Chapter 17
Flipping and Flexing in Science:
Video Lessons and the i²Flex Model

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ABSTRACT

The Digital Native is experiencing education during a very unique time. Learning with the help of technology, becoming independent and flexible learners, will only build on the skills they need to face a rapidly changing world and truly become architects of their own learning. The i²Flex model (a blended learning model) allows curriculum demands to be met while creating a learning environment whereby Middle School Science students are motivated and become engaged in higher order skills. This chapter will discuss the i²Flex philosophy and how the flipped classroom complements this methodology and allows students to build on higher order thinking skills within a K-12 international school setting.

INTRODUCTION

Curriculum demands and the requirements of standardized testing often put a strain on a teacher and the course content; this is especially true in Science teaching where curriculum demands are equated with student learning (Herreid & Schiller, 2013). The teacher is without doubt the driver of instruction, dispensing information, assigning simple redundant tasks desperate to move on and not fall behind (Arfstrom et al., 2013). Little time is left for teachers to engage students and guide them towards applying what they have learned. Simultaneously, however, education is transforming itself reflecting the demands of our ever-changing world and the needs of the 21st century learner. Today's student, the Digital Native, requires different forms of stimulation and new teaching methodologies (Prensky & Berry, 2001). How does one switch from this lecture-based model, to one where students are the ones on the driver's seat; where they are the architects of their own learning and not driven by curriculum, textbooks and tests? The i²Flex approach at the American Community Schools of Athens addresses many of these needs.

ACS Athens in an International K-12 school embracing American educational philosophy, principles and values. In its mission to do this, ACS Athens is committed to providing innovative teaching and

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learning in order to help students realize their unique potential. i²Flex is one such teaching and learning innovations. i²Flex is a blended learning approach whereby students are **i**nspired to learn with the help of technology and the Internet, becoming **i**ndependent and flexible learners (Avgerinou et al., 2014). During the face-to-face component interactive activities are guided by the teacher. Time in the classroom is spent on hands-on, collaborative, inquiry-based, higher order thinking activities, giving students opportunities to challenge themselves and have greater control. The focus is on students becoming entities of their own learning rather than just passive recipients of instruction.

In this chapter, the concept of the flipped classroom within the i²Flex methodology, and how this approach can help meet curriculum demands and concurrently meet the needs of the 21st century learner, will be shared. The study examines the Middle School Science classroom and the Science learner. In addition to looking at completion of curriculum requirements, the Science students' motivation is also considered.

MY "FLIPPED" JOURNEY

During my first year of teaching at ACS Athens 10 years ago, our school had a set of computers in the library, chalk at our desks and an overhead projector positioned in the middle of our rooms. Today, three computer labs, two laptop carts, a dozen iPads and a computer, starboard and projector in my classroom, have transformed my teaching and learning. Technology has infiltrated education at an exponential rate, and rightfully so. With the profile of the 21st century learner changing, so must the methods used to teach them and inspire them.

My journey with technology in education began when I experienced my first online course and subsequently a MEd in Educational Technology. With the degree under my belt, a professional development opportunity three years ago is where I was introduced to the flipped classroom. I learned about Khan Academy®, a non-profit educational organization providing free video tutorial lessons to all. Sal Khan, the founder of Khan Academy, used his own video tutorials to help his cousin with mathematics living in a different state. What he didn't expect was that his videos would be watched by thousands. Bergmann and Sam, two chemistry teachers in Colorado, United States, created videos to help students who were ill and missed the day's lesson. Again, they didn't expect that these videos would be watched by not only the rest of the class, but by students all over the country. Videos appeal to today's digital native and compliments the idea of flipped learning: learn at home and take the learning to a different level at school with the guidance of your teacher. In their model of flipped learning, all videos are made available to students which allows them to navigate through the course content at their own pace. Students choose when and where they learn. Their timeline for learning is flexible as well as the mode of assessment for demonstrating that learning. Class time is spent exploring content and creating memorable learning opportunities. Flipped learning not only supports Bloom's revised Taxonomy (Anderson & Krathwohl, 2001), but also encourages the idea of active learning: learning by experience.

With this in mind, I set out to tackle my challenges as a Middle School Science teacher. How can I meet curriculum demands, have the right amount of hands-on, higher order activities and motivate the reluctant teenage Science student?

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