What if thinking IS cyclical and adaptive?

In my last blog article I shared with you, *theclark real thinking process*. I proposed that thinking is not in fact hierarchical in nature; that contrary to Bloom's Taxonomy, and popular belief, analysis is not lower than evaluation; and application higher than comprehension. Instead, I suggested, and demonstrated through a digital presentation, that thinking is in fact cyclical and adaptive; that there are simply 'types' of thinking that are inextricably linked; and degrees of sophistication embedded within each type of thinking.

So what are the implications of the *clark real thinking process* on teaching and learning? And what are the implications of thinking as a cyclical adaptive process on curriculum design?

In this blog post I will address the first of these questions…

Curriculum internationally is aspiring toward the goal of 'deep knowledge and understanding'. Curriculum documents are promoting creativity and innovation. All too often, the document neglects to instruct the teacher on how this can be achieved. It is as if the mandate alone is enough! How can teachers explicitly and deliberately promote deep, broad, rich thinking; creativity, ideation and innovation?

Firstly, educators need to understand what it means to 'process' learning and they need to understand the real learning process. If the learner engages in a learning experience that reflects the cyclical and adaptive process described, a deep, broad and solid foundation of knowledge and understanding can develop. In turn, learners will be enabled and empowered to *use their learning to make a difference in their lives and the lives of others*™. It is the process that will facilitate the thinking; and it is the thinking that will facilitate real learning!

But how does a teacher practically do this? How does a teacher 'ensure that a learner is engaging in this 'cyclical process'? It's actually easier than you think!

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The entire point of using thinking tools with our learners is to direct thinking explicitly to ensure that they are not simply thinking, but thinking *skillfully*. But all thinking tools are not alike. They each direct specific types of thinking and they do this at differing degrees of sophistication. Educators must learn more about the thinking that is explicitly promoted with the use of specific thinking tools. It is not sufficient to arbitrarily select a thinking tool when designing learning opportunities for our learners. Thinking tool selection must be strategic and thoughtful!

As mentioned above, some thinking tools engage the learner in the same types of thinking, but at differing degrees of depth and breadth; others promote completely different types of thinking. A teacher's ability to deconstruct thinking tools is critical to the selection and implementation of the *rightthinkingtool* at the *righttime*.

We now recognize the learner's need to analyze, evaluate and synthesize, as he finds out. This processing is essential to his 'meaning making' and therefore to the learning itself. Early in this process, however, the learner can only engage in this thinking at a superficial level. The teacher then, must be selective in regard to the tools that are provided or designed into the learning. While the tools must direct the learner to analyze, evaluate and synthesize, they must do so at a level of sophistication commensurate with the learner's processing ability *at the time*, which is quite limited. As the learner develops his foundation of knowledge and understanding, so too, does he develop his processing capacity. With an increased ability to analyze, evaluate and synthesize, more sophisticated thinking tools can be infused into the learning.

A deconstruction of three thinking tools has been provided below in an effort to promote understanding of this critical aspect of thinking skill development. You will see that I have named each tool; outlined the types of thinking that each tool deliberately engages; the learning job of each tool; and finally, the implications of each tool with respect to learning.

Thinking Tool	Type of Thinking Promoted	Learning Job	Implications
P.M.I (Edward de'Bono) Plus Minus Interesting	•analysis in the examination of the plus part, the minus part, and the interesting part •evaluation in the decision making and judgment of the plus and minus	•engages the learner emotionally •invites the learner to develop an opinion •invites the learner to make judgments •invites the learner to identify aspects that are judgment free as 'interesting' is neither a plus nor a minus •has the potential to promote questions based on interesting elements (things that make you go hmmmmm) •it should be noted that	This tool explicitly engages the learner in analytical and evaluative thinking but synthesis is not addressed within its design. Therefore, use of this tool alone limits processing. By inviting the learner to develop questions based on the elements they felt were interesting, synthesis is explicitly embedded. **Summary of Thinking:**

		questioning is not explicit in the design of this tool; if a teacher would like to capitalise on this potential, he must deliberately direct learners to identify any questions that come to mind	Analysis Evaluation (Emotive)
S.W.SW (Lane Clark) Strength Weakness So What ideas	•analysis in the examination of the strength part, the weakness part, and the 'so what' idea part •evaluation in the decision making and judgment of the strength and weakness •synthesis in the design of ideas (Note: a 'so what' answers the question: so you know it…so what? How can you USE what you know to make a difference in your life or the lives of others? The so what links to a glossary of ideas on the 'thinkbox' thinking framework. These include: developing *solutions* to problems the learner is now aware of; designing a *product*; developing *recommendations*, *alternatives* or new *possibilities*; generating new *questions*; *predicting* the future; designing a *vision* and a *mission* to reach it)	•engages the learner emotionally •invites the learner to develop an opinion •invites the learner to make judgments •invites the learner to generate ideas and move his learning forward •invites the learner to develop questions •invites the learner to build ideas based on strengths	This tool explicitly engages the learner in analytical and evaluative and synthesis thinking. The tool generally elicits emotive rather than cognitive responses. Because the learner is guided in his ideas, *synthesis is directed* when using this tool **Summary of Thinking:** Analysis Evaluation Directed Synthesis Emotive
6 Thinking Hats (Edward De'Bono) White Red Yellow Black Green Blue	•knowledge and comprehension in the identification of facts (white) •synthesis in the generation of questions (white) •analysis in the examination of feelings (red) •analysis in the examination of arguments 'for' (yellow) •evaluation in the decision	•invites the learner to activate prior knowledge and skills •invites the learner to develop questions •engages the learner emotionally •invites the learner to develop an opinion •engages the learner cognitively •invites the learner to develop an argument •invites the learner to make judgments •invites the learner to generate ideas and move his learning	In my opinion, this tool is a 'heavy artillery' processing aid. The reason that learners can develop cognitive arguments for and against is because they have at their disposal, the white hat facts that they will use to substantiate their arguments. Emotion is still engaged through the Red Hat, however, an individual may respond emotionally in an

	making and judgment of the arguments 'for' (yellow) •knowledge and comprehension in the substantiation of the argument 'for' based on facts (yellow) •analysis in the examination of arguments 'against' (black) •evaluation in the decision making and judgment of the arguments 'against' (black)) •knowledge and comprehension in the substantiation of the argument 'against' based on facts (black) •synthesis in the generation of ideas that build on arguments for; counter arguments against •synthesis in the generation of lateral ideas that do not depend on 'for' or 'against' thinking (green) •knowledge/comprehension in the summary of the thinking that has occurred (blue) •analysis and evaluation when checking for bias (blue) •evaluation when re-directing the thinking in any direction (blue) •evaluation in the final decision (blue)	forward •invites the learner to counter weaknesses •invites the learner to build ideas based on strengths •invites the learner to generate lateral ideas	imbalanced manner, considering positive emotions only, as the tool does not *explicitly* demand the user to consider both positive and negative emotions. If the emotion is strong enough it could lead the thinker into the development of logical responses that support the emotional response. The importance of the Blue Hat to check for such bias is critical. You may decide to direct the learner to include both positive and negative emotional responses in an effort to safeguard this possible issue. Unllike the S.W.SW tool, when using the 6 Hat tool, *synthesis is undirected*. The learner is invited to generate ideas but no further support is offered to facilitate this thinking. Tools that assist in the development of ideas could be layered into the learning opportunity in an effort to further enhance the learner's ability to design creative ideas. **Summary of Thinking:** **White** Knowledge /Comprehension Synthesis **Red** Analysis Evaluation (Emotive) **Yellow** Analysis Evaluation (Cognitive)

			Black Analysis Evaluation (Cognitive) **Green** Undirected Synthesis **Blue** Knowledge/Comprehension Analysis Evaluation

A thinking tool, is not a thinking tool, is not a thinking tool. Certain tools will engage all types of thinking simultaneously in their design; others may not. In this case, the teacher may need to select and *layer* multiple tools to ensure that the learner is in fact analyzing, evaluating and synthesizing as he learns. Even if a tool engages all types of thinking through its use, the level of processing required will differ tremendously depending on the actual *framing* of the tool. A learner could certainly be provided the 6 Thinking Hat tool early in his learning journey; however, his ability to engage in the processing associated with that tool would be limited. Use of the tool would then result in little more than *weak thinking*. This does not mean that it should not be offered by the teacher or self selected by a learner at this time; it simply means that both the teacher and learner should be aware of both the benefits and limitations of all thinking tools at all times during a learning journey. Perhaps the 6 Hats could be provided early in the learning as a means of collecting baseline data in regard to a learner's thinking; and then used again later in the learning to show growth and change in thinking and thinking ability. Perhaps the tool could be used early in the learning to make explicit to a learner his need to gather more facts in an effort to think more comprehensively or substantively.

What I hope is becoming apparent in the above deconstruction of thinking tools is the need to aid teachers in their developing understanding of thinking tools. Many teachers, the world over, are now becoming quite familiar with thinking tools and they are regularly incorporating them into the design of learning opportunities for their students. This is a terrific start and must be recognized as such; however, teachers and learners must eventually develop their knowledge and understanding of the *types of thinking* that each tool promotes AND the *degree to which each type of thinking is facilitated* through the use of the tool. Only then will teachers be empowered to select *the right tool* or tools at *the right time* in the thinking process.

While it is paramount that a learner analyze, evaluate and synthesize explicitly as he finds out new information, a learner's foundation of knowledge and understanding will only develop depth and breadth if this processing opportunity is *repeated*. Through the repetition of the thinking process, the learner's ability to anlayze, evaluate and synthesize deeply will also become a reality; and it is only with this level of depth and breadth that a learner will have the ability to generate innovative ideas and

produce quality outcomes. True creativity necessitates what David Perkins would refer to as a 'far transfer' from the learner's initial knowledge and understanding.

For example, if a learner was to invent the next 'Concord' aircraft, he would most certainly require a depth of knowledge and understanding in a number of maths and science areas; however it would be his ability to *deeply* analyze, evaluate and synthesize what he has come to know, that would enable him to make the jump from what now exists to what *could* exist. Creativity requires processing over time; and most critically the opportunity to identify what is known deeply; to analyze, evaluate and synthesize what is known deeply; and to USE that depth of knowledge to *design ideas*.

Learners will not become idea generators and innovators because a curriculum stipulates within its documentation that they should. Still, the fact that our curriculum frameworks are now highlighting for teachers the need for our students to generate and develop ideas, cannot be understated; and the importance that has been placed on the underpinning of all curriculum disciplines with 'idea generation' is commendable to say the least. The next step for teachers is to aid the learner in his ability to generate ideas, act on ideas, monitor action and set goals for continued *ideation*. By embedding the thinking processes into the design and delivery of learning opportunities, this essential thinking will be explicitly developed.

Because of the critical nature of tool deconstruction, I will continue to address this topic from time to time within these posts. Feel free to share your questions on this topic or any other on the edmodo website that I have created for this purpose.

Website:http://www.edmodo.com
Password: 0g3itr

Once you have registered, you will see 'groups – join or create' on the left side of the screen. Click on 'join' and input the password provided.