

## The Expansion of Pedagogical Alignment – A Step for the Learning Success

**Julia JUSTINO**

Polytechnic Institute of Setúbal

**Silviano RAFAEL**

Polytechnic Institute of Setúbal

**Abstract:** The adaptation of higher education institutions to the changing needs of employers and society demands critical and creative ability in the elaboration of new curricula. The implementation of these new curricula requires a change in methodology to the learner-centered approach that is not easy at first and requires a deeper reflective and analytical attitude from the teacher. How it starts and how should be applied is a recurring issue at conferences and is the subject of this paper. The first step consists of building the training structure to be implemented, been usual to build a structure which supports contents, learning outcomes and assessment methodology. But this is not sufficiently comprehensive to provide guidance and reflection to the teacher about the learning activities to be implemented nor the learning itself, even with the support of an IT tool to maintain the focus and establish the development phases of the pedagogical structure. The new feature presented in this paper is the expansion of the training structure to all educational elements needed for the implementation of the student-centered approach. An example is given within the context of a course unit of a short-cycle tertiary educational programme (2 years – 180 ECTS), providing the syllabus planning, the learning outcomes setting, linking them with their ground level of cognition, the teaching-learning activities setting for each specific content, the resources to students allocation and/or creation, structuring them on an IT platform, the pedagogical strategies setting and the evaluation method definition. This planning allows to structure the whole teaching-learning process of the course unit, considering the available timeframe, the application environment or context, the students' competences to exercise and the teacher's pedagogical skills.

**Keywords:** Pedagogical alignment, Constructive alignment, Teacher-centered approach, Student-centered approach

### Introduction

Higher education institutions are constantly driven to adapt training and education objectives to the ever-changing needs of employers and society. In particular, the rapid technological evolution in the business areas developed and expanded establishes new needs for the modern economy. In fact, emerging jobs and eliminated jobs need different skills which are characterized by a technological strand and a behavioural and social strand. This adaptation requires from faculty staff critical ability and creative resourcefulness in the development of new curricula, in which it becomes necessary to integrate new technical and scientific skills (hard skills), as well as behavioural and social skills (soft skills). These last competences, although not yet highly expanded in Portuguese higher education, increasingly assume a decisive importance in building students' knowledge, preparing them for the challenge of their integration and active participation in the structure of today's society. So what skills will be needed within the next 10-year and how to prepare students for that future? The implementation of new curricula, taking into account the associated transversal competences and the imposition of reduced contact time between teacher and student, requires that learning has to be more dynamic and interactive than the one occurring in a traditional teacher-centered approach. What should be the role of the academic staff in the learning and teaching process? According to a recent OECD report (OECD, 2018), the traditional methodology still persists in the Portuguese higher education system. Also the public funding of institutions depends partly on the academic success of its students. Therefore, the pressures resulting from

- This is an Open Access article distributed under the terms of the Creative Commons Attribution-Noncommercial 4.0 Unported License, permitting all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

- Selection and peer-review under responsibility of the Organizing Committee of the Conference

social, labor, educational and financial policy gradually leads higher education institutions to an evident consequence: the change of pedagogical methodology. The question is which pedagogical approach should be used.

## **Pedagogical Approach**

There are various types of teaching approaches in education which develop specific aspects of student learning. The teacher-centered approach and the student-centered approach are two of the most common teaching approaches (Sablonniere, Taylor & Sadykova, 2009).

In higher engineering courses the traditional teacher-centered approach, where the student is, in most classes, a mere spectator, often without critical and reflective commitment (Mitre et al., 2008), is still widely used. This learning environment is completely contradictory to the construction of a critical awareness in students, which should be based on a constant creative and autonomous demand, questioning the changing reality, interrogating it and actively seeking suitable answers. Also, in teacher-centered approach, where the contents follow a logic of technical-scientific development, the topics and their levels of knowledge, that establish the intended learning objectives, are sometimes not clear from the students' point of view. Moreover, in evaluation, although contents are addressed, the contents' measurement can easily be dissociated from the learning objectives, upwards or downwards, because there is no systematic application of a learning taxonomy to the established objectives. These differences in the degree of requirements can mislead students who perceive them, sometimes without connection, by the greater or lesser importance given to each subject under study. The evaluation of knowledge and skills, almost always summative, only at the end of the term time by a final exam tends to be punitive, since it is too late for the teacher to provide some kind of feedback regarding the quality of the students' training. In some course units the assessment is strongly discrete, consisting of two summative tests, one in the middle and the other at the end of the term time. These assessment activities, although assigned in two separate periods, and therefore better than a single final evaluation exam, can lead students to discouragement due to the higher concentration of tests of the various course units.

In addition, the course units in engineering are autonomous and most of them disconnected from each other regarding transversal objectives. There is no intentional coexistence of an organizational concern in reinforcing or complementing the students' transversal skills through properly articulated teaching activities, in order to increase the students' human and behavioral potential along their academic path in the context of the classes.

On the other hand, the student-centered approach is an active learning process since students are actively engaged in their learning, driving discussions, asking and answering questions about the contents (Jingna, 2012). In addition, students develop important soft skills (Nitonde, 2014), communicative and collaborative skills, like team work, critical thinking and time management, among others (Dewiyani, 2015).

In the light of the foregoing, the application of the student-centered approach is a way to adapt the educational system to the real needs of the modern economy. However, the change in pedagogical methodology is not an easy task for those who did not integrate the concept of the student-centered learning paradigm, because it means stripping from a teaching-learning process limited to the reproduction and transmission of contents while the students passively receive and memorize them by a more or less exhaustive repetition process.

## **Training Structure**

The training structure consists of establishing all the necessary elements in the pedagogical activity of a teacher at different levels of its performance and interaction with the students. Some of the highlights are the contents, the learning outcomes, the didactic resources, the learning activities, the teaching techniques and the assessment method to be implemented, together with the evaluation of the pedagogical influence in the learning space caused by the implementation of this structure (Piskunov, 2001). According to Kuzmina (Kuzmina & Rean, 1993), there are generally three main activities in the training structure: the constructive, the organizational and the communicative one. This development project of the activities features of the training structure requires from teachers pedagogical skills and knowledge (Biktagirova & Valeeva, 2014; Valeeva, 2013) and also a capacity to predict and monitor the evolution of the subtle changes in students' learning. Operationally, at an early stage, a dedication to the study of the pedagogical method to be implemented is required, in addition to a broad understanding of the dynamics in the classroom, the expected developments of students' learning path, the objectives to be achieved and the setting and assessment of the means for teaching and learning. In the

implementation phase in the classroom, the primary purpose should be the consolidation of the training and educational structure previously developed, which supports the pedagogical attitudes and the assessment methodology (Kalimullin, Vlasova & Sakhieva, 2016). By implementing the student-centered approach, it is necessary for the students to become aware of their responsibility for their own learning, fostering a proactive attitude in the engagement of their knowledge and acquisition of new knowledge to achieve the intended learning outcomes. How it starts and how should be applied is a recurring issue at conferences and public debates. The answer to this question involves a setting and planning procedure that is important to develop and relatively new when supported by an IT tool that helps the teacher to maintain the focus and to establish the development phases of the training structure.

### **Classes Planning**

Classes planning is a teaching aid which contributes to support the implementation of a teaching-learning process, since it allows the teacher to make a reflection and forecast of what his classes should be. Conceptually, planning relates the objectives to the necessary contents and didactic resources. This basic structure of planning is used by the academic staff, been adapted to the specificities of each course unit and its teaching approach. In Figure 1 below an example of the implementation of planning in an Excel spreadsheet is presented, where each column represents a planning topic. Note that this basic model of planning can have more columns, stating, for instance, the class number or the time of a specific topic to be achieved.

<b>Learning Outcomes</b>	<b>Syllabus</b>	<b>Teaching Method</b>	<b>Time (minutes)</b>
Statements describing the knowledge or skills students should acquire by the end of a class, course or program.	Outline or summary of the subjects to be covered in a class or course. It concerns with WHAT is to be learned.	The way to enable student learning, taking into account not only the nature of the subjects but also the students' learning characteristics. It concerns about HOW the teaching is to be conducted.	20

Figure 1. Example of a basic structure of a planning

If planning is developed within the teacher-centered approach, teacher’s reflection and preparation is focused on the organization of the topics or contents to be learned by students, as presented in Figure 1, not taking into account the students’ characteristics and the teaching techniques to be applied. Also, in this basic model of planning the evaluation activity, usually performed by a final exam, is also not considered.

### **Constructive Alignment**

What is “constructive alignment”, according to John Biggs? The ‘constructive’ aspect refers to what the learner does, which is to construct meaning through relevant learning activities. The ‘alignment’ aspect refers to what the teacher does, which is to set up a learning environment that supports the learning activities appropriate to achieve the desired learning outcomes (Biggs & Tang, 2011). So, the teacher’s role is to create a learning environment that supports the learning activities suitable for achieving the desired learning outcomes. An aligned system is obtained when the desired learning outcomes, not only the topics but also the level of understanding, is achieved by the students. The teaching activities of the teacher and the learning activities of the student both have the same goal when preparing for assessment. Thus, the assessment matches the objectives expressed as learning outcomes.

<b>Learning Outcomes</b>	<b>Learning Activities</b>	<b>Assessment</b>
Statements describing the knowledge or skills students should acquire by the end of a class, course or program.	Activities developed by the teacher designed to bring about, or create, the conditions for students learning.	Evaluation process used to measure what the students know or have learned.

Figure 2. Implementation of the constructive alignment

The implementation of the constructive alignment can be carried out, as presented in Figure 2 above, by completing a table containing the learning outcomes in the first column, the learning activities in the second column and the assessment in the third column. In practice, however, this is not enough for a first-year college

teacher to be able to implement the constructive alignment in its course unit. There is a natural need of inserting more columns in this table regarding the specific needs of each course unit. We call this upgrade of the constructive alignment, extended to support topics, the expansion of pedagogical alignment which will be given in Figure 3. The learning outcomes should be aligned with the level of in-depth understanding that the students must achieve, expressed by the action verbs established in Bloom’s taxonomy, along with some subjects covered by the course unit.

<b>Learning Outcomes</b>	<b>Bloom's Taxonomy</b>	<b>Contents</b>
Statements describing the knowledge or skills students should acquire by the end of a class, course or program.	Set of six hierarchical models used to classify educational learning objectives into levels of complexity and specificity.	Outline of the subjects covered by the learning outcomes.

Figure 3. Expansion of the learning outcomes’ pedagogical alignment

The learning activities defined in accordance to the contents covered, should also be aligned with the teaching techniques applied in the classroom along with the setting of the didactic resources to be used.

<b>Learning Activities</b>	<b>Teaching Techniques</b>	<b>Resources</b>
Activities developed by the teacher designed to bring about, or create, the conditions for students learning.	The way chosen by the teacher to engage students in the learning process.	Any tool that helps teachers to teach and students to learn.

Figure 4. Expansion of the learning activities’ pedagogical alignment

In Figure 5 below, the assessment established in accordance to the contents covered is presented, aligned with the aim of evaluation along with the mean chosen to perform that evaluation. Note that the evaluation aim must also address Bloom’s taxonomy.

<b>Assessment</b>	<b>Evaluation Aim</b>	<b>Means of Evaluation</b>
Evaluation process used to measure what the students know or have learned.	What is monitored or evaluated.	How is evaluation performed.

Figure 5. Expansion of the assessment’s pedagogical alignment

This generic example of the expansion of pedagogical alignment, presented above, was implemented in the context of a mathematics’ course unit of a short-cycle tertiary educational programme (2 years – 180 ECTS), providing the syllabus planning, the learning outcomes setting, linking them with their ground level of cognition, the teaching-learning activities setting for each specific topic, the resources to students allocation and/or creation, structuring them on an IT platform, the pedagogical strategies setting and the evaluation method definition. The active learning techniques applied in the classroom environment of the course unit depended on the qualitative and quantitative assessment, the students’ behavioural attitude, the specific objectives for each class within the mathematical contents and the need to optimize the students’ working time, always providing them the necessary learning activities. This whole planning generated a pedagogical alignment matrix that enabled to preview and adapt all the elements in the pedagogical activity during term time, contributing to the success rate of the course unit (Justino & Rafael, 2018).

## **Results and Discussion**

This planning through the expansion of pedagogical alignment allowed to structure the whole teaching-learning process of the course unit, considering the available timeframe, the application environment or context, the

students' competences to exercise and the teacher's pedagogical skills. Its application greatly facilitates the teacher's work of analysis and reflection on its pedagogical practice, as well as the compliance with the objectives reached. In addition, it has the dynamics needed to change the pedagogical path at any time during term time by allowing the necessary corrections in the fulfilment of the outlined educational goals.

## Conclusion

The following significant conclusions were reached in this research work. The basic model of constructive alignment is not enough for a first-year college teacher to be able to implement it in its course unit due to the specific needs regarding the topics covered. The expansion of pedagogical alignment is flexible, allowing to fix the learning paths during term time. The expansion of pedagogical alignment proved to be an efficient tool to implement the constructive alignment in a mathematics' course unit, contributing to foster students' motivation and its adaptation to academia, to reduce the drop-outs rate and to increase the success rate.

## References

- Biggs, J. & Tang, C. (2011). *Teaching for quality learning at university, 4th Edition*. Open University Press, UK.
- Biktagirova, G. F. & Valeeva, R. A. (2014). Development of the teachers' pedagogical reflection. *Life Science Journal, 11(9s)*, 60-63.
- Dewiyani, M. J. S. (2015). Improving Students Soft Skills using Thinking Process Profile Based on Personality Types. *International Journal of Evaluation and Research in Education (IJERE)*, 4(3), 118-129.
- Jingna, D. U. (2012). Application of Humanism Theory in the Teaching Approach. *Higher Education of Social Science, 3(1)*, 32-36.
- Justino, J. & Rafael, S. (2018). Teaching Mathematics in tertiary education through collaborative work. *Proceedings from CISPEE 2018: 3rd International Conference of the Portuguese Society for Engineering Education*, IEEE Xplore Digital Library. DOI:10.1109/CISPEE.2018.8593476
- Kalimullin, A. M., Vlasova, V. K. & Sakhieva, R. G. (2016). Teachers' Training in the Magistrate: Structural, Content and Organizational Modernization in the Context of a Federal University. *International Journal of Environmental & Science Education, 11(3)*, 207-215.
- Kuzmina, N. V. & Rean, A. A. (1993). *Professionalism of pedagogical activity*. (Text). Saint-Petersburg University Press.
- Mitre, S., Batista, R., Mendonça, J., Pinto, N., Meirelles, C., Porto, C., Moreira, T. & Hoffmann, L. (2008). Metodologias ativas de ensino-aprendizagem na formação profissional em saúde: debates atuais. *Ciência & Saúde Coletiva, 13(2)*, 2133-2144.
- Nitonde, R. (2014). Soft Skills and Personality Development. *Conference National Level Seminar on soft Skills and Personality Development*, ResearchGate. DOI: 10.13140/RG.2.2.28116.60804
- OECD (2018). Review of the tertiary education, research and innovation system in Portugal. Retrieved from <https://www.santamariasauade.pt/sgc/Assets/Plugins/CKEditor/kcfinder/Uploads/files/Review%20of%20TERI%20in%20Portugal%206%20February%20DRAFT.pdf>
- Piskunov, A. I. (2001). Pedagogical education: concept, contents, structure. *Pedagogics, 3*, 41-47.
- Sablonnière, R., Taylor, D. M. & Sadykova, N. (2009). Challenges of applying a student-centered approach to learning in the context of education in Kyrgyzstan. *International Journal of Educational Development, 29(6)*, 628-634.
- Valeeva, R. A. (2013). Requirements to the teacher's personality as a tutor in the context of humanistic pedagogics of the XX century. *Issues of Education, 2*, 80-88.

---

## Author Information

---

### Julia Justino

Polytechnic Institute of Setúbal  
Setúbal School of Technology  
Campus do IPS - Estefanilha,  
2914-508 Setúbal, Portugal  
Phone: (+351) 265 790 000  
Fax: (+351) 265 790 043  
Contact E-mail: [julia.justino@estsetubal.ips.pt](mailto:julia.justino@estsetubal.ips.pt)

### Silviano Rafael

Polytechnic Institute of Setúbal  
Setúbal School of Technology  
Campus do IPS - Estefanilha,  
2914-508 Setúbal, Portugal  
Phone: (+351) 265 790 000  
Fax: (+351) 265 790 043

---