Active Learning

by James Sparks

Designing Authentic Active Learning Activities

A Teacher's Guide
based on the blog *activelearner.ca*

Contents

Preface

Teaching is not a spectator sport. Class time is show time and every good teacher takes to the platform hoping that some new awakening is about to occur, that the veil will be pulled back and that the uninitiated will experience the excitement of a growing self, enlivened by unleashed curiosity and entranced by the glimmerings of new understandings. (Well it's not always like this ☺).

But all of this plays out in an institutional context that increasingly is committed to some form of accountability. This commitment to deliver the goods as promised, to public or private owners, has led to a more rigorous detailing of the contractual goals, competencies and learning objectives that are to be met. These are passed down through the hierarchy to the troops in the trenches. Government overseers, district school boards, institutional administrators, and departmental bodies all edit the script that will ultimately guide the teacher's classroom performance.

Teachers are expected to bring forth their students' creative abilities while they themselves are reduced to "covering content" in time frames that don't permit much deviation from the script. This, I'm sure, is not the adventure they bargained for. Do such teachers begin to feel like the waiters and waitresses in an educational restaurant, hustling fast knowledge from the kitchen to the tables of indifferent diners?

If you ask people what they think education is, many will say it is about information or knowledge transfer. Teachers transfer what they know to students who don't. It is a process of filling empty vessels.

It doesn't take much reflection to see that this metaphor leads to a form of teaching, ineffective across a diverse group of learners and failing to offer teachers a worthy application for their creativity.

Why is it that we feel we must teach young people to be creative thinkers? What have they been doing in their years of prior schooling that didn't result in them being critical thinkers? What kind of educational experiences can such students have had that they were able to avoid becoming critical thinkers? Babies learning to walk are becoming critical thinkers, it is a natural process. Have we discovered a way to interrupt its development so that we have to re-activate it years later?

There are many notions of education and its social purpose. But regardless of its specific aims it cannot be that we want to derail naturally occurring development in children nor that we wish to ground the creative electricity with which most beginning teachers are charged.

Educational pedagogy has a relatively short history compared to other disciplines. But useful theory and practice have emerged over the past century and in them we can find the strategies that will support the diverse learning styles of our students

and change the teaching metaphor to one which engages teachers' creative powers.

Active Learning has attracted the attention of educators worldwide. Based on the Social-Constructivism of researchers like Piaget and Vygotsky it defines a new role for teachers. It requires them to give up center stage and to fully become what they have, in fact, always been: learning activity designers. Many teachers, unfortunately, have been designing the same learning activity over and over year after year. Often it takes the form of a lecture.

It is likely that most of us who teach have a psychological need to be in front of a captive audience. Good teachers,however, can put this aside and understand fully the existential reality: only the student can do his learning, and only when he engages with the material to be learned. Only the student can change his own intellectual wiring as the means of integrating new knowledge. Teachers and others can only coach while the learner actively explores the new educational terrain. This exploration must be deliberate since it is also possible for students to actively avoid learning.

Put simplistically, the teacher's pedagogical mission is to design and implement activities that will motivate student discovery, to provide support, and to assess accomplishment. This is vastly different from the more traditional act of teachers trying to talk knowledge into learner heads.

This point needs to be understood even in contexts where students would normally be physically active such as Physical Education classes, science labs, or group projects. None of these constitutes Active Learning if there is not an accompanying, explicit, intellectual awareness of what is being learned and how.

This book explains how to design and evaluate an Active Learning activity.

One misconception about the process deserves special mention. There is a hope among some teachers that a great repository of AL activities will soon come into existence and allow teachers to share their creations with others. There are at least two reasons to abandon this hope. The first is that the extent and diversity of demand is vast. Multiply the number of concepts by the number of courses by the number of levels by the number of programs and add in a teacher's tendency to have a preferred way of doing things and you can see that providing a complete inventory of pre-written activities is impossible.

There is an even more important reason to put aside this expectation and it points to an often overlooked payoff for Active Learning teachers. Teachers should embrace the opportunity to apply the full scope of their creativity. Designing Active Learning activities is one of those open-ended processes which relies on the bringing together of pure imagination, analytical skills, and an understanding of both pedagogy and the learners themselves. Every course taught offers the oppor-

tunity to create many new activities, which when implemented, allow the teacher to step off the stage, walk among the learners, and sit for a spell, long enough to hear someone's misunderstanding or another's ingenious solution to a problem.

The pages of this book are re-printed (and in some cases edited) from the blog activelearner.ca . You can find more information there.

I hope you will brainstorm many new activities, use the pages of this book to pre-test them, and then allow yourself to be a co-learner with your students.

—James Sparks

YOUR ACTIVE LEARNING CLASSROOM

by James Sparks

Active Learning Strategies

A Google search returns nearly two hundred million references for Active Learning. While there are still many questions about Active Learning, teachers at all levels, K-12, college, and university, are now thinking about whether they want to have an Active Learning classroom.

An Active Learning classroom can be a special space designed to support Active Learning activities but more importantly it is a place where students are active learners. The Active Learning strategies are the key to improved learning experiences for your students. The Active Learning classroom supports the collaborative activities you have designed for them.

Why Active Learning?

The studies of Bonwell and Eison show that students prefer Active Learning strategies to traditional lectures and that Active Learning strategies are superior to lectures in promoting the development of students' thinking and writing skills. In addition, there are indications that, for a significant number of students, pedagogical techniques other than lecturing work better. Active Learners experience deeper and longer-lasting understanding because they cognitively engage with whatever they are studying: **they learn by doing and thinking about what they are doing**.

Active Learners are offered a wider range of cognitive experiences. In lectures students are challenged to remember and to understand. Active Learners, on the

other hand, can attempt to apply, analyze, evaluate, and create, moving to the higher levels of Bloom's Taxonomy. Becoming an Active Learning teacher is therefore one of the main challenges facing educators at all levels and in all types of education.

The Shift

In the traditional view teaching is the transmission of information. The teacher is like a radio transmitter beaming out data to be received by any student whose receiver is tuned to the right frequency. Information, correctly or incorrectly received, is recorded by the student receiver so that it can be transmitted back later as proof of reception. This model is so well engrained that becoming an Active Learning teacher often requires some effort. It requires both a shift in philosophy and in practice.

All teachers are designers of learning activities. The traditional teacher, however, has been designing the same activity (the lecture) over and over, perhaps for an entire career. Teachers who make the transition to Active Learning are often looking for the creative license that Active Learning gives in allowing them to design an infinite variety of activities.

In Active Learning: Creating Excitement in the Classroom (Bonwell, 2000) Bonwell describes some of the reasons why teachers may find the transition difficult.

- more time is needed to cover course content
- additional pre-class preparation is required
- it is not easy to use Active Learning strategies in large classes
- instructors tend to think of themselves as good lecturers
- there are insufficient sample lessons and materials available
- students may resist changing from traditional methods

In addition, teachers often fear losing control of the class in the seemingly chaotic activities of groups of Active Learners. All of these concerns are real but yield readily when the teacher decides to become an Active Learning activity designer and to apply the kinds of creative energy we always hope to see in students. The secret to making the transition is to do it in small steps. There is no requirement to re-vamp an entire curriculum in one shot. There is much to be learned from each success and failure along the way.

To make the change a teacher must stop asking the question, "*How can I explain this to my students*?" and start asking, "*How can I get my students to discover this?*". In order for Active Learning to work, teacher and students must come together around the challenge of trying to understand something important.

The remainder of this book focuses on two parts of the activity design process. The first maps out a structure for a typical activity, a kind of x-ray or skeleton which demonstrates that thousands of configurations are possible. The second lengthier section addresses each of the attributes of *authenticity* in Active Learn-

ing activities. This provides a valuable checklist for newly developed teaching ideas.

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Designing Active Learning Activities

Designing Active Learning activities offers enormous possibilities for personal innovation and invention. Here is a chance to create something really new, and highly effective. The list of possible Active Learning activities is infinite! So be daring and have some fun. Don't wait for someone to invent your Active Learning lessons. The following discussion is intended to help you build your own Active Learning activities.

Examine the chart on page 9 and think of it as an anatomical model of an Active Learning activity. It has, potentially, three parts, but at least two. Let's also keep in mind that Active Learning activities can be simple or complex. This model can apply to even the simplest activities, such as a spontaneous in-class think-pair-share, but it is more valuable when you are designing Active Learning activities which are larger.

Let's take the writing of a research paper. I am going to discard the prevailing model which seems to go like this:

> As you know we always do a research paper in this course. It is due in 4 weeks. It must be 1,000 words in length and use APA citation. Plagiarism will be punished by lethal injection. You must use at least three refereed articles and no more than one reference to the Internet. Late papers will be penalized at the rate of .5% per week-day of lateness up to a maximum of 12 marks unless this amount should exceed the deduction for the ineffective use of English…

> I will be available during office hours in case you have any questions. When the papers have been submitted I will trudge home with them and spend more time marking your paper than you probably spent writing it. I will return it with abundant comments and you will tell me you were only interested in the mark.

> If we repeat this activity enough times you will eventually be a good research paper writer.

So let's try a different approach. First of all writing a research paper is a *process* and that's what we hope students will learn. So let's be honest about what the process is. Your idea here may be somewhat different that someone else's. That's OK. What are the five (or are there six?) steps to writing a good research paper, according to you?

One of the major problems with large activities is that students often find them overwhelming, right from the start. In addition, they don't really know the process, the steps to go through. Furthermore, they get no helpful feedback until the end.

The model on page 9 shows the many ways any activity can be constructed. One of the best ways to find out how well prepared students are to undertake the work is to have a Planning step. The model shows several possible outputs from this step depending on the activity. For our research paper we might have students design a research strategy. This could involve a pre-designed form which helps the student articulate important decisions like how the topic has been or will be arrived at, why is the topic interesting or important, what sources have been or will be examined, what will be the subsequent steps to completion.

Our model shows the possibility of feedback which can take several forms: self, peer, teacher, formative, or summative. As the arrows indicate there is a possible return to the Planning stage in order to make corrections. While this may seem time-consuming a good plan can shorten the time required later and produce better results.

The Actualization step is shown as one unit, during which the main work is completed. This can, and should, be subdivided into an appropriate number of sub-steps. There will be drafts and revisions and it might be worthwhile having students write a projected abstract in which they sketch what they expect the results will be. There will also be the refining of the references and citations. All of these Actualization steps offer the possibility of feedback and looping back for corrections.
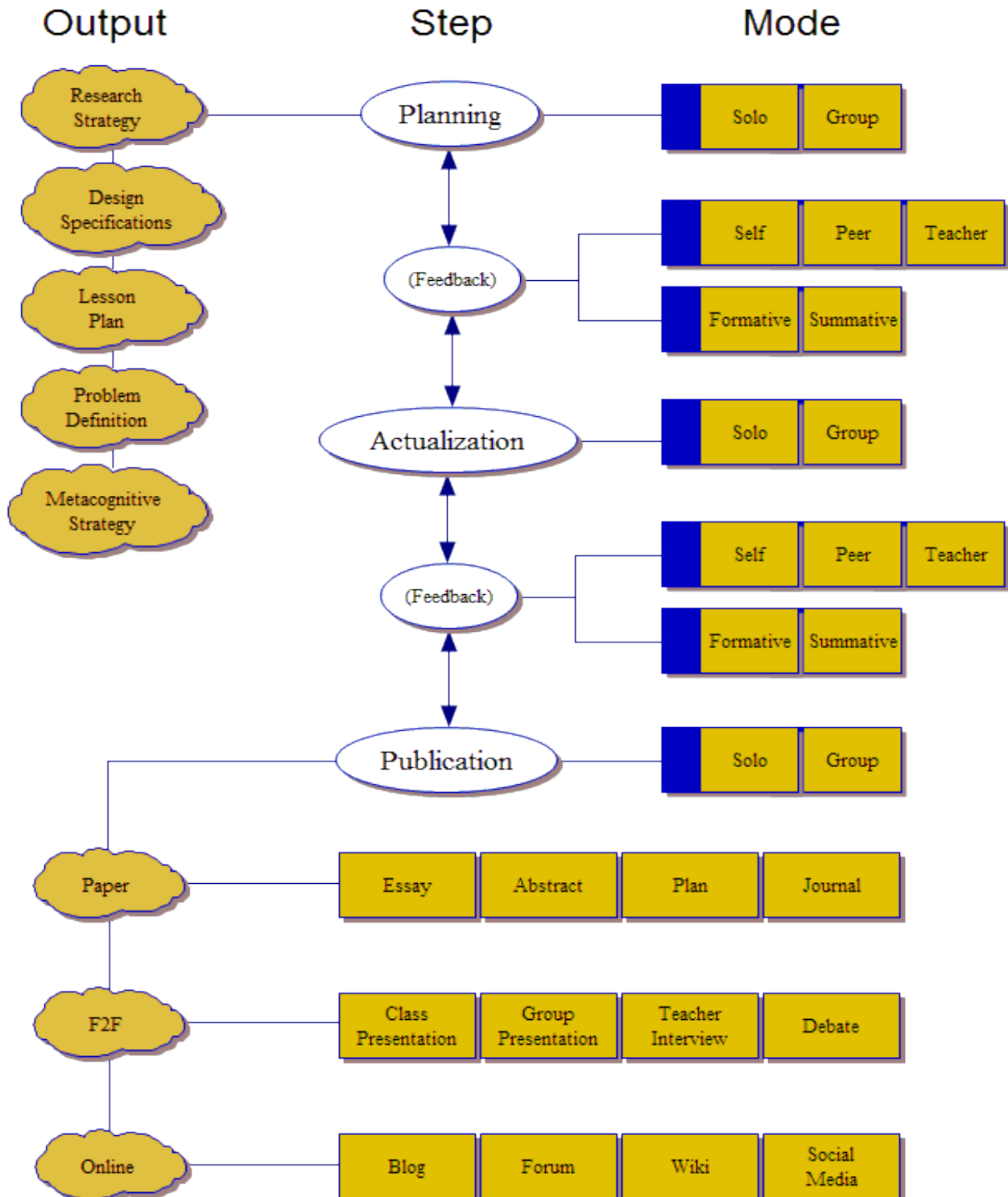
All good Active Learning activities have some form of output. Without it the activity lacks authenticity. The passing of assignments from student to teacher is a school invention and is an activity disconnected from the world outside. So let the output be as public as possible. Electronic media offer many possibilities.

Output from larger activities should be polished. This means that students should go through one or more iterations of feedback and correction before publishing their work.

Possibilities

The model below shows over 17,000 possible variations on the design of an activity. It is here that teachers can express their creativity and carefully design activities that lead students to discover the real process that lies behind the skill. The teacher is ubiquitous in the process: checking, advising, verifying, coaching. It should also seem obvious that the degree of ongoing interaction of the student with her teacher and her peers in these activities renders any form of cheating or plagiarism largeley ineffective. As we build activities with more and more authenticity we can wish for the departure of all the mindless obsessing over these two academic felonies.

Active Learning Activity
Design Model

Output	Step	Mode		

Output

- Research Strategy
- Design Specifications
- Lesson Plan
- Problem Definition
- Metacognitive Strategy

Step

- Planning
- (Feedback)
- Actualization
- (Feedback)
- Publication

Mode

Planning: Solo | Group

(Feedback): Self | Peer | Teacher ; Formative | Summative

Actualization: Solo | Group

(Feedback): Self | Peer | Teacher ; Formative | Summative

Publication: Solo | Group

Paper: Essay | Abstract | Plan | Journal

F2F: Class Presentation | Group Presentation | Teacher Interview | Debate

Online: Blog | Forum | Wiki | Social Media

YOUR ACTIVE LEARNING CLASSROOM

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Authentic Active Learning Activities

> Steve is driving his car. He is travelling at 60 feet/second and the speed limit is 40 mph. Is Steve speeding?
>
> *He could find out by checking his speedometer.*

[John Seely Brown](#) used the word *authentic* extensively in talking about situated learning.

Authentic is, nonetheless, difficult to define. Most definitions of authentic compare one thing to some existing model or template. Something is authentic if it compares well to the original.

In their paper on authentic activities and online learning [Reeves, Herrington and Oliver](#) describe what authenticity means in the design of learning activities. They present ten characteristics that define authentic Active Learning activities. These characteristics can provide a useful checklist for evaluating an activity you have designed.

1. [“Authentic Active Learning Activities Have Real World Relevance”](#)

2. [“Authentic Active Learning Activities Are Ill-Defined”](#)

3. [“Authentic Active Learning Activities Require Sustained Student Effort”](#)

4. [“Authentic Active Learning Activities Involve Multiple Perspectives and Resources”](#)

5. [“Authentic Active Learning Activities Involve Collaboration”](#)

6. [“Authentic Active Learning Activities Provide Opportunities for Reflection”](#)

7. [“Authentic Learning Activities Encourage Interdisciplinary Perspectives”](#)

8. [“Authentic Active Learning Activities Integrate Assessments”](#)

9. [“Authentic Active Learning Activities Create Polished Products”](#)

10. [“Authentic Active Learning Activities Produce Diverse Outcomes”](#)
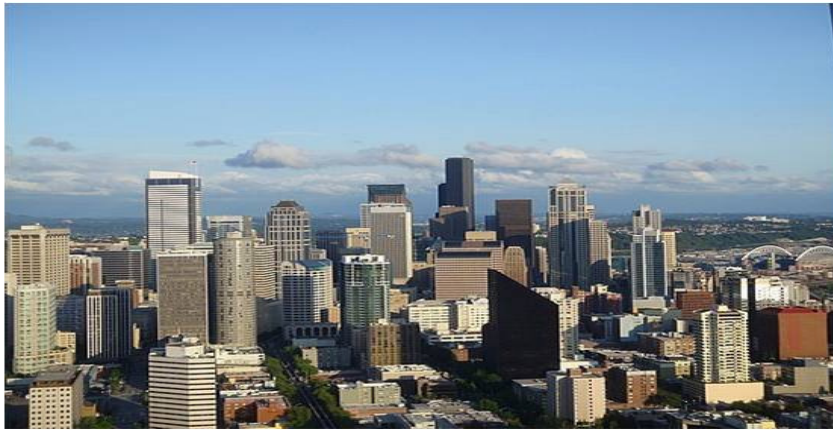
Each of these design features is described in more detail in the following chapters. You can follow the links in the list above.

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Authentic Active Learning Activities Have Real World Relevance

Although the literature suggests that authentic Active Learning activities have *real* world relevance we might be better to say *outside* world relevance. Otherwise the implication is that what goes on in the classroom is unreal.

John Seely Brown sees a divergence between what outside-world practitioners do and what we have typically been able to replicate in the classroom (see blog post) . It is a difficult challenge because when we try to extract the "essence of biologist" we don't get everything. What we usually bring into the classroom is what Seely Brown calls the explicit knowledge. This is the kind of knowledge we find in textbooks.

But we miss what he calls the tacit knowledge, the daily habits and tricks of the trade of the working biologist, for example.

So long as we teach in classrooms we are challenged to make the links between what we ask our students to do and what outside world practitioners are actually doing.

Many educational programs offer work experiences, externships, or cooperative work experience. These help to make the connection with outside world work realities.

What use do you make of the liaisons that are necessary to create work opportunities for students? Are working world contacts invited into your institution to participate in inside learning activities? Are they invited to be advisors to the program? Do they participate on juries evaluating student work?

Educational technology can be a great aid in this process. Since working practitioners are often busy people electronic communications can reduce the need for travel and can open up possibilities at great distances. Tools like Skype, email, discussion forums, and wikis can greatly facilitate interaction between your students and your outside world contacts.

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This kind of interaction not only helps students acquire some of the tacit knowledge they will need but can help teachers check on the currency of the learning activities they design.

Non-Technical Programs

Teachers in disciplines like English, Humanities, Physical Education, Philosophy, Political Science (and many others) should also be thinking about contacts in the outside world. Why not? One only has to ask the question, "Why are students taking my course?". Ideas for outside connections will come streaming in. Why shouldn't students in English communicate with actual playwrights, poets, critics, and literary writers? Humanities spans so many disciplines that the possibilities are endless. Physical Education has a purpose. Why can't that be expressed through contacts with practicing fitness trainers, seniors homes that would appreciate a little help with classes for their residents, or marketers who claim to offer healthy food products in the community? In earlier times philosophers and other academics developed their ideas by writing to their peers. Why not your students? Local politicians can often be enticed to exchange views with students. If they accept, design a full-blown activity around the interaction.
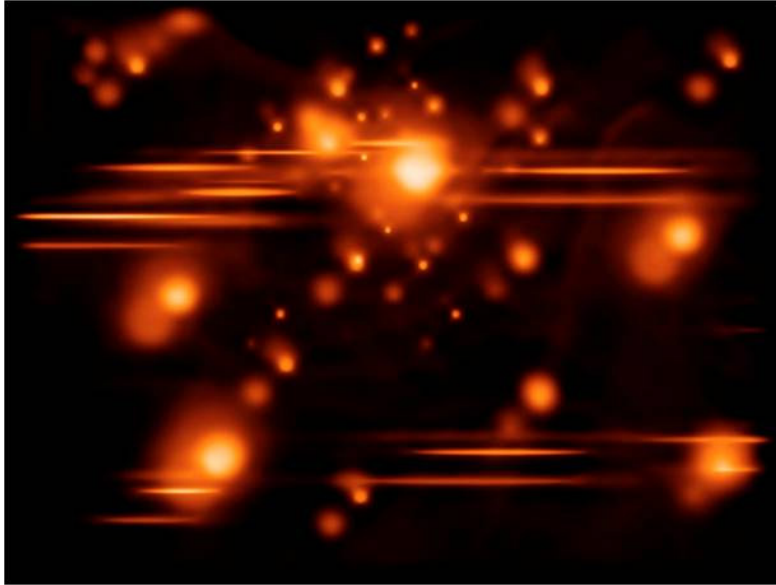
And then there are the social media. Any of them could be a good answer to a very important question: "How can I get my students publishing their work?" Just asking this question will generate reams of great ideas.

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Authentic Active Learning Activities Are Ill-Defined

In their early school years students are often given problems that have clearly correct answers. But learners at all levels are capable of tackling more challenging tasks. Authentic Active Learning activities are ill-defined. This is true in two ways. First, the problem posed, or project to be completed, may not have a clear definition. Some work may be required in order to articulate what exactly is to be accomplished.

For example, "Write a 500 word biography of Marie Curie highlighting her accomplishments in Physics" requires little thinking about the nature of the task.

On the other hand, the nature of this task is more ambiguous: "What should be done about the increased surveillance of public communication?". This issue needs to be contextualized. What part of the world are we talking about and who are the players involved? What constitutes "public communication"? Students must define the key elements of the debate before they can choose a side and begin their research.

As a second step in accomplishing this task a student team would have to decide:

- what form their "case" presentation will take
- what research needs to be done
- who will do what
- what will the project timeline look like

The first step involves giving the task some specific boundaries and the second requires the creation of a plan of attacThese two types of challenge are what ensure that authentic active learning activities are ill-defined. When students have to define the terms of the activity and then plan how to carry out their tasks they are more deeply engaged, can see a greater real-world relevance in their work, learn to utilize the skills of their team members, and develop their organizational skills.

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Authentic Active Learning Activities Require Sustained Student Effort

Authentic Active Learning activities require sustained student effort and the use of substantial intellectual resources. With the easy access to information that the Internet and other media provide, finding information can sometimes be an easy process. Simple queries do not engage students in the kind of thinking that is characteristic of Active Learning activities. Investigative tasks should challenge the student in the way that real world tasks do. Dealing with obstacles and setbacks are part of the learning expectation and lend value to the work accomplished.

When students are consistently given more trivial kinds of tasks they can become intellectually lazy. Teachers then often make unduly low assessments of their students' abilities. It is important to remember that we never know what students are really capable of. It is also true that working on demanding tasks may require some adjustment on the part of learners. Teachers may find it desirable to build slowly.

Tasks requiring perseverance allow learners time to make corrections in the light of what they have just discovered. Knowing how and when to re-design their strategy is a valuable lesson for future learning and career endeavours. Projects of longer duration also increase the challenges and the benefits of teamwork. A challenging project can bring out frustration in some team members but also provide an opportunity for others to provide encouragement in the face of difficulty.

A more prolonged investigation can unearth interesting lines of enquiry thereby enriching the perceived value of the work. It can also introduce the challenge of managing a large amount of information and honing it into a polished product.

Strategic Framework

Tasks of longer duration may best be tackled within a strategic framework. It may help students to discuss such a framework before they begin their investigating. For example:

1. Brainstorm, to get a range of possibilities and group interests
2. Define the key concepts and terms that require understanding

3. Identify possible resources

4. Define the output format of the project

5. Discuss work assignments for group members

6. Set a timeline
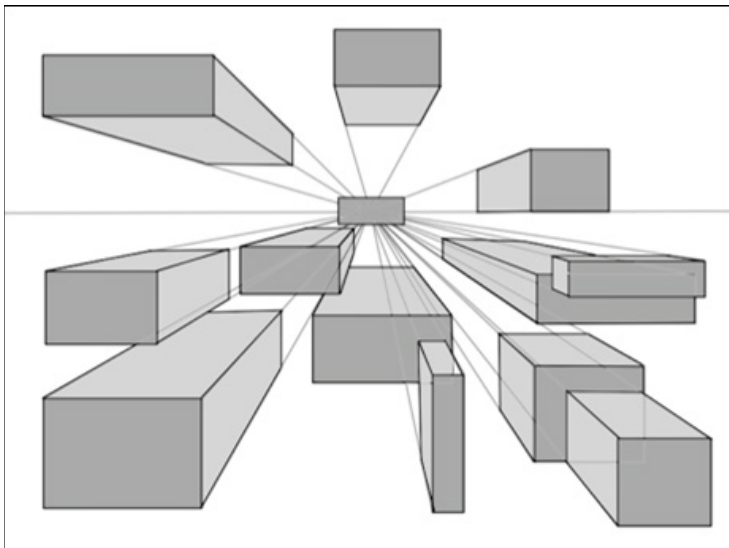
7. Ongoing monitoring

8. Completion

Students who can clearly see the structure of a challenging project have a great advantage in all future learning.

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Authentic Active Learning Activities Involve Multiple Perspectives and Resources

When asked to research a topic or to understand an important concept learners often see the matter from a single perspective. But in all disciplines there are multiple points of view on any topic and so authentic Active Learning activities involve multiple perspectives and resources.

This is more obvious in the Humanities and related disciplines where there may exist diverse points of view on any important issue. However, literary analysis offers conflicting opinions as well. The perspective of the historian or the philosopher can also be brought to bear when discussing literary works as can the views of critics.

In the Sciences important discoveries or theories may have a variety of implications—Einstein and the development of the Hydrogen bomb for example. Notable scientists like Newton were greatly influenced by the epoch in which they lived and, in some cases, have shaped those historical periods. These kinds of interactions are also evident today in the way in which Science, Politics, and Economics interact in the debate over climate change.

Brain science has clearly demonstrated that the brain extends its capacities through increasing and re-organizing neuronal connections. Indeed our brains organize new material by making new connections to existing networks. In a remarkable parallel public knowledge is being extended through the network connections of social media. It should not be surprising that *connections* are what make it possible for us to integrate new knowledge. Through encouraging students to connect multiple perspectives in their learning activities we help them to better integrate facts, concepts, and ideas.

The practice of introducing multiple points of view also helps to keep us honest as teachers. It can ensure, that as co-learners in the classroom, we have not allowed

ourselves to become attached to a single and possibly limiting perspective. Teachers and students may have difficulty incorporating multiple points of view in their work because they have come to believe that, as learners, they should confine their attention to a simple and singular perspective. The risk is what [Ellen Langer, in an excellent book on mindful learning](), calls *mindless learning*, "an entrapment in old categories; by automatic behavior that precludes attending to new signals; and by action that operates from a single perspective".

Students doing research often go straight to Google or similar search tools. Well designed Active Learning activities require learners to use a variety of resources. It may be that the school or local community has experts who can be called upon for input. Students in higher education often have access to databases indexing articles from professional journals. Traditional media such as newspapers, television, and radio can also be tapped. Librarians are often the best advisors for teachers who are designing Active Learning activities that could draw on a wide range of resources.

Using multiple resources and exploring diverse perspectives will require students to sift through material selecting the most appropriate content for their research and the eventual output they will produce. Students should be encouraged to consider multiple conclusions. Weighing different possibilities is intellectually more stimulating than simply taking an easy position. Most real world issues are more gray than black and white. Furthermore, there are few facts or principles that have not been challenged by someone at some time or other. The comparing and contrasting of competing ideas is more consistent with the work of real world professionals than is a blind adoption of a single view.

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Authentic Active Learning Activities Involve Collaboration

Collaboration in education is certainly not a new idea. Assigning students to classes has always created a potential framework for collaboration among students. In higher education particularly it is not unusual for students to organize study groups in order to help each other learn. But public education has tended to focus on individual learning, even to the point of making learning a competitive enterprise, a zero-sum game. In Active Learning the trend is away from these practices. For the most part authentic Active Learning activities involve collaboration, almost as a trade mark.

Social Constructivism, Piaget, and Vygotsky

Active Learning grows out of Social Constructivism, a theory generally attributed to Swiss psychologist Jean Piaget and Russian psychologist Lev Vygotsky. Constructivism is a metaphor that likens building knowledge to building a house. The learner builds new knowledge by attaching it to existing or previous knowledge, very much like building an addition onto a house.
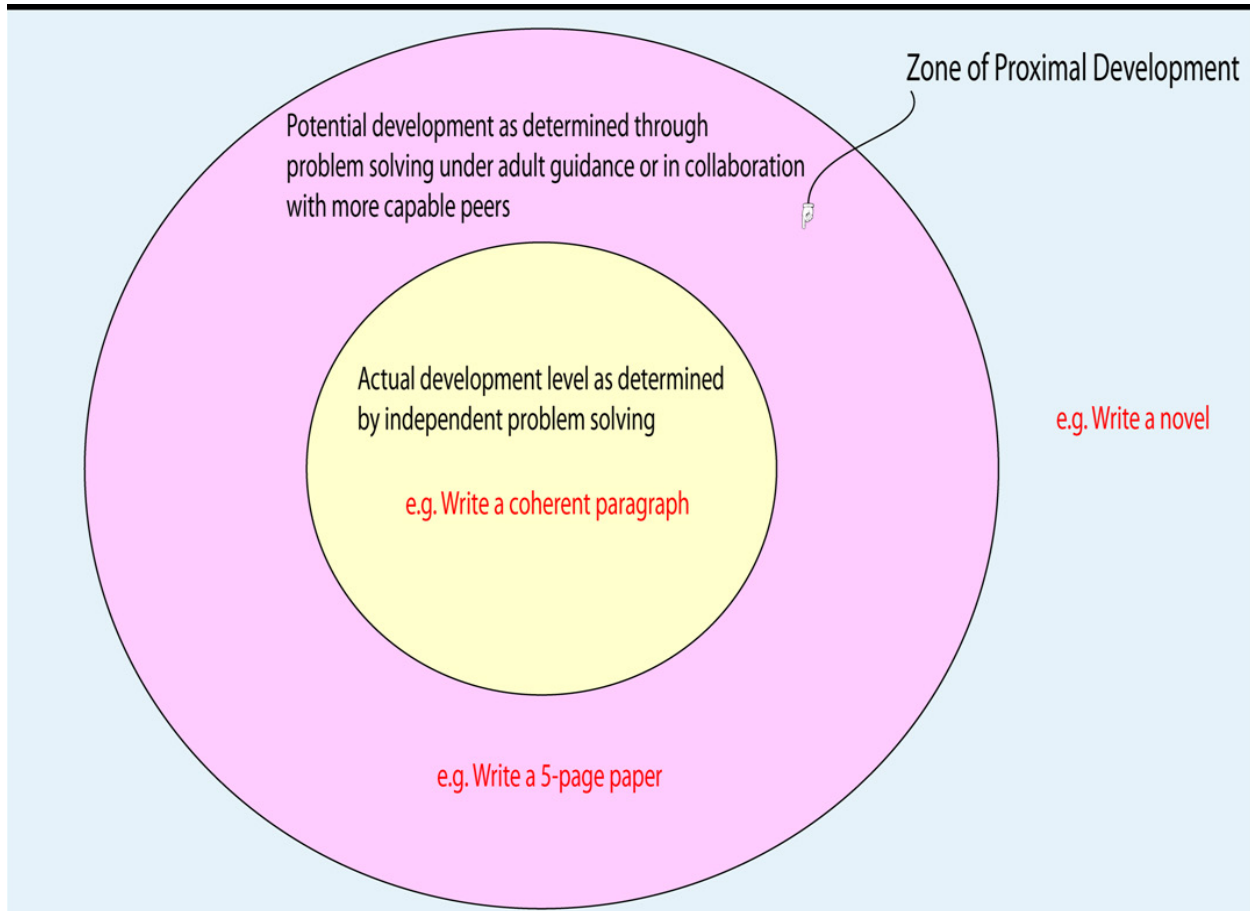
Vygotsky's contribution was the inclusion of social context or culture as a central factor in the way children learn.

> *According to Vygotsky, social interaction, especially involvement with knowledgeable community or family members, helps children to acquire the thought processes and behaviours specific to their culture or society. The changes or growth that children experience as a result of these interactions differs greatly between cultures; this variance allows children to become competent in tasks important or necessary in their particular society.[1]*

Vygotsky is best know for his Zone of Proximal Development.

As this illustration shows our ZPD always exists just beyond our current knowledge. It represents the learning we might reasonably achieve at this point. Our success depends upon coaching by knowledgeable others, adults or more knowledgeable peers. It is in this idea that Active Learning teachers see the dual importance of collaboration among students and the coaching role of the teacher.

ZONE OF PROXIMAL DEVELOPMENT

Zone of Proximal Development

Potential development as determined through problem solving under adult guidance or in collaboration with more capable peers

Actual development level as determined by independent problem solving

e.g. Write a coherent paragraph

e.g. Write a novel

e.g. Write a 5-page paper

The experience of most teachers confirms that students generally like to work together on learning tasks. There is also evidence, as in this Scientific American report, that two heads are generally better than one in problem-solving activities.

Even more important, however, is the value of collaboration when it includes the teacher and other experts. The true spirit of enquiry involves using the accumulated expertise of others to build the best solution. Successful Active Learning teachers are not shy about inviting outside experts to participate in their classroom activities. And more importantly still, Active Learning teachers see themselves as collaborators in the classroom learning experience.

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Authentic Active Learning Activities Provide Opportunities for Reflection

Contemporary educators do not always understood the importance of opportunities for student reflection. Reflection in learning is a kind of feedback loop in which students monitor their own actions and consider the consequences and efficacy of those actions. It requires the ability to look at oneself in an objective way and to consider ways of changing future actions to improve performance. It is largely through reflecting that students acquire important learning skills known as metacognition. Consequently authentic Active Learning activities provide opportunities for reflection.

Metacognitive Skills

According to Ridley et al metacognitive skills include

- taking conscious control of learning
- planning and selecting strategies
- monitoring the progress of learning
- correcting errors
- analysing the effectiveness of learning strategies
- changing learning behaviours and strategies when necessary

Metacognition Development Strategies

Reeve and Brown describe several strategies that can be used to help students develop metacognitive knowledge:

- Students should be asked to identify consciously what they 'know' as opposed to what they 'do not know'
- Students should keep journals or logs in which they reflect upon their learning processes, noting what works and what does not.

- Students should manage their own time and resources, including estimating time required to complete tasks and activities, organizing materials and resources, and scheduling the procedures necessary to complete an activity.
- Students must participate in guided self-evaluation using individual conferences and checklists to help them focus on the thinking process.

It is important for students to know what they know and how they got there. Attaching a short journal writing assignment to the end of an activity can help them to identify new knowledge acquired and an awareness of what learning strategies were effective and which were not. This builds confidence, helps the student to take responsibility for her learning, and improves skills that will be useful in the future.

Most Active Learning activities benefit significantly from the addition of a planning segment at the outset. This gives students a chance to verify their understanding of the activity, ask questions, and share tasks if they are working in groups.

Students are often very frank in evaluating their own work. Learners who achieve a high degree of honesty in self-assessment are less likely to misjudge the effort activities require and more likely to correct habits that are impeding their progress.

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Authentic Learning Activities Encourage Interdisciplinary Perspectives

Not only does the brain make and re-make connections in order to integrate new information but the relevance of that information to the learner is determined by the connections made to his existing knowledge. Much of the learner's knowledge is in disciplines other than the one being studied. Making links to these other disciplines strengthens mental connections and enhances the understanding of key ideas. Authentic Active Learning activities encourage interdisciplinary perspectives and thereby increase the number of links to a student's prior knowledge.

Atomic weights as understood by chemists are related to the structure of atoms as understood by physicists. Mathematics is one of the tools physicists use to express theories in Physics. Mathematicians describe their discipline as a language for representing things and events which are impossible to see. Furthermore, all disciplines are defined by a core set of principles which share common roots. And so learners can make an unlimited number of connections from one discipline to another.

One teacher with an interest in sustainable ecology encourages students in English and History to write narratives as told by the hundred-year-old trees on campus. A course in Forensics is team-taught by teachers from the Physics, Biology, and Chemistry departments. Students in Business Administration, Computer Science, and Nursing take an Ethics course addressing ethical issues in their respective fields. These are examples of the deliberate linking of disciplines. However, teachers often hesitate to stray from their own specialties when designing learning activities. This is especially true in secondary and post-secondary education where disciplines have become clearly identified and departmentalized.

Some teachers may feel uncomfortable leaving their own areas of expertise. This often stems from the mistaken belief that, as teachers, they must have all the answers to all questions. This belief has been reinforced by years of teacher lecturing. When teachers make the shift to Active Learning the pressure to know everything is reduced. They can feel comfortable that in an environment of collaborative learning they may learn also.

When institutions adopt a competency-based approach to education they inevitably choose the program approach as well. This is because a program's stated competencies often span disciplines and in order for students to acquire them the program must bring together courses and teachers from different departments, motivated by a desire to collaborate. As an example, Business students need to be able to write an effective business report. To do this requires language skills on the one hand and the understanding of Business concepts and terminology on the other. Additionally, it might be necessary to understand Statistics.

So teaching interdisciplinary concepts is not an unknown idea. Students study more than one discipline at a time throughout their educational careers. It is therefore reasonable to expect them to make links to other disciplines and courses. If crossing disciplinary lines seems difficult for an individual teacher, team teaching is often a good solution. This enriches the learners' experiences by providing multiple perspectives within the same course.

Finally, some topics are difficult to understand if looked at from only one disciplinary perspective. Climate change is a good example. It is difficult to understand without some knowledge of Science, Economics, History, Geography, and probably other disciplines as well.

The Stanford University Humanities Department describes the benefits of studying a range of humanistic subjects:

> *Insight Into Everything. Through exploration of the humanities we learn how to think creatively and critically, to reason, and to ask questions. Because these skills allow us to gain new insights into everything from poetry and paintings to business models and politics, humanistic subjects have been at the heart of a liberal arts education since the ancient Greeks first used to them to educate their citizens.*

YOUR ACTIVE LEARNING CLASSROOM

by James Sparks

Authentic Active Learning Activities Integrate Assessments
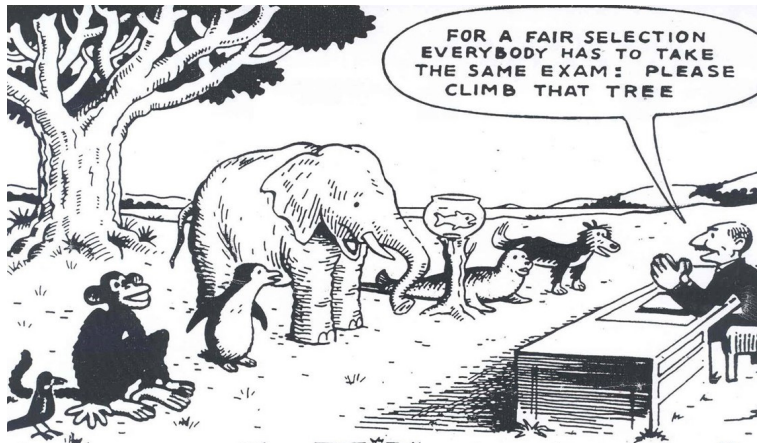
We traditionally think of learning activities or lessons as distinct from assessments. For example we may teach three lessons then stop for a test, following a similar pattern throughout the school term. It is because we attribute a very limited role to assessment that this pattern is so typical. It overlooks the potential of assessments to provide feedback to students and to teachers—to be valuable learning activities in themselves. Authentic Active Learning activities integrate assessments as part of the learning stream.

It is helpful to think of assessment in three different ways.

Assessment of Learning

This form of assessment is often referred to as summative assessment. It is the kind of assessment done for the purpose of assigning a mark or grade. One of the challenges faced by Active Learning teachers is the selection of assessments that are suitable. Active Learning activities can span a greater intellectual range than more traditional strategies such as lecturing. Students can move beyond mere recall and simple understanding of concepts to the application, analysis, evaluation, and creation of new knowledge and artifacts. It therefore does not make sense to employ assessments such as multiple choice tests, for example, to measure the kinds of knowledge students may have acquired from their Active Learning activities. What does make sense is to design assessments which resemble the learning activities themselves.

Grades and marks are the currency of education. For this reason they are particularly important to many students. Summative assessments need to be fair to learners. This means that they provide an equal opportunity to succeed for all students in a cohort, in all their required courses. This requires a student's various teachers to collaborate on the setting of comparable assessment standards. In addition, assessments must be aligned with the course objectives and learning activities.

Assessment for Learning

Assessment for learning is often referred to as formative assessment. In a seminal article by [Black and William](#) the authors define formative assessment in this way:

> "...the term 'assessment' refers to all those activities undertaken by teachers, and by their students in assessing themselves, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged. Such assessment becomes 'formative assessment' when the evidence is actually used to adapt the teaching work to meet the needs."

After reviewing a large sample of studies these researchers conclude that strengthening the role of formative assessment leads to important learning gains. These gains span age ranges, school subjects, and countries. There is also evidence that lower achievers benefit most from good formative assessment opportunities.

Black and William also emphasize that the benefits attributed to formative assessment assume that students are actively involved in their learning, that they are active learners. In addition, the assessment results must be used to adjust teaching and learning in order to be effective.

The authors cite evidence from several countries suggesting that the formative value of assessment is often overlooked. This results in a lost opportunity for effective learning. In addition, assessment results often serve only to compare students and to foster an atmosphere of competition rather than personal improvement. Students who do less well learn that they lack ability and become de-motivated, believing that they are not able to learn.

Feedback to Students

The culture in which students learn affects the impact of assessment results. When feedback focuses on successes and failures instead of constructive advice, students tend to focus on the best ways to earn marks rather than on their learning needs. They spend their time looking for 'right' answers and avoiding difficult tasks. On the other hand, when a culture of success prevails, under a belief that everyone can achieve, students can accept and utilize the feedback to improve their learning.

Self-and peer-assessment by students

When students have a clear picture of the goals of their instruction they can generate valuable self-assessments which are an essential component of formative assessment. To do this students need to know the desired goal of the instruction, evidence about their present position, and some knowledge about how to close the gap.

Integration

Black and William conclude that "instruction and formative assessment are indivisible". Both provide opportunities for students to demonstrate their understanding and this initiates the interaction in which formative assessment aids learning.

The researchers offer some specific suggestions:

- a test can be a learning opportunity
- it is better to have frequent short tests than infrequent and longer ones
- new learning should be tested within about a week of the instruction; more frequent testing is not helpful
- testing must not occur too late to enable students to work with the results

They also note that students may initially resist the change to their learning expectations.

Underlying the success of formative assessment is a belief in the untapped potential of students to learn once the cognitive difficulties and any loss of self-confidence have been recognized and dealt with.

Assessment as Learning

Assessment as learning is about how learning happens and involves students reflecting on their own learning and making adjustments so that they achieve deeper understanding. It is a process of metacognition.

In a recent white paper the Manitoba Ministry of Education describes two dimensions of metacognition, Knowledge of Cognition and Regulation of Cognition. The first includes:

- knowledge about ourselves as learners and what influences our performance
- knowledge about learning strategies
- knowledge about when and why to use a strategy

The second includes:

- planning: setting goals and activating relevant background knowledge
- regulation: monitoring and self-testing
- evaluation: appraising the products and regulatory processes of learning

The process of acquiring metacognitive skills leads to increasing independence on the part of the student. However, teachers have an important role in starting the process. They do this by offering and modelling structured opportunities for students to assess themselves. In addition, teachers design activities and assessments that permit students to reflect on, and monitor, their own learning.

In order to improve students must be able to monitor the quality of their work during actual production. This requires that students

- understand what high-quality work is
- know how to use the appropriate standards in order to compare their work to the standard
- must have a repertoire of strategies for modifying their own work

It is important to keep in mind that students need to see examples of excellent work. We often tend to assume that students can produce good results without ever having seen what these results look like. Students also need to practice self-assessment. This means that teachers must build the opportunities into learning activities and assessments on an ongoing basis.

In confronting the evidence students must accept their failures. But knowing that understanding failures leads to future achievements students can experience ongoing self-assessment as continuous and genuine success.

Students should keep systematic records of their learning which document reflections and insights as they occur. They need feedback from their teacher as they assess their work and that of others. They are creating a log of their learning progress which shows important milestones and successes worthy of celebration.

Sharing their self-assessment with others increases their understanding of their own learning strengths and areas where improvement is needed.

It is important to remember, however, that students may take some time to assume full responsibility for their own learning and to confront the challenges involved. Assessment as learning shifts the focus from getting the right answer or the one wanted by the teacher. The new focus is on the student's responsibility and role in becoming a better learner.

YOUR ACTIVE LEARNING CLASSROOM

by James Sparks

Authentic Active Learning Activities Create Polished Products

It is important to distinguish between authentic learning activities and what are, in fact, exercises. An exercise is always in support of something else. It is an opportunity to practice a skill or demonstrate that certain competencies have been acquired before moving on. Authentic Active Learning activities create polished products which have value in themselves. The product has usually been created for sharing or publishing and the student has "polished" it for presentation. In other words it is an end-product that can stand on its own.

For Whom?

Traditionally student work is submitted to the teacher for grading. This means that the quality of the product will only be known to those two people. This confidentiality reduces the incentive that most of us experience when we know our peers will see the fruits of our labor. This eliminates an important incentive to do our best work. It also implies that creating the product is only an exercise which does not connect to any reality outside the classroom.

Preparing work to be shared with others also creates demands on the student's communication abilities. Thus the activity becomes multi-dimensional, reinforcing additional skills.

It is not necessary to limit the potential audience to the student's classroom peers. Current technology permits going outside the walls in order to reach an audience in other contexts—other schools, other parts of the world. The bigger the context the more the incentive for the student to put a significant effort into the work and the greater the pride of ownership that comes from good results.

Student Publishing

Student publishing is very important for Active Learning teachers.

Publishing refers to any means by which students make their work public. It can include any available medium. Students can write reports or traditional academic papers but they can also make movies. Language students can create works using simple literary forms. One teacher has students write a unique form of sonnet taking advantage of the 140-character limit in Twitter tweets. Others use Twitter as the medium for collaborative story writing where each student tweets the next line.

A similar approach can be used in History, having students build a complete picture of a character, event, or era, or a region in Geography, using Social Media.

Debating is a forum for the publication of facts and opinions. Wikis allow students to compile encyclopedic reports on important subjects. These reports can be viewed by local classmates or even distant ones. Online discussion forums provide a great tool for peer feedback.

Blogging is an excellent way for students to share views and ideas with others and it is easy to start. Any student can have her own blog up and running in five minutes and at no cost. The power of this medium is greatly enhanced when students collaborate with learners in another part of the world in order to develop their ideas and provide feedback to each other. If the blogging subject matter is real-world events then student engagement will likely increase even more. Here is a great example.

Even simple classroom activities where student groups post their findings on the wall or simply share them verbally are steps in the right direction.

A Note About Class Presentations

It is worth noting that while having students do presentations to the class can be valuable it is sometimes overdone. We know that lengthy lectures by teachers can sometimes be tiresome and of limited value. Endless student presentations can have the same result. The students simply replace the teacher. It is not always necessary to have students present to the entire class. Individuals can present to their group and groups can present to other groups. Having too many full-class presentations can burn up a lot of valuable classroom time and some students may begin to feel they are being asked to do the teacher's job. (Incidentally, conscientious teachers should not encourage "death by PowerPoint".)

Just as you will enjoy creating authentic Active Learning activities, students will enjoy

- making something of value
- polishing/perfecting it
- sharing it with a relevant public: classmates, distant peers, the world

YOUR ACTIVE LEARNING CLASSROOM

by James Sparks

Authentic Active Learning Activities Produce Diverse Outcomes

Our educational experiences, from a young age, teach us to value correctness. Early assignments are often marked right or wrong and we strive to earn the gold stars and other rewards given for being correct. Moving through the education system students acquire the habit of looking for the right answer but as students mature they need the ability to deal with multiple outcomes from their work. Their research activities can generate conflicting conclusions. The issues being addressed are simply more complex. To help students make this shift, authentic Active Learning activities produce diverse outcomes.

Many students go straight to their favorite search engine when looking for answers and they often neglect to explore more than one response.

Diverse Outcomes for Different Disciplines

Designing Active Learning activities with multiple outcomes seems straight-forward in disciplines like the Humanities where important issues usually encompass several points of view. Conflicting opinions and supporting evidence are not hard to find on political and social issues such as universal health care or the death penalty, for example.

Historians often present different interpretations of historical events. This too can provide students with the opportunity for comparative analysis. In disciplines such as the Social Sciences there are often different schools of thought. Students could compare the views of Freudians, Behaviorists, and Existentialists in a psychological analysis of behavior, for example. In the natural sciences there is the evolution of theory where older views are challenged by newer ones. These can be compared. Newton's laws of motion apply only under certain conditions. They do not seem to describe the behavior of sub-atomic particles. In Biology the primacy given to genetic structure is somewhat mitigated by the fact that genes can be

changed and the fact that there are not enough genes to account for all of human diversity. Psycho-biologists debate the locus and the role of human emotions in determining behavior. Climate change pits scientists against each other in dealing with an issue that may require a very long time frame to comprehend. Politics and Economics present conflicting responses to concerns about global warming and sustainability.

The challenge for teachers often lies in our tendency to simplify and isolate concepts in order to make them more understandable. We un-complicate the real picture. We reduce it to basics that can be more readily mastered and hope that the greater complexities will be presented at some later point in the student's career.

Active Learning activities are authentic when they present the real world of the practitioner. It is in understanding real world complexity that students can find the motivation to dig into the basics that they will ultimately need. This is, to some extent, a matter of flipping the usual teaching progression. The simple ideas do not have relevance until they can be connected to some larger idea. Having students meet the complex realm first provides a more honest and more effective picture of the discipline under study and creates the challenge of mastering basics in order to return to the more complex problems.