PORT AUGUSTA & QUORN PARTNERSHIP

Empowering Local Learners Newsletter

A pre-school to secondary approach to improving executive functioning through a mathematics lens

ISSUE 1—TERM 1 2015

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What is the Empowering Local Learners Project?

The Empowering Local Learners Project is a pre-school to secondary approach to improving students executive functions through the lens of learning in mathematics.

In relation to our partnership it is a numeracy project in which all schools and centres are involved . Each site has one or more focus teachers that attend two days of professional learning each term. The professional learning is run by Kristin Vonney and Deb Lasscock (pictured opposite) who are project officers for the *Flinders Centre for Science Education in the 21st Century* at Flinders University.

The professional learning program is split up over two days. Monday's session focusses on pre-school and junior primary staff as well as those focus teachers who are new to the project. The focus of this day is on classroom observation.

Deb Lasscock (left) and Kristin Vonney (right).

A pre-observation meeting discusses the lesson that will be delivered, the intent behind the lesson, and the role those observing will take during the activity. During the observation Deb and Kristin deliver their lesson or activity and afterwards in the post-observation there time to unpack the learning that occurred, discuss the links with the theory and plan collaboratively.

The Tuesday session is for those focus teachers who were part of the Empowering Local Learners Project in 2014. The aim of this day is to unpack the work on executive functions more deeply and to begin to use this research in a more strategic manner to plan instruction. Focus teachers in this session work collaboratively across sites to plan lessons that help enhance the development of student executive functions.

Focus teachers in this project are encouraged to share their learning through this project in their own sites.

Term 1 Dates to Remember

Wk	Day	Date	Who	Activity	Where	Start Time
6	Thursday	Mar 5	Any interested staff	Between Visit Session	Flinders View Primary School	3:45 pm
8	Monday and Tuesday	Mar 16 & 17	Focus Teachers	Flinders University Visit	Willsden Primary School and Willsden CSC	8:30 am

Executive Functions, The brain's control system.

What are Executive Functions?

The focus of the Empowering Local learners project is on the development of student executive functions. Executive functions is a term given to a range of processes that regulate our thought processes and our reactions to certain situations. They effect all aspects of our lives including our education, health, welfare, relationships and wealth.

Although mathematics is the focus of this project, taking steps to develop students executive functions in any class will lead to enhanced educational outcomes. The three main executive functions we are looking at are outlined below. Please note that these definitions have been taken directly from one of Kristin and Deb's handouts

Inhibitory Control

Inhibitory control is the ability to pause and think before you act. It helps us to not just do what first comes to mind (including giving up). Inhibitory control makes it possible for us to change and for us to choose how we react and how we behave rather than being unthinking creatures of habit.

Students demonstrate this by

- Stopping and thinking
- Having the ability to master and filter out thoughts
- Holding back initial (emotional) responses
- Resisting temptation and not reacting impulsively
- Pushing aside day dreams
- Not giving up so easily
- Suppressing attention to irrelevant stimuli
- Not jumping to conclusions
- Strategically staying on task
- Strategically sticking to a plan

Working Memory

Working memory is the capacity to hold information in mind and mentally manipulate it. Working memory is a strong predictor of academic achievement. It helps us to bear in mind one idea while we compare, link or build on another idea.

Students demonstrate this by

- Relating one thing to another
- Using information to solve a problem
- Incorporating new information into their thinking
- Understanding a sentence beyond it being a collection of words
- Bringing knowledge and understanding (not just sensory input) to bear in their decision making
- Making connections between seemingly unrelated things. They break down a whole into its parts and hold all of them in mind while they reassemble the parts in a new way.

Cognitive Flexibility

Cognitive flexibility is the ability to flexibly adjust to changed demands, priorities or perspectives. It helps you to think about an idea in a way that is different to what was taught. It underpins the ability to make new connections, see implications and form analogies.

Students demonstrate this by

- Generating metaphors or analogies
- Considering alternative strategies
- Considering the perspectives of others
- Effectively communicating to different audiences
- Being willing to 'have a go' and productively fail
- Thinking outside the square
- Catching mistakes and fixing them
- Admitting they are wrong
- Making inferences

For the Classroom

Introduction

The group of focus teachers on the Tuesday looked at the question shown in the yellow box below. It is a series of statements that the students need to agree or disagree with. These teachers are currently working on designing a lesson for their classes based around this question that they feel aligns most closely with the year levels that they teach. They are going to share the responses next session.

From the Research

"Children's ideas about shapes do not come from passive looking. Instead, they come as children's bodies, hands, eyes... and minds...engage in actions....Children need to explore shapes extensively to understand them fully. Merely seeing and naming pictures is insufficient."

(Clements 1999)

Taken from: Teaching Mathematics: Foundations to middle years , Siemon et al (page 226) - Copies of this text were purchased for each site

I've got a shape.
Its got fours straight sides.
The sides are the same length.
The sides are joined.
It must be a square

Discussion from the Group

- When shapes are rotated they are often given a different name. A square rotated by 45 degrees is no longer seen as a square.
- Depictions of shapes are normally regular, equal side and angle measures
- Children do not consider angles in naming shapes only side numbers and lengths.

For you to Try

This is a question that is being used in the project from lower primary through to secondary. Try putting the statements up somewhere and see what your students think about it. Encourage them to explain their thinking to you, to give a reason for why they do or do not believe this is true. If you find their responses interesting feel free to share it with the focus teacher at your site.

History of the ELL Project in our Region

The Empowering Local Learners Project was first established in Port Augusta back in 2013 with funding from the Federal Government's Empowering Local schools Initiative.

It was recognized that a lot of schools and centres were doing a lot, and having success with, literacy development, but numeracy was an aspect that needed some further work. In speaking with community and industry leaders in the town it was also recognized that numeracy was an aspect of learning that needed further development.

Through NAPLAN and PAT-M testing it was found that our children had significant issues with problems involving mathematical problem solving and reasoning. Neuroscience research has shown that executive functions play a key role mathematical proficiency, particularly problem solving and reasoning and hence Professor Martin Westwell was approached about possible involvement in this project.

In 2013 the project started off in four sites, Port Augusta West Primary School, Willsden Primary School, Stirling North Primary School and Port Augusta Secondary School.

In 2014 this extended to all sites and centres in Port Augusta and Quorn. 2015 has seen the project become one of the major focusses for the Port Augusta / Quorn Partnership plan. This year has also seen the further development of the project and the appointment of Shane Loader to oversee the implementation of the project across the Partnership.

Empowering Local Learners Program Manager

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After More Information? Speak to a focus teacher at your site

Heather	Cargill	Augusta Park Childhood Services Centre
Raman	Bhangu	Augusta Park Primary School *
Ros	Edwards	Augusta Park Primary School
Lisa	Elliot	Augusta Park Primary school *
Brenda	Forbes	Carlton School
Kiran	Nand	Carlton School *
Maggie	Kamin	Flinders Children's Centre and Tji Tji Wiltja Pre-School
Melanie	Ellison	Flinders View Primary School
Daniela	Welfare	Flinders View Primary School *
Troy	Welfare	Flinders View Primary School *
Sue	Gerschwitz	Port Augusta Children's Centre
Shane	Loader	Port Augusta Secondary School *
Simone	Anderson	Port Augusta Special School *
Meredith	Green	Port Augusta West Childhood Services Centre
Pennie	Boscence	Port Augusta West Primary School
Natlie	Keeler	Port Augusta West Primary School
Michelle	Densley	Quorn Area School *
Mari	Ikiua-Brooks	Quorn Area School
Kapil	Pande	Quorn Area School *
Nicole	Downing	Quorn Kindergarten
Balbir	Grewal	Quorn Kindergarten
Kimberley	Brown	RICE
Courtney	Rogers	Stirling North Childhood Services Centre
Lisa	Hardbottle	Stirling North Primary School *
Lesley	Martin	Stirling North Primary School
Jessica	Goddard	Willsden Childhood Services Centre *
Tanya	Bahnisch	Willsden Primary School *
Brittany	Burton	Willsden Primary School
Jenn	Nancarrow	Willsden Primary School *
Sally	Niedorfer	Willsden Primary School

* = attending the Tuesday session for continuing teachers