



## Public submission made to the Review to Achieve Educational Excellence in Australian Schools

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### Summary

Learning outcomes will improve if new educational products that can improve learning outcomes are implemented and used. Getting effective innovations with measurable outcomes widely used in schools is a formidable task in Australia with its barriers to education innovation.

Commercial organisations will concentrate their resources on other markets such as India, USA, Middle East and China where there is an active demand for products and processes that will drive improved education outcomes. This will exacerbate Australia's education ranking slide. It is therefore essential to address the barriers to innovation discussed below.

We believe that these barriers to innovation can be addressed quickly and at low cost by setting up a new independent not-for-profit body that we are calling the Australian Education Innovation Foundation (AEIF). The focus of this organisation will be to assist educational innovators from inception to roll out in Australian schools for those education products or processes that have been empirically tested and shown to improve learning outcomes, to assist teachers and education administrators to understand what innovations work, how they can best be utilised in Australian schools, and how they can improve teacher productivity, which is the subject of recent announcements by Treasurer Morrison.

Our experiences presenting Readable English in Australian schools have provided us with direct experience of the barriers to innovation in the education sector in Australia. Information about the barriers to education innovation has come from interviews and focus groups with teachers, conversations with State Education Department personnel, education researchers and academics and with companies producing products sold into the education sector.

The AEIF would also provide a place where people interested in educational innovation can collaborate, especially on those big projects, such as literacy, that will help Australian education.

## Main submission

Investing in education is an obvious and simple idea - provided it delivers the desired educational outcomes. But there are good reasons to believe this spending might not be as effective as is hoped, because:

- Endemic poor literacy means students are not learning efficiently, and
- Productivity in education in Australia is static

### Poor literacy

Australia has a growing literacy problem. According to the ABS, over 40% of Australians surveyed were classified as having insufficient literacy for 'coping with the demands of modern life and work'

(<http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4228.0Main+Features202011-12>). Moreover, PISA rankings are actually falling – since 2000, PISA results show reading literacy rates have actually fallen by 10 months.

Poor literacy exacerbates all social problems. People with poor literacy have a bleak future: poor education and job skills, low earnings (and tax contributions), with health and mental health costs that are many times the health costs of literate people. They are more likely to be on welfare and be incarcerated – jail is more expensive than Harvard University!! Also, many of our brightest and most creative people have dyslexia, and resultant poor literacy.

Students cannot benefit from education and skills funding if they can't read. The current Australian methods to teach struggling readers involve intense face-to-face tutoring, which is slow and very expensive.

### Barriers to Innovation

According to the Productivity Commission, education productivity in Australia is static. To improve education outcomes, Australia can choose either to significantly increase its education expenditure, or it can investigate promising new ways of teaching that may be lower cost, quicker, and more effective. Such new teaching methods are being actively investigated in India, USA and the Middle East, with National Government backing.

The education sector in Australia is conservative and there are formidable barriers to education innovation in Australia. Barriers to innovation negatively impact Australian education productivity. As commercial education innovators will initially address commercial markets that are the most receptive to innovative education technologies, Australia may wait a long time before these companies start marketing in Australia. This will cause Australia to fall further behind in international education rankings. We urgently needs to build innovation into the education system or risk being left further behind by our competitors.

Innovative educational technologies should be scientifically tested to determine which actually work. However, it is hard for individual teachers to evaluate whether products work. In NSW, the Reading Recovery product was used for over a decade until an evaluation found that the benefits were not retained over time. A systematic approach to scientific evaluation of educational products and teaching methods is required.

When a new teaching technology is found that works, the adoption of that technology in the education system should be encouraged and facilitated so that it quickly gains traction and education results improve quickly. There will be no significant increase in education outcomes unless innovative new products and methods of teaching are rolled out to a large number of schools quickly.

Teaching technologies that do not work should be discontinued.

#### Australian Education Innovation Foundation (AEIF)

We propose the establishment of an Australian Education Innovation Foundation to actively encourage, promote and review innovation in education, to assist educational innovation from inception to roll out in Australian schools, and to educate teachers and educational administrators about what innovations work and how these innovations can best be deployed in Australian schools. Measures to promote education innovation and teacher productivity are simple, low cost, can be quickly put in place, and will, we believe, significantly increase the beneficial impact of any new education funding.

We initially proposed that the government set up a not-for-profit reporting to the Federal Department of Education to provide the information to teachers and schools about which new teaching technologies and products work. However, conversations with educational researchers and academics, education administrators, teachers and people working for not-for-profits in the educational space all highlight the likelihood of political interference in an organisation set up by government. So a government funded but independent not-for-profit organisation is proposed.

The AEIF is a not-for-profit loosely modelled on successful Government interventions such as a US Department of Education initiative to sponsor education innovation.

We propose that the AEIF would be a lean organisation run like a start up. The AEIF would have the following functions:

1. Organisations and individuals with new teaching technologies or products would register with the AEIF, which would review these technologies/products.
  - a. The registration process would require the innovators to explain the innovation and its likely benefits, evidence as to why the innovation is to work, the science underlying the innovation, its scalability, how the innovation can be tested, the qualifications and expertise of the innovators,

what is needed to bring the innovation to being ready for deployment in schools, and so on.

- b. The innovations can be anything that will improve learning outcomes and could include new teaching methods and products, new ways to present information, such as new accessible formats, tools and services to assist teachers, projects to motivate students, such as paying indigenous students who can read to help other indigenous to learn to read, or establishing a story telling competition for indigenous youth with attractive prizes (story illustrations might be another competition), and so on.
  - c. The registrations would be reviewed initially by AEIF staff to ensure that the registration information is complete and the registrations would then be prioritised.
  - d. An expert panel would review the higher priority registrations. The expert panel would enlist educational innovators, innovative teachers, leading educational researchers, technology experts and so on.
  - e. Registration review will provide advice to innovators on how to efficiently progress the development of their innovation, as well as prioritising applications for scientific testing.
  - f. Fast turnaround on project evaluation.
2. Promising, science based teaching technologies and products that are ready for testing would then be piloted in schools with the AEIF's guidance.
- a. The AEIF would find suitable schools and teachers, and teachers and schools interested in innovation would be encouraged to register with the AEIF.
  - b. The AEIF would help with the experimental design of the experiment and with ethics approval etc. to ensure that good ideas are not stopped by bureaucratic barriers or because the innovators have not been trained to design empirical scientific experiments.
  - c. Wherever possible, the AEIF will reuse testing technology used in one test in other tests to enable low cost and rapid testing of innovations. Small scale tests e.g. using paper prototypes with a small number of students may be used as a first step to understand the innovation, its chances of improving learning outcomes, and to understand how best to test and/or pilot the innovation.
  - d. The AEIF would also provide low level funding to teachers and schools to conduct the test – e.g. providing equipment, costs associated with a staff member attending training etc.

- e. It should be noted that it is very difficult and expensive for commercial organisations to organise tests in schools, with some education administrators refusing to see commercial organisations simply because they are commercial. Additionally, it is unethical for commercial organisations to provide incentives to schools and teachers to conduct tests.
3. The AEIF would provide more substantial grants to see the products scientifically tested by professional researchers, who might be academic researchers or professional research organisations. The AEIF would put together a list of such researchers and research organisations.
4. The AEIF would organise publication in a peer reviewed academic journal. A teacher edition of the findings would be made available on the AEIF website, supported with regular email newsletters. The US Department of Education awards substantial grants to independent researchers and publishes on its website teacher friendly information about the teaching technologies and products that have been shown empirically to work.
5. Organise and fund teachers who have run pilots and researchers who have run more extensive evaluations to attend and speak at conferences, run webinars to explain the new teaching technologies and products and the empirical pilot results, as well as answering enquiries from schools and teachers – these are the people teachers want to hear from when deciding whether to trial or adopt a new technology. Having these communication channels will encourage collaboration between teachers which is likely to lead to further innovation.
6. In order to get principals and teachers to think about innovation, each school could be given a small innovation budget by the AEIF that they can access once they have written up the innovation project they want the money for. The project plan should state expected measurable outcomes and the school should report back on whether these outcomes were achieved and what was learned on the projects. Schools which run effective innovation projects could be publicly commended for the project and given increased innovation status.
7. Organise awards for innovative teachers and schools, and have these awards presented at a gala event by the Prime Minister and/or Federal Education Minister.
8. Work with universities and other organisations teaching teachers about new teaching technologies and products so that teachers-in-training are trained in these teaching technologies products and can efficiently teach students using them.
9. Run online and in person courses, workshops and conferences to teach teachers about new teaching technologies, how to effectively teach using the new technologies and products to ensure that these new technologies are properly

implemented, and use these educational activities to address barriers to innovation in the education sector.

10. As some learning activities such as reading practice will need to be done out of school hours – there is not enough school time for students to spend the time to develop reading automaticity – the AEIF will collect information about people and organisations who can provide out-of-school learning activities, and will evaluate their offerings to reduce the workload of teachers who make these arrangements for their students.
11. The AEIF could also sponsor education innovation by matching academics and educators to education innovators, volunteers to pilot projects, donors to specific projects, and investors to innovative education companies.
12. It is anticipated that the AEIF would collaborate with other organisations seeking to promote education innovation and improve education effectiveness. Collaboration should enable timeframes to be telescoped, expertise shared and duplication avoided. The AEIF would establish links to the relevant administrators and decision makers involved with innovation in organisations like state education departments and Catholic education. We have been in discussion with Social Ventures Australia. Although Social Ventures Australia may not be able to run all the proposed AEIF activities, it will be able to do some. For example, its Evidence for Learning program is likely to be able to organise and manage more substantial scientific tests.

#### Involving the Community

Many individuals and organisations recognise the fundamental importance of education and literacy, and want to help, but regulation makes cooperation difficult. For example, an innovative company may have a technology to overcome a social problem, but charities in the area often cannot partner with the company as it is difficult for charities to fund for-profit companies. In respect of their endowments, charities generally invest in public listed companies, not innovative private companies, even though an investment of \$1 in a technical solution to a social problem might produce a social benefit of many hundreds of dollars. It is therefore proposed that the AEIF be structured to facilitate transactions by receiving additional funding from individuals, companies and charities and providing this additional funding to innovative educational companies to enable them to pursue those innovative education projects endorsed by the AEIF.

It might also be a good idea to accelerate the commercialisation of education innovation by offering some matching funding for innovations endorsed by the AEIF using structures like the Early Stage Venture Capital Limited Partnerships (ESVCLP).

#### Involving other disciplines

Science has revealed that there are many factors that will influence the learning outcomes of a student such as the skill of the teacher, the learning materials, how effectively the students commit information to their long term memory via an effective revision strategy, the level of resources at the school, how the student is taught (e.g. fast feedback, meta-cognitive strategies, peer tutoring and collaborative group learning can all assist learning), the level of literacy of the student, their vocabulary, their motivation, interest and curiosity, the support for education at home, to name but a few factors.

Education is now recognised by many as a very complex process, and it is not clear that there is a cohesive and widely held cognitive framework to allow teachers and researchers to navigate these complexities to optimise learning outcomes. But there are frameworks that allow for the optimisation of exceedingly complex systems in other areas that can be adapted for education.

We think a useful cognitive framework for the complex education system is the model of a complex industry supply chain. Manufacturers break a supply chain into multiple individual steps and those steps which are independent of other steps are optimised individually. A number of small improvements when added together can have a large impact and we think the same is likely to be true in the education environment.

In addition to optimising individual steps, the entire supply chain is reviewed to see if a number of steps (usually dependent on one another) can be simplified, optimised, combined and/or omitted. Continuous optimisation is happening all the time and “Best Practice” makes little sense in this model – some teachers who believe that they are teaching using “Best Practice” resist innovation because they believe they are already using the best teaching technique. The supply chain model is an engineering approach used successfully by many companies, and our experience is that this model works very efficiently in the education space.

Machine learning technologies are often employed in supply chain optimisation and can be applied in optimising educational systems. The key to optimisation is the capturing and statistical analysis of meaningful quantitative data to choose between different processes. More data usually improves optimisation and large data sets can allow the simultaneous optimisation across a number of variables within the “education supply chain”, giving even better education outcomes. So the education supply chain model can also provide guidance as to how innovations can be effectively implemented within a complex system.

We submit that the AEIF should also be looking at setting up an interdisciplinary team to help develop a framework to accelerate the efficiency and effectiveness of the whole education process by adapting processes from other disciplines e.g. supply chain management to optimise educational outcomes.

## Solving Big Issues that will make a Real Difference to Australian Education

The NSW Department of Education's Centre for Education Statistics and Evaluation (CESE) has done a review of published literature to come up with Best Practice for teaching reading, which is to use phonics based approaches. Phonics works better than teaching reading by learning the sounds of whole words by rote, but phonics has its problems. Students seeing a new word do not know if the word is phonetic, can be pronounced by using a rule or is an exception, so independent reading practice is difficult if there is no one to tell you the correct pronunciation of a word. As over half the words in English are non phonetic – there is a lot of inefficient rote learning. A lot of Australian students never learn to read very well.

Phonics does not work well when compared to students learning a phonetic language. In Finland, students learn to read Finnish, a phonetic language, in months, and they can read very well after a year. It takes English speakers learning to read using phonics 2.5-3 years to read at the same proficiency, so Finns are reading to learn for 2 years while Australians are still learning to read. This places Australian education – and indeed the Australian economy – at a significant disadvantage (<https://www.ncbi.nlm.nih.gov/pubmed/12803812>).

Why aren't we setting the goal to have say 95% of Australians read as well as the Finns in a similar timeframe? Focusing on big goals will strongly encourage real education innovation, and if we can reach a big goal, there will likely be a massive transformation of the Australian education system. If we don't set big goals which will extend us, then we will never improve much.

The AEIF, operating like a lean start up, can come up with new approaches to solve these big issues and can provide expert assistance, feedback from, and collaboration with, the education sector and funding to education innovators to explore approaches to solve these problems. Promising solutions can then be piloted in schools and if the solution works, the AEIF can assist in rolling out these solutions into schools. This could really make a difference to Australian education.

### Benefits

If changes are not made to the way education is delivered, the education outcomes that are the objective of increased government funding may not be achieved.

An AEIF budget of between \$10 -!5m a year for 5 years (for operations other than innovation grants to schools) could transform Australian education, dramatically improve education outcomes, and ameliorate many of the social problems caused by poor literacy and low education attainment. Fixing poor literacy and low educational attainment is likely to have a huge positive social impact and could substantially reduce the Australian Government budget deficit.



Now that education is such an important export, an important secondary benefit will be to expand the education sector in Australia and increase Australia's education export revenues.