Chapter 16
Designing, Implementing, and Evaluating High School Blended Learning in Math and Science Through the Quality Matters Framework

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ABSTRACT

Nowadays students seem to be less engaged with learning; nevertheless, they seem to have high educational demands and greater learning needs. Thus, they seek for quicker solutions and better accommodations provided by well-prepared courses. Inevitably, the goal of many schools is to engage the learners into the learning experience and maintain the instructional quality. This is why it is imperative to create a solid quality assurance plan that will enable them to achieve their goal. This chapter discusses the implementation of the quality matters framework into the design and teaching of Mathematics and Biology classes at ACS Athens, Greece, as a means of improving and evaluating these blended courses. This framework is discussed in the context of blended learning that ACS Athens offers through the i²Flex methodology. Moodle platform is used not only as a repository of useful information but to meaningfully enhance student engagement and conserve teaching and learning time. Specific examples of class material from the Moodle shells of both courses are presented.

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INTRODUCTION

At the American Community Schools (ACS) Athens, a K-12 International school with over 1,000 students, and about 80 full-time faculty members, we have been implementing the i²Flex methodology-a type of blended learning-since 2013. ACS Athens is a student-centered international school located in Athens, Greece. The school's mission statement is to embrace American educational philosophy, principles and values. Through excellence in teaching and diverse educational experiences, ACS Athens challenges all students to realize their unique potential-academically, intellectually, socially and ethically-and to thrive as responsible global citizens.

The term i²Flex has been organically developed by the ACS Athens community of learners. It is a methodology which integrates internet-based delivery of content and instruction with faculty-guided, student independent, inquiry-based learning, in combination with face-to-face instruction aiming at developing higher order cognitive skills within a learning design framework that is flexible in terms of time, pace, place, and/or mode (Gialamas & Avgerinou, 2015). The methodology was first piloted into various courses, in Middle school and High school, in 2013 and since then, there has been a strategic plan to to adopt and implement it across all secondary school grades (Avgerinou & Gialamas, 2016).

The instructional design criteria and educational technology frameworks that underpin the i²Flex methodology, guide the design, development and implementation of all blended and online courses, and inform the continuous teacher professional development and performance evaluation are (Avgerinou & Gialamas, 2016; Avgerinou & Moros, 2020; Tokatlidou et al., 2020):

- the **Quality Matters** (Quality Matters, 2016) course design standards and K-12 rubric;
- the **TPACK** framework (Koehler & Mishra, 2009; Ward, 2011) that promotes pedagogically sound educational technology integration;
- the **Community of Inquiry** (CoI) Framework (Garrison, et al., 2000; Bogle et al., 2009, Boston et al., 2009) that promotes teacher, cognitive, and social presence online.

As the methodology is a type of blended learning, it encompasses an online component. This online component is offered to students through the Moodle platform. Moodle is an open platform where teachers can add learning materials for their students and create courses for more than one group. At ACS Athens, we have gone a long way, in order to learn how to use Moodle in a very dynamic and meaningful way for the students and their learning. The TPACK (Technology, Pedagogy and Content knowledge) theoretical framework (Koehler & Mishra, 2009) as a means of rethinking and setting the tone for substantive blended learning, has been introduced to and used by the faculty. For all the above reasons and the complexity of the implementation of the 'new reality' in education, the administration has set clear guidelines and professional development opportunities, as well as continuous assistance through meetings and workshops, in order to share best practices toward the development of meaningful and relevant blended courses.

Standardization of our blended courses has been based on the Quality Matters framework (QM) designed by the QM organization (Robinson & Wizer, 2016). The QM is a non-profit, quality assurance organization that provides a system to help an institution deliver well-designed and well-presented online and blended courses at school, and college level. The implementation of a blended course and especially the delivery of its online component is not an easy task for a K-12 institution. This is why it is