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Innovation in Higher Education: A Study of an Interdisciplinary Experience of Challenge-Based Learning (CBL) in Early Childhood Education Teacher Training

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Abstract

The aim of this study is to analyse the impact of the application of the active methodology called Challenge-Based Learning (CBL) on the development of generic competences in university students through their participation in an interdisciplinary project that brought together several subjects. The study was carried out based on an action research design within the framework of an educational innovation project in its third year of implementation. A total of 113 students from the second year of the Degree in Early Childhood Education at the University of Huelva participated throughout the semester, designing an educational experience focused on children between three and five years of age, applying the Challenge-Based Learning (CBL) methodology. At the end of the semester, the students responded to a survey in which they assessed the degree to which their participation in the innovation project favoured the development of their generic competences, as well as the benefits and difficulties related to the application of active methodologies in university studies. The results show the suitability of the use of active methodologies, in this case the CBL, for the development of competences in university students, especially those related to collaborative and autonomous work, oral and written communication skills, initiative and entrepreneurship, recognition and respect for diversity; as well as social responsibility, civic and professional ethics.

Keywords: active methodologies, Challenge Based Learning (CBL), university studies, globalised learning, interdisciplinarity, competences.

1. Introduction

Research carried out throughout the 20th and 21st century on the way we learn and the means of learning has brought to light some fundamental elements on which a good number of

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experts seem to agree: the relationship between previous and new knowledge, the need to give meaning to the contents learned through their contextualisation and use in social and empirical life, as well as the fundamental role of collaborative work with the students themselves and the teaching staff in order for the educational process to be successful (Frolova, Rogach, 2021; Luch, Portillo, 2018; Pozo, Pérez, 2006).

On the other hand, there is the need to incorporate educational proposals whose main objective is to train people for life, for well-being, for understanding and acting in the world in which they live. To this end, Zabala (1999) points out that meaningfulness and functionality are requirements for learning, and proposes the application of a globalising approach that encourages students to develop complex thinking in order to identify the scope of each of the problems that intervention in reality poses and to choose the conceptual and methodological instruments from any of the different fields of knowledge which, by relating and integrating them, will enable them to solve (p. 31).

In order to enable people and countries to respond to the challenges of today's and tomorrow's world, nations have been creating policies and legal frameworks that foster the development of strong education systems capable of meeting these demands including the entire population. This is, for example, the central idea behind the creation in 2018 of a common education framework in the European Union: "The European Education Area initiative helps EU Member States to work together to develop more resilient and inclusive education and training systems" (European Union Education Area).

In 2017 the European Union published the document called Renewed European Agenda for Higher Education, which emphasises the urgency of having an effective and efficient higher education for the development of European societies and, to achieve this, it proposes a series of actions to be implemented in the universities of the member countries among which the following stand out (pp. 6-7): the creation of inclusive and connected higher education systems that address Europe's social and democratic challenges as learning communities linked to their contexts; the development of programmes and curricula that focus on the learning needs of students, enabling them to understand and respond appropriately to the needs of individuals and to pursue lifelong learning; the promotion of students' acquisition of skills and experiences through activities based on real problems; the conception, construction, and implementation of curricula with teachers who are pedagogically trained and whose professional development is continuously and systematically promoted.

Awareness of the growing demands of the complexity of global society together with the conviction that learning processes must be promoted in accordance with human needs, widely demonstrated from the physiological, psychological, pedagogical and social points of view, make a committed and transformative response necessary on the part of teachers, especially those dedicated to Education Sciences, who play a substantial role in the training of people who will become teachers, make a committed and transformative response necessary on the part of teachers, especially those dedicated to Educational Sciences, who play a substantial role in the training of people who will become teachers, as they can become role models in their own educational work with students (Sánchez, 2019).

In this sense, the educational innovation project presented here has sought to respond to the needs and urgencies of our contemporary societies through the application of the active methodology called Challenge-Based Learning (CBL) with the dual purpose of promoting the development of generic and specific professional competencies of university students, and at the same time, to promote awareness of the most relevant needs that exist in their context. These needs would be addressed as a vehicle for their own learning and that of their students, by designing globalized and meaningful educational experiences.

The results obtained through the implementation of this project show the relevance of the application of active methodologies with a globalizing approach that addresses the educational purposes of the students' competence development, the necessary educational transformation of basic education, and the impact of the university on society. It also shows the keys to interdisciplinary work in university subjects, its benefits for student learning and the challenges it poses for teachers.

CBL emerged in the technology company Apple (Nichols et al., 2008) as a working methodology to achieve its objectives. The benefits of its application in the business environment prompted the company to propose it as an educational methodology generating a series of

guidelines and proposals for its consolidation. According to Fidalgo et al., (2017) it is a "method that includes cooperative learning, the vision of problems that globally affect all humanity and the applied vision of various academic subjects [...]. It usually encompasses actions carried out by the educational centre as it needs to integrate knowledge from various subjects" (p. 1).

This methodology has experienced a growing increase in higher education institutions, fostering students' transversal competences, knowledge of socio-technical problems and collaboration with industry and community agents (Gallagher, Savage, 2020). Despite its recent implementation in education and the need for adjustments and standardisations in its application, several institutions show a predilection for it, even over others such as Project-Based Learning (PBL) or Problem Based Learning (PrBL). CBL achieves greater student involvement in understanding, tackling and solving the challenges posed since these are real, relevant, open, and take place in their context which requires them to implement multiple and varied competences, all this in the hands of teachers and experts in the subjects addressed; in addition, of course, to a close collaborative work process with their teammates (Observatorio de innovación educativa, 2015).

The elements and phases included in the CBL in its educational application are (Idem, p. 12):

- General idea: it is a concept whose range allows for multiple explorations; it is relevant and attractive to students and society, for example: biodiversity, health, sustainability, democracy, and equality among others.

- Essential question: this is the question, among all those that can be created from the chosen topic, which reflects the needs and interests of the students and the community. It serves as a guide to focus them in the development of their project.

- Challenge: this is a challenge, task, activity or situation that students must solve through their project. It arises from the two previous elements and generates a concrete and significant action to be carried out by the students in a local way.

- Guiding questions, activities, and resources: these are the elements that students must design, carry out, and use to solve the challenge in a realistic, innovative, and deep way.

- Solution: it can be one or several, since the scope of each challenge allows various forms of action to reach it. It must be characterized by its concreteness, articulation, and feasibility of successful implementation.

- Implementation: the solution must be performed in a real environment.

- Assessment: it should take place before, during and after the solution to the challenge in order to guide the student's process, making the appropriate decisions to improve learning and favour the achievement of the objectives. It should focus on the development of competences evidenced both in the solution to the challenge and in the process of achieving it.

This methodology has an impact on improving academic performance by promoting student motivation in the implementation of its phases as well as the integrated development of specific and transversal competences, and it is considered very suitable for developing students' innovative and research profile competences. It develops digital culture, innovation and critical thinking, and communication skills as well as teamwork, leadership, time management, project planning, and project development; socioemotional skills such as resilience, self-management, autonomy, collaboration, and empathy are also reinforced with the use of this methodology (Universidad Politécnica de Madrid, 2021: 17).

The CBL is an educational methodology that achieves positive results even in the first school years (Castro, 2019; Felices, 2023), thus showing that it is applicable by adapting its phases and the challenge posed to the characteristics and needs of each group in which it is used. For this reason, it was considered to be the most relevant methodological innovation option for the purposes of the design and implementation of the interdisciplinary project described below.

2. Materials and methods

This study was carried out on the basis of an action research design within an educational innovation project in its third year of implementation. The participating teachers designed a Challenge-Based Learning experience to promote the development of generic competences of students in the second year of the Bachelor's Degree in Early Childhood Education.

A total of 113 students participated in the study. There were three subjects involved in the project: Didactics of Mathematics, Didactics of Foreign Languages (English), and Health and Consumer Education.

The students were divided into groups of four to two people. Each group should choose one of the three possible grades of the second cycle of Infant Education (3, 4 or 5 years), and elaborate a proposal for a trimestral design of work in which the CBL methodology was applied. This had to meet three fundamental requirements: 1) be aimed at solving a challenge linked to the context of the school and group in which the proposal would be placed; 2) address at least one of the 17 Sustainable Development Goals as a general idea; 3) promote the integrated development of the competences of the three areas of Early Childhood Education in each of its phases.

As a complement to the use of CBL, the GRASPS tool (Goal, Role, Audience, Situation, Product/Performance and Purpose, Standards and Criteria for Success) was used. This is an inverted learning strategy in which an educational experience is described for the students where the following is specified: the goal to be achieved or challenge to be met, the role that each person has, the target audience, the situation, the subject matter and the context in which it will be carried out; the purpose or product that is expected to be generated and the standards and criteria for success (Egas, 2018).

For the fulfilment of this project, preparatory activities for the initial training and orientation of students were designed and carried out:

1) An educational visit to the Centro Andaluz de Arte Contemporáneo in Seville, which included a guided tour of the site and a complex explanation with an inter- and transdisciplinary vision of its history, construction, uses, and renovations over time and the participation in the temporary exhibition "De ida y vuelta" by the Spanish artist Cristina Lucas. The aim of this experience was to highlight the network of interconnections between the different elements that make up the world and the complexity of the reality: people as biopsychosocial beings, nature and socio-political, and economic systems. The author makes use of a wide range of materials and resources in her exhibition, from a complex approach to the themes and techniques dealt with through which visitors become aware of the urgency of a change of direction for humanity focused on the holistic wellbeing of everyone in harmony with the world and each of the elements that composes it (Centro Andaluz de Arte Contemporáneo, 2023).

2) An initial introductory and training seminar for the solution to the challenge where a general explanation of learning from the globalised approach, the justification of its necessity, the means, methodologies, and resources to favour it, inside and outside the educational context, and two examples of educational experiences, already implemented were analysed, focused on children in Early Childhood Education, aimed at the development of competences through transdisciplinary and globalised educational situations in which children participated actively and collaboratively in real or realistic situations, where they achieved a series of objectives and their previous knowledge, interests, and needs played a fundamental role.

Once the seminar had taken place, the subjects continued to operate in accordance with the stipulations of their teaching guide, with the intention of encouraging the greater penetration and naturalisation of the methodological components of the project (CBL, interdisciplinarity, complexity...) in their daily lives.

The subject of Health and Consumer Education was responsible for presenting and explaining the Project's descriptive document in detail. in this subject, the students requested tutorials (at least one in each group) to clarify the characteristics of the project and the way in which it should be carried out.

Approximately one month after the start of the Project, the students were asked to make a brief presentation with detailed information about their educational proposal, receiving feedback from the teaching staff. This activity was very useful for the adaptation and redirection of their proposals, so that, once they had an adequate basis, they were able to continue with the design of the subsequent phases.

In the three participating subjects there were different moments in which the project was addressed, asking the students to explain the challenge chosen for their project and the context in which they would develop it, as well as the way in which they proposed globalised learning and the integration of all the competences with the challenge as the fundamental node.

As an example, a summary of the proposal made by a group of four students is presented. The name they chose for their educational proposal was "Messengers of the sea" focused on the 5-year-old class of a school in the town of Mazagón, Huelva. The students addressed SDG 13 "Climate action" and SDG 14 "Life below water". The challenge set by the group was to carry out a series of awareness-raising actions for the students, teachers and families of the chosen school, as for the rest of the

community, with the aim of promoting care for the environment, especially beaches, reducing waste generation and reuse or recycling of waste, as well as carrying out activities to preserve the environment in the best possible conditions. All this will be achieved through three main actions: 1) travelling exhibition of real information from reliable sources on environmental pollution (collected, analysed, and systematised by the children themselves); 2) making toys by reusing waste found on the beach by the children themselves; 3) a play created, directed, and acted by the children, which will be open to the public and will show the pollution problems suffered by the coast of Huelva and the possible solutions in which each person can collaborate.

Following the action research process (Hernández et al., 2010), once the project was implemented, data was collected on the students' experience and learning, through a survey specially designed for this research, validated by expert judgement and with a piloting process prior to its application. The survey is divided into five sections: general information, development of generic competences, assessment of the CBL methodology, comparison with other subjects in the degree programme, and assessment of the educational experience. Most of the survey used questions that were answered using Likert-type scales with five grades ranging from: not at all, to completely. Some open-ended questions and one multiple-choice question were also included, thus obtaining quantitative and qualitative data.

The survey was carried out using Google forms and it was answered by 58 students. The information obtained was processed using SPSS v.21.

Once the general process of the innovation project was completed, a meeting was held with the participating teachers, in which they responded individually to a survey in which they recorded the strengths, opportunities, weaknesses and threats (SWOT) of the project.

3. Results

The information obtained through the survey yielded a series of relevant descriptive data, which allows us to make a first and incipient approximation to the experiences of the participating students.

94.7 % of the students who responded to the survey are female. Of the total number of participants, 93 % are aged between 20 and 25, 5.3 % between 26 and 30 and 1.8 % between 31 and 35.

All of the respondents took part in Didactics of Mathematics, while 93 % of them also took Health and Consumer Education, and 82.5 % took Didactics of Foreign Language (English).

In terms of participation in the preparation and training activities for the implementation of the CBL project, 61.4 % attended the Centro Andaluz de Arte Contemporáneo, while the majority (91.2 %) attended the induction seminar, with only 7 % not attending and 1.8 % partially attending.

The students were asked about their perception of the development of the generic competences of the Bachelor's Degree in Early Childhood Education through the project. Cronbach's Alpha analysis of student responses showed a high level of reliability (0.967). The list shows those they considered to be most developed:

Table 1. Competences with the highest degree of development through the project

Competence	Average raiting
Working collaboratively	3.89
Working autonomously with initiative and an entrepreneurial spirit	3.79
Ability to communicate correctly orally and writing in the mother tongue	3.77
Ability to relate positively to others	3.75
Recognition and respect for diversity and multiculturalism	3.73
To behave ethically and socially responsible as a citizen and as a professional	3.70

The rest of the competences analysed have averages between 3.23 and 3.69, which shows a medium to high development of them in the process. It is worth noting that there were only two competences with a percentage of less than three: Knowledge of other cultures and customs (2.96 points) and Knowledge and communication in foreign languages (2.88 points). It is noteworthy that despite the participation of the subject of Didactics of Foreign Languages (English), these two generic competences, which are most directly related to it, received the lowest

marks. The ability to integrate and communicate with experts in other areas and in different contexts was the third with the lowest score, reaching 3 points out of 5.

A correlation analysis was conducted between the different generic competences of the students, finding that those that have the highest correlation with the rest are, from highest to lowest: the ability to assume the need for continuous professional development through reflection on one's own practice, and the ability to integrate and communicate with experts in other areas in different contexts; the ability to search for and manage information; the ability to detect one's own learning needs throughout life; and, lastly, creativity or the ability to think about things from different perspectives, offering new solutions to problems. This analysis also revealed low correlation scores between knowledge and communication in foreign languages and the rest of the competences analysed.

In order to compare the experience in the project with the rest of the subjects studied in the Degree in Early Childhood Education, some complementary questions were asked, from which the following results were obtained:

- The majority of students (47.4 %) agree that the development of generic competences was greater in the interdisciplinary project than when working in a disciplinary manner and with non-active methodologies or methodologies not centred on work in real contexts, while 25.3 % strongly agree and 8.8 % totally agree. On the other hand, we found that 14 % slightly agreed and 3.5 % disagreed.

- Most of the students agreed that participation in the interdisciplinary project was key to the integration of their learning (36.8 %), while 29.8 % strongly agreed, and 14 % strongly agreed. Only 7 % disagreed and 12.3 % disagreed slightly.

- When assessing the Challenge-Based Learning (CBL) methodology, it was found that the majority of students agreed or strongly agreed that the project increased their confidence in carrying out their teaching work (33.3 % in each case), while 12.3 % strongly agreed, 12.3 % slightly agreed and 8.8 % strongly disagreed.

- Comparing with other methodologies (lecture, example analysis and annotated reading), most of the students (45.6 %) indicated that they strongly agree that CBL promotes their learning to a greater extent, while 21.1 % strongly agree and 19.3 % agree. Only 1.8 % strongly disagreed, while 12.3 % slightly disagreed.

- The degree of agreement decreased when the statement "The participation in the interdisciplinary project was key to the integration of my learning" was made, since the majority of the percentages were between: agree (32.1 %), slightly agree (16.1 %) and disagree (14.3 %). There were 28.6 % of students who strongly agreed, and 8.9 % totally agreed.

It is worth highlighting the results of the assessment of the benefits promoted by the CBL methodology in relation to the students' experience. The following table shows the benefits from highest to lowest percentage:

Table 2. Benefits of the CBL as perceived by students

Benefits of the CBL	Percentage
Promotes collaborative learning with peers and teachers	81.8 %
Exercises in research, argumentation, and expression, both oral and written	69.1 %
Promotes awareness of the needs of the environment	69.1 %
Improves the autonomy and self-esteem of pupils	67.3 %
Encourages the development of critical and creative thinking	60 %
Requires interdisciplinary work	60 %
Motivates learners to participate by giving meaning to their learning	60 %
Generates students to act in reality by learning and putting into practice what they have learned	60 %

The students were asked to compare this experience with the rest of the subjects they had studied so far in the Early Childhood Education Degree. The questions and results were as follows:

− 41.1 % of the students indicated that, of all the subjects studied in their university degree, only in some they have carried out activities in which the learning is applicable in reality, while 32.1 % indicated that they have done so in few of them, and 12.5 % in none. On the other hand, 10.7% said most of them and 3.6 % said all of them.

− 47.4 % agree that they have learned more in the subjects in which they have carried out activities linked to the practice of their profession, while 22.8 % strongly agree, and 8.8 % totally agree. We also find an equal percentage of people who strongly disagree or slightly agree: 10.5 % in each case.

Some questions were included to assess overall satisfaction with the project, both in terms of its design, the process of implementation, interaction with the teaching staff, and the work carried out within the team. In general, a medium to low level of satisfaction was observed, with the exception of team work, where most of the percentage was between totally satisfied (43.9 %) and very satisfied (42.1 %), with the third position being satisfied (12.3 %) and only 1.8% not very satisfied. When applying the reliability analysis, the result was acceptable (0.766) through the Cronbach's Alpha test.

The survey applied to the students allowed the inclusion of a comment in relation to their individual experience in the project, obtaining the following information: they state the need and convenience of carrying out this type of project to favour the training of future teachers, significant learning through practice and research as the basis for interesting and effective learning. In relation to the aspects that they also valued favourably; the majority indicated their conviction about the importance of carrying out activities focused on the reality of the teaching work that they will carry out in their professional careers. In most of the comments, the need to improve some aspects was detected: the organisation of the teaching staff and the meaning of the project within each subject; the design of a clear and coherent explanation of its objectives, process and assessment; the planning which provides more time for design and execution, with specific guidelines and characteristics of the assessment from the beginning of the course; the gradual monitoring of the work done through the delivery of drafts, and attendance at tutorials to incorporate the appropriate corrections prior to the final delivery.

As a complement to the assessment made by the participating students, a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis was applied. Both, the teachers who participated directly in the project and those who collaborated indirectly in its different phases, were taken into account, with a total of nine responses. A summary of the results is shown below.

Strengths: commitment of the teaching staff; greater learning on the part of the students who showed involvement; relationship achieved between the various subjects; collaborative work with a common methodological framework; design of the work script, evaluation rubric, and survey.

Weaknesses: low percentage of the work carried out by students in the final grade for each subject, which does not correspond to the effort required for its completion and revision; excessive increase in the workload for the teachers involved, both in monitoring students and in assessment and tutoring; coordination difficulties among the participating teaching staff due to incompatibilities in terms of timetables and workload; lack of experience and extensive training of the teaching staff in CBL methodology; suppression of some content or a superficial approach to them in the three subjects in order to dedicate time to the project. Regarding Didactics of foreign languages (English), its presence in the final elaboration of the students' educational proposals was not very significant, showing a minimal impact on the achievement of its learning objectives.

Opportunities: inclusion of new subjects and participants for the next academic year; systematisation of a more efficient proposal in the use of time and more effective in the achievement of the objectives to enable its implementation in other degrees and subjects; planning each of the phases, especially the evaluation, specifying all its characteristics from the beginning; using the available technological tools to improve the organisation of the teaching staff; updating the teaching guides to favour the best development and use of the project; dissemination of the results within the different departmental areas; congresses, University of Huelva training days to achieve recognition by the competent university authorities as a pioneering project in the Degree in Early Childhood Education; the intervention with students of an expert person who can be in charge of assisting, with specialised criteria, the demands on the general project, or establishing agreements with the teaching staff of subjects in the field of Didactics so that this methodology is approached in greater depth from the first semesters of training; stating a specific number of compulsory tutorials to monitor the development of the students' proposals.

Threats: student resistance to experimenting with educational methodologies other than the traditional ones, resulting in a lack of interest on the part of a large number of students; decrease in teacher participation due to an increase in their workload; lack of teacher training in fundamental elements for educational innovation.

4. Discussion

As evidenced by the results shown, it is confirmed that the use of active methodologies at university level is a solid and effective proposal for the development of competences, with collaborative learning standing out among all of them. According to Pozuelos et al. (2020, p. 407), this competence has undergone significant advances in recent years, generating common experiences that respond to complexity and create meaning. However, it is considered necessary to favour the development of self-learning and self-regulation so that students are able to go beyond the guidelines set by teachers, broadening the horizons of their research, training and action.

The students indicated that the work shared with their teams was highly satisfactory, which may be directly related to their perception of greater development of this competence. These perceptions coincide with the work of Lavega et al. (2013), who carried out an intra and interdisciplinary learning experience similar to the one presented here and found that the assessment of the participating students in terms of the acquisition of competences focused their highest percentage on interpersonal relationship skills, i.e. teamwork.

Although collaborative work among students is fundamental, this collaborative work also refers to cooperation with teachers, where the results were the opposite, i.e. the degree of satisfaction was significantly lower. According to the characteristics of CBL, this type of methodology benefits the relationship and communication with experts in the areas in which it is applied, which, according to the results shown, did not happen either, so it will be necessary to make adjustments in the organisation of this learning experience to emphasise collaboration with the three aforementioned figures.

Coinciding with which is considered to be the main benefits of CBL (Observatorio de Innovación Educativa, 2015; Universidad Politécnica de Madrid, 2021), we found that students did indeed see their awareness of the reality of the environment develop, improving their autonomy and thinking skills, as well as their ability to act in a real learning/action/learning process. The development of their communication skills, autonomy and self-esteem was also highlighted.

The design of future CBL experiences should enhance other fundamental competences that were rated with lower scores by students: innovation and entrepreneurship; critical and complex, logical and creative thinking; self-management particularly before the difficulties that have been shown to learn in ways other than the traditional way, it will be necessary to enhance the ability to adapt to new situations closely related to resilience (Universidad Politécnica de Madrid, 2021).

In regard with the interdisciplinary work that this type of project normally requires, it was noteworthy that the students' responses expressed the difficulty of finding the relationship between the subjects in the design of their educational proposals, highlighting the need to deepen the encounter between competences and contents, and to generate nodes that facilitate the synthesis of learning with a high level of complexity (De la Tejera et al., 2019).

With regard to the teachers' remarks about a certain "dilution" of the subjects, it would be necessary to reflect on whether this observation refers to a difficulty, a lack or a weakness, or, on the contrary, whether it is a positive effect pursued precisely because of their interdisciplinary perspective, in which what is most useful and necessary in each subject is maintained and strengthened in relation to other fields of knowledge. As Evandro Agazzi says: "the real challenge of an interdisciplinary study consists, on the one hand, in taking the different disciplines as a starting point, respecting their specificity of concepts, methods and logics and, on the other hand, in working so that all this does not become a "barrier" to communication" (2002, p. 245). It is, therefore, necessary to look for the best creative and innovative ways to achieve the fusion of subjects, so that each one is necessary and useful for the generation of new learning in which the contribution of each disciplinary field, placed in dialogue with the others, continues to be fundamental.

In addition to the above, it is necessary to make more and better use of the project and its methodology to address the contents of the subjects involved, so that they acquire meaning by relating them to a real situation of interest and relevance to the students. All this will enhance the learning of the disciplines separately, and the project as a conglomerate of their competences.

According to the results of the survey, in the experience of the participating Early Childhood Education students, it has not been frequent in their experience as university students to carry out learning activities related to the reality and practice of their profession, which coincides with numerous studies that have analysed the use of active methodologies in the university environment (Jiménez et al., 2020; Cid et al., 2009; Martínez et al., 2007; MEC, 2006). This shows that, despite the theoretical and regulatory efforts developed by national, supranational, state and local

educational organisations, it is necessary to continue working in a continuous and professionalising way on teacher training for the transformation of their educational work to promote student learning.

In relation to the above, and contrary to what was expected according to research on the benefits of the application of active methodologies on student learning, the results show that the application of CBL in this context is not directly related to a broad student perception of increased learning. These results make it necessary to analyse in detail the development of the process from the beginning in order to elucidate the limitations that prevented the potentiality of learning. The students' comments raise some of them, such as the organisation of the phases and activities to be carried out by teachers and students.

Both the survey and the SWOT analysis showed the complexity involved in the design, implementation, monitoring, and evaluation of this type of educational proposal due to the demands of preparation, sharing with other members of the teaching staff, agreements on assessment and even modifications to subject programming, tutoring, and evaluation, all of which require a considerable amount of time that university teaching staff have very little of. In this sense, the example of the research carried out by Lavega et al. (2013) could be taken into account, distributing all the student teams among all the participating teachers, who, in each case, would be responsible for tutoring them in everything related to the project throughout the course.

The fact that both students and teachers agree on the lack of presence of foreign languages in the whole project and its meaning leaves open the question of how to tackle this problem and make foreign languages a part, even a central part, of learning, relationships, and the life of the institutions.

In order to confirm whether there are significant differences between the development of competences that can be achieved through the application of CBL, as an active methodology, and other educational methodologies with different levels of student involvement and activity, it would be convenient to undertake a new study similar to the one carried out at the University of León by Robledo et al. (2015). The authors designed a study that allowed them to find out the students' perception of the development of their competences through different active methodologies. Another example of this type of design is the one used by Hursen & Fasli (2022), who applied two different methodologies to two groups of students and assessed the results of both on their learning. In this sense, and having at least two groups of students, it would be interesting to apply CBL with one of them, and with the other a similar active methodology model, such as PBL, to enable comparison between both methodologies and their degree of suitability in the university context.

5. Conclusion

In the light of the results obtained through the student survey, as well as the feedback received by the teaching staff through their SWOT analyses, it can be concluded that the application of active methodologies at university level has a positive impact on the development of student competences, mainly collaborative and autonomous work, oral and written communication skills, initiative and entrepreneurship, recognition and respect for diversity, as well as social responsibility, and civic and professional ethics.

However, it also became evident that its implementation requires time and gradual adjustments based on the evidence of learning and the experiences of the participants, so that the level of effort required for its implementation is adequate to the quality of results that both, students and teachers, would expect.

It is, therefore, necessary to continue with its implementation, improved according to the results and analyses carried out, in order to avoid making the mistake of "the episodic nature of university innovation [which] is almost a glass ceiling that is difficult to break. There are many attempts, but a few innovations that manage to consolidate and constitute a new teaching logic different from the previous one" (Pozuelos et al., 2021: 71).

In relation to the previous point, we conclude the need to disseminate projects such as this, their process, scope, and usefulness, since achieving a methodological change in university teaching requires, in addition to the active participation of teaching staff and students, the collaboration of all levels of the institution and the administrations involved (Marin, Alfalla, 2021; De Miguel, 2015: 162).

Teachers, as the European Union indicated in its Agenda for this level of education, must continue to train and, above all, must commit themselves to continuing to innovate in education. However, it is a matter of going far beyond the mere application of technological tools. In other

words, we must commit ourselves to profound and self-aware proposals to transform the ways of thinking and acting in education, with the aim that students take the leading role in the educational process, that they participate actively and committedly in the development of their learning, and that this learning can and should be applied to solve the real problems facing humanity in each of the areas in which the professions are active.

Students also need to know more about it and experience better this type of educational proposals in order to reduce their resistance to what is presented to them as non-traditional (Córica, 2020). Thus, by designing and establishing scenarios to facilitate overcoming these barriers, students will be more open and interested in participating in active and meaningful educational processes.

In order to address the limitations of the research, in particular the fact that it is an incipient, descriptive and non-generalisable study, it would be useful to answer an initial survey, which would provide clear and precise information about the students' starting situation with respect to questions that were subsequently relevant for the development of this initiative: their willingness to learn by methodologies other than traditional ones, their degree of knowledge and interest in active learning methodologies, their previous experiences in the educational context in relation to active methodologies, their level of knowledge about educational regulations and school organisation based on current legal guidelines. The application of the initial and final surveys must be carried out with all students participating in the project.

With the aim of improving the students' experience and learning, it is also proposed that their educational experience designs be applied in a real group, with the support of the tutor teachers.

All these aspects must be combined with the creation of a committed team of teachers who are actively and proactively involved in its design, implementation, monitoring, and evaluation, so that each member becomes a promoter of the development of competences through the educational experience proposed by the project.

Given the ever-increasing demands of teaching and research work at the University, alternatives and solutions are required to improve coordination among faculty team members, and to facilitate the distribution of tasks to be carried out before, during, and after their execution, so that each person contributes effectively to their design and implementation. Going even further, institutional reorganisation to foster inter-area and inter-departmental communication would also be an element to consider.

In the same way, it would be necessary to encourage the experience of a rotating and shared leadership, which encourages the achievement of the objectives set in accordance with the established time and methods, because according to Trujillo et al. (2020, p. 52), among all the conditioning factors of educational innovation, the definition of a leadership project shared by the whole community and the openness to suggestions from any of its members stand out.

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