Mrs Abi Woldhuis,
*Head of Professional Growth &
Junior School Innovation*

Fuelling Future-Ready Mindsets: Explaining Computational Thinking.

Children at Roseville College are learning a new language and it is not one most parents expect. It is the language of computers. The skill of "computational thinking" develops as children practice coding purposefully in computer language to achieve inspirational and often life-impacting outcomes.

Meanwhile, parents scratch their heads wondering why their daughter is coding (and is it like hacking?) and why this is a worthwhile skill. They expected being baffled at their daughter's algebra homework; but this sounds like future-talk. And it is.

My aim is to help you understand what "computational thinking" is, and why it is important to the next generation. I'll also give you some tips on how you can navigate this new field of learning as you simultaneously try to support your child's learning in an area that is most likely new to you, too.

What is Computational Thinking?

Fundamentally, computational thinking is more than learning to write in a computer language. Students use computational thinking when they learn to code and this is an valuable tool as they navigate a digitally saturated world.

However, computational thinking has wider applications – it teaches children how to analyse difficult problems and find solutions. This is particularly important as we move to the future.

Why is Computational Thinking Important to Our Girls?

As a parent, it is helpful for you to understand the benefits of computational thinking because it develops skills that will be essential to your daughter's future. The future demands skills such as advanced problem solving and the ability to work through the sequential steps required to identify and resolve problems… and to break them into manageable chunks – computational thinking fosters each of these. It also requires children to draw on other skills such as communication and collaboration, creativity and critical thinking.

There is a significant benefit to your daughter's wider learning process, too. By learning how to solve specific problems (such as finding bugs in code), a young mind learns how to think critically and work out what she needs to do to move forward – or closer to the solution.

Sometimes, she needs to collaborate with someone else to deepen the pool of knowledge and experience, or share ideas and explore options.

Sometimes, a student is empowered by working autonomously to develop her own concepts and test hypotheses, before arriving at the right solution for the challenge at hand.

As a teacher, a most rewarding aspect of this learning process is observing how children grow in their ability to understand, how they learn and discover, and how to think creatively about problems to forge a way forward. Along the way, they regard discouragement and failures as a valuable part of the problem solving journey.

As parents grasp computational thinking, it is easier to see how it is transferable to so many other areas of life, especially those where creative problem solving is important – and especially across all arenas of learning and innovation. This is important to me in my role at Roseville College and as a mother because I recognise that the jobs my children may pursue in the next decade may be dramatically different to those today, However, I can help equip my children with the skills and thinking that enables them to handle any of the jobs that come their way and that catch their interest.

Computional Thinking at Roseville College

At Roseville College, computational thinking was introduced through a lunchtime *Scratch Club* where students came to inquire and learn what coding was and how to do it. *Scratch* is a free program design by the Lifelong Kindergarten Group at the MIT Media Lab. It provided the framework for students to program their own interactive stories, games and animations, then share them with others in a safe, online community.

There is great satisfaction when children write lines of code and see something happen as they programmed it to happen! First hand, students were learning to plan, think creatively, reason systematically and work collaboratively. First hand, teachers were watching on, nodding, seeing the broader value of these skills to student learning and development.

Roseville College's *Scratch Club* has the motto "Fearless Explorers" because together they want to learn and try new things without worrying about the "what ifs"… students develop resilience and perseverance. It's problem solving, but fun! When students finally solve a persistent problem, they celebrate an "epic win" with their peers. It looks like this: a fist pump into the air and a satisfied, "Yessssss" cheer!

The inherent value of the epic win is that it's achieved without the intervention of an all-knowing teacher who could have shown them the answer more quickly. However, that is the strength of computational thinking; it empowers students in the problem solving process. They don't want to take short-cuts or give in. Some students choose to move into coding EV3 Robots or try their hand at other coding options such as Hour of Code or Pencilcode.

I am excited that Roseville College is preparing children for a digital future and a workplace that will require them to know more than just how to use a computer. They will require the ability to understand how computers work, what makes software and apps, how to troubleshoot and how technology integrates with business operations and procedures. This will no longer be the sole domain of dedicated programmers, although many young people will have promising careers in these specialised roles, too.

Lastly, at home, what can you do? I encourage you to be excited about learning something challenging with your daughter. You are modelling to her what she is trying to do every day at school: being a willing learner and being courageous to attempt something new. She will probably surprise you with how much she already knows or how quickly she learns and ends up teaching you!

To get started, try one of my favourites: *Scratch* (Visit scratch. mit.edu and, for the younger children, there is an app for the iPad called Scratch Jnr) or *Hour of Code* (visit hourofcode. com). You might also like to go searching on Google for Code.org, Start with Code, and Groklearning.com. For families with iPads, try an app, like: Scratch Jnr, Hopscotch, Daisy the Dinosaur, Move the Turtle, or Cargobot.

Good luck and enjoy the fantastic mindset of computational thinking. It's not just for your child.

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