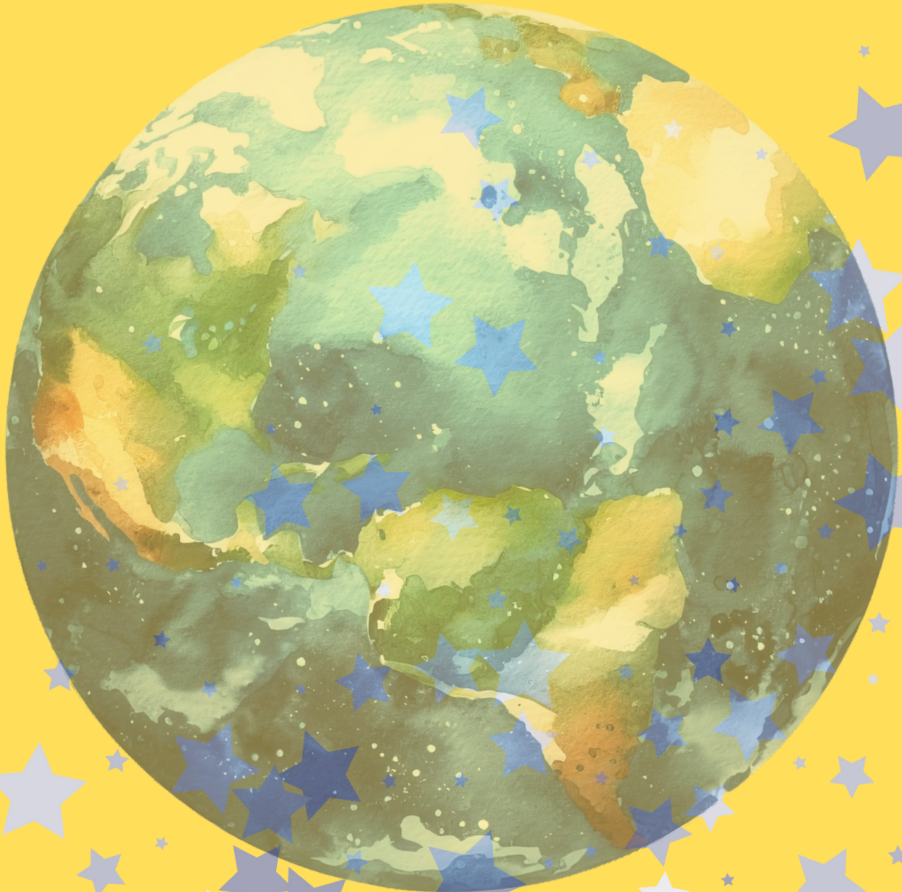
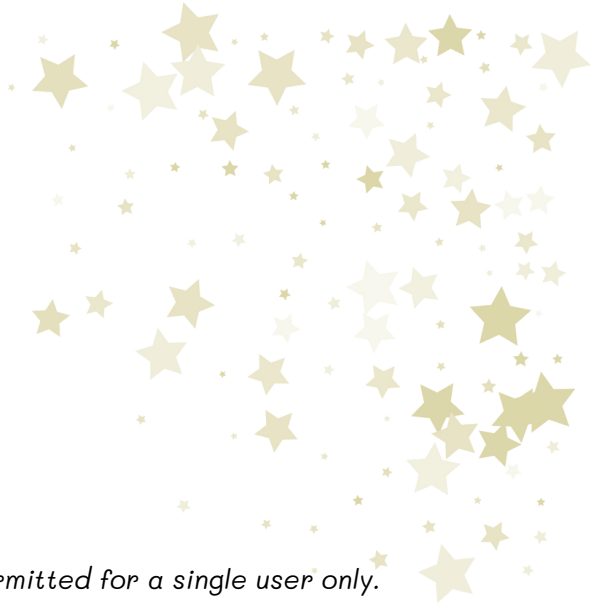


PROJECT-BASED LEARNING

The Comprehensive Guide to Phenomenon-Based Learning: Volume 3 Critical Thinking and Enquiry Questions

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INTRODUCTION

*What if you, as a student
were given the freedom to
find an answer yourself?
You'll never forget it.*

Carl Sagan
Astrophysicist
1934-1996

The words ‘what if...’, open up worlds of adventures and possibilities. They invite you and your students to let their imagination take flight and explore matters from infinite ports.

‘What if...’ questions push us to think more deeply and explore concepts through different angles, and so encourage us to give our students this opportunity.



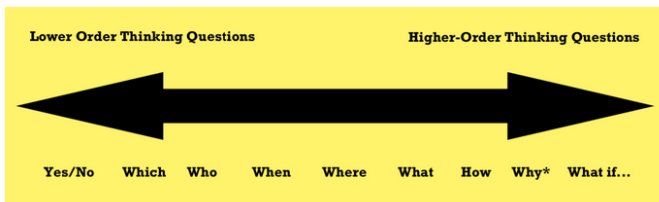
A well-worded ‘what if...’ question sparks within us and our students a compulsion to seek out the information necessary to support a satisfying, personal, and unique solution.

Consequently, the 'what if...' question is the way to begin the most explosive Phenomenon-Based Learning projects...and it is embedded in its entry point with the Enquiry Question. Which is why this treasure of an interrogative is precisely what we are going to use, explore, expand on, test all its possibilities, knowing that it will lead us to discover all its the wonders! Your lessons are going be transformed with just a few extra words and a question mark!!!

Where is the best place to start to understand the power of a well-constructed Enquiry Question? Well, first, let's define a concept that you may have always taken for granted: a question.



Another way to refer to these varied interrogative demands: *hierarchies of question types*. And for those of us who need order in our lives and our minds, we can use an exceptionally instructional tool called the *Question Continuum*. It is a Depth of Knowledge tool that facilitates structuring questions very intentionally, as it establishes the most effective formula to elicit different ranges of cerebral activation.



Why is the Question Continuum useful and important? I am going to let you answer that yourself, first, by considering the intricacies of the question below.

What if victims of cyber bullies were given the opportunity to confront their abusers?

- *Are you intrigued by this question immediately*
- *How is it different from the ones you would usually present in your lessons?*

Different types of thinking

We all ‘think’, and we do it continually. John Dewey, in one of the cornerstone discourses on *thought*, points out that thinking can refer to any ‘random coursing of things through the mind’ (1910). In other words, our minds are constantly running through scenarios in what is often referred to as ‘stream of consciousness’.

Thinking:

The random coursing of things through the mind, not necessarily with any intent, processing, or even conclusions.

John Dewey, 1910

Critical Thinking:

Seeing both sides of an issue, being open to new evidence that disconfirms your ideas, reasoning dispassionately, demanding that claims be backed by evidence, deducing and inferring conclusions from available fact and solving problems.

This does not mean that there is any intent, processing or even conclusions that we reach with this type of cerebral activity. In the modern world, we can equate this to someone receiving thousands of messages and images daily from cell phones, webpages and other digital sources, but not necessarily processing any of them in any subjective or compounded way.



But why, we need to ask ourselves, is there such importance placed on promoting critical thinking? This is an important clarification. Just as we can encourage our students not to take information at face value, we need to question the educational underpinnings we are encouraged to adopt.

If we are clear on our motivations and choices, we will pass on that resolution to our students. If we model thoughtfulness in considering the factors that we support and advocate, our students organically embrace responsible acquisition of input others.

(There is nothing wrong, and in truth only right in questioning what we're told - solicited or not - especially when the source professes to be someone or something of authority.)



To elucidate this in a more practical way, let's consider the statement below:

***Deep thinking
is not natural
to humans.***

“What?”you're thinking? With all the philosophers throughout history masterfully guiding students toward introspective thinking, how can critical thinking be unnatural? In Volume 4, we explore this surprising and counter-intuitive statement through practical examples. In this volume, we will approach it philosophically, from the viewpoint of two eminent scholars of critical thinking.

When asked 'can critical thinking be taught?', Daniel Willingham, world renown scholar in divergent thinking, and Daniel Kahneman, co-recipient Nobel Prize winner on his research he structured as slow and fast thinking, said:



Therefore, while it is true that some people are able to arrive at conclusions faster than others, this does not mean that they have taken all aspects into consideration, and, as seen in Cain's study of the skills that have historically earned students a place in the top business positions, thinking and reacting rapidly may need to be reassessed.

Lateral thinking:

Solving problems using an indirect and creative approach through reasoning that is not immediately obvious.

Edward de Bono
(1967)

System 1 Thinking

Fast thinking - instinctive and emotional

System 2 Thinking

Slow thinking - deliberate and logical

Daniel Kahneman
(2011)

In the future, do we need graduates who act first, loudly and with presumption, or do we need those who consider issues from different angles, who have the ability to evaluate, synthesise, assess and infer, and who thereby have superior qualities than machines?

The answer to this question is one of the overriding reasons that the emphasis on developing deep thinking – crucial, lateral, slow thinking - encouraged in PhBL learning - and begun with a well-written Enquiry Question - is so relevant and important today. We need to foster the very skills that differentiate our students from technology, and that prioritise human elements.

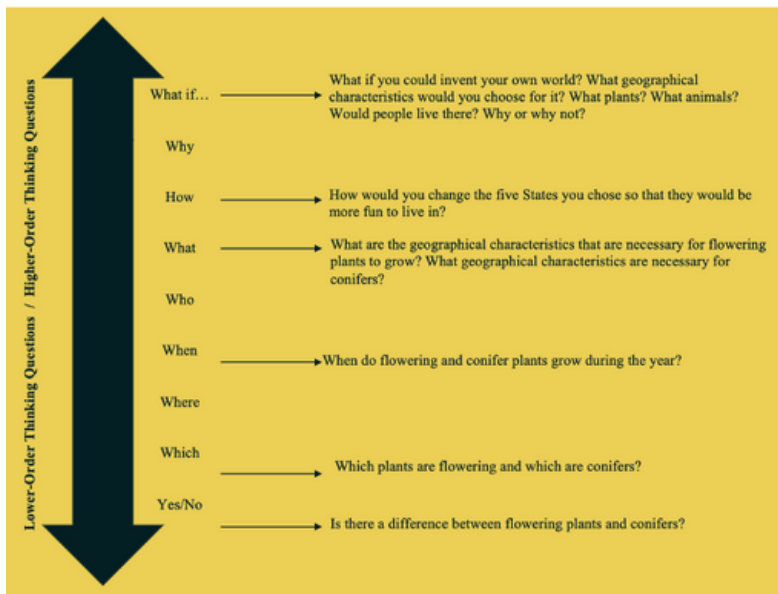
The evolution of critical thinking in education in historical context

Of course, this emphasis on fostering higher-level cognitive skills is not new. Complex intellectual demand was part of educational practices at least as far back as our earliest recorded history. We know that more than almost 3000 years ago,



Socrates challenged his students by posing a succession of systematic and prearranged questions designed to push them into reflecting and therefore improving their thinking. One of the ultimate goals was to gain a better understanding of their own beliefs and ideas.

Below, you'll see how the Question Continuum develops the same subject, rendering the information a bit more active and ready-to-use:



The inherent factor of critical thinking in Phenomenon-Based Learning projects beginning with Enquiry Questions

So, how does all this connect to Enquiry Questions and the Phenomenon-Based Learning structure? Thinking frameworks are integral to PhBL projects. Students, given the opportunity to apply knowledge acquired through deep thinking and original associations, are better equipped to effectuate more original solutions to the challenges they face in day-to-day life and in their future professional careers.

The most engaging PhBL projects begin with a carefully worded Enquiry Question, which are the springboards towards deep engagement and unique Final Tasks. These deceptively simple introductions require specific elements: interest, higher-order thinking, research, a global perspective, real-world themes, and the freedom for varied conclusions. These driving questions house a multi-coloured lens through which students will consider their choices.

So, what are Enquiry Questions? Best said, they are the hooks that gently push students into the world of uncertainty and so discovery. They contain the core idea of the project, phrased in ways that, ideally, excite the curiosity of their audience - students. These key questions can be challenging to create as they need to circumvent the easy paths of answers with finite ends and single responses. Instead, they are drivers towards answers that have many possible conclusions, and expansive thinking

Enquiry Questions

- are open to research
- have multiple possible answers
- seek to address a problem (intellectual, theoretical or philosophical)
- ideally begin with 'how', 'why', or 'what if...'
- are connected to the real world
- encourage the students to become intellectually and emotionally engaged

No Enquiry Question

Choose five of the musicians we have studied this semester and present a 3-minute compilation of the music styles for the final exam, with a verbal explanation of each.

Make a table of the titles of the 10 paintings that appear in Unit 5, and list the recognised art genre of each.

Complete the laboratory experiment given on the worksheet provided.

Enquiry Question

Choose the music of five of the musicians we have studied this semester. Create a guide for a concert audience explaining how your chosen compositions compare with silence?

With your partner you will make a table as an art critic, studying the 10 paintings that appear in Unit 5.

In three separate columns:

1. Invent a name of an art genre of your own imagination
2. Give a brief explanation of their parameters
3. Outline the emotions they invoke in you when you study them

In your groups, read the laboratory equipment listed on the board. Based on the equipment, what type of experiment do you believe you will be performing? What are three possible results you believe you and your classmates might have at the end? Include justifications.

What if the secretary of culture of your district entrusted you and your class to develop an art project – specifically a mosaic – that represented the multicultural aspects of migration in your community. The project includes explaining how immigrants contribute to your community. Where do art and migration meet?

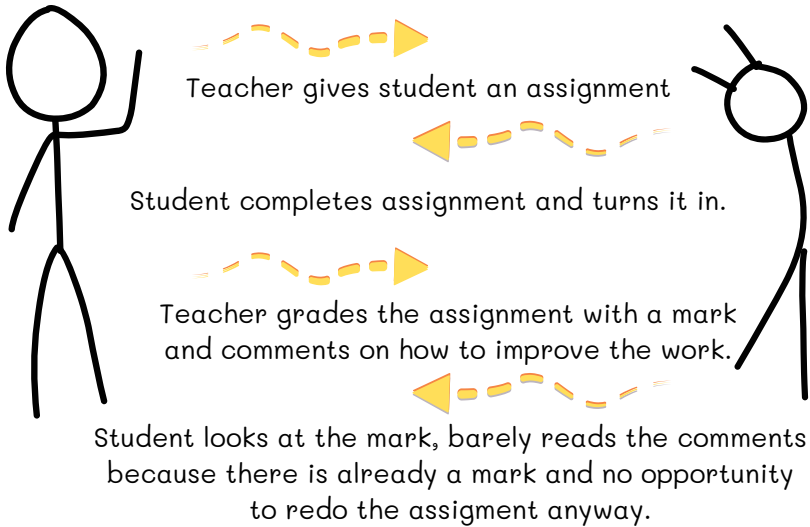


It's 2050, the temperature has risen, and there are no more garbage dumps. World leaders have approved a law to punish people who buy new products when what they already possess can be reworked and reused. Part of the sentence of people convicted of these crimes is to do 50 hours of community service. What product would you show in a video that can be reworked and used as is or in an alternative way?

What if Armani, Fendi, Dolce & Gabbana, Dior, Versace, Chanel and Calvin Klein gave you the opportunity to plan a runway show presenting the clothes and history of one of the subcultures in your neighbourhood? Their goals are two-fold: a) they will use their favourite creations in one of their lines, and b) they will give you and your group an all-paid scholarship to the schools of your choice. How would you prepare the presentation?

Yet, just when you have laid the groundwork and the keys to improvement, your students' learning comes to a screeching halt and have no opportunity to accede to any improvement in their work.

Usual dynamic of feedback...



There are two main factors here impeding the excellence you may well want to foster in your students. The first is the grade you write on the task. Dylan Wiliam (*Inside the Black Box, Embedding Formative Assessment*) explains that the minute we include a numeric or letter mark on our students' work, the learning stops. Our students bypass the comments and go directly to the grade.

If we want to promote an expectation of excellence, and we want the learning to continue, one element that we can change is to include comments without a mark.

There are infinite ways to promote excellence, including treating exams as a continued learning opportunity - not always as a summative assessment.

Luisa is a perfect example of this. In the spirit of knowing that exams are some of the best ways to really grab our students' attention, and that the studying for, and taking exams, are potentially when they learn the most, Luisa began to regularly use them as formative assessments. Here's how she began this practice:



Case Study: Luisa

In a school in a small town on the border between Portugal and Spain, I met Luisa during her first year of teaching. As I got to know her, I found out that she had a very challenging profile for her inaugural educational experience. She was faced with a group of students in their last year of Bachillerato, most of whom who had failed English in their studies up until that point.

They were impatient with themselves, with her, and frightened, because they knew the importance of achieving a certain level of English to be able to succeed in their future careers. This is probably a familiar scenario for many of you - whether your students are planning to continue in the academic world or move into vocational studies, they know that they must have certain level in standard exams in English to enter either.

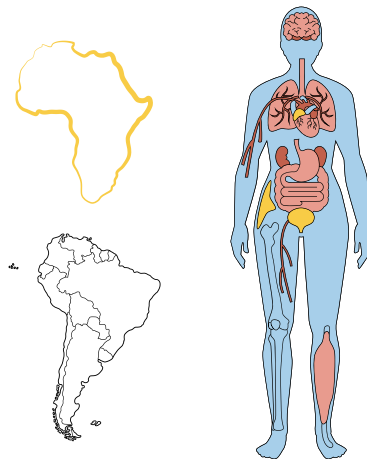
Ready for another complicated situation and one that turned out to be equally successful by moving into the paradigm of *excellence*? This one is with Primary students. See if you could adapt Edu's experience to your own:

Case Study: Edu

Edu teaches Natural Science in English to 3rd year Primary students in Peru. His student population is challenging as they learn half of their subjects in Spanish (the dominant urban language), half in English, but many of them also speak indigenous languages at home. This means that they are constantly juggling at least three languages during the day. To ease into PhBL projects in English, Edu decided to write an Enquiry Question that recognised and honoured all of their languages.

To give context, the project was ambitious as it was based on the premise that his students were voyagers in space and had just discovered a world in which the continents were formed in the shape of the organs of the human body.

The final task involved the students naming each continent as the part of the government that would logically correspond to the functioning of the organ that the continent was shaped like (based on the Peruvian political system).



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Annex 1

Scaffold and Mini-Lessons for Amin's PhBL project

As mentioned above, Amin used direct teaching as a rule and very seldomly strayed from this methodology. His school directors insisted, however, that he develop a project at least once during the school year, and with good-humour, though filled with insecurities, he acquiesced. I had worked with Amin during a workshop in which he himself learned different theories through interactive, communicative and collaborative activities, and so he knew the benefits of this style of learning and was tentatively willing to try them with his own students.

Amin chose the Third Industrial Revolution as the topic for his project. In the past, the most radical deviation from traditional assessments (exams) that he had dared to introduce was to ask his students to create timelines to show their understanding of this information. In this case, however, he agreed that for the final task, his students would write a script, act out and record a puppet show, with key historical figures verbalising historical events.

