

Detailed Table of Contents

Preface	xiii
----------------------	------

Chapter 1

Active Peer-Based Flip Teaching: An Active Methodology Based on RT-CICLO.....	1
---	---

Francisco José García-Peñalvo, University of Salamanca, Spain

Ángel Fidalgo-Blanco, Technical University of Madrid, Spain

María Luisa Sein-Echaluze, University of Zaragoza, Spain

María Sánchez-Canales, Technical University of Madrid, Spain

The RT-CICLO model (real time – collective intelligence applied to a cooperative learning with a social base) is based on generalist processes identified in main active methodologies. This model has been developed as a general model. Therefore, it could be applicable to any active methodology. The main characteristic of the RT-CICLO method is not only to foster active learning, but also to enable students to acquire active skills. In this chapter, the RT-CICLO model is applied to a flip teaching methodology throughout all its phases (lesson at home and homework in the classroom). The main results are obtained in two steps. The first step confirms that students acquire active skills. The second one explores the impact of knowledge creation by students as a way to get feedback and to use the created knowledge as a learning object. It should be highlighted that students’ perceptions are positive using this approach.

Chapter 2

To Flip or Not to Flip? A Case Study on University Engineering Students	17
---	----

Ricardo Castedo, Universidad Politécnica de Madrid, Spain

Lina M López, Universidad Politécnica de Madrid, Spain

María Chiquito, Universidad Politécnica de Madrid, Spain

José Daniel Cabrera Martín, Universidad Politécnica de Madrid, Spain

The use of flipped classroom in higher education has increased in recent years, but there are still few quantitative data on student achievement. In this chapter, a flipped classroom methodology has been applied during two consecutive academic years in an engineering degree. During the first year, one group was taught with traditional lecture (used as contrast group) while the other used the flipped classroom. In the second year, both groups were taught with the flipped methodology. The main objectives were to measure the impact of learning focusing on possible gender differences and on active students to increase the students’ involvement and to study how the students view this new experience. The results show that the developed methodology has a direct impact on learning improving the final grades and decreasing their dispersion. The students tend to attend more to class and to exams with this methodology.

Chapter 3

Flip and Retrofit University Lecture Theatre Into Caribbean Classrooms: Turning Teacher Education and Training Inside-Out.....	38
--	----

Paulette Joyce Feraria, The University of the West Indies at Mona, Jamaica

Caribbean students and teachers in training in a university setting explored teaching and learning in a new dialogic wall-less classroom space in their dual roles as teachers and learners in flipped classroom assessment spaces. This chapter explores how placing university course delivery and assessment within a television teaching-learning studio registered a shift from the usual top-down classroom practice (teach-learn-test) towards synchronous teacher and student inquiry, innovation, experiment, and assessment. Flipping print-rich classrooms into performance-rich classrooms and regular classrooms and lecture theatres into a television learning studio resulted in teacher-student and secondary students role reversals as teachers and learners, symbiotic learning and the strengthening of teacher pedagogy. The findings are indicating that the flipped classroom is a cognitive space that can be retrofitted into teacher- and student-created media spaces for sustainable practice in teacher education and assessment that support alternative pathways to teaching and learning.

Chapter 4

Assessing the Pilot Implementation of Flipped Classroom Methodology in the Concrete and Steel Structures Subject of Architecture Undergraduate Studies.....	55
---	----

Carles Campanyà, La Salle, Ramon Llull University, Spain

David Fonseca, La Salle, Ramon Llull University, Spain

Nuria Martí, La Salle, Ramon Llull University, Spain

Daniel Amo, La Salle, Ramon Llull University, Spain

David Simón, La Salle, Ramon Llull University, Spain

This work is focused in implementing and assessing a flipped classroom model in the concrete and steel structures subject, a core subject within architecture undergraduate studies. Even though current legislation in Spain settle architects as the last responsible of building structures, most architects delegate these processes in professional studios specialized in structures. Being the most common way of proceeding in architectural studios, it is not uncommon among architects to think that a deep knowledge in structures is not necessary, especially regarding calculations development. In this framework, concrete and steel structures is a subject with high logical reasoning component using mathematics, and this knowledge is considered by most of the students as difficult to acquire. With the aim of increasing students' motivation in the subject contents and improving students' acquisition of competences a new teaching proposal using flipped classroom method has been designed, implemented, and analyzed.

Chapter 5

Flip-Game Engineering and Technology Methodology	77
--	----

Milagros Huerta Gómez de Merodio, University of Cadiz, Spain

Juan Manuel Dodero, University of Cadiz, Spain

Nestor Mora Núñez, University of Cadiz, Spain

José M^a Portela Núñez, University of Cadiz, Spain

Flip-GET has been developed with the objective of optimizing engineering practicals. The innovative element of this methodology is the use of serious games, as a complement to the flipped classroom method, in the teaching-learning process of engineering studies. This methodology uses serious games to take

advantage of the capacity of motivation that video games have for the current generation of students, who have been involved with digital content, software, and electronic devices. This methodology has been evaluated using the method of case studies and by an experimental evaluation carried out in different stages, each of which has been developed during an academic course. In the experimental evaluation of the methodology, the control group carried out the practicals dividing the students into subgroups, without using the Flip-GET methodology, while the experimental group performed them with the methodology.

Chapter 6

The CPS Strategy: Challenges and Perspectives – A Flipped Learning Format in Foreign Language Courses	110
<i>Diana Carolina Durán-Bautista, Universidad de La Sabana, Colombia</i>	

This educational research-based chapter describes, analyzes, and evaluates the implementation of the class preparation session (The CPS) as a flipped learning strategy in an undergraduate English as a foreign language (EFL) program in Colombia. About 3000 students are enrolled in the EFL program each semester and an average of 40 teachers are in charge of teaching the courses. The chapter describes the process of implementing the CPS strategy and evaluates its efficacy from students’ and teachers’ perspectives. Participants were requested to take online surveys with the purpose of collecting qualitative and quantitative data about the strengths of the CPS and the challenges encountered its resources. The processes described in this chapter could be adjusted to be used in other institutions. The issues discussed might provide several teaching prospects for teachers and for programs’ stakeholders interested in implementing the flipped learning approach.

Chapter 7

Digitizing Learning: How Video Games Can Be Used as Alternative Pathways to Learning	138
<i>Carol-Ann Lane, Western University, Canada</i>	

The adoption of video games as an alternative classroom resource is acknowledged in technology and multiliteracies discourses as a strategy for meaning-making and developing cultural knowledge. This chapter addresses how educators may be informed about strategies that can potentially reinvent traditional literacy pedagogical boundaries and how boys’ meaning-making establishes new ways and practices shaping their learning processes. This multi-case study examined the experiences of four boys engaged with video gaming in two different contexts: a community center and an after-school video club. A number of findings emanating from this study, including the following: (1) boys use their video gaming practices for meaning-making and collaborative efforts; (2) boys apply their cultural knowledge as creative innovators; (3) boys demonstrate peer mentoring through storytelling, face-to-face interactions, or in their online community of practice; (4) boys make meanings using metacognitive literacy skills; and (5) boys focus on cultural preservation and narrative storytelling.

Chapter 8

Adaptive Learning Using Interactive Training Material	162
<i>Pedro Manuel Hernández-Castellano, University of Las Palmas de Gran Canaria, Spain</i>	
<i>María Dolores Marrero-Alemán, University of Las Palmas de Gran Canaria, Spain</i>	
<i>Rubén Paz-Hernández, University of Las Palmas de Gran Canaria, Spain</i>	
<i>Pablo Rubén Bordón-Pérez, University of Las Palmas de Gran Canaria, Spain</i>	
<i>Luis Adargoma Suárez-García, University of Las Palmas de Gran Canaria, Spain</i>	
<i>Antonio Nizardo Benítez-Vega, University of Las Palmas de Gran Canaria, Spain</i>	

The purpose of this chapter is to describe experience in the development, use, and evaluation of interactive didactic material oriented towards the ISO GPS system that has been introduced into recent academic courses of subjects of various engineering degrees at the University of Las Palmas de Gran Canaria. The Educational Innovation Group Ingeniería de Fabricación sought to generate a tool that would help students with a learning difficulty that had been identified as generalizable across various degree subjects. Student feedback was utilized in the development and evaluation of this didactic material. The results obtained allow us to confirm that the introduction of these materials has had a positive impact and that this preliminary experience of adaptive learning should be supplemented further in order to extend the significant improvement observed, both in the students' learning and the lecturers' teaching, in the last academic year.

Chapter 9

Combining Adaptive and Cooperative Learning Strategies to Deal With Heterogeneity in Large Groups..... 185

Luis Fernández-GutiérrezdelÁlamo, Universidad Politécnica de Madrid, Spain

Luis F. Mazadiego, Universidad Politécnica de Madrid, Spain

David Bolonio, Universidad Politécnica de Madrid, Spain

Fernando Barrio-Parra, Universidad Politécnica de Madrid, Spain

Miguel Izquierdo-Díaz, Universidad Politécnica de Madrid, Spain

In undergraduate university degrees, students start their first year with a high level of heterogeneity in terms of acquired curricular competences. Therefore, the teaching given in these courses must face the challenge of turning this heterogeneity, in principle counterproductive, into an added value that helps students to face the subjects with expectations of success. Consequently, an innovative approach in the teaching of the first degree courses is needed, moving towards adaptive and personalized learning based on the use of new technologies, facilitating the overcoming of learned competences regardless of the starting level of the student. Other works focus on adaptive learning to achieve the homogeneity in groups of students before the beginning of the group lessons. Unlike this “classical” approach, this chapter is based on maintaining the heterogeneity of knowledge and using it as a driving force to learn through interactions among group members.

Chapter 10

Personalized Education for a Programming Course in Higher Education..... 203

Arturo Rojas-López, Universidad Tecnológica de Puebla, Mexico

Francisco José García-Peñalvo, Universidad de Salamanca, Spain

The purpose of this chapter is to present the intervention in personalized education for the Programming Methodology course in higher education. Indicators such as dropout rate, failing rate, and poor academic performance of the students of Universidad Tecnológica de Puebla (UTP) are necessary to propose strategies that improve education quality. Therefore, during the four-month periods of September – December in 2016 and 2017, the authors performed interventions with the strategy of personalized education with the objective to improve the indicators mentioned above. The four strategy elements are 1) content, 2) work methods, 3) pace and times, and 4) assessments options. The study that is presented in this chapter is original because it avoids a unique starting point for all students. The study attempts to go over what the students have in common; this is why the authors were able to stimulate each student to be in charge of their own knowledge freely and responsibly.

Chapter 11

Smart Learning Model Based on Competences and Activities 228

Alberto Real-Fernandez, Universidad de Alicante, Spain

Faraón Llorens-Largo, Universidad de Alicante, Spain

Rafael Molina-Carmona, Universidad de Alicante, Spain

The educational environment we find in our current world does not look like it did some years ago. The learning process has become dynamic and continuous, mainly driven by the great evolution of technology, implying an inevitable change in education. It is a change that requires a complete digital transformation of education to change the teaching and learning process by means of information technologies. This is why, faced with the traditional one-size-fits-all learning, this chapter proposes an open, collaborative, flexible, and scalable adaptive learning model based on information technologies. Because current students need to be prepared for a lifelong formation, let them know they should assume a continuous cycle of learning, unlearning, and relearning. A model that aims to fulfill all the new learning needs emerged on this digital world. It lets the students develop a lifelong learning, where the concepts are updated and reinforced, and dynamically adapted to their learning needs and progress.

Compilation of References 252

Related References 282

About The Contributors 299

Index 305