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EXPERT MASTERCLASS

Cycles of Learning: Curiosity Comes First

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Speaker

Ramsay Musallam, Science Teacher, Sonoma Academy, USA

Summary Paragraph/Key Points

Musallam is an advocate for using online technology to enhance the learning experience, and believes in video and the power of the digital space to share learning. He spent four years investigating the ways in which he could use technology to get the best results from his students, a time which saw him invest in every gadget he could find, even building a studio with a green screen in his garage. He quotes Rushton Hurley: "Technology will not turn a bad teacher into a good one. However, a good teacher using technology well can do great things."

With this in mind, he embarked upon a PhD on the "flipped classroom" concept, delivering a dissertation entitled: "The effects of using screencasting as a multimedia pre-training tool to manage the intrinsic cognitive load of chemical equilibrium instruction for advanced high school chemistry students." Through the use of technology and media, he decided to flip his own chemistry lessons, whereby what was traditionally set as homework was done in school and students were told to "do the learning" at home. Surprisingly, his average Mean AP Chemistry Score was 3.2 out of 5, and it descended regularly year upon year - in fact, he saw no evidence of improvement in understanding at all. But there was no doubt that the "flipped classroom" could work. "It was about finding the right 'sweet spot' at which to do the flipping," Musallam explains.

Referencing Sweller's 1998 "Cognitive Load Theory", Musallam further explains that when students watch something at their own pace, their cognitive load is decreased and they can process the information better. However, this works on the assumption that the students are fully engaged and fully motivated. Musallam shares a video of Sweller, in which he states: "There are many ways of ensuring that students resources





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... are fully devoted to the task. But, how do you get students to be fully directed and fully concerned with the task? That's for other theories!"

Musallam realized that he would have to look at this critical problem from a different angle. He now understood that just because he had flipped the learning to use video did not mean that his students were motivated to watch.

Musallam identified an interesting correlation between the axes of **knowledge** and **curiosity**. When students have no knowledge, they are actually not very curious. And when they have all the knowledge, they're not that curious either. "There is a sweet spot, right in the middle, where the maximum curiosity is found," states Musallam.

Musallam has proved that with specific questions - which are truly "interesting" and where the "cognitive brain has opened up" - he could tell us any answer he wants and we would probably accept it, due to our levels of curiosity and eagerness to learn.

He identifies two further axes of "**mental muscle**" and **curiosity** and demonstrates that if certain information is withheld, students are more likely to "devote their cognitive resources to the task". It is about choosing what information to give and what to withhold.

"That - to me - is the art of teaching," claims Musallam.

Sharing a video of a candle whose flame is extinguished, juxtaposed with another video clip of two candles, he creates another example whereby "cognitive resources are being fully devoted to the task". He proves how, when students are truly pushed to understand for themselves, they become more curious.

Drawing a fascinating parallel between the great "teachers" of Hollywood, Musallam compares Yoda from 'Star Wars', Mister Miyagi from 'The Karate Kid' and Robin Williams' character, Sean Maguire, in 'Good Will Hunting'. He identifies the one common thread which links them all; a delay in appearing on screen in each of their respective movies of just over 40 minutes. Although a seemingly trivial point, this parallel can be directly compared to the BSCS 5E Learning Framework: the helper and problem solver is never there at the start and only appears at the "Explore" (or second stage) of the cyclical diagram. Creating a direct correlation between "The Hero's Journey" through a fictional, narratives script and the 5E Framework, Musallam demonstrates how the student is going to be more curious and hungry to learn when he has already experienced his "call to adventure" (or the "Engage" stage of the Framework).

He gives the example of one of his students, whose self-made video he found online. When faced with a challenge that a specific science experiment result "wasn't going to happen", the student created a work of art which proved his answer to himself in the process of creation.





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By building this delay of instruction into a strong lesson plan, Musallam argues that teachers can create a structure that is safe and predictable for them as educators. In his own teaching, he ensures that whether he flips the lesson or not, he makes sure that his lecture is not the first thing he does. “When the hands-on exercise precedes the lecture, the learning is so much more authentic,” he maintains.

But a strong lesson plan is key. Musallam shares all of his templates via his website and email subscription list, and quotes Jon Stewart:

“It is through intense structure that I find the safety to be creative.”

Musallam does not write outcomes on his classroom board because he wants his students to question how to do things and to learn through the process. However, he claims to love lecturing, because the way in which he does it makes him an “artist”. And who does not love a good movie analogy?

Through his “call to adventure in the classroom”, Musallam teaches us all how to be the hero in our students’ learning journeys.

MAIN TAKEAWAY: Tomorrow’s students will be more curious if the “flipped classroom” concept is adapted to delay instruction, and allow students to devote their own cognitive resources to the task first.

