

School of Education

Updated

RESEARCH HIGHLIGHTS

'Is this really fair?'
How high school students
feel about being
streamed into different
classes based on 'ability'

FEATURED ARTICLES

- From shopping lists to jokes on the fridge – 6 ways parents can help their primary kids learn to write well
- The use of representations in solving maths problems
- Nature Play and Grow program

Message from Dean

There is a hint of warmth in the morning air bringing a spring to our step as September has arrived. It is wonderful to see connections and collaborations flourishing as we live and move around the country and the world.

The School of Education is excited to be once again collaborating in person with interstate and international colleagues. Our students will have the opportunity to travel to complete professional experience in an international setting later this year and planning for in and out-bound study tour opportunities is underway. The School of Education is committed to preparing job ready graduates.

We know the work of teachers is varied, challenging and rewarding and is much more than delivering the curriculum. The 'world around' us informs classroom and leadership activity. This edition of UpdatED is indicative of the vast array of topics and issues that affect teachers' professional lives as it shares news about creativity, diversity, health and living in the digital age. As teachers and school leaders prepare students to be thriving members of community, we hope the research featured in this edition will be useful.

I trust you will enjoy this edition of UpdatED in a quiet time of reading and reflection while you pause to smell or view the wildflowers of the Djilba season (current Noongar season).



Associate Professor Glenda Campbell-Evans
Dean, School of Education
Edith Cowan University



Is this really fair? How high school students feel about being streamed into different classes based on 'ability'



By Dr Olivia Johnston, Lecturer, School of Education

Many Australian schools still use "streaming", where students are separated into classes based on ability. However, not all students see streaming as beneficial.

My research, published in the journal *Research Papers in Education*, found streaming caused some students to feel unduly pressured, privileged, disempowered, and misunderstood. Some students in higher-ability classes said they felt more confident and motivated, but students in lower streams reported conforming to teachers' low expectations for achievement.

Students see less opportunity in lower streams

In Australia, there is no official educational policy on streaming (also known as tracking, setting, or "between-class ability grouping"). Schools make local decisions about if and how to stream students. My recent research in Western Australia shows students themselves can experience the inequity embedded in streaming. I followed 25 year 10 students across their school days for one week of school. I did more than 100 interviews with the students and conducted 175 classroom observations.

The research revealed some students in lower streams found their learning opportunities were limited. Student in the higher streams had different exams, assignments, grading, and excursions than students in lower streams. Ryan* discussed how in the higher stream, they "got to build roller coasters" while students in the lower stream were "just building bridges."

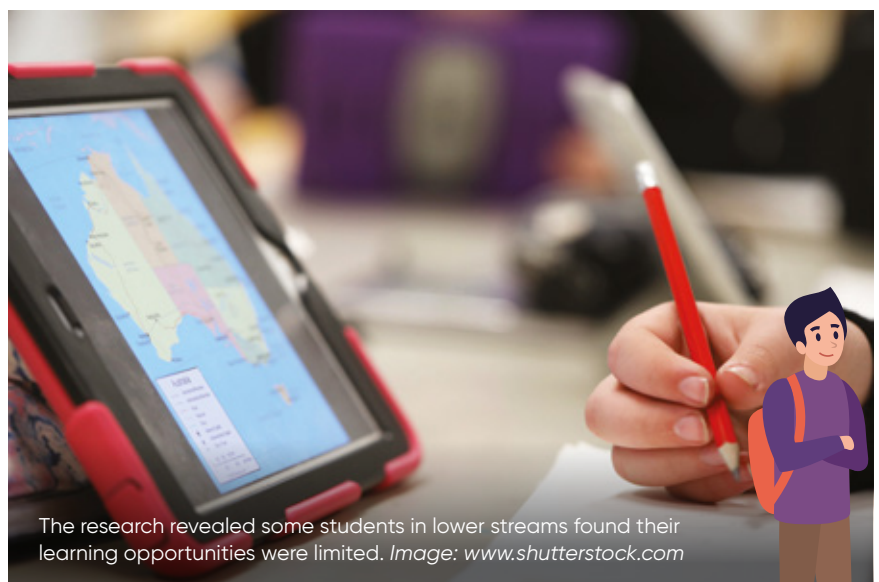
Students also expressed frustration their capacity to succeed was limited by streaming. Jerome said, "that in a lower streamed class the highest mark you can get in that class is a C". Moving up between streams highlighted the difference for students too. Curt remembered it was like he "skipped a year." Krissy said "there is a big gap of knowledge" when you "move up" to a higher stream.

Some students in higher streams welcomed the challenge of more difficult learning and extra opportunities. They felt motivated by the additional opportunities and, as Jenny put it, "wanted to be pushed" because it made them "feel good about themselves". For other students, streaming felt restrictive. These students felt their teachers saw them in a way that didn't match how they saw themselves.

Not seen as individuals

Many students felt their teachers had conceptualised their ability because of the streamed class they were in, rather than seeing them as individuals.

Being expected to perform at a higher level academically felt constrictive and unwelcome for some students. Jessica, for instance, resisted being told to do more difficult work in higher streams. When her teacher told her the work, she was doing was Year 11 work she responded by thinking, "Why can't we do Year 10 work? What happened to the Year 10 work?" Other higher stream students also felt unmotivated by being assigned work they found too difficult. Rochelle avoided her maths teacher and the learning, saying, "Some of the math, she's like doing stuff on the board and I'm just like [wide eyes] oh my God. This is too hard [...] If I don't get it, I'm like, I lose motivation."



The research revealed some students in lower streams found their learning opportunities were limited. Image: www.shutterstock.com

* All names have been changed to protect the students' identities.



Students in lower streams complied with their teachers' low expectations for learning. Jerome said his teacher [...] understands what class we're in, like everyone's just, no one really cares. So, she does understand if I don't really focus that much. Many of these students felt they didn't fit in with the teachers' homogeneous expectations for streamed classes.

Call out inequity

Not all students accepted streaming. Some felt undue pressure and privilege in higher streamed classes. Jessica noticed she and her classmates in higher streamed classes sometimes had to do extra tests her friends in different classes got to skip. It's really like, 'is this really fair?' Because I'm getting all this extra stress, and like, it's helping me, but it's not like 100%.

Sarah noticed students in the higher streams "had the privilege to go on a lot of excursions" while students in lower streams didn't. She said she thought it'd be better if there was no streaming. I don't think there should be a (higher streamed) class [...] I think it's better with everyone fair, and everyone should do the same. These students questioned the fairness of streaming, even while acknowledging the privileges of being in the higher streamed class.

Poor behaviour in lower streams makes learning harder

Poor behaviour in lower streams made it difficult for students already struggling at school. Asher, who was in a lower streamed class, said "They're not learning because they're always mucking around, and it takes away from everyone else's ability to learn because the teacher's preoccupied dealing with them [...] And we're behind a whole assessment because of the people in our class."

Other students described their peers in lower streams as "naughty", "noisy", "rowdy" or "messaging around." Students in higher streamed classes noticed and appreciated how being streamed protected them from poor behaviour of students in the lower streams. Rochelle said she'd felt "distracted" in the lower streams, but since moving the higher stream found "things have changed [...] my class is pretty good."

Since moving to the higher streamed class, Curt noticed "everyone focuses." This had not been his experience in the lower streamed classes. Clustering students who have difficulty achieving at school can lead to more behaviour problems in lower streamed groups.

Streaming can perpetuate disadvantage.

A growing body of research has identified a link between streaming and equity issues. Critics of streaming say it is an ineffective way to cater to the varied needs of students and that it can perpetuate social inequality (because students from lower socio-economic backgrounds and minorities are often placed in "bottom" groups, where their opportunities to learn are limited).

Education researcher John Hattie has said streaming (or "tracking") says to kids that "this is where you perform" and it presents equity issues. Yet, teachers in Australia often believe streaming is beneficial because it allows them to meet students' learning needs more effectively.

So, what should educators do?

Schools, educators, and policymakers making decisions about streaming should consider students' experiences and take into account how streaming helps perpetuate cycles of disadvantage. Policymakers could look to guidelines aimed at reducing the inequality associated with it.

All students deserve the opportunity to learn well and to confront limiting expectations and prove them wrong. My research shows students want to be taught and seen as individuals – unconstrained by labels and assumptions. We should take care adults' socially contrived notions of student "ability" don't place limits on their capacity to succeed at school.

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From shopping lists to jokes on the fridge: Six ways parents can help their primary kids learn to write well



By Dr Anabela Malpique, Senior Lecturer, School of Education

Learning how to be a confident and communicative writer is one of the most important skills students learn at school.

But NAPLAN results show a **significant decline** in Australian students' writing performance. Research for the period to 2018, shows year nine students performed nearly 1.5 years behind the average student in 2011. International studies **have also** raised concerns about students' writing performance, stressing the need to learn more about how writing is taught in primary schools. So, what is happening in Australian primary classrooms? And what can parents do to help their children learn to write at home?

Our new research

In 2020, **we surveyed** 310 primary teachers around Australia. Through an online questionnaire, we asked teachers about the time children spent writing in their classrooms and what types of activities they did to teach writing. While this has been studied at the state level,

this is the first national survey in Australia about the teaching of writing to primary students. While no classroom is the same, the Australian Education Research Organisation **recommends** primary students should spend at least one hour per day – or 300 minutes (five hours) a week – doing writing activities and being taught writing.

Most teachers in our survey said their students usually spent about three hours a week on writing activities in their classrooms. But responses varied considerably, with some teachers reporting only 15 minutes of writing practice per week and others reporting 7.5 hours per week. Most teachers spent more time teaching spelling (about 88 minutes) than any other writing skill. They spent an average of 34 minutes teaching handwriting, 11 minutes teaching typing, 35 minutes

teaching planning strategies, and 42 minutes teaching children strategies to revise their texts.

While the development of spelling skills is obviously important, the lack of attention given to planning and reviewing a piece of writing is concerning. Research **shows** children who plan and revise their texts end up writing much higher quality pieces of writing. However, studies **also show** that unless children are taught how to do this, they rarely do it.

How much are families asked to help?

In our survey, we asked teachers about the use of 20 different strategies for teaching writing. But strategies to promote writing at home with parental support were the least reported. Almost 65% of teachers we surveyed never asked students to write at home with the support of a family member. Meanwhile about 77% said they rarely (once a year) or never asked parents or carers to read their children's written work.

This is concerning as **research shows** parental involvement helps children build their writing skills. So, our findings show a need for teachers and families to work together more. As well as the need to provide families with more guidance about what they can do to support children as developing writers.



Students need to learn how to spell, but also write clearly, plan and revise their work.
Image: www.shutterstock.com



What can families do?

If you want to do more to help your child learn to write and write well, there are **many things you can do** in your everyday life at home. Here are some recommendations to consider:

1. Get your kids to write for a reason

It doesn't matter how small the task is. Encouraging children to write for a clear purpose is key. It can be a simple reminder note, a message to go in someone's lunch box, a shopping list or a birthday card.

2. Write together for fun

Encourage family activities that make writing fun. Create jokes, riddles, stories, rhyming lists, and anything else you can think of!

3. Display writing done in the family

Use the fridge, family noticeboard or calendar. This shows children how writing works in our lives and how important it is and how it is valued.

4. Get your kids to read you their writing

Ask children to read their writing aloud. This shows your kids you are interested in what they are doing. Also, when children read their written work aloud, they will inevitably notice some mistakes (so it's like revising their work).

5. Be encouraging

When working on writing skills with your child, make sure, you are positive. You could say things such as, "I noticed that you really focused on your writing" or "I really like how you used [that word]". Also recognise any progress in their writing efforts, "I noticed that you checked your capital letters".

6. Take the initiative at school

Talk to your child's teacher about what you are doing at home and ask for suggestions about what your child needs to further develop their writing skills.

Malpique, A., Pino-Pasternak, D., Valcan, D., & Ledger, S. (July, 2022). From shopping lists to jokes on the fridge – 6 ways parents can help their primary kids learn to write well.

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Banning classic kids' books isn't necessary – but add some stories from this century



By Dr Helen Adam, Senior Lecturer, School of Education

If we were to look at many children's book collections, chances are we'll see the classics: *Harry the Dirty Dog*, *Where the Wild Things Are*, *Hairy MacLary*, *Possum Magic* and the like.

The classics are classic for a reason: they're examples of quality, captivating literature. Who doesn't love the rhythm and adventure of *We're Going on a Bear Hunt*, or the lyrical opening line of *The Very Hungry Caterpillar*: ("In the light of the moon a little egg lay on a leaf")?

They're the same titles which have been sitting on bookshelves for decades – which my research has shown can raise some issues given they often portray a world which is far different from society in the 2020s. But contrary to widespread misreporting in the media on this research, it does NOT mean we should be banning children's books from yesteryear. I have all of the above books on my shelves, as well as classics from my own childhood such as *Blinky Bill* and *Snuggle Pot and Cuddle Pie*. Classic books tell much-loved stories, but they also evoke treasured and important memories of childhood. For many of us, they launched us into the world of books and the love of reading.

Perhaps this is why any perceived criticism of these books evokes such a strong reaction – a reaction which would be understandable if I were actually calling for these to be banned or removed from bookshelves. But I am not. In fact, if a book is banned then I want it in my collection! However, several studies, including my recently published **research with pre-service teachers**, have shown many adults rely on classics as

their go-to books to share with children. In my recent study, the top 10 choices had been published between 1963 and 1992. I found similar results in **my other studies in early learning settings**.

Yes, classic books absolutely have their place in today's homes and classrooms and many enjoyable hours and positive conversations can come from them. However, we *also* need books reflecting today's world for today's children. It's about adding new titles to our collections, not replacing or removing the classics. There is room on our shelves and in our kids' hearts for old and new stories.

In our diverse, multicultural Australia, at least 25 per cent of children rarely get to see characters which look like themselves or their family reflected in a book. In fact, research overseas suggests children from minority ethnic backgrounds are more likely to see a dinosaur or a rabbit as a main character in a book than someone who looks like them. Believe it or not, this matters. Children learn about themselves and the world through books; when children see characters, they can relate to in a book this can transform their lives.

It promotes children's sense of identity and belonging and understanding of others who may be different to themselves. Diverse books benefit children of all backgrounds. If we truly want all children to read and learn,

then all children have the right to see themselves reflected in the books we choose to read to them. This can include characters of different genders, ethnicities, religious beliefs, physical abilities, family backgrounds and more.

By all means, keep the classics – but diversify your book choices too. Even the authors of some of your childhood favourites have written or continue to write books which do reflect today's world: Mem Fox's *The Tiny Star* or *I'm Australian too*, and Michael Rosen's *Sticky McStickstick* based on his recovery from COVID being just three examples. There are also many newer writers such as Maxine Beneba Clarke, Scott Stuart and Jasmine Seymour to name just a few.

There are scores of **excellent stories** about today's world for today's children. Yes, you can do good things with almost any book, but you can't make the invisible visible. Unless you're Grandma Poss.

Credit **ECU Newsroom**



Ditch the widgets.

Start investing in their amazing futures

By Daniel Edwards

The cost of teaching a student from a low SES background is significantly higher than for more advantaged students.

The reasons for these costs include the 'obvious' assumptions, such as bursaries, but are likely driven more substantially by infrastructure investment by a number of universities specifically supporting campuses in areas and regions as part of their mission to provide a university pathway as an option to a diverse range of our population.

We believe this *investment* (a better way of thinking about it than 'cost') could be better recognised in funding agreements by switching the focus from 'activity-based' funding (i.e., "count your widgets, take your dollars"), to 'mission-directed' funding (i.e., recognition of the social impact and additional resources that these contributions require and perhaps redirecting funding from the low cost 'low hanging fruit' approaches of some).

Who are we and how did we discover this? A team of researchers spanning multiple universities (Victoria Uni, ANU, Curtin RMIT) and ACER **published an article** exploring the costs associated with supporting students from low socioeconomic status (SES) backgrounds in university. Our study has a ridiculously complex methodology – using econometric modelling to explore the economies of scale in relation to the costs of educating students in Australian universities, with ten years of financial, enrolment and employment data from 37 universities, and then exploring the outcomes with people who run universities across a range of states – but when you pare it all back, a relatively simple set of findings:

Here's an overview.

Quantifying costs and differences in costs

First, we compiled a large dataset spanning all Australian universities across 10 years. The dataset contained operating expenditure, student enrolments, level of enrolment, field of education and background characteristics of students, teaching costs, research grants, location of university and type of university. This was analysed using an econometric model to identify the average costs for each student, and to explore if there are economies of scale in enrolling some groups of students – in other words, does the average cost decline the more of a group of students you enrol?

The stark finding (that we checked and re-checked) was that when all other elements are controlled for, the average annual cost for a student from a low SES background at undergraduate level was about 6 times higher than for a student from a medium or high SES background. The difference was slightly lower for postgraduate level students, but nonetheless, it was still a notable difference.

However, the other aspect of the analysis did show that there are economies of scale in enrolling students from low SES backgrounds at undergraduate level – that is, the higher the number of students of this background, the lower the average costs per student become. We also found the opposite (i.e., a diseconomy of scale) for medium and high SES student enrolments.



Image: www.freepik.com

Explaining the differences

We took our data findings 'on the road', visiting four diverse universities in Australia to talk with academic, finance and student support leaders. We wanted to test whether the outcomes from the analysis made sense on the ground and found that while views differed, some key explanations were clear:

- The kind of additional support needed by students from low SES backgrounds includes outreach support to raise aspiration and relevant individual capital prior to enrolment; academic, personal and financial support while at university; and in some cases, support to care for students with highly complex needs.
- The support factors that contribute to the additional costs include investment in the items listed above plus the costs of establishing, maintaining and appropriately staffing multiple and/or regional campuses, particularly but not only those located in highly disadvantaged communities. Further, it was found that universities that are strongly prioritising or enacting missions to address disadvantage have higher costs than universities with other missions.
- Additional support costs are not the same for all low SES students. Low SES students are not a homogeneous group. Depending on their particular background and circumstances, low SES students may experience different levels of disadvantage and/or multiple disadvantage.

In the universities consulted, there were different costs and different approaches to supporting low SES students. This was partly because of the differences in the universities' missions, the number and geographic locations of campuses and the characteristics of the particular low SES students for whom support was being provided.

Future considerations on funding

We hope that what this research does is help to highlight the difference in investment required depending on the backgrounds of students enrolled in a university. The emphasis in shifting language from 'cost' to 'investment' is intended as a means of changing views and perceptions – much the way in which some universities in Australia embed in their mission an aim to open up opportunities by investing in areas or communities where previously a university pathway was not a consideration.

A radical, yet seemingly logical, proposition coming from this research is that if some student groups need a greater investment than others, then perhaps the funding pie should be cut in a way that recognises the variable investments required. From our work, we feel that consideration of ideas to recognise the various missions of universities and the different students they serve in following their mission could be captured in funding allocations. Ideas we have suggested for further consideration include a redistribution of funding based on need; shifting emphasis from activity-based to mission-directed costing; applying the principles of 'cost compensation'; and conceptualising funding support for students from low SES backgrounds as a transformational investment that can improve outcomes for individuals, communities and society, rather than as a cost.

Credit EduResearch Matters

Dr Daniel Edwards is the Director of the Tertiary Education Research Program at the Australian Council for Educational Research, and an Honorary Senior Fellow with the University of Melbourne's Melbourne Centre for the Study of Higher Education. Daniel Edwards (ACER) wrote this post on behalf of the project team:

- Marcia Devlin (VU)
- Liang-Cheng Zhang (ACER)
- Glen Withers (ANU)
- Julie McMillan (ACER)
- **Lyn Vernon (Edith Cowan University)**



Dr Lyn Vernon,
Vice-Chancellor's Research Fellow,
School of Education



Teaching teenagers to spot the signs of Meningococcal Disease

An educational app developed by an Edith Cowan University research team has proved equally effective in teaching high school students about Meningococcal Disease (MD) as classroom-led programs.

An educational app developed by an Edith Cowan University (ECU) **research team** has proved equally as effective in teaching high school students about Meningococcal Disease (MD) as classroom-led programs.

Developed in collaboration with **The Amanda Young Foundation**, the interactive online game MIApp is specifically designed for high school students in Years 7 to 10.

Professor Amanda Devine from ECU's School of Medical and Health Sciences said MIApp had the potential to save more lives by making meningococcal disease education accessible to every rural, regional, metro or home-schooled secondary student throughout Western Australia.

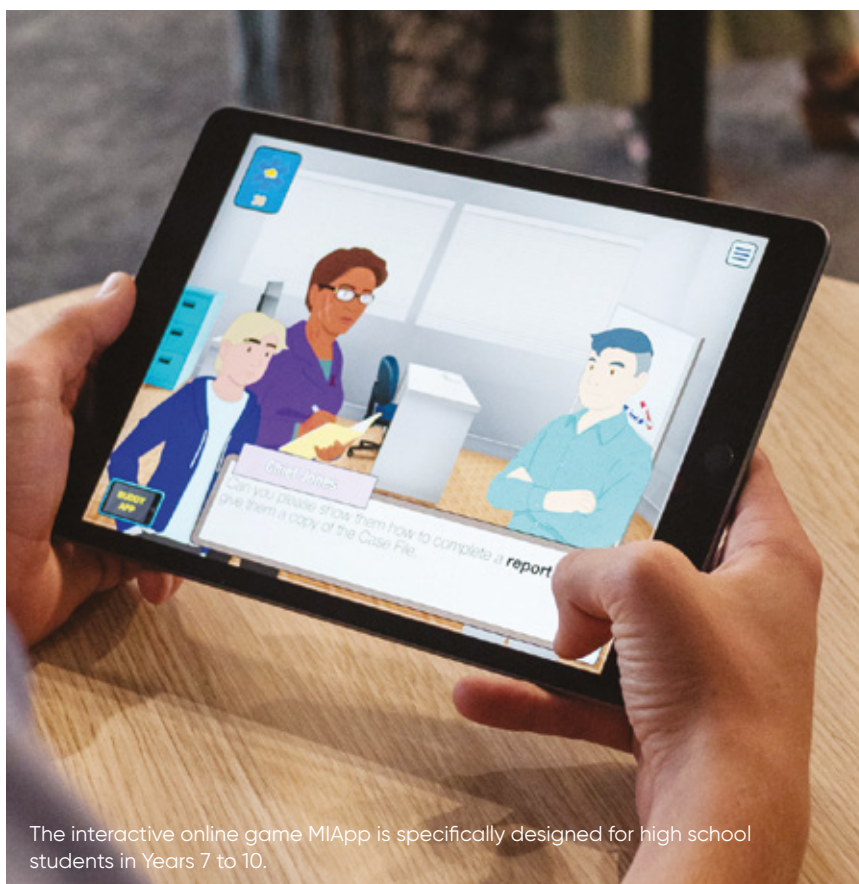
"MD is a rare but very serious, vaccine-preventable infectious disease, of which adolescents and young adults are at particular risk," Professor Devine said.

The disease resulted in 43 cases and the death of six Western Australians in 2017, with cases doubling between 2016 and 2017 alone.

MIApp equally effective as face-to-face learning

Dr Lauren Bloomfield from ECU's School of Medical and Health Sciences said the research trials were conducted among 788 students in Years 7 to 10, across six WA high schools.

"We evaluated changes in students' knowledge about meningococcal carriage, disease and vaccination after using the app, and compared these to



The interactive online game MIApp is specifically designed for high school students in Years 7 to 10.

students who received an in-class education presentation, which is currently the primary mode of student education offered by the Amanda Young Foundation," Dr Bloomfield said.

Both groups demonstrated a significant improvement in key knowledge of MD infection and prevention.

"The median score for correct responses in both groups increased from 37.5 to 87.5 per cent. The majority of students who played MIApp also agreed that it was easy to use and more enjoyable than a presentation."

Essential learning resource for secondary teachers

Dr Julie Boston from ECU's School of Education said the results show that overall, students using MIApp had a very similar improvement to their knowledge of meningococcal disease as those who attended a presentation.

"This fantastic result means the education program can be delivered in schools across WA and beyond – this is particularly helpful for schools in regional and remote areas who don't currently have access to face-to-face sessions," Dr Boston said.

Professor Amanda Devine said students using MIApp will learn how to best protect themselves from the disease – and what to do if they suspect they may have caught it.

“Teachers who use MIApp in the classroom can be confident that their students are gaining the same important knowledge of this serious disease through interactive, engaging, self-guided game play,” Professor Devine said.

Schools and teachers who take part in the free MIApp education program will also receive a curriculum-aligned teaching and learning resource.

Deanna Howell, Education Manager at The Amanda Young Foundation said she was proud of the of the partnership formed with ECU through the MIApp project.

“My overall aim has been to have a suite of online resources for K to

12 that teachers can freely access from our website. With MIApp, and the teaching resources, now available online – we are complete.”

Barry Young, Founder of The Amanda Young Foundation said:

“Lorraine and I have been dedicated to reducing deaths from meningococcal disease since the death of our daughter Amanda in 1997.

“Our Health Promotion Officers have been presenting to schools for over 20 years. While our presentations are highly effective, due to our limited resources our outreach is not as extensive as we would like.

“MIApp provides us with an opportunity to reach all schools in Western Australia with the same health message.

“Thank you to our major sponsor Lotterywest and co-contributors Edith Cowan University, the WA Department of Health and our own foundation for supporting this project.”

MIApp is free and available at the App store. Schools and teachers can download the PC or iPad version, user guide and teaching resources via the [Amanda Young Foundation website](#).

*MIApp was developed by experts from ECU’s School of Medical and Health Sciences, School of Education and School of Science, in conjunction with the Amanda Young Foundation. For more information visit the **Meningococcal Infection, Awareness, Prevention and Protection (MIApp) research project website**.*

Credit ECU Newsroom



Professor Amanda Devine and Margaret Miller.



A proud partnership. Jack Barker, Deanna Howell, Dr Julie Boston (ECU), Lorraine Young, Barry Young, and Abby Holme from The Amanda Young Foundation.

I Nature Play and Grow program

By Dr Fiona Boylan, Lecturer, School of Education

Dr Fiona Boylan recently recorded a podcast for the Nature Play and Grow program.



The Nature Play & Grow program is delivered in partnership between Nature Play WA, The ORIGINS Project, Telethon Kids Institute, Joondalup Health Campus and Minderoo Foundation. The Nature Play & Grow project has been designed to encourage a family-based healthy lifestyle. This pilot program of nature-based outdoor group sessions aims to provide families with ideas and choices for how they spend time together. They steer families towards fun and interactive experiences (green time) and away from sedentary activities on devices (screen time).

Parents and children engage in outdoor group sessions which are supported by a Podcast to develop knowledge of the benefits of nature play. Fiona's podcast presented the concept of positive dispositions as fundamental for learning. She spoke about the differences between fixed and growth mindsets and the importance of developing a growth mindset for learning in the early years.

Program goals

The outdoor group sessions have been designed with a specific focus each week but also contribute to some overarching themes and understandings:

- Develop a community (participate, engage, and communicate)
- Develop a connectedness to nature (awareness of, responsibility toward, enjoyment of nature and specific places)
- Develop healthy ways of living and sustainable practices (reduce, reuse, recycle)
- Develop a playful mindset (be conscious of responses e.g., what to say instead of "be careful")

The children will:

- Develop lifelong habits or dispositions (creativity, curiosity, confidence, enthusiasm, endurance, independence, persistence, resilience, imagination, problem-solving) to take care of themselves independently and be engaged, motivated and contributing community members
- Develop an explorative mindset
- Engage with their senses (sight, sound, touch, taste, smell)



- Engage with nature
- Develop social, emotional, physical, cognitive, and language skills
- Develop risk assessment skills and safety sense (what's safe to explore)

A link to Fiona's podcast can be found here – Episode 4 of the Nature Play & Grow Podcast anchor.fm/natureplaywa/episodes/EP04---Nature-Play-Grow---Mind-Matters-Feat--Dr-Fiona-Boylan-e1thus9v

Other nature play resources can be found here: www.natureplaywa.org.au/resources



The use of representations in solving maths problems

By Dr Vesife Hatisaru, Lecturer and Angela Kelly, Lecturer and Dr Christine Ormond, Honorary Senior Lecturer, School of Education



Math problems are often solved in one single way – in other words, by relying on one single representation system (e.g., symbolic/equations) – in many mathematics classrooms.

Our experience shows that one single way of solving a maths problem may not be accessible to *all* students. A solution based on a particular representation system (either *symbolic*, *verbal*, *concrete*, *graphical* or *visual*) may be more suitable than others for particular students. Therefore, providing several solution types can provide a mechanism that is accessible and helpful for *all* students to engage in solving maths problems.

For example, in solving the *Eva's expenditure* problem below three different types of representation systems may be used: *concrete*, *visual*, and *symbolic*. The solutions based on the use of these three representation systems are illustrated in Table 1.

As in the national curricula of many countries (e.g., the USA and Singapore), mathematical problem solving is one of the four key proficiencies in the *Australian Curriculum: Mathematics*. Mathematical problem solving, however, has been unsuccessful for many school students, and students who need to experience more concrete strategies are further affected by their common beliefs that there is only one single way of solving maths problems. As teachers of mathematics, we need to be better informed about research-based practices and provided with good practical examples.

The example we have presented can be helpful for you as a teacher of mathematics in assisting your students' mathematical problem-solving skills, and could also be adapted in similar, yet slightly conceptually different, mathematical situations.

In the School of Education at ECU, as part of our desire to help initial teacher education students to become excellent teachers of mathematics, we use and present various representations in our teaching practices. The solutions to the *Eva's expenditure* problem illustrated in Table 1 are presented to them and discussed. It is interesting to mention here that our pre-service mathematics education students usually remark that they learn much from the approach taken in this table.

Eva's expenditure

Eva spent $\frac{2}{5}$ of the money she had on a coat and then spent $\frac{1}{3}$ of what was left on a sweater. She had \$150 remaining. How much did she start with?



Table 1: Various solution representations to the *Eva's expenditure* problem

The use of concrete representations	The use of visual representation
15x $\frac{2}{5}$ = 6x (on a coat) 9x $\frac{1}{3}$ = 3x (on a sweater)	
The use of symbolic representations	
Solution A Started with: $15x$ Spent on a coat: $15x \cdot \frac{2}{5} = 6x$ Remained: $15x - 6x = 9x$ Spent on a sweater: $9x \cdot \frac{1}{3} = 3x$ Remained: $9x - 3x = 6x$ $6x = \$150 \Leftrightarrow x = \25 Started with: $15x = 15 \cdot \$25 = \375	Solution B Started with: x Spent on a coat: $2\frac{2}{5}x$ Remained: $x - 2\frac{2}{5}x = \frac{3}{5}x$ Spent on a sweater: $\frac{3}{5}x \cdot \frac{1}{3} = \frac{1}{5}x$ Remained: $\frac{3}{5}x - \frac{1}{5}x = \frac{2}{5}x$ $\frac{2}{5}x = \$150 \Leftrightarrow 2x = \$750 \Leftrightarrow x = \375

Cyber security curriculum in WA primary and secondary schools

Cyber-crime is increasing exponentially; hackers continue to develop new ways to scam citizens.



While there are educative resources and support available for adults of various ages to assist in protecting themselves from cyber-theft, there is a need for research to explore what opportunities there are to better educate young people in WA.

Computing device users constitute the weakest links in cyberspace, therefore developing the right behavioural patterns early according to best practices is crucial. There are many false assumptions amongst both teachers and parents about how digitally literate children are; in fact, the prevalence of computing device use does not entail being about cyber nous nor knowledge about how to be cyber-safe. In addition, the general perception of what some groups of people believe schools teach in relation to cyber security, an increasingly important field that not yet taught on its own, varies greatly.

Cyber criminals are becoming more creative in the ways they trick WA citizens into stealing their identity and their finances.

As people become aware of certain scams, other new ones are created. There is an ongoing need for citizens to be critically aware of what might be unsafe, unsavoury, or untoward. There is a need to educate people, so they effectively use strategies to counter against these personal, individualised attacks. Educating young people is an investment in the future as it will mitigate cyber-risks in later years and bring about positive change.

Instigated by the Government of Western Australia acting through the Department of Premier and Cabinet, Office of the Digital Government (DGOV), this project will map existing and proposed WA/national school curriculum to ascertain what aspects surrounding cyber security are covered and where they are located (learning area, year level, etc.). A state-wide advisory group will be established to advise on how we best position young people in WA to be cyber-aware and cyber-safe, both now and in the future. Multiple consultation workshops with cyber security providers will produce

recommendations into how cyber security curriculum might be best taught, practiced and assessed within WA, especially in light of the new version where a number of changes have been made to the Digital Technologies curriculum and the ICT general capability (to be named Digital Literacy from 2023).

The project is in its infancy and is currently scoping international frameworks and curricula as well as comparing the existing curriculum with the new 9.0 Australian Curriculum revision to be implemented in 2023. The project also acknowledges and incorporates the WA senior secondary curriculum context. The investigators will consult with education curriculum experts from the School Curriculum and Standards Authority, the Department of Education, principals, teachers, and parents. This project is obviously of interest and very relevant to many stakeholders, and not just in WA!

Those interested in the project workshops and reports are welcome to email Nicola at nf.johnson@ecu.edu.au

Researchers

Dr Nicola Johnson is Deputy Co-Director of the Security Research Institute, ECU, and an associate professor of digital technologies in education. She is also the Associate Dean of Research in the School of Education.



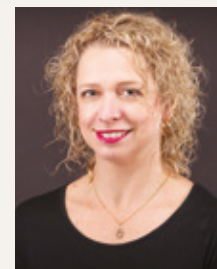
Dr Leslie Sikos is a lecturer in Computing and Security in the School of Science, the Course Co-ordinator of Bachelor of Computer Science, and a researcher at the Security Research Institute. Leslie specialises in network forensics and cybersecurity applications powered by artificial intelligence and data science.



Dr Ahmed Ibrahim is a Lecturer in the Computer and Security discipline in the School of Science, the Course Coordinator of the Bachelor of Science (Cyber Security) course, and a researcher at the Security Research Institute. Ahmed specialises in critical infrastructure, IoT security, and cybersecurity risks in organisations.



Research in the School of Education



Associate Dean (Research), Associate Professor Nicola Johnson

The focus of this edition is on recent research by School of Education academics relating to primary teachers and teaching. A brief explanation of the article is provided which may just pique your interest to find out more. All articles are freely available.

Greater understanding about the effects of trauma on children has steadily increased. This article explored the experiences of primary school teachers who were supported to implement trauma-informed practices in a regional primary school with a large number of First Nations students.

Schimke, D., Krishnamoorthy, G., **Ayre, K.**, Berger, E., & Rees, B. (2022). Multi-tiered culturally responsive behavior support: A qualitative study of trauma-informed education in an Australian primary school. *Frontiers in Education*, (7). doi.org/10.3389/feduc.2022.866266.

If you are interested in finding out more about the research, also available is:

Bellamy, T., Krishnamoorthy, G., **Ayre, K.**, Berger, E., Machin, T., & Rees, B. E. (2022). Trauma-informed school programming: A partnership approach to culturally responsive behavior support. *Sustainability*, 14, doi.org/10.3390/su14073997

What do we know about how well primary students are being taught how to write? This article reports on an Australian survey exploring the preparation and self-efficacy of primary teachers and what instructional practices they use.

Malpique, A. A., Valcan, D., Pino-Pasternak, D., & Ledger, S. (2022). Teaching writing in primary education (grades 1-6) in Australia: A national survey. *Reading and Writing*. doi.org/10.1007/s11145-022-10294-2

How much digital device use for children is too much? What do parents perceive as the negative impacts of their child's engagement with mobile media on their behaviour, well-being, academic success, and ability to pay attention? The article points to the importance of providing parents with education as to the role of mobile media in shaping their child's behaviour and associated executive functions.

Milford, S., Vernon, L., Scott, J. & Johnson, N. F. (2022). An initial investigation into parental perceptions surrounding the impact of mobile media usage on child behaviour and executive functioning. *Human Behaviour and Emerging Technologies*. doi.org/10.1155/2022/1691382

Not so much about primary students per se, however, our Associate Dean of Primary A/Prof Matt Byrne is a co-author. This study of 657 healthy Australian adults explored the efficacy of a 7-week cooking program in improving cooking confidence, whether this transferred to behaviour surrounding food, and/or affected mental health.

Rees, J., Ching Fu, S., Lo, J., Sambell, R., Lewis, J. R., Christophersen, C., T., **Byrne, M. F.**, Newton, R. U., Boyle, S., & Devine, A. (2022). How a 7-week food literacy cooking program affects cooking confidence and mental health: Findings of a quasi-experimental controlled intervention trial. *Frontiers in Nutrition*. doi.org/10.3389/fnut.2022.802940

For us as educational researchers, we have more challenges conducting research in WA schools than in other Australian states. This article documents and reflects on these challenges.

Striepe, M., & Cunningham, C. (2022). Gatekeepers, guides, and ghosts: Intermediaries impacting access to schools during COVID-19. *Ethnography and Education*. doi.org/10.1080/17457823.2022.2049332

Find out more at www.ecu.edu.au/schools/education/research-activity



Future Research and Career Pathway

Become part of a team that leads, initiates and sustains high quality research that effectively addresses pertinent issues faced by learners and educators both within and beyond educational settings.

Professor Dawn Penney

Professor Dawn Penney is a leading figure in Health and Physical Education research nationally and internationally, undertaking research projects addressing quality and equity in health and physical education, physical activity and sport. Much of Dawn's research in education and sport reflects her passion to inform and facilitate developments that will ultimately enhance learning and participation opportunities for all young people and strengthen community health, wellbeing and engagement. She has a longstanding record of working with curriculum agencies, schools and community sport

organisations to strengthen the evidence base for policy and working with teachers and coaches to explore innovations in practice. Dawn is further building capacity in health and physical education research at ECU, supervising several Higher Degree by Research students whose projects add to this body of knowledge. Current investigations include those detailed below. Dawn always welcomes inquiries from teachers and coaches interested in further studies. Outside of work Dawn pursues her love of endurance sports and opportunities to escape to some of the more remote parts of WA.



Kate McCreery: Master of Education

Kate is investigating the opportunities open to children in rural Australia to participate in both formal and informal sport.

Jaxon Hogan: Master of Education

Jaxon's research is exploring the feasibility of ePortfolio-based assessment of physical literacy in primary health and physical education.

Jeff Giles: Doctor of Philosophy

Jeff is exploring ability, inclusion and teaching practices in lower secondary PE in Western Australia.

Janeen Thomsett: Doctor of Philosophy

Janeen is investigating initial teacher education provision for health and physical education (HPE) within generalist primary courses in Australia, with reference to teachers' pedagogical content knowledge in HPE and the National Professional Standards for Teachers.

Vicki Evans: Doctor of Philosophy

Having completed Masters' research in Wales, Vicki is commencing an international comparative study of physical education initial teacher educators' experiences of working in contexts of curriculum reform.

Steven Connelly: Doctor of Philosophy

Steven is also building on Masters' experience to pursue his interest in enhancing provision for students with disability in secondary physical education.



Dr Elisa Williams

Recent PhD Graduate

About yourself:

I am a sessional lecturer at the School of Education and WAAPA. I initially trained as a secondary drama teacher and after teaching for a few years I trained as an actor at the Victorian College of the Arts. Over the years I have managed to marry both sides of my career, that of a drama teacher and of a professional actor and director. Ten years ago, I was working for a not-for-profit organisation providing arts education programs to disadvantaged schools in Australia. I was part of a team of educators that created a program called Deadly Arts with the support of Indigenous Elders in the Darug nation in Sydney. I brought that program over to schools in WA and spent three years working with really talented Nyoongar artists in schools. This experience changed me as an educator and as an artist. I saw the immense benefit these Indigenous-led arts programs were having on the schools, and I wanted to conduct research in this arena so that I could advocate more strongly for programs like Deadly Arts.

Why did you choose ECU to do your PhD degree?

For me ECU was the perfect university for me to conduct my research. I wanted to work with supervisors who were leaders in their field, both in education, research and in Australian Indigenous theatre. I was able to have a panel of supervisors who were from the School of Education, WAAPA and the School of Arts and Humanities. So, ECU allowed me to have the versatility of having supervisors from a range of disciplines who each added a great deal to my research.

What have you enjoyed the most?

I really enjoyed conducting my research and it is really hard to say because there were many highlights in the study. I would have to say that one of the best was a moment during my creative project when I had invited a Nyoongar community artist called Marcelle Riley to deliver a workshop to the participants of my study who were secondary drama teaching students. Even though we were working in theatre Marcelle taught the participants her craft, which was making a form of traditional Nyoongar dolls that she called Story Dolls. During the workshops the participants and Marcelle shared their stories and crafted beautiful dolls that had been made with fabric that was dyed on country using native plants. It was a big turning point in the project because the participants learnt so much from Marcelle and she enjoyed sharing her knowledge with them. Being able to collaborate in this way and work across genres was great and it had a huge impact on the outcomes of the study.

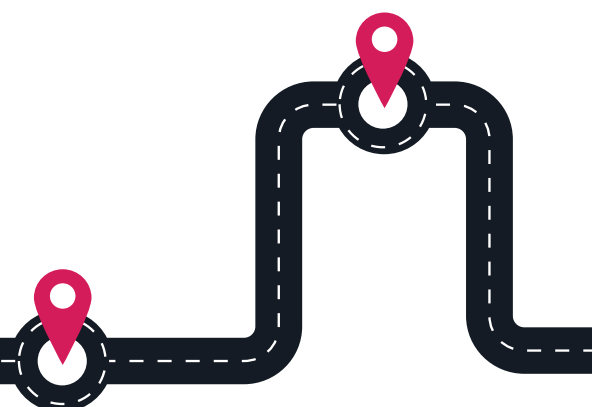
What is the focus of your thesis?

The focus of my thesis was on decolonising tertiary and secondary education. Specifically, my research involved creating a practical pathway for drama

teachers in tertiary or secondary education to follow to respectfully explore Australian Indigenous theatre texts. These texts are incredibly valuable because they reveal histories told from an Indigenous perspective. They also convey Indigenous knowledges, cultures and perspectives, which are vital for a decolonised curriculum. The findings from my study can also be extrapolated across all subjects in the curriculum, not just theatre and drama education.

What will you do after your PhD?

During my study I came together with some Nyoongar artists who I had worked with in Deadly Arts, and we created our own not-for-profit organisation called Boss Arts Creative. We wanted to create a company, where the funding for the programs stays on Nyoongar country and benefits First Nations artists. Boss Arts Creative's vision is to provide high quality training and support for young and emerging First Nations music artists, dancers, actors and performers. As well as running weekly classes, we also curate both contemporary and traditional performances for festivals, corporate performances and showcase events. Boss Arts Creative also deliver high quality, curriculum aligned programs in Nyoongar culture and arts for schools. I am one of the founders of Boss Arts and I hope to grow the organisation so that we can engage with more schools and work with more emerging Indigenous talent. We are looking forward to delivering our own event at the upcoming **10 Nights in Port Festival** in Fremantle, come along and support us!



ECU Education Alumni spotlight: Mitch Mackay

- Diploma of Teaching (Secondary) 1982
- Bachelor of Education 1987
- Master of Education 1996

Education is the best career path you can follow if you're looking for a purpose in life, according to Mitch Mackay, who was recently awarded the title of WA Secondary Principal of the Year.

"Teaching can really offer a meaningful vocation and I believe there is no greater profession in terms of helping and supporting the next generation," says the ECU graduate who has forged a highly successful career in teaching over the last four decades. "What's more, I really believe that teaching can give people a chance to develop their own life skills because there's so many opportunities for self-growth. Yes, it can be tough, and it has its ups and downs, but it's a noble and honourable profession and I can honestly say that I absolutely relish going to work every single day."

By his own admission, Mitch loved his own school years at Dianella Primary School and John Forrest Senior High School, though he admits to not being the perfect student.

"I was good academically though I remember being very outspoken when I saw injustice, and I certainly wasn't perfectly behaved," he recalls. But Mitch was passionate enough about education and learning to initially begin a double degree in engineering at UWA, although he soon realised the course wasn't for him. "By that time, I'd decided that teaching could be a real option because I loved working with people and felt that sitting at an office desk all day wasn't going to work for me, so I switched to ECU where I was able to go straight into the second year of a Diploma of Teaching. "The early 80s was a time when student teachers were encouraged to get straight into the workforce, so I was soon sent off to Mandurah which, as a surfer, was like going to heaven," he laughs.

After completing his Diploma of Teaching (Secondary) in 1982, Mitch went back to ECU to undertake his Bachelor of Education in 1987, followed by his Master of Education in 1996. "By the time I began my masters I had a passionate belief in what I was doing," he says. "Instead of listening to lectures and undertaking exams, we were encouraged to change the way we thought, something that has had a lasting impression on me, and which has ultimately shaped the way I conduct myself in the workplace. I absolutely came out of the course a different person."



During his masters, Mitch was teaching at Greenwood High School but soon gained a promotion to become the head of mathematics at Thornley High School. "Doing my masters contributed to that promotion, it really did expand my thinking and the consequence was that when I did go for my next role, I was able to talk confidently about leadership, management style and policy."

Soon after, Mitch relocated to Bridgetown High School where he undertook his first deputy principal role for two years, before moving to Hamilton Senior High School and then going on to do a stint as the Manager of Operations at the regional education office in Fremantle. From there he took an acting principal position at Leeming Senior High School before transitioning to Rossmoyne Senior High School where he was principal, and then to another principal's position at John Curtin College of the Arts which, under his leadership, is now one of the top schools in WA. It was while he was there that Mitch was nominated for and awarded the title of WA Secondary Principal of the Year, an accolade that he says he was surprised and humbled by. "All of the finalists were great leaders and so I was really honoured to be given the award; it was wonderful to be acknowledged for the work I'd done not just as a good principal, but in terms of my contribution to education in schools across the state," he says.

"I have absolutely loved being a teacher, a principal and a leader in education, it has truly given my life immense purpose. For me, it's been about the journey, not the destination, and if I could I'd happily do it all over again."

Student SHOWCASE

Outstanding examples of the works completed by ECU's pre-service Design and Technology teachers.



Hanson Dean | Swing Chair | SHS steel and Karri



Thomas Bacich | Junkyard Dragon | Recycled agricultural equipment and construction waste materials



Marijke Heijer | Bowl Set | Ceramic Raku Glaze and over glaze



Brock Thompson | Ballpoint pens | Hard pen casing, marble pattern and stainless steel



David McCappin | Stereo Case | Up-cycled skateboards

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