

# WHAT IS ALL THIS LIFELONG LEARNING STUFF?

## Introduction

Do you, as a teacher of mathematics, feel like education and schooling is taking on a life of its own and you are being left behind? Do you sometimes feel like you do not understand the changes being mooted, the amount of educational jargon increasing daily and why any of it is even relevant?

Education systems around the world are talking about 'lifelong learning', 'futures', 'critical literacies', and so on. What do these things mean in the context of being a teacher of mathematics? Do you sometimes feel that they are irrelevant to you or more likely, that they are just too hard to even consider? This paper attempts to put all these things in perspective for you in the safety of your living room. So put your feet up, grab a drink (not too strong) and mull over some of my musings.

## Lifelong learning

I have recently moved from Western Australia to the ACT and was not surprised to find that one of the main issues for teacher resistance to change anything (especially in the learning area of mathematics) in WA is also an issue here, probably more so due to different structures. (The ACT has a high school and a college structure for all year 7–12 students; that is all government school students attend a Year 7–10 high school and then move to a Year 11–12 college). The cries of, 'We have to prepare our students for college,' are very loud in Canberra high schools.

What does 'preparing students for college'

mean? Unfortunately for many college and high school teachers, it means 'stuffing the kids' heads full of mathematical content'. The belief is that mathematical rigour is produced through students being taught (notice I did not say 'students learning') things that are difficult to understand and learn.

A while ago, a teacher from X High School said to me, 'The college teachers really like our kids because they've been taught how to do surds.' Another said, 'The colleges hate the kids from Y School because they don't know how to do quadratic equations.'

When are we going to get serious about inclusivity? We know all the rhetoric about 'teaching children where they are at' but in practice this frequently does not occur. Are we really prepared to take students 'where they are at' or is that all it is — rhetoric?

I recall a teacher saying to me once, 'This middle schooling has nobs on it: we have a whole class of Year 11 geometry and trigonometry students and not one of them has been taught that the sum of the angles of a triangle is 180 degrees!' My comment was: 'Well they obviously haven't needed to know it or they wouldn't have successfully gotten through to this course. And what's more, they will now learn it in one fifth of the time because they have a need to know it in this context.'

I taught a student in Year 12 calculus once and had serious misgivings about his likelihood of success — he had not studied any trigonometry. I thought, how will he understand vector calculus or be able to succeed with trigonometric integration? This boy topped the class! He had the motivation and attitude to succeed despite having missed

what I considered to be essential background content. He learned the essential content with some, but not much, help from me; he was motivated himself through understanding that he needed it in order to do the calculus.

What we as teachers sometime call ‘preparation for college’ or ‘preparation for upper school courses’ (as in WA Year 8–12 senior high schools) is not, in my opinion, about content preparation but about teaching students how to learn. This is the focus of most (not all) middle schools.

Now, at this point, do not put your drink down and think that I am going to write about middle schooling here, because I am not. What I do know is that middle schooling aims at focussing primarily on teaching students about themselves, their capabilities and how to learn, than it does on teaching students about content; this is why there is such a nexus between middle schools and the senior schools and colleges they feed into, but enough of that.

## The changing nature of teaching

I was at a talk the other day by someone from the Chamber of Commerce in the ACT. He made the following statement: ‘For most of us, we went to school to learn the things we needed for our career. Students these days must go to school to learn how to learn, since they will probably have much more than one career and they need to learn how to learn the new things required for each one.’

In the context of schools and education, one of the hardest things is to change teachers’ teaching styles. The reason is that we learned our predominant style during our training and invariably it was also modelled to us when we were at school. It worked for us. In the last twenty years or so, research has taught us much about how people learn. This and the increased availability and access to information and communication technologies (ICT) have meant that teaching is not what it once was and we are being asked to learn new ways of teaching, new pedagogies, new assessment practices and so on, to accommodate this. Unfortunately, no one ever taught us how to learn or indeed, made it a requirement that we should know how to learn. We trained to be

a teacher with the expectation that this was what we would be doing for the rest of our working career (a broad generalisation but true for most baby boomers, I believe).

There was no expectation that teaching would change and indeed ‘look different’ every ten years of our career and that we would need to retrain, to a large extent in our own time, in order to learn those new skills and knowledge.

We know now, and the presenter from the Chamber of Commerce certainly reinforced this, that most careers these days change in their nature (or cease to exist) at least every five to ten years. Employers expect that employees will be aware of this and be prepared to acquire new skills and knowledge on the job and during their own time; these are the conditions employees agree to when taking the job.

I recall a colleague saying to me about five years ago, ‘I got into teaching to teach kids not to nurture and counsel and care about them; if I’d wanted that I would have had kids of my own.’ More recently a comment was related to me from someone where I work: ‘I teach Chemistry, I don’t do relationships.’ Both of these comments are indicative of the way that teaching has changed since many of us began our teaching career. We are being asked to do more and more that is related to having strong relationships with our students and seemingly less and less to do with teaching the content of the discipline that we felt so passionate about.

This manifests itself in different ways. I can recall discussions with teachers about what content we should be leaving out of our programs in order to make time to develop these relationships and help students develop higher-order thinking skills through problem solving. Teachers were reluctant to leave anything out: it was all important and valuable in its own right even though there was much that we agreed our students would probably never use again. Some of the justification was about rigour; a lot of it however, was merely that we had always taught it and it was an important part of the discipline.

Similarly, discussions about what algebra to leave out of courses with the advent of the graphics calculator resulted in the same arguments. I recall one comment: ‘We can’t leave out completing the square — I love teaching that!’

## Lifelong learning skills

One of the problems as I see it is this: we are being asked by our employers (education systems and schools) to teach our students how to be lifelong learners when we do not necessarily know what they are or how to be lifelong learners ourselves. This is probably because nobody ever taught us to be lifelong learners and what is more, we do not necessarily appreciate the fact that we need to teach these skills to our students (even if we knew what they were!).

## What are lifelong learning skills and how do we teach them?

In economic and educational forums there is an assumed link between the economy and education. The term 'learning society' is being used more and more in the context of the future needs of society and, in particular, work and the economy. There is an equity issue here and that is to ensure that everyone has access to education and training opportunities.

It is for this reason that inclusivity is so important. If students are not given access to meaningful programs at school (both in the compulsory and post-compulsory years), they are at risk of being excluded from the workforce. Schools and colleges that provide programs that are not meaningful (I have seen some students in Year 11 courses which are nothing more than baby-sitting lessons to keep them engaged) while focussing on 'preparing the more intelligent students for university', are, in my opinion, grossly negligent in their role as education providers.

We must remember that engagement does not equate to learning and that while engagement is necessary, it is not sufficient. Educational programs must be both engaging and produce meaningful learning outcomes. For students to value education (which they must learn to do if they are to be lifelong learners) they must be involved in meaningful, relevant programs continually during their formal schooling years.

There is a lot of information about lifelong learning around at present. I have found one document that provides some good definitions

for my purposes. It is the ACER report on *Engaging secondary school students: Lifelong learning* (Bryce & Withers, 2003). The other good thing about it is that it provides case studies of high schools which have become lifelong learning schools by changing their culture. Bryce and Withers (p. 1) make it clear that all schools are learning communities of some kind and that 'becoming a learning community oriented to lifelong learning does not require complete or radical change'. This is good news!

The key elements of lifelong learning for this project that are identified (p. 2) are:

- Ownership of the need to learn and its content are given to individuals;
- Learning is about how to think rather than what to think;
- Teachers are mentors and models of lifelong learning more than dispensers of knowledge;
- The purpose of assessment is to assist and encourage further explorations, rather than to categorise or merely relate students to some concept of a 'norm';
- Learning should be viewed as an enjoyable and integral part of one's life.

Oh no! Not another list! I am so tired of all the lists that are around: 16 habits of the mind, 6 thinking hats, 20 productive pedagogies, 13 multiple intelligences (or are there more than that?)... Sorry.

From this list I can get another list of what the lifelong learning skills are.

Students need to be able to:

- access and retrieve information;
- adapt to change;
- make connections between and across learning areas and knowledge;
- take risks;
- deal with uncertainty;
- assert their opinions and respect those of others;
- reflect on their learning;
- inquire and challenge;
- communicate what they think and what they have learned;
- set and evaluate their own goals.

Yet another list!

I prefer to talk about the outcomes we want for children and young people. Most of the education systems around the world are attempting to write 'overarching' outcomes that capture what it is that we want children to be able to do apart from those that are discipline-based. This is what has primarily changed in schooling, particularly over the last ten to twenty years. When many of us started teaching the outcomes we wanted for children (although that terminology was not then used) were mostly about disciplines, or as we now call them, *Key Learning Areas*. The other 'stuff' was called the 'hidden curriculum'. Now, it certainly is not 'hidden' — in fact it has become important in this age of accountability that these things are made explicit and that schools are charged with ensuring that students achieve these things.

In Queensland they are called *New Basics*; in Tasmania, *Essential Learning*; in Western Australia they are labelled *Overarching Outcomes*. I have done a study of these and those from other systems nationally and internationally, and have come up with my own list (forgive me) which I believe simplifies the language in ways that make sense — and there are only six of them! These are what I call 'essential outcomes' for all children.

All students should be able to:

1. think critically (that is, ask questions about what they are doing and why, make conjectures and ask 'what if...' questions);
2. have a sense of community (that is, interact respectfully and productively with all groups of people, including from different cultures, in the classroom, school and wider community);
3. be able to find things out (that is, use research skills);
4. express themselves for a range of audiences (that is, in written and oral formats including with information, and communication technologies);
5. have confidence to make choices (selecting and using methods, techniques, tools, technologies, literacies and mathematical models);
6. have self management skills and work individually and collaboratively (that is learn from self reflection and mistakes,

take risks, and work independently and with others).

In these outcomes are embedded the life-long learning skills articulated above. The challenge for us as teachers who have focussed on teaching for the outcomes of the discipline, is how to teach for our students to achieve these outcomes at the same time.

A crucial part of this is that teachers model these outcomes in and through their teaching. This is absolutely critical in my opinion and I would challenge you to think about how you are doing these things in your classes now.

In a previous *AMT* article (Perso, 2003) I outlined a framework based on the mathematical modelling approach which would assist teachers to ensure their students achieved these six outcomes. Many teachers of mathematics have always done these things but using a framework like the *Clarify, Choose, Use, Interpret, Communicate* (CCUIC) framework ensures that we deliberately pay attention to these things as we teach mathematics.

For example, in clarifying any situation that requires some mathematical application, we need to be modelling and teaching students how to ask questions, how to identify issues, how to focus on what is required, how to verbalise their thinking processes as they do this and how to organise their thinking. They can do this by drawing concept maps and using frameworks such as 'Plus, Minus, Interesting', or 'Strengths, Weaknesses, Opportunities, Threats', and so on. We can use pedagogies that enable the use of these models; for example, getting students to do this in groups by brainstorming or writing down one strength and passing the paper on to the next person to write an opportunity. One teacher I know uses a paper tablecloth on desks set up as coffee tables: students jot things they think of on the tablecloth and then move to another seat. This strategy allows students to identify what others think and write what they think anonymously, thus reducing feelings of fear and allowing students to take risks and hence think more laterally. They can also extend the ideas of others, learning to respect others' opinions.

In choosing the models, strategies, tools, technologies, methods, literacies and so on,

students initially will learn to listen as we do it, arguing with ourselves, changing our minds, verbally justifying our choices as we plan a course of action. Students need to feel comfortable about changing their minds; this is one culture we drastically need to change in the teaching and learning of mathematics — that there is only one way of doing everything and you lose marks if you do not do it that way! Students need to feel comfortable about choosing another way, even after they have invested some time doing something another way first.

Lifelong learning as a concept is valuable and one we need to pay attention to, but the skills can be taught through the processes many of us have always used. The framework I have suggested is just a way of ensuring that we are paying attention to these things in our day-to-day teaching of mathematical concepts.

The framework, when we become familiar with it, will also enable us to approach the teaching of mathematics in a different way than we perhaps used to do. For example, instead of teaching volume of a prism one week, volume of a sphere the next, volume of a pyramid the next and so on, let us now ensure that our students understand the concept of volume; then give them some real life volume problems to solve or investigations to undertake (preferably those they might find some interest in); negotiate with them how they want to be assessed (e.g. a written project, a verbal presentation, a *PowerPoint* presentation, a video, etc.) and let them go for a week or more, ensuring that you are intervening at any point to make sure they are developing the essential outcomes (content and process) listed above.

## What is 'preparing'

I am advocating that 'preparing students for college or post-compulsory schooling' is really about teaching them how to learn, so that if they find there is some content they should know, they have the confidence and skills to be able to learn it as the need arises, and hence achieve success. I have not seen any data produced from research into the success of students having been through a middle school relating to their subsequent perfor-

mance at college; certainly, they might not know some of the content but has that made a difference to their final results? What can make the difference is their loss of confidence through teacher comments such as, 'You kids from X School don't know anything!' or 'You mean to say you haven't been taught (blah) at your last school?'

## A word of caution

Whenever I talk to groups about these issues, especially the notion of preparing students for something else, particularly the next phase of schooling, I am careful to point out that this approach can put us in the dangerous position of inadvertently allowing our students to believe that there is something wrong with them now. This is a deficit model and can result in students feeling that they do not belong, they will never be good enough, they cannot learn 'the stuff' as quickly as other kids, and so on. We must value all students for who they are now, what they know now, and use our teaching skills and pedagogies to help them learn their own capabilities, so that they can learn to appreciate themselves and their own strengths and failures. In doing so, we are helping them to have confidence in who they are and their capacity to learn new skills and knowledge as required.

## References

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