

# *Educational Perspectives*

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Imaginative Education

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# Educational Perspectives

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# INTRODUCTION

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I am both flattered and pleased to introduce this issue of *Educational Perspectives*, edited by my colleague Dr. Geoffrey Madoc-Jones. My aim in this introduction is to provide an overview of the main features of what we call, perhaps a bit presumptuously, Imaginative Education. I will try to explain some of the background that shows how what amounts to a new conception of education leads directly to more imaginatively engaging ways of teaching and learning.

Now, I've started with the claim that I will provide an overview, and I will—but it will be someone else's. One of the graduate students attached to the Imaginative Education Research Group at Simon Fraser University has already written a very clear general introduction to the ideas that we will be exploring in this issue, so rather than try to do again something he has done better than I could, let us begin with Owen Tyer's overview.

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## Owen Tyer's guide to imaginative education

When we talk to teachers about their work, three common objectives become apparent. They are interested in helping students become excited by learning. They want to ensure that students not only learn knowledge, but also understand the meaning of the knowledge. And, they aspire to help their students attain improved test performance and academic achievement. This last objective is particularly important in today's climate of increasing reliance on standardized assessments.

Imaginative Education (IE) offers a new approach to education that effectively meets these objectives. It accomplishes this by engaging students' emotions and also, connectedly, their imaginations in the material of the curriculum. It is not new to point out that children's thinking is most deeply and energetically engaged when their imaginations and emotions are active.

What is new and unique about IE is that it offers a theory and a set of frameworks and techniques for accomplishing this within the mainstream academic curriculum.

### Pentathletes and Educated Minds

One way to think about IE is to draw a parallel to a 2,700-year-old sport. Since its inception in the ancient Olympic games, the pentathlon has intended, through its combination of five sports, to provide a competition where strength and speed are combined in harmony to produce the best athletes. Decades of research led to a remarkable conclusion that can be seen as echoing the pentathlon. In Imaginative Education it is suggested that education might best be thought of in terms of a person developing five main kinds of understanding. Thus, while the pentathlon uses five sports in an effort to produce the complete athlete, we can see the IE approach as using five kinds of understanding in an effort to develop the most educated mind.

### Kinds of Understanding: The Core of Imaginative Education

The five kinds of understanding that provide the basis for IE enable people to make sense of the world in different ways. Each kind of understanding is a somewhat distinctive way of thinking. They are each useful for different purposes and all five are required to develop the educated mind in much the same way that each of the sports in the pentathlon is equally valuable and all five are required to develop the complete athlete.

Trying to learn five elements instead of specializing in one can be challenging. The pentathlete must work to maintain

Table 1. The kinds of understanding and their developmental order

Somatic understanding Pre-linguistic
Mythic understanding Oral language
Romantic understanding Written language
Philosophic understanding Theoretic use of language
Ironic language Reflexive use of language

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expertise in the sports already learned while becoming skilled at each new sport. Similarly, our students must work to preserve the kinds of understanding already learned while developing each new kind of understanding. Despite these challenges, the gains in overall intellectual functioning for our students, and overall athleticism for the pentathlete, are well worth it.

With the above in mind, we can see that the purpose of IE is to enable each student to fully develop and preserve the five kinds of understanding while they are learning math, science, social studies and all other subjects. As shown in Table 1, this will ideally be accomplished in a certain order because each kind of understanding represents an increasingly complex way that we learn to use language. To explain these kinds of understanding in greater detail, we will look at the life of a girl named Sara.

### Kinds of Understanding and the Process of Imaginative Education

*Somatic* understanding refers to the physical, pre-linguistic way that Sara comes to know the world around her while she is an infant. She makes sense of her experiences through the information provided by her senses of sight, hearing, touch, taste, and smell, and crucially with the emotions that these are tied up with. She also experiences sensations of balance, movement, tension, pain, pleasure, and so on through the way her body physically relates to the objects and persons she encounters.

As Sara grows older and learns an oral language, her understanding of the world expands and she begins to develop the second kind of understanding called *mythic* understanding. In this phase of her life, she is no longer limited to making sense of the world through direct physical experience. Now, Sara can rely on language to discuss, represent, and understand even things she has not experienced in person.

Several years later, Sara begins to learn and understand her experience through written language. At this point, she is developing the third kind of understanding called *romantic* understanding. During this time, she begins to realize her independence and separateness from a world that appears increasingly complex. She relates readily to extremes of reality, associates with heroes and seeks to make sense of the world in human terms.

While she is a teenager, Sara begins to focus more on the connections among things. She begins to see that there are laws and theories that can bring together, and help her make sense of, what she originally thought were disconnected details and experiences. In this stage of her life, Sara is developing the systematic understanding of the world called *philosophic* understanding.

After a few more years pass, Sara begins to realize that there are limits to her systematic thinking. She starts to appreciate that theories, and even the language she relies on, are too limited and crude to capture everything that she means and is important about the world. She also recognizes that the way she makes sense of the world depends on her unique historical and cultural perspective. At this point, Sara is in the process of developing the fifth kind of understanding called *ironic* understanding.

As an adult, Sara has developed all five of these kinds of understanding. She recognizes that each one makes a distinctive contribution to her understanding, and that they work best if they can be combined.

We do not “naturally” develop each kind of understanding at a particular age in some steady and inevitable process. Rather, the process sketched above occurs when the appropriate forms of IE are used adequately. Sara’s teachers have focused their efforts on engaging her imagination and emotions with knowledge about the world and on developing her use of an array of cognitive tools.

### Cognitive Tools: How Can We Develop the Five Kinds of Understanding?

Returning briefly to our metaphor, we can recognize that the pentathlete develops expertise in each of the five sports by learning to master certain skills and tools. For example, in fencing the pentathlete needs to learn how to use the sword to lunge, feint, parry, and so on. Likewise, Sara was able to develop each of the five kinds of understanding by learning to use specific “thinking tools.” In IE, these are called cognitive tools. These tools were invented and developed by our ancestors for making sense of the world and acting more effectively within it. Examples include

- ♦ stories that helped people to remember things by making knowledge more engaging,
- ♦ metaphors that enabled people to understand one thing by seeing it in terms of another, and
- ♦ binary oppositions like good/bad that helped people to organize and categorize knowledge.

It might seem strange to refer to these as tools, but the term tries to reflect the fact that these are mental devices that help us think and do things more effectively.

When we look around us, we can see that these cognitive tools, and many others, have become a part of our culture. In fact, it would be difficult to imagine life without basic cognitive tools such as stories or metaphors. Each of us can learn to use these cognitive tools to enlarge our powers to think and understand, or we can fail to learn to use them.

Table 2 shows the key sets of cognitive tools that students have available for learning. (The two sets most active during school years are highlighted). Most teachers will intuitively recognize the importance of many of these; however, they may not be familiar with how to use them in the classroom. Consequently, many of the most powerful cognitive tools that students have available for imaginatively and emotionally engaging with knowledge tend to be underused in schools. To help resolve this situation, IE provides a set of frameworks and techniques that show how cognitive tools can be effectively used to make everyday teaching more interesting and meaningful while also developing the different kinds of understanding.

Table 2. The set of cognitive tools students should acquire to develop each kind of understanding

<b>Somatic understanding</b>	<b>Mythic understanding</b>	<b>Romantic understanding</b>	<b>Philosophic understanding</b>	<b>Ironic understanding</b>
bodily senses	story	sense of reality	drive for generality	limits of theory
emotional responses & attachments	metaphor	extremes & limits of reality	processes	reflexivity & identity
rhythm & musicality	abstract binary opposites	association with heroes	lure of certainty	coalescence
gesture & communication	rhyme, meter, & pattern	wonder	general schemes & anomalies	particularity
referencing	joking & humor	humanizing of meaning	flexibility of theory	radical epistemic doubt
intentionality	forming images	collections & hobbies	search for authority & truth	
	sense of mystery	revolt & idealism		
	games, drama, & play	context change		

## Imaginative Education in Action

When teachers use the sets of cognitive tools to structure and teach the subjects in the curriculum, the lessons become more meaningful and interesting to students. This engages their imaginations. When we speak of imagination, we are referring to the ability to think about what might be possible. It is the “reaching out” feature of students’ minds that picks up new ideas, tries them out, weighs their qualities and possibilities, and finds a place for them amidst the things they have already learned: “Look! See what I can do with this!” The effort required is fuelled by the pleasure individuals take in discovery and invention.

IE is as important for successful learning in science and math as it is for the arts. The main role for teachers in IE is to use the sets of cognitive tools to structure and teach the subjects in the

curriculum. Planning frameworks are available online that show teachers step-by-step how they can routinely use the cognitive tools in their own classrooms. After more than a decade of implementation by teachers, the consistent feedback has been that IE results in motivated, interested students who learn effectively. These students not only learn the knowledge, but also understand the meaning of the knowledge and can apply it in different contexts. Just as importantly, this approach is realizable even with the constraints on time and resources that teachers currently face. For these reasons IE is spreading throughout North and South America, Europe, Africa, Australia and Asia. We hope that this introduction to IE has stirred your imagination and provided you with some useful ideas. Additional information can be found on the IERG website <http://www.ierg.net>.

Owen mentions that the IERG has developed various planning frameworks to help teachers put together a lesson or unit that uses the ideas described above. These frameworks are really only organized reminders of some of the cognitive tools students at different ages will have available for engaged learning. The “organized” part means coordinating a number of the tools to work together in teaching imaginatively. I’ll give outlines of two of them below—the first dealing with “mythic understanding” for students from about K to grade 4, and the second dealing with “romantic understanding” for students from about grade 5 to grade 9 or 10. After each outline, I will provide a brief sketch of how the elements of the framework might affect a regular teaching topic.

Each of the frameworks is made up of a set of questions about the topic to be taught. Answering the questions should provide a plan for the lesson or unit that should direct us to teach

it so that it engages students’ imaginations. Following the questions is some brief guidance about how to answer them. You might find it useful to photocopy Table 3 and Table 4 should you want to use the frameworks in planning various topics.

The frameworks as they stand might look a bit daunting. Throughout this issue you will see references to them, and we will be providing examples as well. If you want to see how these frameworks can radically influence the way various topics might be taught, in science and math no less than in social studies and language arts, you could visit: <http://www.ierg.net/teaching/lesson-unitplans.html>. In that area of the IERG website you can also find some other planning frameworks. They are not that complicated to use, and many teachers feel comfortable with them quite quickly. After a bit of practice using them you will likely find you grasp the principles and you won’t need them any more, though perhaps they may be useful to refer back to now and then.

# Mythic Planning Framework

## Locating Wonder

*What is emotionally engaging about this topic?*

*How can it evoke wonder?*

*Why should it matter to us?*

In order to help students connect emotionally to the material, teachers first need to identify their own emotional attachment to it. A sense of wonder about something is usually connected to this attachment. Everything that we teach can evoke some kind of wonder and produce some emotional response in us. A sense of wonder and an emotional response to material are important in engaging students' imaginations. So this first question asks the teacher to *feel* for what is wonderful about the topic. This can seem difficult if the topic is something like the use of the comma or place value in math! The trick, though, is to try to re-see the topic through the eyes of the students, to catch what can stimulate the sense of wonder about even the most routine topics. When teachers have been taught to become expert at organizing classroom activities and structuring topics into instructional units, this can be especially

hard. It is asking the teacher to do something that is, for most of us, quite unfamiliar—to begin by *feeling* about the topic. Try to indicate for any topic you plan to teach what is wonderful about it, and what can provide the student with an emotional engagement to it.

## Thinking about the content in story form

### Finding Binary Opposites

*What binary concepts best capture the wonder and emotion of the topic?*

Now to the work of locating the best binary oppositions on which we can construct the “story” we are going to tell. It should be possible to select the one that seems best, though you might want to note some alternatives, in case you find the first set chosen doesn't quite carry you through the lesson or unit as well as you might have expected.

### Finding Images and Drama

*What parts of the topic most dramatically embody the binary concepts?*

*What image best captures the dramatic contrast?*

Here the goal is to identify the drama inherent in the topic. Remember, every topic has some kind of dramatic conflict in it. What binary opposite concepts best capture that dramatic conflict? Again, as the teacher, trying to *feel* the drama is as important as thinking about it. This task, too, can be quite difficult at first. It does become easier as we begin to recognize that there is something quite usual about thinking in these terms. The drama of commas may not be so obvious, nor how you might break up your lessons about commas into binary opposites. But everything has within it something dramatic, and, as we'll see, everything can be broken down into binary opposites. We are so accustomed to thinking about content, and about concepts, that we often forget that every topic also has a wide range of images attached to it. And the image, remember, can carry the emotional meaning of the topic and can also make the topic much more memorable—if we find a good image, of course. Look for a core conflict, contradiction, or drama that seems to best convey the wonder and emotion of the topic.

### Structuring the Body of the Lesson or Unit

*How do we teach the content in story form?*

Having done the hard work that has put in place the basic structuring elements—we've identified the binary opposites and the basic drama—it should be relatively easy to create a narrative plotline of the content. The opposites provide the cognitive and emotional framework of the story. Remember, all good fictional stories are built on a conflict or puzzle; the only difference here is that the “story” content is the curriculum content. It might help to think about the plot of the unit's story in terms of beginning, complication, and resolution.

Table 3. Mythic Planning Framework

<p><b>1. Locating importance</b> What is emotionally engaging about the topic? How can it evoke wonder? Why should it matter to us?</p> <p><b>2. Thinking about the content in story form</b></p> <p><b>2.1. Finding binary opposites</b> What binary concepts best capture the wonder and emotion of the topic? If this were a story, what would the opposing forces be?</p> <p><b>2.2. Finding images, metaphors, and drama</b> What parts of the topic most dramatically embody the binary concepts? What image best captures that content and its dramatic contrast? What metaphors can be used to help understanding?</p> <p><b>2.3. Structuring the body of the lesson or unit</b> How do we teach the content in story form? How can we shape the content so that it will have some emotional meaning? How can we best bring out that emotional meaning in a way that will engage the imagination?</p> <p><b>3. Conclusion</b> How does the story end? How do we resolve the conflict set up between the binary opposites? How much do we explain to the students about the binary oppositions?</p> <p><b>4. Evaluation</b> How can one know whether the topic has been understood, its importance grasped, and the content learned?</p>
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## Conclusion

*How does the story end?*

*How do we resolve the conflict set up between the binary opposites?*

*How much do we explain to the students about the binary oppositions?*

Every story has an ending in which the conflict is in some way resolved or at least explained. For younger students a simple resolution may be appropriate; for older students an exploration of the opposites and the dramatic space between them can be explored. The conclusion can therefore take on many forms from students' presentations, to displays, to a story that shows another form of the opposition being worked out, to dramatic presentations of the story with visuals, and so on. Remember, the conclusion is another opportunity for students to feel the drama of the story and internalize the material while expressing their understanding of it in imaginative ways.

## Evaluation

*How can we know whether the topic has been understood, its importance grasped, and the content learned?*

Any of the traditional forms of evaluation can be used, but in addition, teachers might want to get some measure of how far students' imaginations have been engaged by the topic. Various kinds of information, including that derived from discussion, debate, art work, journal writing, etc., can be collected as the unit is being taught. The teacher can also measure the amount of non-required reading students engage in. They might also record what other reading or video-watching they may have performed related to the subject matter of the topic. In addition they could ask the students to keep personal notes in which they record in an open-ended way any ideas they have had about the topic they are studying.

# Romantic Planning Framework

## Identifying “heroic” qualities

*What heroic human qualities are central to the topic?*

*What emotional images do they evoke?*

*What within the topic can best evoke wonder?*

In order to help students connect emotionally to the material, teachers first need to identify their own emotional attachment to it. What heroic human quality or emotion—courage, compassion, tenacity, fear, hope, loathing, delight—can we identify in the topic? These “romantic” qualities help us, and our students, see the world in human terms and give human meaning to events, facts, and ideas in all disciplines. “Romance” invites us to view the world in human terms: not to confuse, but to infuse, the world with human meaning. Again, this first task is the most difficult part of planning the lesson or unit. We are asked to *feel* about the topic as well as to think about it.

## Organizing the Topic Into a Narrative Structure

### Initial Access

*What aspect of the topic best embodies the heroic qualities identified as central to the topic?*

*Does this expose some extreme of experience or limit of reality?*

For the first lesson of a unit or the opening part of a single lesson, teachers are asked to search their own imagination for images that catch the heroic quality that will provide the dramatic

structure for the unit. Remember, it is as important to *feel* the heroic qualities as to *think* about them. Rather than focus exclusively on the content and how we will organize it, we should also search our understanding of the topic and its content for those images that best capture what is important about it.

### Composing the Body of the Lesson or Unit

*How do we organize the material into a story to best illustrate the heroic qualities?*

*Sketch the story, ensuring that the qualities will be made clear by the narrative.*

The principal heroic quality should provide the drama and conflict in the story. Remember, the heroic qualities should be those that most effectively convey the content of the topic. In making this brief initial sketch, try to capture just the main narrative thread that will carry the students' understanding from the beginning to the end of the lesson or unit.

### Humanizing the Content

*What aspects of the story best illustrate the human emotions in it and evoke a sense of wonder?*

Think of how a good movie or novel makes aspects of the world engaging. Obstacles to the hero are humanized in one form or another and almost given motives. They are seen in human terms. To do this, we don't need to falsify anything, but rather we highlight a particular way of seeing it—because this is precisely the way students' imaginations are engaged by knowledge.

Table 4. Romantic Planning Framework

<p><b>1. Identifying “heroic” qualities</b></p> <p>What heroic human qualities are central to the topic? What emotional images do they evoke? What within the topic can best evoke wonder?</p> <p><b>2. Organizing the topic into a narrative structure</b></p> <p><b>2.1. Initial access</b></p> <p>What aspect of the topic best embodies the heroic qualities identified as central to the topic? Does this expose some extreme of experience or limit of reality? What image can help capture this aspect?</p> <p><b>2.2. Composing the body of the lesson or unit</b></p> <p>How do we organize the material into a story to best illustrate the transcendent qualities? Sketch the story, ensuring that the qualities will be made clear by the narrative.</p> <p><b>2.3. Humanizing the content</b></p> <p>What aspects of the story best illustrate the human emotions in it and evoke a sense of wonder? What ideals and/or challenges to tradition or convention are evident in the content?</p> <p><b>2.4 Pursuing details</b></p> <p>What parts of the topic can students best explore in exhaustive detail?</p> <p><b>3. Conclusion</b></p> <p>How can one best bring the topic to satisfactory closure? How can the student feel this satisfaction?</p> <p><b>4. Evaluation</b></p> <p>How can one know that the content has been learned and understood and has engaged and stimulated students’ imaginations?</p>
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### Pursuing Details

*What parts of the topic can students best explore in exhaustive detail?*

While it is easy to give students a project to do, it is a little harder to think about what aspect of the topic they might be able

to *exhaust*, i.e. be able to find out nearly everything that is known about it. But there are such parts in every topic, and the security and sense of mastery that comes from knowing nearly as much as anyone about something is a great stimulus to inquiry. Think of something that is intriguing, that can be seen from a variety of different perspectives, or that is alluded to but not examined in detail in the content or in your teaching of it (referring to your notes from above should help).

### Conclusion

*How can we best bring the topic to satisfactory closure?*

*How can the student feel this satisfaction?*

We should end a topic in a “romantic” way, which can have two forms. The first form is to re-examine the images we started from and review the content through the lenses of other heroic qualities, including some that might give an opposite or conflicting image to that of our earlier choice (for a very general example, if we have all along been looking at literacy as the heroic maker of the modern world, then we might pause to consider how it also was involved in the destruction of the hunter-gatherer societies that preceded our literate world). The second form is to show how the romantic association the student has formed can help them understand other topics in a new, more imaginative, way. Of course, one can always use both.

### Evaluation

*How can we know that the content has been learned and understood, and has engaged and stimulated students’ imaginations?*

Any of the traditional forms of evaluation can be used, but in addition, teachers might want to get some measure of how far students’ imaginations have been engaged by the topic, how far they have successfully made a romantic engagement with the material. In addition, the concluding activities (above) are also evaluative in nature. Various kinds of information, including that derived from discussion, debate, art work, journal writing, etc., can be gained as the unit is being taught. The teacher can also measure the amount of non-required reading students engage in. They might also record what other reading or video-watching they may have performed related to the subject matter of the topic. In addition they could ask the students to keep personal notes in which they record in an open-ended way any ideas they have had about the topic they are studying.

## Examples in Brief

Let me just quickly outline how a lesson or unit might be influenced by these frameworks. I'll take two topics—math and language arts—to illustrate the Mythic framework, and science and social studies examples for the Romantic. (These are taken from Egan, 2005.)

Here's an example about how we might teach place value or decimalization to first-grade students:

Imagine a king who wants to count his army, but the councilors he asks can't come up with a simple way to do it. One suggests marking sticks, cutting a notch for each soldier, another suggests some way of matching them with fixed objects they could then count, while another says that "very many" is the number of the soldiers. None of the councilors seems able to devise a good system for counting them. At this point the king turns to his daughter in despair because he knows she is clever. She says she can tell him how many soldiers there are. First, she tells each of the five clueless councilors to pick up ten stones each. Then she has a table laid in the field to which the soldiers will be marching from their tents. The clueless councilors are asked to stand in line behind the table, and then a bowl is placed in front of each of them.

As the soldiers go by, the councilor at the end of the table puts a stone in his bowl for each soldier. Once the ten stones have been put into the bowl, he picks them up and carries on putting one stone into his bowl for each soldier who walks past. So he has a rather busy afternoon, putting stones in his bowl as the soldiers go by, and picking them up and starting again on the next ten. The clueless councilor to his left has the less arduous job of watching him put his stones in the bowl, and each time he picks up his ten stones the second clueless councilor puts one stone into his bowl. When the second councilor has put all ten stones in his bowl, he too picks them up again, and continues to put one down each time his fellow councilor picks up his ten. The third clueless councilor has only to watch the bowl of the second, and each time the second councilor picks up his ten stones, the third councilor puts one into his bowl. And so it goes on, with the fifth councilor having a very slow afternoon, putting a stone down when the fourth councilor picks up his ten. At the end of the afternoon, the fifth clueless councilor has one stone in his bowl, the next councilor has seven, the third has none, the second has one, and the first, exhausted, councilor has six. The daughter looks at the bowls and tells the king that he has seventeen thousand and sixteen soldiers in his army.

As stories go, this isn't exactly a thriller, but what it does do is focus on the sheer brilliant ingenuity of the decimal system for keeping count of large numbers of objects and showing students why place value matters. The rest of the lesson, or the next lesson, can involve the students in counting objects using this method. Two things commonly occur when place value is taught like this.

The first is that the students learn the point of decimal systems quickly and well, and understand, for example, why one can't simply ignore a zero in a decimal system. The second thing that usually happens is that the students make an emotional association with the ingenuity of the king's daughter, and so with the ingenuity of the decimal system.

But what we've done with the example is indicate why the issue of place value matters and what is wonderful about its ingenuity. We have built the unit on the binary opposition between the clueless and the ingenious in such a way that the students will associate with the ingenuity. We have shaped it into a story structure that engages the emotions of the students.

Another example that often causes teachers and students headaches is homophones—words that sound the same but have different meanings—like knight/night or bow/bough. How do we get the students to remember which is which and learn to spell them right? So what's the story on homophones? How can you generate a story context in which the difference between, say, "their," "there," and "they're" will become clear to children?

Break the class into three groups. Each group is given one of the set of three. Group one gets the girl called "There," group two gets her twin brother "Their," and group three gets their older brother "They're." The groups have to come up with a detailed description of their characters, based on the spelling of the name.

The story developing in this lesson invites the students to generate an image of someone with particular characteristics. The teacher could invite the children to draw their images, indicating in the pictures the features that distinguish "There" from "Their" and "They're."

The teacher could start this off by suggesting that "There" is a very kind and helpful person, whose last three letters seem just to be pointing the way to things so people know where they are—she is constantly pointing with the tail of the final "e" that things are there, over there, or there. The vowel at the end of the word lets the meaning slide easily out. The first "e" sets up the direction, the "r" checks that that is Right, and the final "e" does the precision pointing. Her character is that of a helpful, cheerful, precise person.

"Their" on the other hand is a very egotistical fellow. He is self-regarding—you can tell this because he keeps his ego—his "i"—inside, and traps it with the final consonant. He is also, unfortunately, rather greedy and envious, and constantly goes on about what people own.

You can tell that "They're" is the oldest, as he has grown more letters than the other two. He was always a very inquisitive member of the family, constantly asking "why?" In fact he asked it so often at school that he seemed to have his hand permanently up as soon as he thought of another "y" question to ask, hence the apostrophe. He is a bit boring, as he keep telling people about

what the family is doing or planning all the time: “They’re going to get a new car,” or “They’re going to watch TV tonight,” or “They’re planning to go to Mexico.”

Well, you get the point. The students can work out further elaborations of the characters by observing other features of the words and giving them “personalities.”

Having created the characters, the next part of the lesson would be to construct some story in which they take part, and in which their particular characters drive the plot. I won’t bother working this out here, but you can see how easy it would be to involve the students in constructing a story in which the good-natured “There” is trying to point out where they should go, but the selfish “Their” is concerned that he will lose out on some money if they do, while poor old “They’re” is just curious about why they should bother to go there, telling everyone that they’re planning to go in the opposite direction next week.

For this example we have started by locating the mystery of how sounds convey meaning, and the wonder that lies at the heart of writing that language down. The binary opposites are formed between the meaningful voice—to which these words are never ambiguous and the arbitrary written symbols, which cause us such confusion. We have created images of the words as personalities. (Teachers might be surprised at how readily young children will engage in this kind of activity after being given a start.)

Now I’ll offer an example that indicate how the *romantic* framework can be used to shape lessons and units. In this case I’ll again borrow the example a science unit from my book, *An Imaginative Approach to Teaching* (Egan, 2005).

In our local science curriculum teachers are required to teach about a cold-blooded vertebrate. I chose, more or less randomly, the eel. How can we make the eel *romantic*? What is heroic about the topic? Well, I’ll choose scientists’ persistence and ingenuity in finding out about the eel’s life-cycle as the heroic quality I’ll build the unit around. I’ll also search for a romantic image to convey that heroism.

The mystery of eels’ sex lives makes a good place to begin. In the ancient world much knowledge had already been accumulated about all kinds of creatures, but eels presented a bizarre mystery. Eels were very common but no one had ever found a baby eel or even a pregnant eel. The Egyptians, Greeks, and Romans considered eels a delicacy, yet despite becoming expert at catching them, they discovered virtually nothing about their life cycle. Aristotle proposed that the eel was sexless and that its young were created spontaneously out of the mud in river bottoms. Pliny suggested that when they wanted to procreate, eels rubbed themselves against rocks, and young were formed from the skin thus detached. Other explanations of their birth included that they came from putrefying material in rivers, that they came from the gills of other fishes, that they grew from horses’ hairs that dropped into water, or, delightfully, that they were sinful monks whom St. Dunstan in a rage had transformed to do eternal penance (so giving the English cathedral town of Ely its name—the eely place).

The solution to this 2,500-year-old mystery came only in the twentieth century through the heroic, persistent ingenuity of Johannes Schmidt, a Dane. At the end of the nineteenth century a tiny, transparent, leaf-like fish, quite unlike an eel, was caught in the western Mediterranean. A few similar specimens had been seen before and designated a new genus. This particular specimen was reared in a fish tank, and by a series of amazing transformations grew into an elver and then into an adult eel. Schmidt becomes heroic through the ingenuity and persistence he displays in tracing the early life of the eel. It might be useful to set off Schmidt’s voyages and discoveries against the social and political background of his time, which absorbed most people’s attention. While the politicians and soldiers filled center stage, wreaking the terrible destruction of the First World War, Schmidt’s gradual piecing together of the eel’s life cycle contributed something to our accumulating knowledge. The counter-pointing of his slow, persistent inquiry against the cataclysmic destruction that fills our history texts might lead to brief meditations on the value of different kinds of activities, and so stimulate some wonder.

The narrative will follow Schmidt’s early explorations in the Mediterranean. He discovered more larvae and found that on average they were larger in size the further east they were caught. So he sailed west out into the Atlantic, finding ever-smaller larvae drifting in the currents. Schmidt persuaded more than twenty ship-owners to collect samples for him, and to chart where each was found. He began to home in on the area where the greatest concentrations of tiny larvae were found, locating their breeding ground between latitudes 20 and 30 degrees north and longitudes 50 and 65 degrees west, among the strange floating weeds that constitute the Sargasso Sea.

Our hero is Schmidt, our heroic image is of him criss-crossing the Atlantic on the decks of various ships from Iceland to the Canary Islands, from North Africa to North America, pulling endless catches aboard and examining their contents in his unrelenting attempt to unravel the mystery of the life cycle of eels. He began his search in 1904 and continued for twenty years. His unremarked voyages, single-mindedly pursuing knowledge about eels, challenge those of legendary Sinbad and Jason, and those of Drake, Magellan, and Cook. You can see how easy it would be to include all the other “romantic” cognitive tools in engaging students’ imaginations in such a lesson.

♦ ♦ ♦ ♦ ♦ ♦ ♦ ♦

The four articles in the next section of this issue of *Educational Perspectives* are written by teachers who have experience using IE. In most cases that experience has been slight; we thought it might be best to have some people who had only recently tried it out on topics they commonly teach to indicate how they found they could quickly adopt the IE approach, and adapt it to their style of regular teaching. They deal with such topics as pirates, mathematics, pronouns, and role

play. Prepare for a slightly wild ride! In the third section Margo Hrennikoff offers an example of a third grade science curriculum based on the mythic framework.

The issue concludes with a theoretical discussion that connects education with imagination. The basis of IE draws on some sources connected with the work of the Russian psychologist, Lev Vygotsky (1896–1934). We are fortunate to have Dr. Natalia Gajdamaschko, one of the leading authorities on Vygotsky's work, especially as regards education, associated with the Imaginative Education Research Group. We are privileged to be able to publish her new article “Vygotsky on the development of the imagination” in this issue of *Educational Perspectives*.

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# TEACHERS AT WORK WITH IMAGINATIVE EDUCATION

## Philosopher Pirates: Teaching Over Their Heads

Caitlyn James

Pirates! Of Penzance? Of Queen Elizabeth's England where the Irish female pirate, Gráinne Ni Mháille (Grace O'Malley), was a formidable force? Of the present-day Strait of Malacca where well-armed pirates arrive by zodiac, terrorize the crew, commandeer the ship, take it into international waters, rename and repaint it? Of the Caribbean with crazy but gorgeous pirates who resemble Johnny Depp? Or, perhaps, quietly in dens and bedrooms all across the "plugged in" world pirating music, movies, and software?

Pirates capture the imagination, span centuries of history, have great clothes, conform to surprising codes of conduct (apparently there is honor and democracy among thieves), and invite a wide variety of themes and subjects for teaching.

Ask an average fourteen year old what they know about pirates, and they will recite a mix of fact and fancy from movies, cartoons, and the occasional book. Some may even mention their own piracy.

Piracy can be a seductive topic for all ages. Consider the 2003 movie, *Pirates of the Caribbean*, and its 2006 sequel—the adult asides, the kid-pleasing action, lots of explosions for my husband, plenty of bad boys for me. In spite of the imaginative appeal of the topic, piracy is insufficient as a starting point for a well-connected social studies, science, math, and English unit until we ask challenging questions, like what are the deepest meanings of this theme? How is the topic useful emotionally, spiritually, and academically?

To draw out some of the more profound and pertinent meanings, one might use questioning strategies, conjure up images, ask what is important and why, speak with others, do research. What is piracy? How is it different from stealing, thievery, looting, pillaging? (Surely, it isn't just the clothes?) Stealing can happen at any mall; piracy happens outside the jurisdiction of any territory—at sea, or on the Internet. Do fourteen year olds operate outside the jurisdiction of any authority? If so, in what ways? How do they manage to do so without being caught? What knowledge and personal attributes do they need? Are there any similarities between them and pirates? When they operate outside the control of any legal authority, are they "stealing" anything?

While I am responsible for asking challenging questions, I need not have all the answers. Like Postman and Weingartner (Gross & Gross, 1969), I believe that questions should push the learner to make further inquiries and "allow for alternative answers" (p. 166). Most importantly, the questions and their answers should "help the learner to sense and understand the universals in the human condition" (p.167).

During an exploration of piracy at an alternate school for thirteen to sixteen year-olds, the students asked, "Should all stuff be common stuff without personal ownership?" They wondered

aloud if the murder of the captain on a recently boarded container ship in the Strait of Malacca was a crime. What about grabbing a boatload of poorly guarded containers? Was that acceptable given the "snooze-you-lose" rule under which, many of the students agreed, they operated? They also wondered how someone thinks up a device like a sextant.

In response to the apparent unscrupulousness of the students, I chose a picture book on the theme of piracy, *The Pirate Queen*, so that we could discuss some of the rewards and costs of living opportunistically. The book led to lessons about Britain's coastal geography, Elizabethan England, and how to get away with burning someone's property right before their eyes. The question of the sextant took me on a fascinating journey of learning that I estimate took me thirty hours of study in order to produce a four-hour project.

A sextant is the means by which seafarers of old (and modern seafarers without batteries) discover where they are on the globe. In its simplest form, it is used to sight the sun at noon in order to calculate latitude. I have never seen a group of teens so interested in learning how to use sine, cosine, and tangent calculations as our class prepared for the equinox. They busied themselves putting a hole in the end of a meter stick with my grandfather's auger drill, a task that provided some ADHD energy focus. When the less channeled energy of some warriors was redirected from swinging heavy metal washers at each other's heads to the task of attaching them as plumb lines to the meter sticks, we synchronized our watches and checked the weather.

I have taught geometry in the past and usually required students to memorize the formulas for angles. Now, students were applying what they knew to mapping. They breezed through a variety of math problems involving trees and shadows, which inspired one creative individual to figure out the angle of a stream of urine coming from the dog he drew beside the tree. Is there such thing as too much imagination?

As 11:55 a.m. approached on September 23rd, we gathered our equipment, I uttered a teacher's prayer of thanks to the sun goddess, and we headed outside. As the students (none of whom knew we lived on the 49th parallel) had done their calculations and compared their results, they concluded that we were located at 48.4° north. "Not bad," I said, whipping from my pocket a handheld GPS device. Not one of my heavy-smoking, "I'm hungry" teenagers even noticed it was lunch break. They were too busy finding the best place to locate satellites. Their calculations were confirmed by GPS—we were standing at 49.12° north.

In addition to using the sextant we studied a graphic novel of *Mutiny on the Bounty*, read *Treasure Island* aloud, and interacted with several picture books and poems—Susan Musgrave's poetry

was a special favorite. Students were particularly impressed that her husband is Canada's most notorious bank robber and that he only ended up in jail when his heroin addiction got the better of him. At that point, I made an executive decision not to learn about successful bank robbery and turned quickly to the subject of geography.

Seafaring pirates have sailed all over the globe, and this introduced us to the study of the geography and trade (what were those pirates stealing, anyway?) with China, Indonesia, the Caribbean, Spain, England, and even the west coast of Canada. The students cracked jokes about smelling them coming. They sang "Aaargh, Métis" (maties)—a joke taken from the Arrogant Worm's song, "The Last Saskatchewan Pirate." This led to a discussion on the history of the Métis nation.<sup>1</sup> One of the girls in the class who identified herself as Métis was able to speak to some of the issues of not fitting in with the urban Native community at first, and, yet, being seen as Native by the dominant culture.

The theme of piracy lent itself to many imaginative projects before we reached the end when *Pirates of the Caribbean* was released on video in December 2003. The class enjoyed the pirate slapstick, and I sighed loudly over Captain Jack Sparrow, a.k.a. Johnny Depp (my infatuation being a running gag throughout the two months duration of the unit).

Because of the enormous personal investment in learning how to find latitude without modern technology, I found that mapping was the most rewarding part of the piracy unit. It integrated the study of science and math in a meaningful way. Students learned how the world revolves around the sun and why we have seasons. They learned how to calculate angles and latitude. Although writing report cards was a nightmare, I was able to tease apart what percentage of the curriculum could be allotted to each subject area. I knew these students had learned more about the world than they had for years.

What is important to understand about piracy? What narratives lead us to that understanding? And, what cognitive tools were we using as I brought my own sense of fun and passion to the serious job of educating alienated and rebellious young people?

Lesson planning and preparation often focus exclusively on what will happen in the classroom. Like the Scouts, we follow the motto, "Be prepared." But the problem with this style of planning is a loss of what is important. We have ways of accounting for transitions from activity to activity, formative evaluation, intricate methods of leading students to conclusions, even a little creative work and hands on production, but we are largely engaged in transmitting the formulas that we learned for essay writing, mathematics, laboratory work, and perspective drawing. Jagla (1994), however, suggests that it is important to imagine, as we plan, the sequence of events and individual student reactions. To find out, we must find the narrative about what we teach.

Piracy is not simply a matter of making a neat connection to a popular movie, or even a route to the study of *Treasure Island* or the gross national products of seafaring countries. Piracy is a topic with great opportunities for emotional engagement—one that we think we know something about, until we ask questions such as the difference between piracy and stealing. I was delighted to discover that pirating on the Internet has parallels to piracy on the open seas. It helped me to see that I could escape the rigid requirements of governmental expectations, parental concerns, administrative requirements, and educational mediocrity and risk a little piracy of my own by setting off with my students on a multi-disciplinary voyage.

What did I learn? First, it's important to ask real questions while planning. Even when you are good at this, it takes time. Not only is this time "worth it" for the students, it will engage you in learning at a more profound level. Enlist the help of someone who is a good questioner (children in the "Why?" stage, or a colleague) to keep you from superficiality. You will not need to answer all the questions you are able to generate, but you will find that some are irresistible and some of these answers will become the central narrative for your unit.

I know that a question is worth pursuing by checking my own level of emotional engagement. In what ways am I a pirate? Are alternate school students the pirates of our educational system? What are the emotional realities of piracy? Adventure, hope, curiosity, discovery, fierceness, persistence, survival, greed, hopelessness, sharing, teamwork? I was able to bring out each of these realities in different parts of the unit—some like survival, adventure, and greed were integral; others showed up as by-products. I was most surprised when "teamwork" came up as a theme. I had not considered the camaraderie and loyalty required of pirates, but I see how it fits my group of outsiders. Angry, alienated youth fall into very different cliques in a regular high school: Goth, gangster, party girl, loner, teacher's pet, and stoner. Like pirates of yore they had to find ways to work together.

Teenagers, especially those labeled "at risk," need a metaphor to help them explore the idea of living outside the rules. The glorification of the gangster is powerful in youth culture, but no adult is allowed to say anything that might sound critical. In some ways, these gangsters are the same hard drinking, partying, flash-the-gold rebels that Johnny Depp portrays. Piracy embodies the intensity of opposites that many teens face: loyalty and betrayal, family versus individualism, planning for the future or living for today, survival by any means versus living by a moral code, following the rules or suffering the consequences of rebellion, greed and generosity, right and wrong.

Throughout history there have always been people operating outside the rules. Their lives have been difficult, dangerous, and sometimes, rewarding. Some had to accept survival by any means, as "more right" than living by society's moral code. Grace O'Malley is an example of such a person. As a child in the 1500's, she knew she wanted to be a sailor, but in those days girls did not get to be sailors. She never gave up her ambition. She cut her hair

<sup>1</sup> The Métis people constitute a distinct Aboriginal nation largely based in western Canada. They emerged out of the relations of Indian women and European men. While the initial offspring of these Indian and European unions were individuals who possessed mixed ancestry, the gradual establishment of distinct Métis communities, outside of Indian and European cultures and settlements, as well as, the subsequent intermarriages between Métis women and Métis men, resulted in the genesis of a new Aboriginal people - the Métis. See [www.metisnation.ca/who/faq.html](http://www.metisnation.ca/who/faq.html).

and dressed as a boy and convinced her father, who owned a fleet of ships, to take her sailing. She agreed that if ever there was any trouble she would go below decks. But that arrangement did not sit well with Grace and, one day, when pirates boarded the ship, she climbed the rigging to watch the fight. She saw a pirate sneaking up on her father and dropped from above, shrieking, and knocked the pirate out of the way. The distraction allowed her father and the crew to gain the upper hand and save the ship. From then on, she lived most of her life aboard ship.

Later, when she was about thirty years old, her husband was killed and his family refused to give her the estate. She could have lived with them and been fed and housed, but she declined and left for sea. Employing her legendary shrewdness, she soon owned her own fleet of ships and five castles in Ireland, and had the loyalty of a good crew. Grace was known as a fearless leader and fierce fighter.

Around this time, she married a man with his own castle thereby strategically improving her ability to ward off the English who were appropriating Irish holdings. The marriage was a success, but when her husband died seventeen years later she was, again, denied her inheritance. So, with four children and a few castles to support, she decided on piracy and resisting the English as a way of life. This proved an adequate arrangement until Grace was captured and sentenced to hang for treason.

Her son-in-law offered himself in her place. Queen Elizabeth approved of this arrangement, as long as Grace agreed to stop her piracy and submit her lands, cattle, and homes to England. Grace was released from jail, but her years of piracy were not over. Tragically, the English later captured her brother and son. As much as she loathed the thought of cooperating with the English, Grace pleaded with Queen Elizabeth for their release and promised allegiance to England in return. Queen Elizabeth agreed, and Grace, who had been blowing pirates away when she was fifty-six years old, continued to defend England until she died at the age of seventy. Grace's commitment to Ireland, her family, and her crew led her to do things that many of us would condemn. At the same time we can admire her loyalty, bravery, and persistence.

Although, there are more dead pirates than heroic ones, the resourcefulness of those who thrived is astonishing. This is the narrative I used, hooked to a central theme that survival and loyalty by any means may sometimes be "more right" than living by the moral code of established society. In working with my students I would turn the theme to a discussion of moral themes. However, with a high percentage of students whose parents teach them to shoplift and fail to question the arrival of a new \$200 jacket in the closet, I hoped to explore times when others have had to place survival above moral considerations.

Following a narrative is a complex intellectual task of fitting things together, identifying what is important, constructing emotional meaning, and synthesizing the parts into a reasonable whole. Some of us do this well, and even easily, but others struggle to identify important themes, or fail to connect emotionally with the subject. For this reason, I think we might benefit from occasionally

acting like philosopher pirates when we teach our children. At our best, we can be fierce, loyal, persistent, and shrewd. At worst, we can simply whine for someone to give us the prepackaged lesson plan.

There are many reasons why those in our profession sometimes finds themselves unwilling, or unable, to plan one more lesson. But, I think, if we were to add philosopher to the vision of ourselves, we might simplify our planning and students would learn more. Joseph Conrad wrote in *Lord Jim* that "there is nothing more enticing, disenchanting, and enslaving than the life at sea." School-teachers often labor with the same contradictions. How beguiling to think that we might impart wisdom, better students' lives, spread joy, and practice new skills! How soul-destroying to think that if we do not teach to the test, our charges will be left behind!

Unfortunately, academic programs for "at risk" youth frequently assume knowledge that they rarely possess. Children who miss school for long periods have a difficult re-entry when they decide to show up again. As a result, many alternate programs focus on preparing students for work. They use sequential learning booklets and forgo strenuous academics. The realities of teaching youth who may be involved in crime, drugs, and street life highlights the challenges in simultaneous efforts to socialize, self-actualize, and intellectualize students.

As I contemplate the success of my pirate unit, I look for significant events and consider my project as it relates to imaginative teaching and learning. I oppose the practice of giving the least capable teenagers collections of worksheets in the hope that this will raise the level of their basic skills. I see that, although teachers must operate within the jurisdiction of "the system," there is a sense, for some of us, of setting out to sea when we close the door of the classroom. We imagine new possibilities for developing understanding beyond the already known and socially useful. We are the pirate teachers, trying to operate outside the jurisdiction of traditional practice. We want to engage all our students and to do this we need to fire up their imaginations as well as our own.

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## Using Imagination in the Math Classroom

Jarrett Wilke

What does your mathematics classroom look like? Does it look like the math classroom you experienced through childhood? Were you bored? Are your students bored? Are they engaged in the material presented? Do they enjoy learning? Do they look forward to your class? Do they participate in mathematical thinking and inquiry? Simply put, do they like mathematics? Reflect on these questions while you transport yourself into one of my recent tenth grade math classes.

I called the class to attention and began. “Once upon a time there was a little boy named Carl who lived in Brunswick, Germany. The year was 1785. Little Carl was a very smart boy even though he came from a poor family. He taught himself to read and write—as well as to add, subtract, multiply, and divide—by the age of three. At the age of seven, he attended school in a one-room schoolhouse with students both older and younger than himself. Even though he had older classmates, he was the smartest in the class. The problem was that he was also the poorest behaved.

You see, Carl learned very little at school because he was already so smart. Some even say that he knew more than the teacher. I paused slightly, knowing what was coming.

“It sounds like me, Mr. Wilke,” quipped Tim.

“Funny guy, Tim. Funny guy,” I responded laughing with the whole class. I continued, “Anyway, because Carl was so bored, he did things that made the teacher very angry. He was also the first to answer questions the teacher posed to the class. This annoyed the teacher even more. On one particular occasion during a math class, where Carl seemed to be crawling on the ceiling while answering every question, the teacher could not take it anymore. Finally she said, “Carl I am sick and tired of you. Go into the corner. I do not want to hear from you for the rest of the day. Oh ... go add the numbers from one to one hundred.” So Carl grabbed his things and plopped himself in the corner eager to meet the challenge.

“Now, if you really think about this, Carl could actually be there all day. Carl did not have one of these,” I said, holding up my graphing calculator.

“Is this a true story?” asked Megan.

I responded, “That is a secret. I could tell you but...”

“Then I’d have to kill yah,” the rest of the class yelled in chorus.

“I want you to imagine you are Carl. You need to solve the same problem that his teacher posed. There are a few rules however. First, you may not use a calculator. Secondly, you can work together if you wish. And lastly, you only have thirty seconds to work on it.” I waited for the response.

“What?” “You’re kidding!” the students cried in disbelief.

I nodded. “After thirty seconds in the corner, Carl stood up and said ‘I did it! I did it.’ Well, can you imagine the teacher’s reaction? So, pretend you are Carl; and yes, I am kidding, you have ten minutes to find out how Carl did it in thirty seconds.”

Immediately the desks moved together, the talking commenced, and they started to work, determined to solve the mysterious problem.

You may have heard this story before; but students, most likely, have not. If you have not, it is, for the most part, true. After giving my students time to work on the problem, I reconvened the class, and we discussed how Carl went about solving it. Carl is, of course, Johann Carl Friedrich Gauss, the second most famous mathematician ever to have lived.<sup>2</sup>

After a discussion of the problem and their solutions, I continued by showing the connection between it and the formula to sum a series taught in high school mathematics curricula. The formula is:  $S_n = \frac{n}{2} (a + t_n)$  where  $S_n$  is the sum of the series,  $n$  is the number of terms in the series,  $a$  is the first term in the series, and  $t_n$  is the last term in the series.

Carl discovered that the series  $1 + 2 + 3 + \dots + 98 + 99 + 100$  has a pattern. The first term + the last term = 101, the second term + the second last term = 101, etc. Now, how many 101’s will there be? 50 pairs! Therefore,  $50 \times 101 = 5050$ . Applying this to our formula,  $n = 100$ ,  $a = 1$  and  $m = 100$  giving  $S_{100} = \frac{100}{2} (1+100) = 50 \times 101$ .

Before showing this formula to my students, I posed another question allowing them to apply “Carl’s logic” to a similar problem. My students were then encouraged to apply this same principle to every series! For example, given the series  $9 + 11 + 13 + \dots + 41$  that has 17 terms, the sum is  $S_{17} = \frac{17}{2} (9+41) = 425$ . Awesome!

Why the story? Is it a waste of valuable class time? I would like to strongly argue that it is not a waste of time. In fact, I would like to argue that taking the time to engage students in this manner is vitally necessary!

I started by asking a series of questions. What does your mathematics classroom look like? Does it look like the math classroom you experienced through childhood? Are your students bored as you were as a child? Are they engaged in the material presented? Do they enjoy learning? Do they look forward to your class? Do they participate in mathematical thinking and inquiry? Simply put, do they like mathematics? The answers to these questions are of course varied and complex. However, I hope you see that my students were engaged in this lesson. They did enjoy learning! They did participate in mathematical reasoning and thinking!

So what makes this class different from the norm? Can we use

<sup>2</sup>Isaac Newton is, of course, the most famous mathematician.

this example to establish criteria that we can then use to engage students and help them think mathematically? I believe we can. Students must be encouraged to think for themselves by tapping into their imaginations. Only when mathematical concepts are presented in an imaginative way will students fully benefit from their experience. Both teachers and students must engage themselves in this creative realm of thinking, where imagination plays a vital part in learning and teaching. As Egan (2005) states

Imagination is too often seen as something peripheral to the core of education, something taken care of by allowing students time to ‘express themselves’ in ‘the arts,’ while the proper work of educating goes on in the sciences and math... [But] imagination is the center of education; it is...crucial to any subject, mathematics and science no less than history and literature. Imagination can be the main workhorse of effective learning [and teaching] if we yoke it to education’s central tasks. (p. xiii)

By allowing my students to imaginatively enter Carl’s world they became interested and involved. Students were intrigued. They wanted to know more. They were not bored. “This concept of teaching implies the need for teacher’s use of their own imagination capacities while interacting with students to engage them in truly enjoyable and relevant learning” (Jagla, 1994, p. 4). I was able to turn a very theoretical math concept, summing a series of numbers, into a meaningful, enjoyable, and relevant topic.

What were the characteristics of this particular class that made it so effective in an imaginative way? Firstly, I allowed my students to take part in the narrative. Students love to hear stories, but they also like to reenact them. A “boring” concept was made to come alive by engaging students in the story of “Carl,” and what is especially fascinating to them is that the story was actually true! Story telling can be used in any subject at any grade level, including tenth grade mathematics. As Jagla (1994) observes, “Storytelling is a delightfully imaginative activity for all ages...the telling of stories is a wonderful way to provide context and make connections for students at any level” (p.132). With a little effort, students were able to put themselves in Carl’s classroom and picture themselves in his predicament. The story included themes of hero and villain, mystery, humor, and excitement. My students actually became part of the narrative! And most of them solved the problem!

I believe students will remember this concept and how to use this formula because it was given a personal dimension with the introduction of Carl. The mathematical concept was reinforced by the story. It would have been very easy to stand in front of the class in a traditional manner and give them the formula with three or four examples. Would this have been as effective? Would students have been engaged, or would they have been bored, if I had taught it in this way? Stories serve two purposes: they are effective in communicating information and they orient the hearer’s feelings about the information. The story of Carl communicated a mathematical concept, but it also instilled positive feelings toward the material that I was going to be testing them on the following week.

Secondly, this was an effective classroom experience because students were able to discover the required learning outcomes on their own. Through experimentation, most students were able to solve the problem  $1+2+3+\dots+100$ . Some were able to apply it to another example, and some even came up with a generalized formula. Of course, this technique employs an old idea that has been around for a long time: allowing students to discover material on their own adds up to a rewarding educational experience. Thinking skills are important to develop. With practice in problems like the one that Carl solved, students are able to improve their problem solving skills. It would have been very easy for me simply to show them the concept; but students are much more likely to own the material, understand it, remember it, and apply it to new and different situations if they are given a chance to think. Herbert Spencer puts it this way: “Children should be led to make their own investigations, and to draw their own inferences. They should be told as little as possible, and induced to discover as much as possible” (Kazamias, 1966, p. 75). Encouraging the use of a students’ imagination is directly related to critical thinking and problem solving skills. Jagla agrees: “imagination is thinking of the various possibilities of a certain situation...you have to know scientifically what will work—you also have to go after what has never been done before, you don’t even know if it could work” (1994, p. 30). My students had never seen a problem like this before! By using their imagination, they were able to experiment with different new ideas that led them to the solution.

Thirdly, Carl’s problem appealed to my students’ sense of mystery and intrigue. My students, like Carl, were anxious and excited to solve this problem on their own. They wanted to be the “naughty boy” who was able to solve the problem the teacher posed as punishment. How could Carl do this in thirty seconds? Impossible! No, it was possible! Well then, prove it! My students were engaged and became engrossed by the problem. It is an awesome sight to see students become completely immersed in a problem. And they solved the mystery! Math can actually be interesting! As Egan (2005) states, “All the subjects of the curriculum have mysteries attached to them, and part of our job in making curriculum content known to students is to give them an image of richer and deeper understanding that is there to draw their minds into the adventure of learning” (p.6).

Lastly, another way to engage students in a topic is to use humor. People love to laugh. When students enjoy themselves they are more eager to participate, they are more likely to retain and understand the material, and they are more likely to use the concepts covered. Although it is not evident in my narrative, humor was part of Carl’s story. In relating the story of Carl, my interactions with my students involved humor. The general presentation of the story can easily be made funny, thus increasing the enjoyment of the experience. Humor can alleviate monotony and boredom. Egan (2005) explains that “[It] can also assist in the struggle against sclerosis of the imagination as students go through their schooling—helping to fight against rigid conventional uses of rules and showing students rich dimensions of knowledge and

encouraging flexibility of mind” (p. 4).

Are these the only techniques at our disposal to engage students in learning? Of course not! If our chosen technique to relay information to our students allows them to embrace the material, then it is worthwhile. Narratives, self-discovery, a sense of mystery, and the use of humor were four powerful tools used in this particular situation. What other imaginative techniques could I have employed in this lesson? Two other strategies that I often employ involve role-playing and the use of mental imagery.

Let me offer another example. One of the most important concepts taught in high school mathematics is factoring. The skill of factoring is taught in every grade from nine to twelve. Less complicated factoring is introduced in the elementary school grades. To be successful in each of these courses, it is vital that students understand how to factor, why to factor, when to factor, and what to factor. For that reason, factoring is a huge “production” in my classroom. If there is one thing my students remember about math when they graduate it is the Wilke Bug.

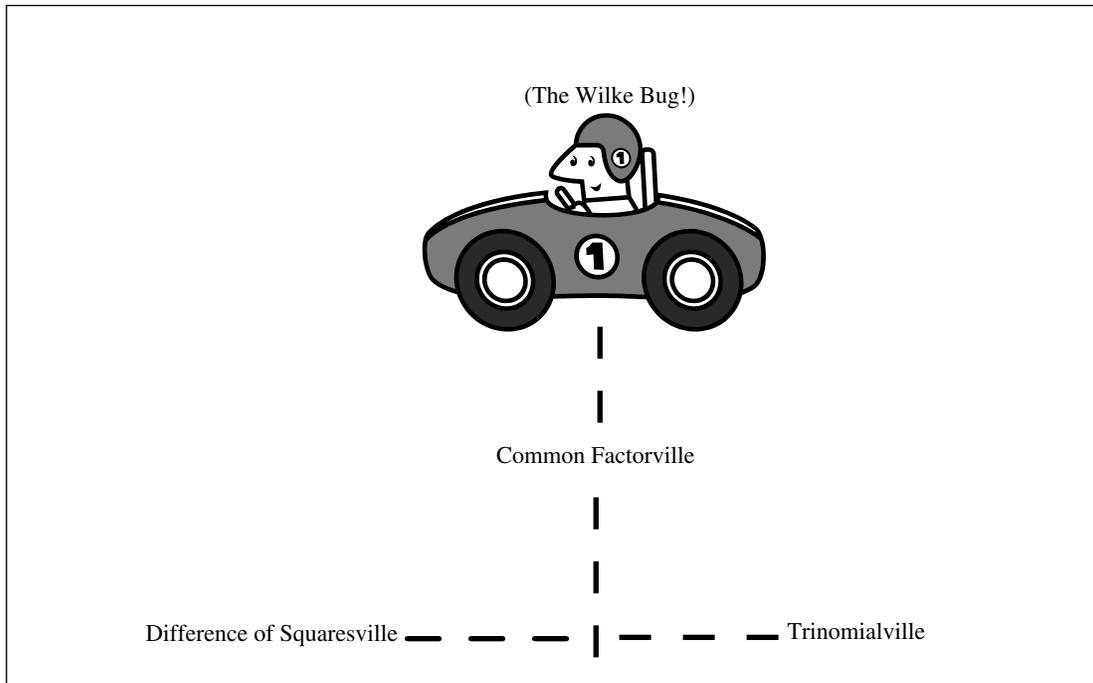
The Wilke Bug is used as an analogy for factoring. In grade nine, the fundamentals of factoring are learned. Students begin by learning common factoring. Given any polynomial, the first step is always to look for a common factor; for example,  $3x^2+6x$  can be factored into the form  $3x(x+2)$  because the factor  $3x$  is shared between the two terms. After common factoring, there are two other main types of factoring: difference of squares and trinomials. Difference of squares has two terms, such as  $y^2-16$ . This can be factored into  $(y+4)(y-4)$  since its expansion is its corresponding multiplication question. Trinomial factoring has three terms—for example,  $x^2+5x+6$ . This can be factored into  $(x+2)(x+3)$  for the

same reason. (Just as  $+2$  and  $+3$  multiplied is  $+6$ ; and added is  $+5$ ). So, where and when does the Wilke Bug roll into town?

The procedure for factoring is compared to the process of driving from town to town using a map to guide the steps. The road first leads to the town of Common Factorville. It is always the first stop! If a common factor exists between the terms of the polynomial, it must be removed! I explain to my students that the journey does not end at Factorville. “Keep driving” is a phrase in common use in my classroom. However, after Factorville, the road forks and students must then choose which path to take: two terms leads to the town of Difference of Squaresville, while three terms leads to Trinomialville. Understanding this concept is important because some factoring questions involve both types; for example,  $2x^2-2$  is first factored using common factoring  $2(x^2-1)$ , before one continues to Difference of Squaresville”  $2(x+1)(x-1)$ .

So why bother with such an elaborate metaphor to explain a mathematical operation? Wouldn't it have been more straightforward just to show the students the three methods and then assign them practice questions? Maybe! But, for some reason students love the whole Wilke Bug experience! Past students walk by me in the hallway and ask me “How's the Wilke Bug?” Some students want me to get a license plate with the letters WILKBG on my car! Each year, I have a Wilke Bug contest in my math classes. The person that designs the best Wilke Bug receives bonus marks! (See the attached picture for last year's winning entry). In higher grades I introduce students to other types of factoring, and I add more paths to the fork in the road. I believe that this type of activity contributes to an enjoyable, exciting, and unique learning atmosphere. Students appreciate that there's a serious side to

Students use a factoring map to drive the Wilke Bug through the process of factoring. I draw the factoring map as follows:





having fun in the class—they are actually learning one of the most important concepts in high school mathematics.

The use of metaphors in the classroom is an effective tool that teachers have at their disposal in any grade or subject. Egan (2005) lists metaphor as one of the cognitive tools used to benefit student learning. The Wilke Bug is an example that plays upon a student's (and teacher's) imagination. "Metaphor is the capacity, or cognitive tool, that enables people to see one thing in terms of another" (Egan, 2005, p. 13). In this example, students use a simple map to guide them through the journey of factoring. Egan (2005) argues that, "The use of appropriate metaphors can stimulate the imagination and creativity in all subject areas" (p. 13).

Another cognitive tool that I frequently employ when I teach factoring is the use of role-playing. After the whole factoring routine is explained, my class practices questions using the Wilke Bug. I set up two chairs in the front of the classroom and ask for a volunteer. Together, we drive the Wilke Bug around the classroom using our map to guide us to the different towns. I start off by calling shotgun. The use of this type of role-playing is an extremely effective teaching technique, and it can be employed in any subject and grade level. Role-playing engages students in a physical manner and helps students to learn and retain information. Students are captivated when material is presented in a different, often outrageous manner. As Egan (2005) states, "there are endless ways to shift the context so that the routine classroom becomes a place where students never quite know what to expect... the imagination can transform the classroom" (p.105). In my classroom I sometimes feel that I am more of an actor than a teacher. Acting out the Wilke Bug routine is part of the math show!

Another important tool for learning used throughout these classes is mental imagery. I ask students to picture in their minds the crazy Mr. Wilke driving the Wilke Bug around the classroom when they are at work on factoring questions. This helps them to remember the routine. These images provoke positive and humorous feelings, while contributing to their understanding of the subject

material. In mathematics, it is extremely important to visually picture ideas and strategies to various problems. Talking through questions can sometimes help struggling students.

When it comes to evaluating students on factoring, I ask them to write a factoring letter. They are to write a letter to anyone they wish explaining the factoring process, so that the reader will be able to do factoring. The letter allows the student to go through factoring in a manner that works for them. Writing down the routine allows them to sort through difficulties and put the procedure in their own words. In other words it helps reinforce the idea.

Carl's series and the factoring Wilke Bug are two examples of the use of imagination in teaching mathematics. As educators it is our responsibility to engage students in meaningful and exciting lessons that aid in learning course material. The lessons are imaginative in that they do just that. There are many techniques to present material imaginatively, and it is the teacher's task to develop various activities that challenge students to think in creative and innovative ways. The lesson about Carl employs storytelling, discovery learning, mystery, and humor to achieve learning outcomes effectively. The Wilke Bug makes use of role-playing, metaphors, and imagery. These are a few of the imaginative learning tools at our disposal. Be creative and have fun!

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## The Pronoun Rules

*Kelly Han*

Pronouns are cool. There! I said it. Of course, I only said it on the assumption that no schoolyard bullies would be able to hunt me down and pull my hair, and that the type of person who would read this issue of *Educational Perspectives* might be open to such an idea. But, the truth remains and must be dealt with: Pronouns are cool.

Part of the trick for educators, especially those who look towards imaginative education, is to fix on what turns us on about the materials we teach. No small feat. How often does a well-parsed sentence send shivers up your spine? Most things should stir us, when the underlying human connections are uncovered and dusted off, however imperceptibly. Identifying and elaborating on those stirrings may improve with practice and greatly enrich our teaching and our lives. What does not stir us at all?

This was definitely the case for me with pronouns. For years, I've found them mildly interesting, but I'll be the first one to admit, I'm not picky. However, when it came to teaching pronouns, even I was bored, and most teachers would agree that that constitutes the death knell of any lesson. The masses of pronoun worksheets I generated became the stuff of nightmares for the photocopier and for my colleagues lined up behind me. The pronoun charts I carefully transcribed onto the board and that were in turn faithfully copied down by my students were desiccated versions of what had been living knowledge—language tools developed by humans, for humans. Of course, this is not to say I didn't try various ways of livening up my classroom: various games and group work and funny examples. I strove to communicate how necessary and fundamental pronouns are, and even resorted to their utility for all sorts of standardized tests. But I knew something was amiss, although I couldn't, and wouldn't, given my teaching situation at the time, examine my discomfort too closely.

Instead, I rationalized the discomfort by reminding myself that school is boring, sometimes; there are boring parts of every job, of every life, and students should get used to it. Grammar is dull, it's *meant* to be dull, and that's that. I was doing my job, and not so badly, under the circumstances.

While I've painted a grim picture of the pronoun process, the most insidious belief that I held (I see it clearly in hindsight) is that grammar is *meant* to be dull. Somehow, in my mind, grammar was one of the spawn of Ebenezer Scrooge's joyless attitude and mean spiritedness—meant to keep students numb and teachers employed. The work was no more different than pulling a lever in a factory.

It took the right time and the right context for me to escape from the view that grammar is meant to be boring, and the prejudice that those like me who enjoyed it were somehow mildly eccentric or even masochistic. This imaginative discovery, and others like it, have vastly improved my teaching, and more importantly, they have engaged me profoundly in our shared world.

Pronouns take the place of other nouns. In the case of personal pronouns, they often take the place of nouns that identify persons (hence the term, personal pronoun). Pronouns change form depending on their function in the sentence:

Subject form – *I* touched the dog.

Object form – The dog touched *me*.

Subject AND object form – I touched *myself*. (Sure to excite a giggle), and

Possessive form – That's *my* dog. Or That's *mine*.

In each of these cases, *I*, *me*, *myself*, *my*, and *mine* refer to the same person, even though the terms themselves change form.

But to teach about personal pronouns as I have just done to you not only disengages and chills, it also fails to convey the ingenuity of our language. Our written language finds its roots in long forgotten lists of the number of barrels or the quantity of chickens. Along with the improvements to the technology of writing—pencils, parchment, paper, printing presses—we also see improvements in writing itself: spaces between words, lower case letters, the use of cursive, punctuation, and, among other things, pronouns.

While I am certainly no historian, nor a desert-island alumna, I definitely am an avid reader and movie-watcher, so I'll go ahead and assert that people who are stranded on desert islands with others who speak different languages will start communicating by pointing at concrete objects such as fish, tree, bird, fire, and knife. Eventually they advance to demonstrable actions: eat, sleep, hunt, and run. Then, things fast-forward very quickly, and suddenly everyone is getting along quite well, having built an impregnable fortress from three coconuts and a shoelace.

Somewhere along the line, pronouns come into play for our hypothetical desert islanders and for us, the users of modern languages. But when does it occur? And how? And what difference does it make?

The pronoun is a brilliant abstract concept that gives us the power to get close to, or to draw back from, what we want to describe. Think of the difference between a father telling his child, "I love you," and the same father saying, "Dad loves Child." *I*, *we*, *our*, and *ours* bring us closer to the subject; that's why they are first person pronouns. On the other hand, third person pronouns like *he* and *it* move us farther away, as in parent-teacher-student meetings when we awkwardly describe "her learning progress" to the parent while she herself is sitting right there; the awkwardness forms because the pronoun is meant to hold things at a distance, but in this case, the student in question is sitting two feet away picking her fingernails.

Pronouns also possess the incredible ability to take no proprietary form. They simply represent whatever we want them to represent, and through their various forms, people use them however they want to use them. Bart Simpson of the long-running series *The Simpsons* helps illustrate this feature in an episode in which he finds an automated display promoting fire prevention: The display's recorded voiceover shouts, "Only YOU can prevent forest fires! Only YOU can prevent forest fires!" A quiz at Bart's eye level reads, "Who can prevent forest fires?" followed by two big red buttons: YOU or ME. As the display continues to shout, "Only YOU can prevent forest fires!" Bart presses YOU. "WRONG!" the display roars. "Only YOU can prevent forest fires!"

When I first saw that episode, I laughed, because it struck me as funny. I'm still highly amused even as I type this. But the more I think about it, the more I see its deeper implications, the iceberg below the water level. Pronouns are, in fact, meaningless on their own and only develop meaning to suit the user and to suit the subject's position in the sentence. It makes a big difference to say "*he* walked the big dog" when you really mean "the big dog walked *him*." The pronoun highlights the difference by being formed differently, and by being placed in different spots in the sentences. This remarkable human creation provides clarity without exerting much energy in describing exactly who was walking whom. Somehow, magically, new meaning arises when we change pronouns from one form to another.

Similarly, the computer mouse's on-screen pointer does not exist in any formal sense, except to signify where the mouse in your hand is resting on your mouse pad, which in turn magically signifies a relationship to the content stored on your hard drive. Imagine being without that pointer—What chaos! What inefficiency! Pronouns are no less innovative. While pronouns of course speed things up, especially if your name is Rumpelstiltskin, the conceptual distinction between *she* from *her* is itself pure genius. *She*—the subject, actor, activator. *Her*—the object, recipient, victim. Pronouns point out the differences as they change form, and vary their representational function: the pronoun is the mouse pointer of language.

Now, it is undeniable that at some point, I must impart to students that pronouns represent other nouns and that they can take different forms. I should also convey exactly which forms in precisely which situations. But by framing the material as alive, as living knowledge, I engage students' emotions and affect their learning and retention more efficiently. We should teach that pronouns are products of human genius, with human roots and human purposes. This approach is not only more palatable to students, but more energizing to those of us who have to teach them. And speaking of teaching them, perhaps I should address in more concrete terms how to teach using Kieran Egan's Imaginative Education frameworks that can be found at [www.ierg.net](http://www.ierg.net). In this article, I'll handle personal pronouns within the *romantic* framework with a touch of the *philosophic*; this type of unit aims to encourage students with fairly complete literacy skills to begin forming a more abstract theory of pronouns, of grammar, and of language. The

pedagogical underpinnings of the lesson, specifically the types of cognitive tools utilized and expanded therein, should also make it easier to justify the methodology to parents, students, administrators, and colleagues.

## Finding My Narrative: Heroic Qualities

*What "heroic" qualities or values are central to this topic? What makes the characters in this story full of wonder?*

As previously mentioned, pronouns are cool. However, we've got to narrow the field down. General terms like "cool" or "interesting" don't stir the emotions as deeply as the more specific and powerful ideas "seductive" or "unruly" do. I find personal pronouns *magical*: clever little magicians well practiced in the art of grammatical legerdemain. I hope my students will find them magical, too. They can make us see what they want us to see, whether pulling something close, holding it at a distance, making it walk, or making it be walked all over. The trick for students, then, is to learn to control these magicians, because it's easy to imagine the havoc a disorderly magician can wreak. Given the ongoing Harry Potter mania, the image of a young magician just learning to control his latent powers is one that is familiar to many students.

Alternatively, if one is wary of anthropomorphizing the non-human, the creation and invention of a pronoun system is itself magical: How do people on desert islands figure them out? How did the early language users devise such an ingenious system? The idea that a human construct can be both *nothing* and *anything* boggles my mind and my imagination. Still, I do prefer the anthropomorphizing for two reasons: (1) it more directly links the students to the material, and (2) it requires less preparation time spent in research, and, to my great embarrassment, that matters to me.

## Finding My Narrative: Heroic Images

*What image best captures the heroic qualities of the topic?*

In describing my heroic quality, I'd already stumbled upon my heroic image: a black-clad pale-faced magician with arms outstretched, just moments before she points her wand at something and it suddenly... Well, it could do anything—grow gigantic, shrink from view, turn into a rutabaga, or turn into the man slicing the rutabaga. That breath just before the magician selects her target is my favorite image; at that precise instant, her powers are concentrated on whatever purpose she chooses, and it's up to the learners to steer her powers wherever they want them to go.

## Finding My Narrative: Organizing Content into Story Form

*What "heroic narrative" will allow us to integrate the content we wish to cover?*

Continuing along the vein of little grammatical magicians, the early lessons should focus on the pronoun groupings of first, second, and third person—not only so students can identify voices

on a standardized test, but so that they can understand their essential differences and learn these voices as tools in their own language use. If we want our personal anecdotes to have more power (in other words, to be closer to our hearts), we use the first person; it is almost instinctual, but it still needs to be made explicit. Jay Leno on *The Tonight Show* often makes jokes about invented situations that he claims have happened to him—cooking macaroni, pushing a cart through the supermarket, or walking around a strip mall—situations that might apply more reasonably to his joke-writers than to him. But it certainly is less funny to start, “This weekend joke-writer Lenny was making some macaroni when...” In other words, he uses the first person as a tool to make his stories magical and closer to both him and his listeners.

Without belaboring the point, the second person is how we command or direct operations—the voice of the *Choose Your Own Adventure* series and of countless self-help books. It is yet another magical form, which we can use to address our speech or our writing directly to an audience, and they can feel, in turn, its directness. The third person is the voice of observation, a way to report and watch while standing slightly apart from the action—a simple human innovation that conjures up a subtle distance between speaker and object. To fully learn the role of these voices, students might generate their own mnemonic device for them: I invented the idea of three friends who are invited to my dinner party. The First Person to enter the room, because he came in first, is the garrulous one, the one who walks right up to you and starts chatting as soon as he’s throwing his coat on a table. With him it’s always “I did this” and “That happened to *me*.” The Second Person comes in after him, nagging him for not hanging his coat up properly—always the director and usually the one focused on people other than himself—“*You* didn’t hang your coat” or “Kelly’s going to reprimand *you*.” The Third Person is the most reserved. He arrives last. He observes the coat on the table and might have some opinions about it, but he adopts a position of neutrality, especially in comparison to his two friends. He is more likely to think, “*He* never hangs *his* things up” or “*He’s* always got something to say about everyone else.” He would be neither so bold nor so weak as to say, “*You* should hang that,” or “Fine, I’ll do it,” because those responses are not his style.

Similar examples of each voice happen every day in all contexts. Pronouns are so familiar a part of our lives that it is hard to view them as external linguistic tools. It’s easier to say, “It just sounds right.” Pronoun groupings by voice lend themselves to writing exercises such as turning the same neutral information, like a weather report or a sheet of automobile facts, into three different voices and observing the magical effect of such simple changes. Using film also helps to draw the distinction clearly. For example, use a video recording of a professional athlete who talks about himself in the third person (baseball player Ricky Henderson comes to mind), and gather student impressions of such usage.

Continuing with my dysfunctional party guests, the First, Second, and Third Persons, each voice has its own favorite subjects: First Person uses the in-your-face *I* and *We*; Second Person uses the directed address, *You*; and Third Person, the observational *He*,

*She*, *It*, or *They*. These are their favorite subjects, both in terms of what they like to talk about, as well as the subject forms of each voice. The student writer selects from among these subject forms to conjure up the actor, the one who performs the verb, in whatever way the student commands. *He* goes to the jailhouse. *She* walked her cat. *It* can’t be stopped. *Who* goes there? *I*’ll never tell, so *you*’ll never know. If we take a little mental hop over to our magician who is poised with magic wand at hand—Subjectis Dooing! She pronounces the spell, “Iwe you, hesheitthey who!”

But let us not sell our black-clad friend short; a magician’s tricks are many and her skills certainly don’t stop at just doing things. Another of her popular tricks is having things done, or Objectis Receiving, which she initiates through “meus you, him-heritthem whom!” Once cast, this spell will light up the part of the sentence that has received or is receiving the fruits of the verb: The coach favors *us*. The rabid goat chased *her* around the asylum. The recalcitrant B-list actor refused to do *it*, and nobody can blame *him*. Without a subject-object pronoun distinction, our language would suffer from ambiguity: Who is doing the verb? Who is on the receiving end? “It chased it” makes a glimmer of sense only because we know certain things about the first *it* and certain things about the second. We know the two *its* aren’t the same thing; otherwise, the sentence would read, “It chased itself.” We assume the first *it* chased the second *it* because we’ve grown accustomed to a specific English word order. Subjectis Dooing and Objectis Receiving apply even when the pronoun doesn’t change. In comparison, “he chased him” is crystal-clear because there is a distinction between the subject and the object.

When it comes time for students to practice these new understandings, I’ve found nothing as effective as somebody else’s really bad writing, full of textual errors that cripple clarity and deaden the magic. Some students can be amazing with worksheets—maybe it’s the controlled contexts where a mistake is definitely present and located in a specific place. But instead of using worksheets with contrived sentences with blank lines for students to add their corrections, I use paragraphs written by students in other classes. I also use sentences I’ve constructed from worksheet sentences, and ones I’ve invented from scratch. This takes time, but I console myself that I can reuse the examples indefinitely. My paragraphs may possess no errors at all or a rampant abundance of them. I hope to hone my students’ *ear* for the language—the ability to notice illogical and unclear language usage—a skill that is more fully developed by context-filled paragraphs than by isolated sentences. I often include a flawless piece to keep my kids on their toes—ah, the howls I get when they realize it contains no errors.

## Developing Cognitive Tools: Exploring Human Strengths & Emotions

*How can students understand the human hopes, fears, passions, or struggles that have shaped our knowledge of this topic?*

My approach in this particular instance is closely connected to the meta-narrative of English as the product of millennia—the story

of language, of human innovation, and of our natural disposition for communication. I seek to impart this wonder and to elevate lessons on the dryness of pronouns or the subjunctive mood or Dickens's *Oliver Twist* by virtue of this meta-narrative. The meta-narrative of English gives life to the history and development of our language and provides a background that invests even subjects like the pronoun with its human dimension.

Debates are another way of engaging students at the emotional level. For example, pronouns can help to trigger discussions about our language's gender divide. Just consider the different uses of gender in pronouns.

### **Developing Cognitive Tools: Collecting & Organizing**

*What parts of the topic can students best explore in exhaustive detail? How can students present their knowledge in some systematic form?*

Not every language uses the pronoun the way we do; other cultures have found other ways to exercise the same magic. Some languages have no repeating pronouns like the English "you," which can be used in singular and plural cases. In Spanish, distinct words are used. Given the range of languages and cultures in the modern school population, students might enjoy the challenge of looking at the magic of pronouns in some of the world's other languages such as Mandarin, German, Hindi, Japanese, Spanish, Bengali, Portuguese, and Russian. How do other languages achieve the same abilities to move objects closer or farther?

### **Looking Forward and Concluding: A Celebratory Ending**

*What is the best way of resolving the dramatic tension inherent in the unit? What communal project or activity will enable the students to experience and share this resolution?*

*How can one know whether the topic has been understood, its importance grasped, and the content learned?*

I began this pronoun journey with the image of a pale-faced young magician primed to strike, but what her spell might do was not yet fully spelled out. By this point, however, students should have a much better understanding of what such spells might achieve, and I'd really like to unleash their creativity. My favorite idea is to ask students to create an original physical representation of the pronoun magician: a sculpture, artwork, or computer animation, for example. I hesitate to specify much more, for fear of limiting creativity. These pieces would be displayed in the classroom as vivid reminders of the power of pronouns to do our bidding. As a concluding activity, this would provide a unique access into students' thoughts and ideas about pronouns and their uses.

### **A Brief Adieu**

I must say that while it did take time to create new ideas about how to teach pronouns, these ideas took no more time to generate than any other well-laid out unit. The paragraph worksheets require extra typing time, but creating a unit exam, evaluating writing samples, and assessing projects and charts are all time expenditures that would occur regardless of how a lesson is taught.

I hope that I have successfully highlighted the enormous untapped potential of humanizing a subject so that it engages students emotionally. It seems impossible to me now that students could be more affected by the dry exposition of pronoun usage than by a vividly colored and enthusiastically rendered tale. The investment in time is well worth the effort.

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## Using Role Play in Middle-School and Secondary Classes

Asia Wilson

I can still remember my seventh grade research project on Egypt in vivid detail. My friend Susan and I immersed ourselves in ancient Egyptian customs and brought the mummification procedure to life for our attentive eleven and twelve-year-old colleagues, and a very stunned teacher, Ms. Herbert. We worked on the project for weeks, readying and planning. We constructed, with the help of jigsaw and parents, a wooden pyramid that opened up on a hinge to reveal various levels, pathways, and tombs. We outlined our exhaustive notes on an ancient scroll reaching from floor to ceiling, burned and stained for authenticity's sake; and we guarded our mysterious hush-hush performance with intense secrecy.

When the big day arrived, we stood in front of our class with a giant ornate coffin looming in the background—a construction of cardboard, paint, glitter, stones, and Egyptian script. Inside the coffin, and scattered about us, were canopic jars filled with jewels and innards—hearts, livers, and intestines from our small town Supervalu butcher. A large table sat at centre stage, adorned with a sheet for our embalming ritual. My little sister's giant life-size Jill doll was the focal point—she was our cadaver. Hours before we had cut open the back of her head and chest and filled her with chicken livers and beef kidneys—she was set, and so were we. The role-play was about to begin.

I still remember Ms. Herbert's eyes opening larger and larger as my grandmother's knitting needle became our dissecting instrument: insert carefully through the nose, hook the gooey insides and pull, then place in jars to preserve for the afterlife. We prepared our body meticulously; and then we anointed it and wrapped it. Amazing, after all these years, I can still remember every step. Why? Because I was invested in my project with a degree of intensity that far surpassed any question and answer worksheet.

I was recently telling my students about my Egypt project, and they recounted how their seventh grade teacher had mummified a chicken in the classroom. They all remembered, with bright and energetic eyes, every detail of the procedure.

How very different this experience was from simply reading an encyclopedia account such as “The mummification process varied from age to age in Egypt, but it always involved removing the internal organs, treating the body with resin, and wrapping it in linen bandages.” I wasn't just reading about Egypt; I was recreating Egypt. I became an Egyptian immersed in ancient traditions. I too worried about the afterlife. I too wondered what I might be able to take with me when I die. I too wondered about how, where, and if I wanted to be buried. I was part of a story: a human story that involves billions of people.

But why did I need to rip apart the chest cavity of a doll and stuff it with animal innards to connect with Egyptian rituals and customs? Why wasn't I satisfied with simply reading the *Encyclopedia Britannica* and writing a report? The answer to this lies

in the fact that, in the seventh grade, I was fully engaged in developing my *romantic* toolkit. At the age of eleven, I was in the prime of *romantic* understanding. I was drawn to everything bizarre, sensational, and exotic. I was fascinated with the extremes of real life experiences that existed outside my zone of familiarity. Anything that allowed me to reach beyond my small, home-town world was intriguing, especially a past culture whose people preserved bodies in strange and wondrous ways. I was absolutely engrossed with my grandma's knitting needle and what it could do to a dead human body. Can you imagine that people actually shoving a hooked instrument (much like the one I held in my hand for my presentation) up a dead person's nose? Gross. Cool. No way. Eye-popping. BIZARRE!

I possessed a number of other cognitive tools in addition to my ready focus on extremes that kindled my fascination with Egyptian life. Children immersed in *romantic* understanding are intrigued with building collections of things and devoting time to hobbies. They also understand things in terms of human meaning and emotion, embed knowledge in narrative understanding, become fascinated with gathering information, and foster the embryonic tools of abstract thinking. My study of Egyptian burial customs allowed me to securely understand the topic by putting immense intellectual energy into an exhaustive search of everything related to it. I was enthralled with diagrams that outlined the mummification process and ancient tombs. I was intrigued by a list that itemized the kinds of things that Egyptians buried with their dead. But I wasn't only immersed in the when, where, and how of ancient Egyptian customs—my investigation helped me to understand why. Why did these human beings preserve the dead so carefully? Their customs reflected their fears of the unknown and their beliefs in an afterlife (knowledge embedded in human meaning and emotion). I had been raised Catholic, so their ideas had never entered my cognitive world; but I was beginning to ponder how all of this related to my own beliefs—would people centuries from now see my beliefs as strange and bizarre? Were my beliefs simply mythical? The role-play activity allowed me to explore these beliefs, and my imagination allowed me to expand my intellectual horizons while simultaneously experiencing what was not really present. The *Oxford English Dictionary* defines role-play as “the adoption or enactment of a role.” Role-play is one of the most engaging instruments for imagining what is not actually present. It was the integral binding agent of my seventh grade performance as an Egyptian embalmer. Role-play traverses and incorporates all of the Romantic toolkit categories. I exhaustively researched details, examined symbolic forms, and wondered about every feature of the mummification process in order to play the role of an ancient Egyptian.

Role-play can take a variety of forms: student(s) enacting; teacher(s) enacting; and student(s) and teacher(s) enacting together.

While some of my elementary school teachers engaged in role-play—one played the wacky scientist and another donned the garb of a traditional Japanese woman—and other teachers at university had students perform skits and plays (Shakespeare’s *Romeo and Juliet*, for example), role-play was the exception, rather than the norm. I seldom remember any secondary teachers of mine adopting roles; nor do I remember them asking us to. None of my social studies teachers donned the uniform of a World War II soldier, for instance, nor asked us to imagine that we were on the front lines. I am not sure why. They should have. It’s not difficult.

In this article, I will examine a number of different ways for teachers to incorporate role-play in their classrooms to make student learning more participatory, stimulating, and imaginative. My work with a broad range of students over the past five years, in terms of age and ability, has allowed me to see that role-play works with students of all ages.

## Role-Play in Elementary and Middle Schools

Jane Elliott, a third grade teacher in Riceville, Iowa, delivered one of the most fascinating examples of learning through role-play. On a Friday morning in April of 1968, the day after Martin Luther King was assassinated, Elliott decided to teach her third graders a lesson about discrimination. She didn’t simply want them to know what the word meant; she wanted them to understand how it felt. Elliott divided her students, according to eye color, into two groups: blue eyes and brown eyes. William Peters (1987) explains:

On the first day, the blue-eyed children were told they were smarter, nicer, neater, and better than those with brown eyes. Throughout the day, Elliott praised them and allowed them privileges such as a taking a longer recess and being first in the lunch line. In contrast, the brown-eyed children had to wear collars around their necks and their behavior and performance were criticized and ridiculed by Elliott. On the second day, the roles were reversed and the blue-eyed children were made to feel inferior while the brown eyes were designated the dominant group.

What happened over the course of the unique two-day exercise astonished both students and teacher. On both days, children who were designated as inferior took on the look and behavior of genuinely inferior students, performing poorly on tests and other work. In contrast, the “superior” students -- students who had been sweet and tolerant before the exercise -- became mean-spirited and seemed to like discriminating against the “inferior” group.

Elliott repeated the lesson in 1970, live in front of rolling cameras. The film footage makes stunning viewing. The children in Elliott’s class turn into absolute monsters. In the shadow of “God Bless America,” little John tells Elliott what happened at recess: “Russell called me names and I hit him. Hit him in the gut.” He had hit Russell because Russell called him ‘Brown eyes.’ Another child chimes in, “They always call us that.” Elliott asks, “What’s wrong

with being called brown eyes?” Roy offers a shocking explanation: “‘It means we’re stupider.’” In an even more appalling response, Raymond says, “I felt like I was—like a king, like I ruled them brown-eyes, like I was better than them, happy.”

I will not summarize the whole lesson. Suffice to say that when teacher and students debrief after the lesson, *all* of the children are anxious to discard their collars (one uses his teeth in a kind of symbolic deconstruction of the event). And when Jane Elliott says, “I hate today,” Rex agrees, “I hate it too.”

The lesson left a life-long impression on all of Elliott’s pupils. Years later, when the third graders are fully grown adults, they reunite with Elliott to reminisce on the blue-eyed/brown-eyed exercise. One student, named Sandra, tells Elliott

You hear these people talking about different people and how they’d like to have them out of the country. And sometimes I just wish I had that collar in my pocket. I could whip it out and put it on and say ‘Wear this, and put yourself in their place.’ I wish they would go through what I went through, you know.

It’s amazing to me that being told one is inferior can have such a tremendous impact on one’s behavior. The lesson taken from a role-play such as this could never be gleaned from simply reading didactic materials that espouse the Golden Rule. Elliott has also performed her lesson with adults, and they act equally as monstrously as the children.

It was this Frontline documentary, coupled with a barrage of anti-Arab sentiments after 9/11, that prompted me to design and implement an exercise similar to Elliott’s. After 9/11, friends of mine—Arab friends—started being treated differently. People glanced at them apprehensively in airports; and news reports of Arabs being accosted for no reason began to surface more and more frequently. My sixth grade students might learn something important, I thought, from a lesson similar to Elliott’s.

I was committed to helping my students understand the notion of empathy. I presented them with numerous narratives—contexts from which they could form an understanding of stereotypes, bias, racism, prejudice, etc. We watched the documentary, *A Class Divided*; read children’s books like Maxine Trottier’s *Flags*; and studied newspaper articles; but there was always something missing. I wanted them to feel prejudice; I wanted them to feel singled out and feel persecuted as a group. I wanted them to feel what it feels like to be cast as “other.” So, I decided to intern them in a concentration camp—a lesson I had tried out during my teacher training. It had worked effectively with my adult colleagues.

In the morning, students were divided into families and given paper suitcases. (I had one of my parent volunteers make these—they are a little labor intensive, if you want, as I did, to have authentic copies of historical passports and baggage tags attached to them. The National Nikkei Heritage Centre in Burnaby, British Columbia supplied pictures and information). They were also each given an internment notice. Each family was given an envelope. Inside the envelopes were pieces of paper scrawled with words

denoting various family owned and personal items; for example, a teddy bear, photo albums, grandma's jewelry, clothing, furniture, hardware store, etc. The families had to decide what to pack and why. The rule was that whatever they wanted to keep had to fit inside the suitcase, and there was only one suitcase per person. "What's this for, Ms. Wilson?" students asked. "Just pack your bag—you have fifteen minutes to decide what to take," I answered. "Where are we going? How long are we going for?" "Just pack your bag." When they were done, they went out for recess.

When students came back to class, things had changed. I had changed. Students had always moved freely in and out of the classroom, but not today. I stood at the door, in uniform, holding a clipboard. I spoke harshly and looked severe: "TWO LINES! BOYS, THIS SIDE. GIRLS, HERE. SILENCE!!" Anyone who whispered was severely chastised. I came, two inches from a talker's face, glared, and hissed in a venomous tone, "You don't want to know what will happen if you can't be quiet." Even though they had some idea of what I was doing—they had seen *A Class Divided*, we'd talked about concentration camps, and I'd shown them pictures of a trip I made to Dachau—they were clearly shaken. They later told me that they thought I was really angry: "Your eyes... Your voice... You were so scary..."

The students stood in the hall, and no one moved. I began, with the aid of my helper, to finish what I'd started: taking all of their personal belongings from their desks—book bags and all—and throwing every last bit of everything they owned, except their suitcases, into the hallway under a "For Sale" sign. One student's protest was met with a glare. Their faces showed evident signs of apprehension.

Students with their suitcases in hand were marched in silence to an imaginary bus outside that I made from chairs, paper wheels, etc. On the bus, I continued to play the role of an officer. I told them their numbers (their names were no longer important), and they were given ID tags. I then told them to close their eyes; and I took them on a visual simulation of our travel experience to an internment camp.

We returned to the classroom. The desks, which they take a great deal of ownership over, were stacked to the side. A divider separated the room, and there was a black banner covering one length of wall. It was plastered with startling images: faces of concentration camp victims, evacuation notices, "Work will set you free" and other mottos. I posed in front of them with a hard, stern look, and I ordered the men and women into separate camps where they took seats according to their numbers. Boys sat on one side of the divider; girls on the other. I then turned on the film, *Daniel's Story*.

Even as adults, it is difficult to walk through a concentration camp with its gas chambers, scientific experimentation rooms, and horrifying images. *Daniel's Story* was created specifically to educate children about the camps. It follows one boy, Daniel, through the Holocaust. It is moving, but not as graphic as many of the other films on the topic.

When it was over, the children wrote "in role." I asked a few

simple questions: How did you feel today (about being given the internment notice, packing your bag, being taken to a camp and treated like nothing)? Imagine if this really happened? How might it have felt to be Daniel? Obviously, this lesson was followed with a debriefing period and a number of accompanying activities.

The role-plays I have discussed are humanities-based ones as this is my primary area of interest. However, elementary and carefully configured middle schools lend themselves well to interdisciplinary study. I want to look at two examples here: one integrates the sciences with the arts; the other merges all subject areas into one.

Anne-Marie Dooner, a teacher in Winnipeg, Manitoba, is doing some particularly fascinating work that can be used to amalgamate science and English language arts curricula. Dooner implements extraordinary role-play scenarios in her teaching. Once students have covered a number of scientific concepts related to their studies of particle theory, the students become actual particles—the particles "talk and interact with each other" in plays or puppet shows. Students write and perform skits that integrate sophisticated concepts such as conductivity, kinetic energy, and the expansion and contraction of matter. Dooner is often faced with the students' desire to tell the story of the particles. But Dooner does not allow her students "to distance themselves from the action"; instead, she challenges them to put themselves in role. And they do—by representing various concepts through their particles' speeches, actions, and dress. She takes this one step further when students create "a 'love story' (of great attraction and of great heartbreak) as particles become either solutions... or heterogeneous mixtures."

Even more fascinating is Dooner's role-play of the heart-system—a role-play that involves her entire class.

After learning about specific white blood cells (lymphocyte B and T cells, neutrophils, macrophages) and the action of antigens, we learn how they circulate in our body both through the lymphatic and the circulatory systems. Once the kids have learned specifically about the system of the heart and how blood travels, we transform our entire classroom into the heart system (picture it... lots of tarps, only flashlights... with kids making the pumping and gushing sounds associated with the workings of the heart...). The classroom door becomes the inferior and superior vena cava. People that show up (this is during Halloween so other classes are invited to participate) become antigens entering the body. The antigens travel through shaking tables covered with cloths that act as the right atrium and ventricle (and kids who act as the tricuspid valve allow them to pass...). Using tarps, the antigens travel by means of the pulmonary artery while kids acting as lymphocytes (B and T) and neutrophils hide and try to attack the antigens (respectfully). Kids (with fans and billowing cloths) become the lungs (very bossy) and order the blood to rid itself of CO<sub>2</sub> and take in O<sub>2</sub>. The antigens (by this time, usually frightened...) then

move through the pulmonary vein and enter the left atrium and ventricle with kids acting as the mitral valve (allowing the antigens to pass to the ventricles). Finally, the antigens make their way into the aorta where nutrients in the blood demand that the blood (and the antigens) make their way to the tissues (and out the classroom door). The antigens are usually being chased by a lymphocyte or two... (A.M. Dooner, personal communication, December 14, 2005)

Just imagine the endless possibilities that one could tie into such a lesson! A student could imagine herself in the role of a reporter—shrunk down to a microscopic size—reporting back on her voyages through different bodies (a healthy body, a heavy smoker's body, etc.). Imagine the interest and excitement that such an activity would generate: "The most fascinating part of my voyage..." "I was terribly frightened when..." "I was shocked and horrified to find..." When students become experts in an area of study they feel intelligent, empowered, and invigorated; their thirst for knowledge grows because learning itself is a joy—both challenging and rewarding.

Fresh from student teaching, I began my teaching career at a middle school with some amazingly creative and energetic teachers. In the last two weeks of the school year, our team (composed of four classes) integrated all the academic subjects, art, and physical education into an intensive role-play activity dubbed "Utopia." Along with current events, we had been examining ancient civilizations and world cultures. We pondered such questions as: Why do civilizations form? Why do global organizations exist? How can we make our world function more effectively? Why do wars happen? Utopia is a highly elaborate role-play that pushes students to explore how and why the world exists as it does and how, or if, we can create a more utopian world for ourselves.

Each classroom became a continent; and each continent subdivided into seven countries composed of groups of four students. Students were given information cards outlining the various particulars of their imaginary nations—natural resources, fertile lands, water resources, etc. They named their countries, designed flags, composed national anthems, and drew up laws. We held international meetings to debate global political issues, and countries competed against one another in the Olympic Games. Each nation created their own national sport.

Students also performed tasks in order to accumulate revenue. For example, they designed and sold products, based on the natural resources of their country, to other people in the world. All students voted on which products they would buy; and countries were awarded resources based on the voting results. This revenue came in the guise of resources: students received cards with cattle, hay, water, and gas stamped upon them. Countries had to "trade" cards with each other to reach the utopian state of having enough food, water, shelter, environmental protection, and natural resources for everyone.

Then, disaster struck. Students rolled the dice of chance. Some countries were hit with natural disasters while others lost their harvests because of drought. Soon, war followed. Countries were

allowed to attack one another (using dice—highest rollers win) to win resources. Some countries got selfish. They wanted more than enough cards and didn't care that other countries were poverty stricken. Some countries, however, shared with others. Our debriefing exercises after this activity were fascinating. I am proud to say that a number of my students figured out that there was enough for all if they shared—no one had to go without. The green-eyed monster was, however, rampant at times; and students looked at their own wars as microcosms of those in history.

Throughout this article, I have discussed one teaching tool: role-play—it is, by no means, the only one. In order to be effective teachers, as Leier (2005) notes, we need "to use a range of teaching methods, from lectures to dramatic readings to films to singing to creative assignments, from using primary documents such as diaries to using the internet." In addition to this, we need to ensure that we awaken a sense of wonder in students by making the topics we choose to teach alive and exciting. Luckily, human history has been and continues to be plagued with strange and weird occurrences. It takes very little to inspire human beings to commit atrocious acts of violence/degradation or to immerse themselves in bizarre experiments. The list is inexhaustible—the regimes of Stalin and Hitler, the marriages of Henry VIII, sending monkeys into space, cannibalism, scientific cloning experiments. Even the things that we take for granted today such as cars, bicycles, airplanes were once thought to be strange and different ideas. It's not hard to find something that will fascinate one's audience. Virtually anything can be fascinating with a little bit of wonder and a touch of role-play.

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# IMPLEMENTING AN IMAGINATIVE UNIT

## Wonders of the Water Cycle

*Margo Hrennikoff*

### My Curricular Problem

The grade three curriculum set out by the British Columbia Ministry of Education has four categories for science: Processes of Science, Life Science, Physical Science, and Earth and Space Science. Within each of these categories there are numerous topics to teach. For example, the physical science curriculum requires students to learn about magnetism, energy, matter, and sound. In addition, students are expected to be able to classify, demonstrate, describe, create, distinguish, identify, evaluate, classify, compare, and infer different aspects of each of these topics as needed. This is an overwhelming task and covering all the material in a meaningful way, so that every child develops and expands their concepts, is a challenge, to say the least.

In the Integrated Resource Package that outlines the curriculum for life science, students are to learn about the life cycles of different plants and animals and compare them. Students are to learn what each needs for survival, discuss the environment, fossils, endangerment, and extinction. In an effort to tie these topics together I decided to introduce the water cycle as a basis for understanding what students are required to learn about plants and animals.

The following unit is based on Kieran Egan's *mythic* framework. My aim is to introduce the students to how plants and animals (including humans) are connected to the water cycle and explore these topics in depth in later units. As future science units will explore these topics in greater detail, this unit will provide a basis for future learning. Interconnectedness is the main concept to be developed in this unit.

### 1. Identifying Importance

It is important for children to realize how necessary and precious water is. It is essential that children understand how water connects plants, animals, and humans to each other. It is fascinating that the water we use everyday has been around since the beginning of Earth. The very same water we drink, that composes 70% of our bodies, is the very same water that dinosaurs, cavemen, and your great-great grandparents drank and used daily. The only way new water enters the cycle is from icy comets entering our atmosphere.

**Emotional Engagement:** The incredible fact that the water we have on Earth today is the same water that existed when the Earth was formed.

### 2.1 Finding Binary Opposites

Movement (motion) and stagnation (stillness) embody the essential elements of the water cycle. Water is in constant motion. Whether it is solid, liquid, or gas, the molecules vibrate and move

depending on how much energy they possess. The continuous motion of the water cycle ensures that water is cleaned and used where it is needed. Water molecules are never still, but water is sometimes trapped within rock beds or glaciers or even within a loop between evaporation and precipitation. The water cycle is not a predictable and perfect cycle; sometimes water stagnates in oceans, glaciers, and rock layers for thousands of years or more. Although the water seems still in these places it is really in motion as the molecules gain and lose energy.

As water moves it rejuvenates itself and nourishes life; however stagnating water can bring disease and danger. If water does not flow to plants and animals they will die. The constant movement of the water cycle is essential for life on this planet.

### 2.2 Finding Images and Drama

I have created the character of Walter the water molecule to help highlight the interconnectedness of the water cycle. The unit illustrates how the movement of water enables life on our planet.

The water molecule (Walter) has been around since the beginning of Earth's life exploring every corner of the planet. This reflects the binaries of motion and stillness. Walter moves throughout the cycle changing forms yet he can become trapped, and it may seem like he is still. Walter's movement (along with his water molecule friends) is a necessary part of the health of plants and animals. Considering that only 3% of the water on Earth is fresh (drinkable) water and of that 2% is trapped in ice, only 1% of the water on Earth is accessible to drink. This stagnation (trapping) of the majority of the water (within oceans and ice) creates an environmental problem. If we are not responsible with our water use then there will not be enough water for all the plants and animals, including humans, to survive.

### 2.3. Organizing Content into Story Form: An Overview

Once Walter is introduced he is referred to throughout the lessons. It is important for students to see Walter as a character as we discuss how he changes (gains and loses energy). Students will understand that as Walter loses energy he moves closer to other molecule friends and as he gains energy he runs around and bounces off other molecules as they all spread apart. Discovering that Walter needs to evaporate, condense, melt, freeze and precipitate to travel around the globe helps students understand the movement of water throughout the cycle.

Unit two continues the story as students learn how Walter is connected to all aspects of the environment. Students will under-

stand all the places water travels to and see how it can get trapped and become unusable to plants, animals, and humans. Students will see the essential interconnectedness of water and appreciate that the movement of water is necessary for the health of our planet.

## Unit 1

### LESSON 1: THE INTRODUCTION OF WALTER THE WATER MOLECULE

A long time ago, before you were born, before your parents, grandparents, great, great, great, great grandparents were born; in fact, before there were any people on Earth, there was water. Water was on Earth before the dinosaurs, before the trees and even before the oceans. When the earth was born it was made of layers upon layers of rock. (At the very centre of the earth the rocks were so hot that they were liquid. This is called magma. The core of the earth is still molten rock, and we sometimes see this when it erupts out of volcanoes as lava.) As these layers formed, volcanoes grew and started to erupt. As the lava, rocks, gases, and water exploded out of the volcanoes water began to collect and formed the oceans we have today along with lakes and rivers. The presence of water allowed life to begin growing on our planet. If we did not have water then we would not be here today.

Walter had been around watching all of this happen. He remembers being shot out of the mouth of a red-hot volcano and falling gently into the oceans that were beginning to form. His ride had been better than any ride at Playland! Walter had been there at the beginning because he is a water molecule, and he has been exploring the world forever. Walter usually travelled with friends as he moved around the globe, and today is no different. Today Walter is moving around wherever the ocean tides take him. He enjoys the ocean because it is so big, and he always discovers something new with every trip.

#### *Activity:*

Why is the Earth called the Blue Planet?

The oceans cover 71% of the earth's surface. In fact there is so much water on our planet that it is called the blue planet. Let's find out why Earth has this name.

Students will observe the earth from space as it rotates. NASA has a web site that nicely illustrates how blue the earth is and how much of the earth is water. The class will then discuss what they saw.

#### *Conclusion:*

The earth is called the blue planet because from space you can see more ocean than land. From space Earth looks mostly blue. Like Walter, the water that moves around our planet today is the same water that has always been here. The water never leaves our planet and it never dies or goes away. Sometimes new water is added to our supply, for example when icy comets hit the earth, but most of our water has been here since the beginning of Earth. It is amazing

to think about where the water we drink everyday has been. The last glass of water you drank may have been the same water that dinosaurs drank, or maybe it was trapped in a glacier for millions of years, or maybe it had been inside a great white shark. The possibilities are endless.

#### *Activity:*

Where has water been?

Students will sit in groups of four and brainstorm a list of all the places the water they drank earlier today could have been. This brainstorming activity is called a place mat brainstorm. Students are given a large piece of paper (11X14) and divide it into four parts. Each student writes their ideas down as they share them aloud. It means that everyone is involved in the activity and everyone shares ideas. Once students are done they will share their ideas with the class.

#### *Conclusion:*

Water is an essential part of our planet and the lives of animals and plants are deeply connected to it. The water cycle is what we call the movement of water throughout our environment.

### LESSON 2: MOLECULE

#### *Discussion:* What is a molecule?

Everything in the whole wide world is made up of atoms—your chair, your desk, your hair, your bed, your pencil, the smallest bug, and the biggest whale. Even Walter is made of tiny particles or pieces called atoms. Atoms are not normally found by themselves. Usually, atoms bond or attach together. When atoms bond together they form a molecule. (An atom is like a baseball player all by herself. When all the players are together then they form a team. When atoms are together they form a molecule.) Molecules are also incredibly tiny. They are smaller than one grain of sand. In fact they are so tiny you can't even see them! For example, one droplet of water has 10 billion molecules in it!!

#### *Demonstration:*

Using an eye dropper, show students one drop of water and inform them that it has ten billion water molecules in it.

One water molecule, like Walter, is made up of two hydrogen atoms and one oxygen atom. When the two hydrogen atoms and one oxygen atom get together they make a water molecule. So this team has three players (two hydrogen and one oxygen) and when they all come together they form a team called a water molecule. Draw this image so students have a picture of it in their minds.

#### *Activity:*

What does Walter look like?

Give students three circles—two smaller (same size) and one larger. Students then label these circles hydrogen and oxygen. Students will then glue these circles together to form a water molecule like

Walter. Once the molecule is glued together students will fill in the sentences below with their new information about water molecules.

### LESSON 3: ENERGY

#### *Discussion:*

I hope you remember where Walter was when we left him. That's right he was in the ocean with billions of friends. Walter isn't always with his friends. Sometimes he is all by himself floating through the air without a care in the world. When he is by himself he has so much energy he bounces around doing whatever he wants. Other times Walter doesn't have as much energy, and he likes to hang out with his friends, like he is now in the ocean. There are also times when Walter has very little energy, and he sticks really close to his friends.

Walter, like all water molecules, can transform into three states (forms). I know that Pokemon can change and become different characters but water molecules can become three different things! "What makes Walter and his friends change states?" you ask. Good question. Water molecules change states depending on how much or how little energy they have, and they get energy from heat, like the sun or an oven.

Sometimes Walter has lots of energy, and he bounces around just like you do when you run around the playground. At other times Walter has very little energy, like when you don't get enough sleep or enough to eat. What do you do when you have little energy? Like you, when Walter has little energy he moves slowly.

#### *Prediction/Demonstration/Observation Activity:*

Students will discuss and then predict what will happen to water molecules as they gain energy and lose energy. Students will record their thinking on a prediction/observation sheet.

#### **Prediction.**

Let's think about all the molecules that are in this bowl of water. Remember that one drop has ten billion molecules. What do you predict would happen if this water was heated up? Class discusses.

Now we are going to think about what will happen to the water molecules as the water is heated up. Talk with people at your desk about what you predict will happen to the water molecules. Write your predictions down.

What do you think will happen if this water is cooled down?  
Discuss your predictions.

Now we are going to think about what will happen to the molecules as the water cools down. Talk with your desk partners and write down your predictions.

#### **Demonstration.**

Discuss the predictions students made about water molecules as they heat up.

Students will now observe a kettle boiling. Pour the water into a glass bowl so students can observe the water. Discuss what is happening with the class. Tell me what you notice.

We see steam and this is called water vapor. This is a gas. The water began as a liquid and now it is turning into a gas. The water molecules are gaining energy as they are heated. As they gain energy they begin moving further and further apart, bounce off each other, and become a gas. Heat gives water molecules more energy so they move faster and are able to escape from each other and move freely in the air. When water molecules are heated at or above one hundred degrees celsius they move apart and become a gas. Students record observations.

#### **Demonstration.**

Discuss the predictions students made about water molecules as they cool down.

Students will observe ice and discuss what they notice.

We see ice and the water is frozen. When water turns into ice this is called a solid. As molecules cool they lose energy and move closer together, thus forming a solid. When water molecules are put in a cold place (where they don't get enough heat) they lose energy and move towards each other. When water molecules are cooled below zero degrees Celsius, they reach the freezing point and form a solid. Students record their observations.

#### *Conclusion:*

We observed that when water molecules are heated up they move apart from each other, and when they are cooled they move closer together. As molecules gain energy and lose energy they change states.

### LESSON 4: MOLECULES CHANGING STATES

#### *Activity:*

Students pretend that they are a water molecule. They are reminded that two are hydrogen atoms and one is oxygen. Together, they make up one water molecule. As a class we will pretend to be a liquid, a solid, and a gas and move around the room accordingly.

Show me what you would do if you were to heat up and gain energy.

Now show me what you would do if you cooled down and lost energy.

What would you do if you had lots of energy, and what would you do if you only had a little energy? What would you do if your energy was medium?

#### *Conclusion:*

Heat affects water molecules and the energy of these molecules determines its state. Water is the only substance on earth that exists in three forms.

*Discussion:*

Molecules always have some energy, therefore they are always moving, even if it is only a little bit. When they are a gas their energy is high and they move a lot and take up a lot of room. When they are a solid their energy is low and they only move slightly. If the molecules are heated (maybe by the sun or an oven) they gain energy, and as molecules lose heat they lose energy.

It is easy to think that molecules stop moving when they are in a solid form but this is not true. Although they don't move very much they continue to vibrate slightly even when in a solid state. A solid is like you when you're sleeping. Even though you are still (not moving) your lungs are moving, your blood is pumping and many other parts of you are in motion. A molecule is the same. Even though it may seem still, it actually has energy and is moving.

*Conclusion:* Molecules have energy therefore they are continuously moving. Although water molecules change forms they continue to move.

## LESSON 5: PICTURE IT

Begin the lesson with a brief discussion reviewing how molecules change states and what three states they become.

*Activity:*

Students will draw what water molecules look like in each state. Discuss that when water molecules heat up to or beyond one hundred degrees celsius they become a gas. These molecules gain so much energy that they move far apart and change into a gas. They float in the air bouncing into each other and anything else in their way. Discuss what gives molecules energy. Think of some examples of a gas.

When water molecules cool down below zero degrees celsius they become a solid. They lose so much energy that they move close to each other and turn into a solid. Discuss when molecules would lose energy. Think of some examples of a solid.

When water molecules are between a solid and a gas they are a liquid, like the water we drink. They are warmer than zero degrees celsius and cooler than one hundred degrees celsius. The molecules are close together but not too close. Think of when molecules would be in a liquid state and discuss some examples.

## LESSON 6: MOVING WATER

Read *The Snowflake, A Water Cycle Story* by Neil Waldman.

*Activity:*

Now let's think about where we would find water in a liquid, solid, and gaseous state. Let's brainstorm some ideas. Write down student's ideas on chart paper and label each column as a solid, liquid, or gas. Label the following main ideas on the chart.

*Discuss:*

To change states the molecules would need to gain energy or lose energy. How do they gain energy (heated)? How do they lose energy (cooled)?

Let's think about Walter, our water molecule. As he sits in the ocean what form is he in? (Liquid) Now let's pretend the ocean Walter finds himself in is the Arctic Ocean in the dead of winter. What might happen to Walter and his molecule buddies? (Freeze – as they cool they lose energy and huddle close together therefore forming a solid – ice) Have some students stand up and act this change out for the class. (Begin by holding hands as they loose energy the molecules huddle together and lock arms.)

- ♦ Water molecules become a solid when the temperature is zero degrees celsius or below. This is called the **freezing point** and the molecules form ice.

Walter and his molecules friends float around the freezing waters of the Arctic as ice. Show some pictures. They begin to drift southward. As they float the sun shines brightly, and they start to warm up (gain energy!) What will happen now? (Turn back into a liquid – gain some energy so they separate from each other more but still remain connected.) Have some students act out this change for the class. (Begin by huddling together with arms locked together. As they gain energy they loosen their grip on other molecules and just hold hands.)

- ♦ **Melting point:** when a solid is heated, the temperature rises and the molecules gain energy and move apart and the solid melts into a liquid form.

The sun continues to shine and Walter begins to heat up even more. What will happen to Walter as he continues to gain energy? (Turn into a gas – evaporate - break the bonds with other molecules and rise out of the ocean and float upward on his own.) Have some students act out this change for the class. (Begin by holding hands then drop hands and move freely around the room.)

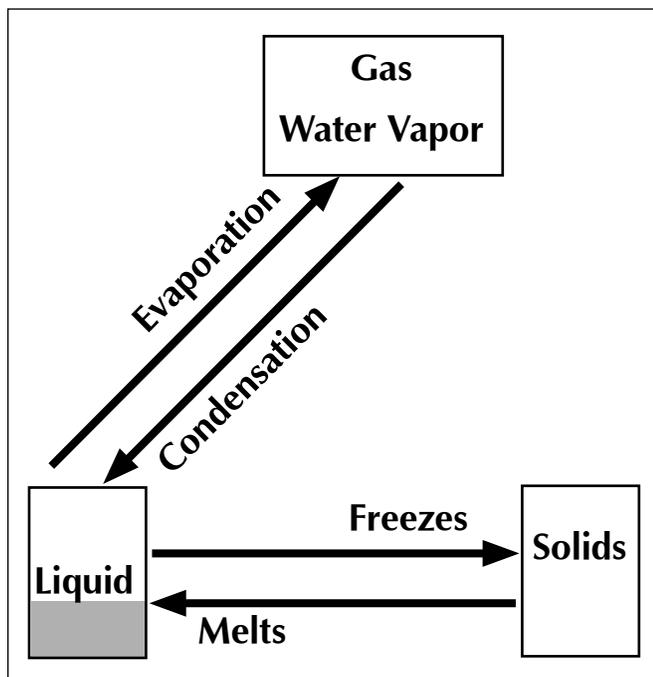
- ♦ **Evaporation:** as a liquid heats up the molecules gain energy and escape into the air as gas—molecules on the water's surface have the energy to evaporate and form water vapor.

- ♦ **Water vapor** is water that becomes a gas when heated.

As Walter floats higher and higher above the ocean the air begins to get cooler. When Walter and the other molecules lose energy they start to move together again and form a liquid. (After the gas has risen, it may lose energy. If the water vapor loses energy, it will turn back into a liquid.) This is called condensation. **Condensation** happens when water molecules, like Walter, turn from a gas into a liquid.

## LESSON 7: THE THREE STATES OF WATER

Review the chart the class created in the last lesson and discuss the main ideas again. Draw a chart for the class showing this information.

*Activity:*

Students create their own poster of this cycle for their science book.

*Drama Activity:*

Students will be put into groups of five and will act as water molecules changing states. Students will perform these in front of the class and will tell us what happens as they change from state to state (i.e.: we are in a glass of water, now the water is being put in the freezer, then put on a table and then the sun shines on the water all day long).

## LESSON 8: CONDENSATION AND CLOUDS

When Walter sits on the ocean's surface with his friends they are heated by the sun. As the temperature increases Walter gains energy and breaks his bonds/attachment with other molecules. He begins floating above the ocean as a gas called **water vapor**. Once Walter is water vapor he is a molecule on his own.

The higher Walter goes the colder the air gets, and he starts to lose some of his energy. The same thing happens to other molecules, and they can't stay apart so Walter and the other water vapor molecules begin attaching to each other and to particles/pieces of dust, dirt, pollen, salt, or anything else in the air. As they attach, these molecules change from a gas back into a liquid (droplet) and start to form a cloud. This process is called **condensation**. A cloud, therefore, is a liquid, not a gas.

As Walter and his molecule friends sit in the cloud, the cloud continues to slowly rise. The higher the cloud gets the colder the air is and more condensation occurs. The cloud starts to get full of

water! Once the droplets cannot hold any more water they are too heavy to sit in the cloud so they fall out of the cloud as rain. Walter and his friends fall to the Earth and this is called **precipitation**. Rain, snow, hail, and sleet are all types of precipitation.

If the cloud's temperature is zero degrees celsius or below, the vapor condenses as ice crystals not water droplets. When this happens it will not rain it will snow, hail, or sleet (liquid or solid, rain or snow). Eighty percent of precipitation falls into oceans. A water molecule spends eight to ten days in the air between evaporation and precipitation.

*Discuss:*

As a class, discuss how a cloud is formed and what precipitation is. Create a drawing of the process and discuss.

## LESSON 9: CONDENSATION AND CLOUDS CONTINUED...

*Demonstration:*

Do some experiments with water to show evaporation, water vapor, condensation, and precipitation.

- ❖ Boil some water and watch the water vapor rise up from the water. This is evaporation. **Boiling point:** when a liquid is heated the temperature rises, the molecules gain more energy and break free of each other, thus turning the liquid into a gas. By putting a boiling kettle in front of a blackboard students can see the water vapor. If the kettle is close enough to the blackboard the water vapor will condense on the board, and if there is enough water vapor present the condensed water will join together and create droplets of water that look like it's raining down the blackboard.
- ❖ Some things will make water evaporate faster.
- ❖ Example 1: The wind. When we hang laundry outside to dry, the sun and wind both help to make the water evaporate. The wind blows the water vapor away from above the liquid.
- ❖ Example 2: Surface area. A liquid in a cup will evaporate much more slowly than water that is spilled on a table and covers more area. We can see this when we put water on the chalkboard. It magically disappears but we know that the water is turning into water vapor and evaporating. Once the water condenses on the blackboard, wave a fan/book at the liquid and students can watch it turn back into a gas and evaporate quite rapidly.
- ❖ Put ice cubes into a glass and leave it out for a while. Watch as water vapor condenses on the side of a glass. As the ice cools the water vapor (gas) in the air, water molecules begin to move together and as they attach they form a liquid that condenses on the side of the glass. We can also see condensation happening on windows or on the bathroom mirror after a shower.

*Activity:* Students will create their own picture of how a cloud is formed and label it accordingly. Students should show where

evaporation, condensation, and precipitation occur. They should show an energy source and label the water vapor. To show the molecules changing states students should show what molecules look like as they go through the various states.

## LESSON 10: ASSESSMENT

### *Activity:*

Students will complete the “Tell me what you know” assignment. This assignment asks students to define melting, freezing, evaporation, and condensation, and then to draw the process.

### *Conclusion:*

The same water we still have on Earth today has been here forever. The water molecules don’t go away instead they get recycled through the environment. In the next unit student will explore how water is connected to the oceans, plants, animals, and humans. As a concluding activity we will watch Bill Nye the Science Guy’s video on the water cycle.

### *Conclusion:*

To conclude this unit it is important for students to recognize how water moves. We have mediated the binary opposites of motion and stillness and discovered that molecules do not simply move and stay still, but are in constant motion throughout the water cycle. Students learned that as a gas water molecules are moving more than when they are in the form of a solid. Students used these two ideas to understand that medium-energy molecules exist as a liquid. After learning this students will then apply this knowledge in an example. Understanding how the processes of evaporation and condensation create clouds will help students to see how water moves throughout our environment.

### **Evaluation**

This final assignment will provide me with an insight as to how well each student understands the concept of a water molecule and its changing states. Having students both write and draw about the concepts allows students to fully show their understanding despite any difficulties they may have with language and writing.

## **Conclusion**

Overall I was extremely pleased with my unit on the water cycle. I thoroughly enjoyed the lessons and my students were successfully engaged. They speak about water with a new level of confidence and understanding. My students seem to have a better appreciation of the world around them, and they see how their new knowledge connects them to the earth. They understand that the water we drink has been around since the beginning of the earth and that it cycles throughout the globe. The enthusiasm and excitement of my students has invigorated me and motivated me to further engage and nourish their imaginations.

Having students understand the scientific aspects of a concept is important. In the past I have taught about the water cycle but have not stressed the need to understand molecules or where water

came from. I would briefly teach what molecules were and then moved on to what they look like as a solid, liquid or gas. In this unit, however, I took the time to discuss how water became a part of our Earth and how interconnected it is to everything on the planet. Students learned what molecules were and how they worked in regard to energy. I feel that I have been able to establish why water is an important concept and have built a stronger understanding of how and why molecules change forms. Prior to this I think my students were missing the notion of why it is important and how this information connects to other things they know. Inviting students to discover things they don’t know requires a sense of purpose: “Why should I learn this?”

Imaginative education showed the relevance of subject and engaged my students in a meaningful way. It is important for students to understand how precious and necessary water is because it is essential to our survival. By engaging my students emotionally in the topic I was able to arouse their sense of wonder and motivation for learning. I agree with Kieran Egan’s view that “a sense of wonder and an emotional response to material are important in engaging students’ imaginations” (2004, p. 35). I feel that once I located the wonder in my topic, not only was I excited, but so too were my students.

This unit reflects Egan’s mythic framework and many of the cognitive tools associated with this stage were incorporated into the lessons. Binary structures were used to help students mediate their understanding of water. In order to make sense of the fact that water molecules are in constant motion students began lesson three by predicting what would happen to water molecules when the water was heated up and cooled down. Many students predicted that molecules in frozen water would not move and molecules in boiling water would move really fast. Beginning with the students’ intuitions I was able to introduce the idea that water molecules are always moving even if it is very slowly. Students were introduced to the scientific concept that as water molecules lose energy they move closer together and as they gain energy they spread farther apart. Students could then determine that molecules with less energy move less and molecules with more energy move more, but water molecules are never perfectly still.

Metaphor also helped to develop the scientific concept of water. For example, in lesson three, as I introduced energy, I compared the energy of a student to that of a water molecule. I feel that metaphor helped my students better understand the content I was teaching. Students also used metaphor to explain their thinking, for example one of the students compared molecules gaining energy to a war.

The tools of imagery and narrative were also used in this unit. Although I introduced the lesson with a story of how water came to be on the earth, the image of Walter the water molecule became a more powerful tool for my students. For example, when students drew water molecules, they showed three atoms. This showed me that they had truly internalized the concept of what made up a water molecule. As we discussed the changes that water went through as solid, liquid, and gas students could invoke the image of Walter and

his water molecule friends to understand how water changed forms. This proved to be an invaluable tool as students could easily act out what molecules did during evaporation, condensation, melting, and freezing. This image continued to be powerful as some students drew molecules talking to each other as they changed states.

Imagery enabled my students to show something they could not see and thus encouraged them to think abstractly. Vygotsky believes that “from the point of view of development, creating an imaginary situation can be regarded as a means of developing abstract thought” (1978, pg. 103). Because my students had an image of a water molecule, they could picture the abstract processes involved as water changes states. In the past having students understand these processes was extremely difficult, however this year I felt my students had much more success and developed a deeper understanding of the processes. Students, for example, were able to think of situations where condensation and evaporation may occur.

Stories were used to introduce my unit and were continued throughout. Although the beginning story and the image of Walter engaged my students in a powerful way, I would like to develop this story in a more substantial way. Picture books furthered the ideas we were developing, helped students make meaningful connections, and offered new perspectives. In the future, when I end unit two, I intend to have students write their own adventure story of water. I feel that this will be an excellent way for students to show their understanding of how water moves and is connected to the environment.

Rhyme also proved to be an excellent tool to aid the memory of my students. Many of the terms used in the water cycle were a challenge for my students. To improve their memory of the difficult and complex words I found a song on the Internet ([www.proteacher.net/archive/posts/2001/03/24/12048.html](http://www.proteacher.net/archive/posts/2001/03/24/12048.html)). My students love it and are now able to pronounce these words correctly.

Many of these tools allowed everyone in my class, regardless of ability, to develop their understanding of water. The image of Walter, for example enabled them to understand what molecules do as they gain and lose energy. The rhyme of the song helped all students figure out how to pronounce difficult words and remember the processes involved in how clouds are formed. The tools sug-

gested by Egan for developing *mythic* understanding have been very successful, and I feel satisfied that these tools lead to an improvement in my curriculum and instruction, as well as the learning of my students. The notion of concept development empowered me to be more purposeful and directive in my teaching. Conversation provided the opportunity to mediate my students' understandings. Concept development, imagination, and wonder have become the starting point of my practice, and I look forward to developing this into more units in the future.

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# THEORETICAL CONCERNS

## Vygotsky on Imagination Development.

Natalia Gajdamaschko

Lev Vygotsky was an educational theorist and psychologist of extraordinarily wide knowledge whose major writings deal with our entire learning-teaching-development experience. Despite a wide-ranging interest in Vygotskian theory, the issue of imagination remains outside of the main line of general inquiries into his work. Thus, there is a gap in the list of “Vygotskiana” topics that are studied in North America and Vygotsky’s writings on the imagination and its development have only recently become a topic of discussion. This article attempts to fill the gap.

To understand Lev Vygotsky’s (1986–1934) views on the development of imagination, it is necessary to recognize that he did not accept a narrow view of imagination as some sort of innate and relatively stable capacity of a child or adult—a capacity that does not change over time and is not necessarily connected to the intellectual development and/or cultural development of the individual. This interpretation of imagination is common among North American educators, many of whom consider imagination to be an unconscious, or semi-conscious, autistic, spontaneous capacity. For them, imagination plays out in childhood conflicts but is not influenced by teaching or learning processes in school. This idea of imagination is obviously closely tied to the specific notion of development itself, which is viewed as a set of gradual maturation processes separate from learning-teaching (*obuchenie*).

This concept of imagination separates the role of imagination development in children’s development from their cultural development or from their intellectual abilities, and it denies the link between the development of imagination and the processes of learning-teaching. At the same time, it has also reduced the choice of methods and instruments that educators can use to evaluate and assess the development of imagination and the types of interventions that are possible to help develop children’s imagination.

As we shall see, Vygotsky views the development of imagination as a part of the cultural development of the child’s personality. He claims that in school the imagination undergoes a revolutionary shift that profoundly impacts students’ cultural development, intellectual development, personality, behavior, and ways of understanding and making sense of world. According to Vygotsky, it is in this imaginary world of imaginary heroes, testing of boundaries, and imaginary intellectual games that the real battle for the development of personality, identity formation, and development of thinking is fought out during school years. Thus, we cannot overemphasize the importance of a detailed analysis of imagination development during the school years.

Vygotsky wrote a century ago

Somehow our society has formed a one-sided view of

the human personality, and for some reason everyone understood giftedness and talent only as it applied to the intellect. But it is possible not only to be talented in one’s thoughts but also to be talented in one’s feelings as well. The emotional part of the personality has no less value, than the other sides, and it also should be the object and concern of education, as well as intellect and will. Love can reach the same level of talent and even genius, as the discovery of differential calculus. Here and there human behavior has assumed exceptional and grandiose form. (Vygotsky, 1983, Russian edition. Vol. 3 p 57)

Our dealings with school children, especially adolescents, are tainted by contradictions in the narrow views we hold of this transitional period in their lives. On the one hand, we have a tendency to view adolescents purely in terms of their emotional functions. We even coined the phrase “crisis of adolescence” because it is commonly understood that the emotional lives of teenagers becomes much more complicated, and at times, they are simply difficult to deal with. On the other hand, in school, we view them as mature students who have finally arrived at the point in their intellectual development where we can now “feed” them real scientific and theoretical knowledge because they are now capable of thinking in abstract concepts and learning formal science. However, it is at this very moment that they seem to lose an interest in schooling altogether. We are also not so sure about their volitional abilities, especially at a time when they want to motivate themselves, and we start to doubt that they even possess self-regulatory skills at all. The biggest puzzle is: Why do they become so very “secretive”? We suspect that it is because “they have something to hide from us” (their sexual or aggressive drives, for example). We often observe them during moments of daydreaming and fantasizing.

Consequently, educators often find themselves somehow at a loss in dealing with all these contradictions, and even worse—simply do not know what to do with these children and teenagers. Instead of enriching their experience, we turn our attention to safer topics.

One final reason that we have neglected the detailed study of the development of imagination as a part of the cultural development of school children is due to theoretical beliefs. While there is a little doubt that the study of imagination is important, apparent contradictions exist in the way we approach this subject theoretically. In recent years, the urgency of reviewing the general theoretical framework in our approaches to imagination has been apparent.

## What was Vygotsky's understanding of development?

Because traditional child psychology does not distinguish between biological and cultural lines of development, Vygotsky judged that it overlooks the main problem of child psychology—the problem of the development of the child's personality. He wrote

Only a decisive departure beyond the methodological limits of traditional child psychology can bring us to a study of the development of that same higher mental synthesis that, on a solid basis, must be called the personality of the child. The history of cultural development of the child brings us to the history of development of personality. (Vygotsky, 1997, Vol. 4, p. 26)

Vygotsky's research led him to conclude that the traditional psychology of development could not handle the task of researching cultural development properly. He argued,

Child psychology did not know the problem of higher mental functions or, what is the same, the problem of cultural development of the child. For this reason the central and greater problem of all psychology, the problem of personality and its development, still remains closed. (Vygotsky, 1997, Vol.4.p.26)

"Even now," Vygotsky continued, "many psychologists are inclined to consider the facts of cultural changes in our behavior from their natural aspect and think of them as facts of habit formation or as intellectual reactions directed toward a cultural content" (Vygotsky, 1997, Vol.4, p.92).

Vygotsky offers a critique of Piagetian theory. He wrote that for Piaget "the process of development appears to be a process that is governed by natural laws and happens as a maturational type of the process of development, and learning-teaching (*obuchenie*) is interpreted only as a pure "vneshnee" (*coming from outside*) utilization of possibilities that are appearing in the process of maturation" (Russian edition, Vol 2. p. 252) (English, similar translation in Vygotsky, 1987, Vol. 1, p. 194).

This understanding of development has its own methodology, which corresponds to its assumptions. For example, the study of psychological development is designed to minimize the influence of the concrete content of the testing tasks. The "typical expression of this kind of position," Vygotsky wrote, "is an attempt to very carefully divorce what is coming from development, and what is coming from learning-teaching (*obuchenie*), take the results of both processes in their pure and isolated form" (Vygotsky, Russian edition, Vol.2, p. 252) (Similar translation in English in Vygotsky, 1987, Vol. 1 p.194).

For Vygotsky such a position signifies a reduction that leads to the absence of certain critical elements of imagination such as the absence of culture and history in the child's development, and, ironically, the absence of the child and the personality of the child, in the process of development. He explained, "What is missing, then, in Piaget's perspective is reality and the child's relationship

to that reality. What is missing is the child's practical activity. This is fundamental. Even the socialization of the child's thinking is analyzed by Piaget outside the context of practice" (Vygotsky, 1987, Vol.1, p. 87).

Moreover, such a position doesn't take into account the mediated nature of cultural development, and thus it does not really explain development as Vygotsky views it. Vygotsky suggests that in the process of development, the child "arms and re-arms himself with widely varying tools" (Vygotsky, 1997a, Vol.3, p.92). This idea is central to Vygotsky's views on development in general and development of imagination in particular. Only the acquisition of cultural tools allows the transformation from lower natural functions to higher (cultural) functions. This transition is the one that might lead to the conclusion that Vygotsky viewed the development of children as a process of self-development with the help of psychological tools that the child internalizes and that change the inner make-up of the child's personality. He wrote

If we seriously consider the fact that with the knot tied for remembering, the man, in essence, constructs externally a process of remembering, the external object compels him to remember, that is, he reminds himself through an external object, and, in this way carries out a process of remembering as if externally, converting it to external activity, if we consider the essence of what occurs here, this one fact can disclose for us all the profound uniqueness of higher forms of behavior. (Vygotsky, 1997, vol. 4, p. 59)

And, he continues

The very essence of human memory consists of man actively remembering with the help of signs. In general, the following might be said about human behavior: in the first place, his individuality is due to the fact that man actively participates in his relationships with the environment and through the environment he himself changes his behavior, subjecting it to his control. (Vygotsky, 1997, Vol. 4, p. 59)

Warning against a mechanical understanding of the role of "psychological tools" in the child's activity, Vygotsky explained that not everything could be a tool. If something "did not have the capacity to influence behavior, it could not be a tool" (Vygotsky, 1997, Vol. 3, p. 87). In this sense, the only context that would matter would be one that changes something in a child's personality. Following the Hegelian idea that internalized cultural tools empower a child in her development, Vygotsky considered the mediated nature of psychological functions to be one of the most important mechanisms of development.

At the same time, this idea of mediated development leads directly to the conclusion that context is intimately involved in this process, thus schooling and teaching in general should play a major role in imagination development:

One of the most fundamental ideas in the area of the development of thinking and speech is that there can be no fixed

formula that determines the relationship between thinking and speech and that is suitable for all stages of development and all forms of loss. In each stage of development and each stage of loss, we see a unique and changing set of relations. (Vygotsky, 1997, Vol. 3, p. 92)

Similarly, in describing the development of the imagination, Vygotsky stresses that imagination does not develop all at once, but very slowly and gradually. It evolves from more elementary and simpler forms into more complex ones. At each stage of development, it has its own expression; that is, each stage of childhood has its own characteristic form of creation. Furthermore, it does not occupy a separate place in human behavior, but depends directly on other forms of human activity, especially the accrual of experience. Vygotsky highlights the importance of the connection between imagination and conceptual thought:

What is substantially new in the development of fantasy during the transitional age is contained precisely in the fact that the imagination of an adolescent enters a close connection with thinking in concepts; it is intellectualized and included in the system of intellectual activity and begins to fulfill a completely new function in the new structure of the adolescent's personality. (Vygotsky, 1998, Vol. 5, p. 154)

What all these examples suggest is that to study the development of psychological functions, we have to account for a number of things simultaneously. Psychological functions (including imagination) develop throughout childhood not only by the acquisition of the cultural (psychological) tools created by society, which become the content of a child's psychological activities, and not only by restructuring the psychological functions themselves as they form a cultural line of development. They also develop by forming new interfunctional connections in the new psychological systems. And Vygotsky adds that it is a mistake to view the process of development only as a structural change of a single psychological function:

In the process of development, it is not so much the functions that change (these we mistakenly studied before). Their structure and the system of their development remain the same. What is changed and modified are rather the relationships, the links between the functions. (Vygotsky, 1997, Vol. 3, p. 92)

Before I move on to discuss his notion of the development of imagination, let me summarize Vygotsky's views on development. Vygotsky's dialectical approach to development contrasts with traditional, more or less linear approaches, such as Piaget's, that analyze development but do not explain the origins of the new cultural psychological structures. When we discuss context, we must not forget that Vygotsky discussed it within the framework of his own unique developmental theory. Vygotsky wrote that "if one holds the point of view [that] the process of intellectual changes that occur at adolescence can be reduced to a simple quantitative accumulation of characteristics already laid down in the thinking of a three-year

old . . . the word development does not apply" (Vygotsky, 1998, Vol. 5, p. 29).

Instead Vygotsky formulated the first law of the development and structure of higher mental functions, which can be called "the law of the transition from direct, innate, natural forms and methods of behavior to mediated, artificial mental functions that develop in the process of cultural development" (Vygotsky, 1998, Vol. 5, pp. 167–168). In Chapter 4 of *Mind in Society*, entitled "Internalization of higher psychological functions," Vygotsky points out that every function in the child's cultural development appears twice: first on the social level and, later, on the individual level. This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relations between human individuals "(Vygotsky & Cole, 1978).

### The controversy between Piaget and Vygotsky about the nature of imagination.

It should be very clear by now that the main theoretical controversy over the development of imagination is between those who, like Freud and Piaget, stress the unconscious, or semi-conscious, autistic, spontaneous characteristics of imagination that play out in childhood conflicts, and those, following Vygotsky, who consider imagination to be an active, conscious process of meaning-making, an attribute of normal thought, and primarily, a cultural psychological function.

Piaget, for example, had worked under the assumption that imaginative thinking is the opposite of realistic thinking (in this he agrees with Freud) and that childish thought, undirected and egocentric, is gradually supposed to be replaced by adult logical, realistic thought. Here, imaginative abilities and realistic thinking are viewed as opposite and even antagonistic characteristics of consciousness.

This theoretical view about the nature of imagination, however, has led us to the conclusion that imagination is a primary, natural process, something that a child is already born with, and that exists regardless of prior school experience or any educational influence. If this is the case, then we, as educators, have no direct ways or means of influencing the process of its development. This divorce between imagination and logical thinking in Piagetian theory is particularly regrettable for one more reason: in a theory where imagination and conceptual thinking are treated as separate (and opposite) entities, there is nothing but a non-communicable and nonverbal, autistic form of egocentric thought connected to the imaginary world of a child.

Reality is far removed from the fantasy of the child. Unlike conceptual thinking, Piaget claims that symbolic imagination is ruled not by "gnostic" but by "pathic" attitudes. This attitude can be described as egocentric and vague. It evokes temporary reason for immediate satisfaction and pleasure. And it is "further and further removed from a real situation" (Piaget, 1962, p.164).

In the first place, just as practical intelligence seeks success before truth, egocentric thought, to the extent that

it is assimilation to the self, leads to satisfaction and not to objectivity. The extreme form of this assimilation to personal desires and interests is symbolic or imaginative play in which reality is transformed by the needs of the self to the point where the meanings of thought may remain strictly individual and incommunicable. (Piaget, 1962, p. 164)

Thus studies of imagination based on these presumptions often turn into efforts to measure its distance from reality. The more the distant imaginative behavior is from reality, the more *original* and *creative* it is deemed to be.

I believe that in classroom practice this theoretical position creates more problems than it solves. In particular, it does not show educators a way they can have real impact on the development of children's imagination.

Vygotsky disagreed very strongly with Piaget's theoretical stance. He considered imagination to be a process directly connected with meaning making—a higher psychological function that has connections not only with emotions but also with intellectual functions. In Vygotsky's view,

This false interpretation of fantasy is due to it being viewed one-sidedly, as a function which is linked to emotional life, the life of drives and attitudes; but its other side, which is linked to intellectual life, remains in the shadow. Moreover, according to the valid observation of Pushkin, imagination is as necessary in geometry as it is in poetry. Everything that requires artistic transformation of reality, everything that is connected with interpretation and construction of something new, requires the indispensable participation of imagination. (Vygotsky, 1998, p. 153)

In his work on imagination and creativity in childhood, he underlines the importance of imagination as the basis of all creative activity:

It is precisely human creative activity that makes the human being a creature oriented toward the future, creating the future and thus altering his own present. This creative activity, based on the ability of our brain to combine elements, is called imagination or fantasy in psychology. Typically, people use the terms imagination or fantasy to refer to something quite different than what they mean in science. In everyday life, fantasy or imagination refer to what is not actually true, what does not correspond to reality, and what, thus, could not have any serious practical significance. But in actuality, imagination, as the basis of all creative activity, is an important component of absolutely all aspects of cultural life, enabling artistic, scientific, and technical creation alike. In this sense, absolutely everything around us that was created by the hand of man, the entire world of human culture, as distinct from the world of nature, all this is the product of human imagination and of creation based on this imagination. (Vygotsky, 2003, p. 9–10)

Vygotsky considered imagination and thinking processes as forming a special unity that helps the child to make sense about the world: "In the process of their development, imagination and thinking are opposites whose unity is inherent in the very first generalization, in the very first concept the people form" (Vygotsky, 1987, p. 78). Moreover, because of this unity, we cannot place imagination at the beginning of the development of the child. Imagination develops as thought develops, and its development is included in the process of development of the child's thinking and conscious meaning-making.

## The role of language in the development of imagination.

Vygotsky also disagreed with Piaget on one more, very significant point: the role of language in the development of imagination. For Vygotsky, language is one of the most powerful cultural tools, and it plays a central role in his theory of the development of imagination. However, unlike Vygotsky, Piaget did not see a connection between language development and imagination development. Vygotsky noticed this difference, when he wrote, "From the perspectives of Freud and Piaget, an essential characteristic of primal child fantasy is the fact that this is a nonverbal and consequently non-communicable form of thought." (Vygotsky, 1987, p. 345).

Vygotsky disagreed with Piaget. He argued that, "The verbal character of thought is inherent to both imagination and realistic thinking" (Vygotsky, 1987, p. 349). He also argued that speech plays an important role in the development of children's imagination. In this regard both imagination and realistic thinking are social and verbal.

Continuing this line of argument, Vygotsky outlined how the development of speech is linked to imagination development as a cultural function. He wrote that

The development of imagination is linked to the development of speech, to the development of the child's social interactions with those around him, and to the basic forms of the collective social activity of the child's consciousness. (Vygotsky, 1987, p. 346)

With good reason, Vygotsky considered the development of speech an important part of the development of imagination. He observed, "Speech frees the child from the immediate impression of an object. It gives the child the power to represent and think about an object that he has not seen" (Vygotsky, 1987, p. 346).

Piaget emphasized the undirected and unconscious, passive, and spontaneous nature of imagination. He saw almost no connection between language development and the development of imagination, and offered no explanation of its development beyond the general mechanism of disequilibrium between assimilation and accommodation, and the general maturation of global symbolic function. In contrast, Vygotsky believed that imagination is always a conscious, active process, intimately connected to the child's language development. The existence of imaginative ability allows

a child to build a world independent of the optical field.

Vygotsky perceived imagination to be a higher psychological or cultural function that enables a child to master his own behavior. As a cultural function, imagination is active and it is a part of the child's cultural experience. Vygotsky invites us to

...consider the domain of artistic creativity in this connection. This domain of activity is accessible to the child at a young age. If we consider the products of this creativity in drawing or story telling, it quickly becomes apparent that this imagination has a directed nature. It is not a subconscious activity. (Vygotsky, 1987, p. 346)

He further invites us to

.... consider the child's constructive imagination, the creative activity of consciousness associated with technical-constructive of building activity, we see consistently that real inventive imagination is among the basic functions underlying this activity. In this type of activity, fantasy is highly directed. From beginning to the end, it is directed towards a goal that individual is pursuing. (Vygotsky, 1987, p. 347)

As we see from the quotes above, Vygotsky considered developed imagination as necessary for the technical-scientific creativity of children, as it is for the arts or any other form of cultural activity. In his opinion, the arts and sciences are not so different, and both demand the cultivation of imagination in our school curriculum.

As the process of imagination becomes more and more intimately connected with the thinking process, it becomes increasingly a part of a child's cultural experience. This cultural experience is an active experience, and as the system of imaginative activities that a child uses for making sense becomes more complex, the child is able to solve more complex problems. At the same time, the child learns about some of the rules for dealing with imaginary and real worlds, and about some common and socially appropriate practices that can be guided by imagination.

### Mastering imagination, mastering culture.

Vygotsky argues that imagination "does not develop all at once, but very slowly and gradually evolves from more elementary and simpler forms into more complex ones" (Vygotsky, 2003, p. 12). At each stage of development it has its own expression, and at each stage of childhood it has its own characteristic form of creation. Furthermore, it "does not occupy a separate place in human behavior, but "depends directly on other forms of human activity, especially accrual of experience" (Vygotsky, 2003, p. 13).

Developmentally, Vygotsky says, it would be strange if we regarded the development of imagination and development of thinking to be fixed. This is one of Vygotsky's most fundamental ideas, the idea that there can be no fixed formula that would determine the relationship between psychological functions that could be suitable for all stages of development. In each consequent

stage of development, the relationship of imagination to speech and imagination to thinking is changing. He wrote

One of the most fundamental ideas in the area of the development of thinking and speech is that there can be no fixed formula which determines the relationship between thinking and speech and which is suitable for all stages of development and all forms of loss. In each stage of development and each stage of loss we see a unique and changing set of relations. (Vygotsky L.S, 1997a, p. 92)

There are a few ways, according to Vygotsky, for the imagination of a child to develop. Through childhood the imagination is undergoing development by incorporating new mediating means and thus changing the entire structure and functioning of the imagination. Vygotsky discussed not only some new mechanisms of imagination and new connections that the imagination forms with other psychological functions during its development, but also how we, as teachers, can influence the development of imagination by providing children with cultural tools that become the content of children's imaginative activities.

At the earliest stage in the development of the child's imagination, the child "is able to imagine much less than the adult, but he trusts the products of his imagination more and has less control over them" (Vygotsky, 2003, p. 34). Thus, according to Vygotsky, the ability to control imagination comes with maturation and development. Furthermore, the emotional development of a child is related to the development of imagination. One of the most interesting units of analysis that Vygotsky introduced into psychology is "perezhivanie," the unity of affect and intellect. In analyzing the development of imagination, the need to take into consideration the ability to develop emotional control of the products of imagination is very important. Vygotsky said, "every construct of the imagination has an effect on our feelings, and if this construct does not in itself correspond to reality, nonetheless the feelings it evokes are real feelings, feelings a person truly experiences" (Vygotsky, 2003, p. 19).

Some researchers, following Piaget's influence, consider children more imaginative than adults because they are mistaken in their interpretation of the unit of analysis of a child's imagination: they think that children are more imaginative because they control their emotions less. They only see one side of imagination, the one connected to emotions. The other side—intellectual—must also be taken into account. Vygotsky's idea that imagination has to be meaningful and connected to intellectual development, should not be overlooked.

Another important ability develops concurrently with imagination, the ability to transfer a function from one object onto the other that did not previously have such a function. According to Vygotsky, this ability is very closely connected to the development of the symbolic function in a child. At first, imagination in play shows the child how to divorce the meaning of the object (and its function) from the object itself in order to enable the transfer of the

“pure function” into another object. It does so by the “law of pivot” which is, according to Vygotsky,

.... a divergence between the field of meaning and vision (that) first occurs at preschool age. In play, thought is separated from objects and action arises from ideas rather than from things: a piece of wood begins to be a doll and a stick becomes a horse...the child does not do it at once because it is terribly difficult for a child to sever thought (the meaning of the word) from object. Play provides a transitional stage in this direction whenever an object (for example, a stick) becomes a pivot for severing the meaning of a horse from a real horse.” (Vygotsky, 1978, p. 97)

Vygotsky stressed that this ability enables the child to learn how to mediate a situation by the use of symbols—a skill that will become very important later as the child learns to read and write.

Another very important capacity of the imagination is developed in play. According to Vygotsky, it is in play when a child’s “greatest self-control occurs” (Vygotsky 1978, p. 99). Development of self-control is related, in part, to the ability to create and sustain an imaginative field or scenario. This ability is based on the image of the whole situation, created according to a preliminary plot with certain rules. Again, it is places difficult demands on the child who must create and sustain the imaginary situation (El'koninova, 2002). Nevertheless, this is an essential skill that is perfected in childhood play.

Vygotsky points out that play has a key role in child development. It leads to the development of imagination by enabling a child to create and sustain imaginary situations: “From the point of view of development, creating an imaginary situation can be regarded as a means of developing abstract thought” (Vygotsky, 1978, p. 103).

As I have tried to illustrate here, these theoretical differences between Piaget and Vygotsky are not merely trivial technicalities. The differences go directly to the core of our philosophical beliefs about education and have implications not only for understanding of the nature of imagination, but also for our pedagogical practices.

## Cognitive tools for imagination: Vygotskian perspectives

Vygotsky believed that imaginative activities are “crystallized in culture.” “All objects of common life,” he asserted, “appear ... as crystallization of the imagination.” Thus, he concludes, “absolutely everything around us that was created by the hand of man, the entire world of human culture, as distinct from the world of nature, all this is the product of human imagination and of creation based on this imagination” (Vygotsky 2003, p. 7). Imaginative activities develop through the interiorization of correspondent cultural forms that serve as psychological tools. Imagination, which in early childhood appears as a function of play, is gradually developed and appropriates new cultural tools through learning activities. As it changes, it gradually turns into the imagination of the adolescent and then into the productive imagination of the adult.

In order to understand imagination, we need to analyze those cognitive, psychological tools that mediate imaginative activities. In this section I will briefly explore why it is important to understand more about how culture is mediated by cognitive tools, and how this changes our entire understanding about imagination. Vygotsky lists some examples of cognitive tools:

The following may serve as examples of psychological tools and their complex systems: language, different forms of numeration and counting, mnemotechnic techniques, algebraic symbolism, works of art, writing, schemes, diagrams, maps, blueprints, all sorts of conventional signs, etc.” (Vygotsky, 1997a, p. 85).

He warns against a mechanical understanding of the role of “cognitive” or “psychological tools” in the child’s activity, and urges that not everything can be considered “a tool”: if something does not possess “the capacity to influence behavior, it could not be a tool” (Vygotsky, 1997a, p. 87).

In the process of the development of imagination, the child “arms and re-arms himself with widely varying tools.” So the imaginative capabilities of a child depends on her ability to appropriate and to interiorize existing cultural tools that engage imagination. Through the processes of interiorization and appropriation of cultural tools that mediate social (interpersonal) activity, a child is constructing psychological tools of her own inner activity.

Once internalization of cognitive tools occurs the entire nature of imagination is changed: “Cultural devices of behavior do not appear simply as external habit; they comprise an inalienable part of the personality itself, rooted in its new relations and creating their completely new system” (Vygotsky, 1997b, p. 92).

Imaginative activities, like any other cultural or higher psychological function, develop as a complex system. Imagination does not exist in isolation; it creates a unity with verbal thinking, logical memory, and/or perception. At different ages, those connections take different forms. Remember that “secretive” world of teenagers? It is a world that is almost always closed to the eyes of adults. What is hidden is the imaginative world that originated in child’s play. It resembles child’s play, and it is a successor of child’s play, but it does not manifest itself on the “outside.”

It is not in the classroom, nor on the playground, where we infer the development of imagination at this stage, but in the hidden “theater stage” of the child’s personal imaginary world. As Elkonin has noted, “in full-blown, mature play children don’t play anymore—they only negotiate (in words) how to play if they would play” (quoted from Kravtsova, 1996, p. 95). In other words, the imaginary plane is moving from practical reality into the world of symbolic, language realities. In consequence, the make-believe play of pre-school children becomes the imaginary life of school-age students. It is also during this time that imagination becomes consciously regulated through speech and begins to collaborate with verbal thinking, more than with memory.

The principal moment in the development of imagination and other cognitive abilities occurs when well developed imaginative

activity not only leads the child to more successful ways of dealing with intellectual and educational tasks but also leads to changes in the structure of psychological functions, making them conscious and volitional. *Gradually the child becomes a master of his own imagination.* It is at this point that the revolutionary shift in school children's imaginations occurs.

Mastery of the processes of imagination has the following outcomes, which have important implications for education:

- ❖ The individual gains greater control of the emotions.
- ❖ The individual gains mastery of new practical skills such as the ability to transfer symbols from one object to another and the capacity for dealing with quantities of which the child has no direct experience.
- ❖ The individual gains expertise in the use of different cognitive tools.
- ❖ The individual gains more control over the imagination.
- ❖ A more complex relationship is established with other psychological functions. This occurs not only with perception but with thinking, and as thinking develops, imagination also develops.

## An alternative approach to curriculum and instruction development

Vygotsky's theory offers a unique perspective on imagination that can help educators achieve their aims. He offers an alternative approach to curriculum and instruction in the middle school—one that involves a greater use of the imaginative capabilities of students. His approach aims both to facilitate development of imagination and to help children *master* their imagination.

In terms of the school curriculum, Vygotsky's ideas also have implications for the development of educational materials and activities.

The curriculum, therefore should aim to develop the child's cognitive tools. The following list sets out the general requirements for something to be regarded as a cognitive tool for education:

- ❖ Activities should be "crystallized in culture."
- ❖ They should involve the of unity of imagination and thinking, and imagination and the emotions.
- ❖ They should influence the child's behavior (otherwise they would not be considered to be cognitive tools).
- ❖ They should be actively accepted by the child (adolescent) as part of her cultural development.

Egan suggests that the story form is congruent with Vygotsky's requirements for cognitive tools:

What is a story? A compact answer is to say that it is a narrative unit that can fix the affective meaning of the elements that compose it. That is, a story is a unit of some

particular kind; it has a beginning that sets up a conflict or expectation, a middle that complicates it, and an end that resolves it. The defining feature of stories, as distinct from other kinds of narratives—like arguments, histories, and scientific reports—is that they orient our feelings about their contents. ...Stories are "crystallized" in culture and therefore they could be used as mediators, tools for engaging that imagination of children. " (Egan, 1992)

Once we agree with Egan's Vygotskian perspective that stories may serve as tools for engaging imagination, the only question that remains (and it is not an easy one to answer) is which kinds of stories should we use in the education of our school children?

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