Teaching and Educational Practices

... a different viewpoint

I've been writing a lot about educational practices and their importance to education students and new teachers. But there is much disagreement in the educational community about how to teach well, and some of the ideas I've been writing about don't sit well with me. That's what this article is about. You may not agree with everything here, but the ideas are important.

First, I believe there are some fundamental truths in teaching. Teachers need to be literate. They have to be able to write effectively, using good grammar and with few spelling mistakes. Teachers need to love learning, and model this for their students.

I know many teachers. Most of them are exceptional. Among those who aren't, I know one who hates to read, and seems quite proud of that fact. I know another who has the worst grammar you can imagine, in his conversations with other teachers (and I would assume, with parents). I know more than one teacher who cannot write a simple paragraph that isn't filled with spelling and grammar errors.

I consider each of these teachers an embarrassment to the profession.

In recent years, educational teaching practices have changed. Classrooms need to be places where students learn. But the focus has switched from direct instruction by the teacher to 'inquiry-based learning'. Along with that switch has come an emphasis on understanding, rather than the acquisition of facts and processes.

Teacher education classes and textbooks no longer emphasize knowledge as being important. Traditionally, teaching has been teacher-centered, where knowledgeable teachers transmit their knowledge and information to students. However, the new teaching model presented by schools of education is student-centered, where teachers function not as givers of knowledge but as 'facilitators' who help students to discover knowledge for themselves.

This is not a bad thing. But some of the pedagogy that comes with it is flawed. Let me try to explain what I mean by that, with some examples.

Group Work (Cooperative Learning)

Cooperative learning means breaking a class into groups to work on an assignment. Teachers like this because it results in less marking, and it allows for students to help each other. Ideally, strong students will reinforce their own learning, while weaker students will benefit from peer tutoring. These are all good things.

Unfortunately, there are problems. Often, good students end up doing most of the work, and weaker students learn to be followers. Some younger students cannot function well in groups, and end up doing little work, or disrupting the learning of others in their group.

Cooperative learning, *used once in a while*, can be an excellent method of instruction, if students are taught how to function in a group setting. However, it should never replace teacher instruction as the primary means for students to learn.

Some examples might be in order here. The following is an actual post from an educational website where new teachers can ask for help.

"What teaching or other methods have you found to be successful in motivating and stimulating students to learn, especially college or HS biology/science? Active learning ideas? Group activity ideas? Lab based instruction methods? Problem sets / case studies? Any ideas welcome... please brainstorm and share! ... [I am a community college biology teacher and am seeking research on this issue ... to help students learn in the classroom.]"

This was the reply, from a college student:

"I am a college junior currently taking a Physical Science course ... I think that it is probably the worst class that I have ever taken, the instructor doesn't teach. She basically stands in front of the room, mentions something, and then has the class discuss it in small groups ... she offers no guidance or instruction. Also, almost all of the class activities are done in groups. Even part of each exam is a group problem. I think that some group work is okay, but not all the time. I like to do projects on my own because I can get them done and not have to wait for the rest of my group. Why can't the teacher teach me something?"

I had a course like that in university. Nuclear particle physics, of all things. The instructor spent every class standing at the front kibitzing with students in the front row, and talking about his weekend mountain-climbing expeditions. We were expected to read up on the subject and talk about it. But no reading lists were provided. I felt cheated ... I'd paid money for that course, and expected to be taught something.

Another post, this time from a college education student:

"Does anyone have any idea of what social and emotional learning means? I am taking an accelerated 5-day course regarding classroom management behaviours. The instructor assigned our group the topic of defining and exploring social and emotional learning. I am going to do much online researching but I wanted to get some opinions from anyone on here....as soon as possible".

This comment was made:

"Uh, sounds like social learning is when you pay good money for a college course ... but instead of a solid, fact-filled week of sessions, you get placed in a 'group' and are supposed to make up answers by yourself out of thin air".

I have attended many Professional development sessions as a teacher where this was the norm. Sharing ideas is important, but sometimes you just want someone who knows, to *teach* you something!

Projects and Collaborative Displays (Discovery Learning)

Students are provided with projects to work on, where they will discover the things they are supposed to learn, on their own. Teachers believe that students will be more likely to remember what they learn by creating something, than they would from reading and regurgitating facts.

Again, there are problems. Students sometimes miss the discovery they were supposed to make. Often the projects assigned do not match curricular objectives. Too much time is spent on them. The process is slow and time-consuming, and there is often little knowledge gained.

Projects can also be used by teachers to allow students to demonstrate what they've learned, and to reinforce that learning.

Projects are everywhere, in every classroom. Posterboard, crayons, coloured pencils and construction paper abound. Powerpoint and KidPix take up period after period. Students make dioramas, working models, multimedia presentations, and the ever-popular collages. Projects can take hours and hours, merely to reinforce learning that should have taken place in the classroom.

There is nothing wrong with these techniques, if used sparingly, and if the teacher realizes that students aren't really learning much when they use them. As a method for reinforcing learning, they are excellent, but as a method of instruction, they are inefficient.

Teaching Facts

Starting in Teachers' College, and throughout their careers, teachers are constantly reminded about the 'dangers' of teaching facts. They are told not to teach 'mere facts' to be 'regurgitated'. Learning of specific content knowledge is called 'low level', and memorization is discouraged. The amount of direct teaching is to be minimized.

So, if the teacher isn't teaching facts, what are the kids doing? You got it ... more projects!

What a disservice we are doing to our students when we believe this.

Factual knowledge is important. Critical thinking can't take place without a sound knowledge of the facts. One cannot think critically unless one has a lot of relevant knowledge about the issue at hand. Good teachers should be able to convey facts in a meaningful way.

Again, some examples.

The Social Studies curriculum in Alberta is big on values. Much of the rich history and geography content was removed years ago. If you don't believe this, ask a high school student to draw a map of Canada. Ask a student to find Iraq on a map of the world. Ask him to name the continents, or describe why the railroad was so important in the founding of Canada.

The problem is not with our teachers. It's the curriculum. Recently a teacher in our school was teaching an excellent lesson on the 'Ring of Fire' in Jr. High Science. The students were to locate earthquake occurrences on a map of the world, by city or country, with internet help. *They couldn't find the countries ... they had no idea where Japan was, or Australia, or Chile, or Alaska, in relation to the map of the world.*

A school I visited once was very proud of their lengthy 'discovery' projects in science. But because of the time needed to complete these projects, huge sections of the curriculum were never taught. But parents loved their kids' dioramas of rainforests and illustrated posters on air pollution.

Parents see a problem too. Their kids seem to be spending a lot of time working on projects in the evening. Finishing that collage. Writing their journal entries. They complain that their kids have too much homework.

I was at a teacher PD activity once that encouraged high school math teachers to let their students keep a journal about their classroom experiences in math. '*How did factoring that polynomial factoring make you feel*?' I swear it's true!

Yet those same students don't know their times tables. They can't spell or write an error-free sentence. They aren't familiar with a map of the world.

That's what they should be doing for homework.

Keep Them Happy

The idea that children must be 'entertained' and feel good while they learn has been around for a while. As a result, in many schools, students are watching movies, working on multimedia presentations, surfing the Internet, putting on plays, and dissecting popular song lyrics. The idea is to motivate them, but the emphasis on 'having fun while learning' is a poor substitute for engagement. It's fake. They're not engaged in the subject matter ... they're engaged in the 'fun activity'. It makes for students who are less likely to challenge themselves or stretch their abilities.

Recently I offered a set of bonus problems to my Jr. High math class, problems which were well within their abilities, but which would require a little thought and work. I thought they were pretty interesting. For example, do you know how much money you'd have, if you put one cent on the first

square of a checker board, and then doubled the amount you placed on each succeeding square?

There was even a prize involved. But I made the mistake of making the assignment optional. The majority of the students took one look at the assignment and turned it back in. Their comments included '*too hard*', '*too much work*', and '*that won't be fun*'.

"Project-based Learning' always has the potential to be based on fun rather than content", says former teacher and administrator Elaine McEwan. She uses the example of a class of academically struggling elementary school students in Arizona that spent 37 hours -- more than a school week -- building a papier-mache dinosaur. The local newspaper even ran a photo of the students and their handiwork. "Those kids couldn't read well, and they spent all that time messing with chicken wire and paste", says McEwan.

For years, experts have held that the only good way to engage students in their work is by making it exciting, engaging, and fun. Studies must be 'intrinsically' interesting. Teachers and education students have been told that if their teaching is truly innovative and creative, students will learn effortlessly.

But there is an unfortunate truth about learning: *learning takes study and study takes time and effort. It's hard*. Many lessons in both school and at work are not fun at all. Students who study because they know it's necessary, even if it's not fun, learn the material. But they learn an important life lesson as well. They learn that real achievement usually requires a real effort. And it isn't always fun.

Students spend years being encouraged to write about themselves and their feelings, and draw pictures about themselves and their feelings. They are instructed to make collages about what they've learned. But by the time they reach high school and college, it's time to learn something, and to discover that learning can be hard work.

More examples ...

Some students in my Jr. High classes can't be convinced of the necessity for learning basic math facts, such as the times tables, or integer and exponent operations. They won't make the effort to learn them. It's 'boring'.

I emphasize it in my teaching, but there is no curricular expectation for mastery.

As a result, I always encounter students in my Sr. High math classes who can't multiply 8 x 12 in their head, or calculate -3+-7, or remember that 2 to the power of 5 is 32. This shouldn't be a problem, right? They have calculators, after all.

The *problem* is that if you have to use your calculator every time you encounter one of these simple facts:

- you'll take twice as long to do the advanced problem you're working on
- you'll spend an inordinate amount of time punching buttons on a calculator, instead of thinking critically about the problem

Algebra skills is another area where rote memorization of facts and procedures is valuable. But that too is deemphasized in the curriculum. It's one thing to encourage students to explore ways to multiply $(x + 4)(x – 5)$ in Jr. High by using algebra tiles or pictures. But by the time a student reaches Sr. High, if they have to rely on tiles to solve such a simple problem, they're never going to be able to pass Math 30, *whose curriculum demands a facility with algebraic operations*. Yet the textbooks are still full of 'alternate ways to understand the procedure', rather than encouraging teachers to demand mastery of proven procedures, and provide ample practice.

Make no mistake here: I am not opposed to 'alternate ways to understand the procedure' in mathematics. Quite the contrary. It's now an accepted thing in math classes up to about grade 9, and I think it's the best thing that has happened to mathematics instruction in the last one hundred years! It lets weak students be successful, and students who are good at math really understand how it works, rather than memorizing set algorithms. How much do you learn about how numbers work when you struggle to learn the long division algorithm?

Nevertheless, I have seen comments from highly educated people who say something like this, about Elementary and Jr High math courses: "*Instead of making them learn all these strange alternate ways to get the answer, just teach them the method that works, that will get the answer correct every time … the method we all learned back in the day when we were in school!*"

What's wrong here is that math classes up to about grade 9 *aren't about 'getting the answer!* If they were, we could just hand them a good calculator and let them 'get the right answer' every time!

Rather, it's all about understanding how numbers work, understanding the relationships between concepts, and learning new ways to solve problems.

It used to be that many students coming out of Jr High actively disliked math, and about 20% of them couldn't do it. Those that *could* mostly were just good at memorizing procedures, and didn't really *understand* what was going on. Ask yourself if you know why the area formula for a circle is **A = pi times r^2**. (The explanation is in the resources section of this site if you're interested).

Now students get to explore how numbers work be looking at and learning about all the ways that a given type of problem can be attacked. As long as they can show and understand a method, we don't care how they did it.

It's all about process. That's where the real math is hidden. I sometimes would give a test where all the final answers were provided at the bottom of the page. There were no marks for correct answers. All the marks were for showing the correct steps in the procedure they chose.

This frustrated some students, who liked to do work in their head and disliked showing their work. But it emphasized the fact that senior high math can't be done in your head! Moreover, you need to show steps so the teacher can help you if you mess up.

Where I was originally going with the math example I outlined above was that by the time a student reaches grade 10 and above, in an *academic* math class, it's no longer about 'picking a method'. Those who managed to learn the traditional algorithms, which were always one of the choices explored, can now proceed to do algebra and other topics properly. Yet textbooks continue to offer alternate methods that are time consuming and sometimes ridiculously contrived.

OK, I sort of got off track a little here. This page is about teaching practices that are sometimes suspect. Let's get back to that.

Some educators actually believe that excessive practice will kill a student's interest in the subject. But this idea is contradictory to what we see all around us in the world. For example, athletes, pianists, ballerinas, and others must go through repeated practice to achieve their goals. Cognitive psychologists agree. You may remember a book about top professional athletes or other experts, and how long it took them to master their sport. The author found that in most cases it took about 10,000 hours of practice to achieve world class excellence.

I'd like to insert a quote here from the legendary math teacher Jaime Escalante:

"The ideal textbook also has a tremendous number of practice problems because practice, practice and more practice is demanded from each student. Finding enough practice problems has always been difficult, thus I am currently developing my own texts and practice workbooks for class and homework use that are consistent with the lesson plans of the program."

Teachers who don't know who Jaime Escalante is should search out information about him. I've learned a lot about teaching mathematics from what he has written.

Do Teachers' Colleges still bombard their students with useless 'projects' and 'activities', such as making 'personal literacy philosophies,' and 'Mind Maps' ... but seldom teach them exactly how to teach anything? My own experience included more than a few teacher prep courses that did nothing to help me become a teacher. One memorable Educational Psychology course saw us meeting twice a week to sit around in small groups and discuss our 'educational philosophies'. The instructor did nothing except 'facilitate' the discussions. She taught us nothing. We learned nothing.

My hope is that current teacher education institutions do a better job of preparing teachers.

Let's look at some terms popular in schools at the moment.

‘**Authentic assessment**’ is a term often heard now in educational circles. The idea is to let a student show what they have learned in any way they are able to. The term used is ‘performance-based’ assessments. Often the assessment by the teacher will be based on a project. These projects can include letters, exhibits, plays, discussions, or drawings, and are usually graded subjectively.

The idea is that some students don’t do well on standardized tests, and need some other method to show what they have learned.

This is a good thing.

But there are some problems. First of all, teachers need to learn how to make alternative assessment tools that *truly measure the curricular objectives*. Too often this doesn’t happen.

More importantly, the success of students in grade twelve is measured using standardized tests (Diploma exams); students need to be prepared to show what they have learned using this type of tool ... practicing with Powerpoint presentations and collages won’t do the job.

‘**Competition**’ has taken on a negative connotation. Some educational experts disagree with grading (marks) because it separates students into higher and lower streams. *“They believe students will learn for the sake of learning if their self esteem is not deflated by competition”*.

The flaw in this argument is that it is human nature to be competitive. Even more importantly, the ‘real world’ occupations that students will eventually seek out demand it. College and university programs are based around academic results. Try getting into law school without a high LSAT test score. You won’t get a welding job unless you can show competence in that skill, and your job opportunities won’t be there if everyone else can weld better than you.

Competition still exists in the classroom, no matter how hard a teacher tries to prevent it. Evidence suggests that carefully created tests during a course of study actually improve learning. Competition *can* be used effectively to guide and motivate learning.

Portfolio assessment is often used by teachers as a sort of extended version of performance-based assessment. Collections of a student’s work done over the year are kept in a folder and graded as a whole, to show evidence of improvement over time. This works well for teaching writing

and art, and perhaps making lesson plans in Teachers' College, but little else.

'Research has shown'. You'll see this phrase used a lot in educational theories. I've used it a lot in my own posts here. But the truth is ... educational research is pretty shoddy. It varies enormously in quality and reliability. Some research is unreliable because its sample sizes tend to be small, and there are many variables (social, historical, cultural, and personal) that cannot be controlled.

If an educational article describes a 'successful' strategy', such as building a castle out of Popsicle sticks instead of reading about castles, the success is assumed to translate over to all classrooms and all students, *without any evidence*. In addition, many findings in educational research are highly contradictory.

But confidence *can* be placed in educational research if it is consistent with accepted findings in fields like psychology and sociology.

Textbook learning. This phrase is used to disparage traditional forms of education, symbolized by textbooks, in favour of methods where knowledge is gained from hands-on activities rather than from what is written in textbooks.

There is some truth to this. Some textbooks are poor, and, particularly in the sciences, become out-of-date rather quickly. Many textbooks are written for teachers rather than students, are difficult to learn from, and often don't discriminate between what's more important and what's less important.

But the alternative to textbook learning ... hands-on, project-oriented teaching, is highly ineffective. Nothing works better than carefully focused teaching of subject ideas through good well-thought-out textbooks and a teacher who knows the subject. It's been that way for hundreds of years. In the sciences (and in post-secondary courses such as medicine and engineering), well written textbooks have always been necessary and valuable for learning.

Whole-class instruction. This is the term used to describe what most people think of when they consider what goes on in the classroom. The teacher is at the front of the room teaching.

As with anything else, this method of teaching can be incredibly bad. We all have memories of ineffective teachers who droned on at the blackboard,

while students sat bored in their seats, passing notes and not paying attention. I had more than one teacher like that.

But while one-on-one instruction is a noble goal, it is not practical in a large class of students. Whole class instruction is sometimes a necessity, and it's the norm. That doesn't mean it has to be bad.

Good teaching is interactive, with many interchanges between students and the teacher. Good teachers don't stand in front of the room delivering facts ... they make it seem as if they are sharing the learning with their students, who are engaged in the process. **This is the most difficult skill for new teachers to master**. The teacher is frequently informally assessing the learning that is taking place, through questions, discussion, or observation of student work.

Of course, whole-class instruction will be supplemented with individual coaching, cooperative learning (group work), seatwork, and, yes, the occasional project.

Whole-language instruction. As a parent of a grade one or two student, or as a new teacher, you may still hear this term, although it is now outdated. Originally it described an approach to the teaching of reading that emphasized the pleasure of reading, and avoided the drill-like instruction in letter sounds (phonics). The method was supposed to motivate children by emphasizing an interest in books, and by encouraging students to read holistically, by recognizing whole words. Students who had trouble learning solely by 'phonics' would no longer become discouraged and end up hating reading and writing.

After large-scale experience with unsatisfactory results (students reaching upper elementary or Jr. High classes who couldn't spell or write coherently), a 'mixed' approach was advocated, where some letter-sound correspondences are taught explicitly. In almost all grade one classrooms now, reading is taught using a blend of holistic and phonics-based methods. No expert in the field of reading now advocates a teaching methodology that neglects phonics. With proper instruction, nearly every child can read at grade level by the end of first or second grade.

I actually know quite a bit about this, as my late wife Jane (the best and most caring grade 1 teacher I've ever known) was a pioneering expert at it.