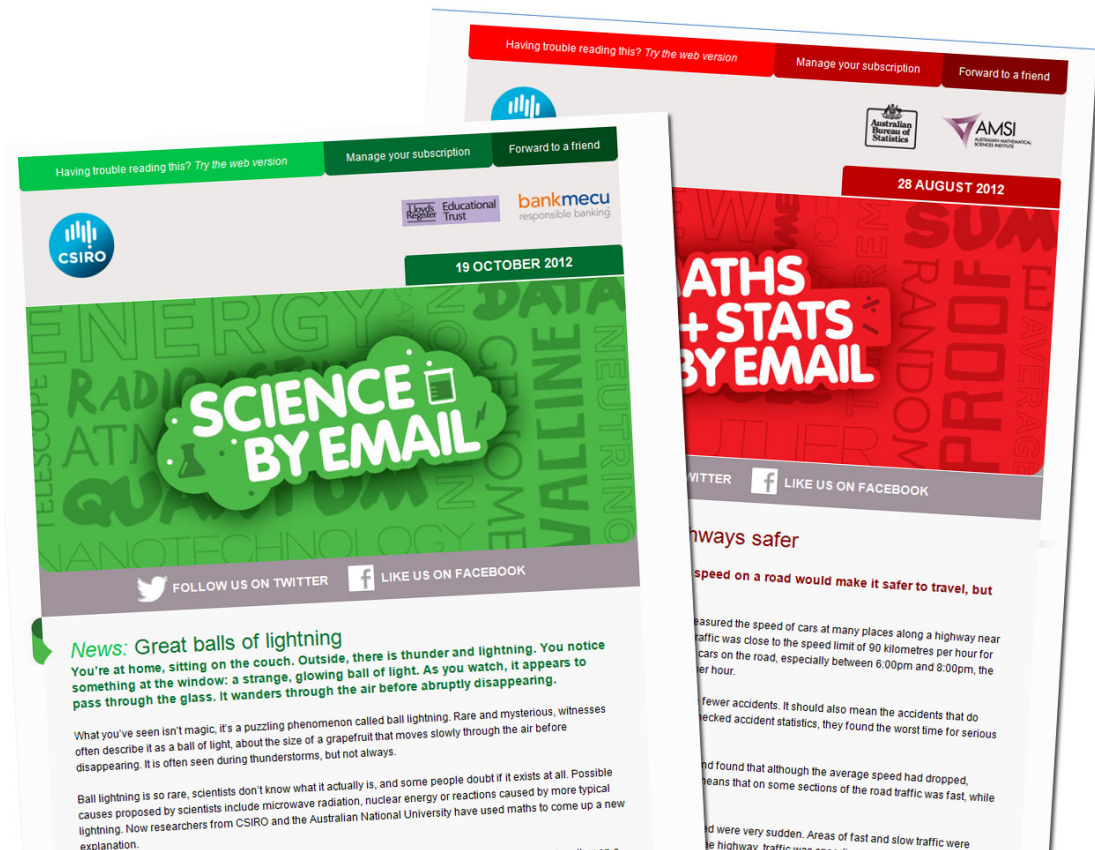
5 n=902, of 6000 subscribers

6 n=450 of 22 817 surveys delivered. Subscribers >40 000.



primary audience according to survey results is teachers, parents and carers. They subscribe on behalf of children and use the content in the classroom or at home.

The 2011 *Science by Email* survey also indicated that different aged audiences subscribe to the newsletters for different reasons, even though the content is the same. Youth subscribers agreed they are generally more positive towards science and scientific research from reading the newsletter. Adults have improved scientific knowledge, increased confidence in communicating science, and those who are teachers use the newsletter maintain their professional currency in teaching science.



Discussion: a gateway audience

Across all of these publications, it appears that teachers, parents, carers and relatives act as a gateway audience, whether they are subscribing for themselves as in the case of the email newsletters, or purchasing gifts for young readers as in the case of the magazines. It can be difficult to work across these borders in creating material for such a varied audience.

We have chosen to continue to produce content for students, even if in some cases the audience is in reality teachers and parents. In the past we've had teachers' guides to accompany our magazines and their uptake, whether purchased or free, has often been less than a tenth of that of the magazines. We suspect that this is because these products require some translation, discussion, or direction for use. This is work for teachers or parents, who are often time-poor, to enable the product to be used with the intended audience of students.

With the gateway audience in mind, not only do we need to provide what students enjoy, but it also has to be seen as worthy in the eyes of those disseminating the information: teachers, parents, carers and relatives. Historically, the topics preferred by our readers are animals and space. These topics have been consistently the most popular in survey results across our publications, spanning years. However, our content strategy includes a diverse range of science and maths topics, as well as a range of skills and values that include critical



thinking and curiosity. These are valued by teachers and the community, as they are reflected in the Australian Curriculum: Science. We don't just give young readers what they want when they are surveyed, but equip them with the tools required to become scientifically and mathematically literate. To balance this, we make an effort to ensure each story has an angle that we believe appeals to the young reader so they continue to enjoy and engage with the publications.

Of interest to the publishing industry is that print numbers are steadily falling. When considering print for a youth audience, and the interplay between the adult purchasers of our magazines and our target audience, there are factors to consider. Firstly, it is more difficult for parents and teachers to retain control over what children are reading in an online environment than in print, which may lead to a preference for a print magazine rather than a digital publication. Secondly, print magazines may also be a preferred option for those adults looking for alternatives to screen time for children. CSIRO recommends, "that children have less than two hours recreational screen time per day. This includes watching TV, playing computer games and surfing the net for entertainment purposes."⁷ There's a correlation between children having more than two hours of screen time and being overweight; being less physically active; drinking more sugary drinks, snacking on foods high in sugar, salt and fat; and having fewer social interactions. As such there are complex interactions to consider when spanning the divide between the ages involved in the uptake of our products.

Discussion: greater accessibility for greater reach

We have been looking to repurpose our content to make it more accessible to a diverse audience across a range of technologies. The 2011 *Science by Email* survey found that readers were already repurposing content themselves. Material from *Science by Email* can be found on websites and blogs around the world, not necessarily by youth readers, but definitely by the older audience of teachers and science communicators. This represents a potential promotional opportunity, encouraging innovative use and extending the reach of *Science by Email*. As we were not operating in this space at that time, others were repurposing content on our behalf, so appropriate credit was not always given to our publications. CSIRO recognises that online communication tools such as blogs, photo and video sharing sites and online communities are increasingly used by business and government for direct interaction with the community, the media and other stakeholder groups. So, to increase our presence in this space, the Helix @ CSIRO blog (www.csirohelixblog.com) was launched in November 2012.

The screenshot shows a blog post from the Helix @ CSIRO blog. The header includes navigation links for HOME, BLOGGERS, GUIDELINES, and SPONSORS. The main content area features a purple banner with the 'DOUBLE HELIX' logo and the 'Helix @ CSIRO' title. Below the banner, the post title is 'Share some cakes (or pies!)' dated 14 March 2013 by David. The post includes a 'You will need' section with a list of items: three cakes or pies, a knife, friends to share with, a plate for each person, and measuring cups, spoons, and scales. It also has a 'Method 1: I cut, you choose' section with four steps. On the right side, there is a 'BLOG POSTS BY TOPIC' section with categories like Hands-on, Maths, Science, Biological sciences, Chemical sciences, Earth and space sciences, and Physical sciences. There is also a 'TAGS' section with the tag 'agricultural and veterinary'. The post includes two images: one showing the ingredients and tools, and another showing a sliced cake.

7 CSIRO (2011), Recreational screen time, <http://www.csiro.au/en/Outcomes/Health-and-Wellbeing/Prevention/10-steps-for-healthy-families-ScreenTime.aspx>, Accessed 8 January 2013.



Given a range of different delivery options in the 2011 survey, *Science by Email* readers believe email is still the most relevant form of delivering the newsletter by a significant majority of both young people (92%, n=116) and adults (97%, n=265). While the majority of the curriculum experts consulted thought email was still the best format to use for delivery, there were some suggestions that consideration should be given to other formats such as iPad or tablet apps. These suggestions have been considered and are part of our planning to increase the reach of the publications across borders such as age.

Conclusion

The audiences for youth publications are not always the target audience and can in some cases be made up primarily of adults. *Science by Email* and *Maths and Stats by Email* are mostly received by adults including teachers, parents and carers using it to increase confidence in communicating science, and for teachers to maintain their professional currency in teaching science. *The Helix* and *Scientriffic* magazines primarily reach their target audience, but are purchased by parents and other adults whose needs must be considered. Despite this broad uptake, we continue to write for a student audience, as we suspect our adult audience appreciates being able to directly pass our publications to young readers without creating an additional workload. There are many ways content can be repurposed to get out to a more diverse audience, such as via blogs. CSIRO education publications are taking the strategy of using content for a youth audience across a range of traditional print and digital media to gain the greatest audience possible reaching youth and adults alike.

Further reading

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