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Formative assessment in project-oriented learning to improve academic performance

Víctor M. López-Pastor, Juan Carlos Manrique Arribas, Roberto Monjas Aguado and Juan Manuel Gea Fernández

This paper describes our experience of combining the use of Project-Oriented Learning (POL) and formative assessment strategies in higher education to improve the development of professional competences among our students. This combined methodology has been used for eight years in our Teacher Education College in Segovia (University of Valladolid, Spain) as part of our process to enable our courses to meet the criteria for full integration within the European Higher Education Area. The data compiled from these studies show that combining POL and formative assessment leads to a high level of learning and success for the students and the development of metacognitive learning processes as well as professional competences. We also analyse the main problems that might arise in using this methodology and how to resolve them.

Our research team has been developing innovative processes for higher education teaching for 12 years. We have experimented with this methodology in eight separate courses within the Physical Education Teacher Education programme (PETE) with a total of approximately 640 students. All the courses taught have a large number of students (80 – 150). There is also a considerable number of students doing part-time work outside the University, which makes it difficult for them to perform teamwork effectively.

We used POL in modules at all three levels of our university curriculum for Physical Education teachers and Childhood Education teachers. The modules where POL was used were: Motor Learning and Development, Sport Education, Team Sport, Teaching Physical Education, and Psychomotricity.

Project-Oriented Learning (POL)

Project-Oriented Learning (POL) is a methodology where student groups are required to perform a learning-oriented task in order to solve authentic problems or situations that they might encounter during their professional lives (Meyer, 2004). It is a methodology that stimulates active learning, analogous to Dewey's 'learning by doing' (Dewey, 2004). Students should work in small groups of no more than five and should carry out tasks within an authentic professional project or a simulation very close to reality. The project must always be supervised by the teacher, and it requires successive group tutorial sessions in order to make sure the contents are understood, the material is properly organised, and that the practical activities undertaken in class are correctly designed (López-Noguero, 2005).

Examples of a POL task for Teacher Education students are:

- Planning a teaching unit on Introduction to Sport for 5th grade pupils in primary education (age 11) and developing three sessions within real Physical Education (PE) lessons in the first week of February
- Preparing the theoretical framework and a practical session on Action & Adventure Spaces and delivering it to their peers in a combined theoretical and practical class on Teaching PE
- Observing the level of motor development in children of 5 years of age in real situations (i.e. PE class in a school), in the Motor Learning and Development module.

Enquiry-Based Learning (EBL) is another teaching methodology similar to POL. In EBL students suggest key questions for their professional development and also have to be able to find the answers with the help the teacher provides. However, in POL students do not decide the professional skills they must work on; the teacher guides the process through connecting the tasks the students must do with their future professional needs (teaching students in real schools) or through a simulation as close to reality as possible. So, POL helps students to recognise the important professional skills and attitudes they must have to become teachers in the near future.

Formative assessment and its influence on learning

Formative assessment refers to any assessment process aimed at enhancing the teaching and learning taking place. The main goal is not to give a mark to the student, but to provide feedback and guidance that helps the student to improve and learn better (Brown & Glasner, 1999; López-Pastor, 2008, 2009). Brockbank & McGill (1999) explain that the term 'assessment' has a Latin stem meaning 'sitting by' in the sense of helping or co-operating. In fact, this way of understanding and practising assessment is the most suitable one for the development of POL.

Design and methodology

Our working group has been making use of POL methodology together with formative assessment processes in HE for eight years now and employing consecutive cycles of action research projects as a means to innovate in and improve our teaching (López-Pastor, 2009; Torrego, 2005).

Various individual action research projects have taken place in a variety of locations and modules simultaneously. Results are shared and new action research projects commenced based on the previous results. This article analyses the main outcomes obtained from the POL tasks developed so far.

The primary techniques and tools used for obtaining data were: course documents and students' work (drafts, final reports, self-assessment sheets, anonymous questionnaires, individual and group surveys, written observations, etc) and teachers' documents (the teacher's notebook, the module specification, group interviews, students' portfolios, annual assessment reports on innovation, etc).

Table 1 shows the research plan.

Table 1: Phases and methods of data collection of research projects on POL

Stage	Activities to be carried out
I	Students plan their POL in their module
II	Development of POL within the normal process of the module
III	Students collect data on the development of the POL and the results obtained through teacher observation and student documents
IV	Data collection on the results of the POL and assessment of students through anonymous questionnaires and personal interviews
V	Analysis of the results obtained with each module POL
VI	Preparation of a report on the module by individual teachers
VII	Collective analysis with the students of the results obtained: successes, problems and proposals for improvement
VIII	Preparation of a final report on the development of all the POLs in the module by the tutor
IX	Dissemination of results

Combining POL and formative assessment

Some of the key features of our working approach are the following:

1. Ensuring the success of the project and learning by making the continuous and formative assessment processes compulsory
2. Holding group tutorial sessions on the drafts produced by the students in order to guarantee the smooth running of the POL, pointing out to the group those aspects to be improved
3. The redrafting and subsequent tutorial sessions procedure is repeated as necessary until an appropriate standard of POL is achieved.

Generic process for the development of POL

Table 2 shows a summary of the different stages followed during the development of the POL as well as the roles and tasks to be performed by the students and teachers for each of them.

Table 2: Stages and roles of students and teachers in the POL's development

POL stages	Students' tasks	Teachers' tasks
First month	Attendance at class in order to understand the course programme, how to undertake the POL and its importance within the programme	Presentation of the course and explanation of how to perform the different learning activities
Second and third months	Design and production of POL drafts Meeting the teacher to review the drafts Inclusion of corrections made by the teacher and repetition of the process until the project is correctly completed Implementation of the POL	Group tutorials to review the drafts of the different POLs and instructions for corrections to be made Ensuring the deadlines assigned to each POL are met
Once the POL has been completed	Production of the final report on the POL's implementation and results obtained Correction of mistakes noted by the teacher until the report meets the standards set	Review of the POL final reports submitted by each group and informing the students whether these meet the standards set or whether they must correct and resubmit them
Fourth month	Submitting the group portfolio at the end of the four-month period with self-assessment reports by each student in the group Attendance at the final interview with the teacher	Review of the portfolios and self-assessment reports Interview with each group of students, analysing the learning process followed on the course and the operation of the group, and providing some feedback on its quality

Results

The research methodology was based on the combined analysis of the data obtained from the different techniques and tools used in the POL. Through this process the teachers obtained results that we have divided into two sections: advantages and problems/disadvantages. Our aim was to generate some ideas that could be applied to improve POL.

Advantages

- POL greatly helps the students to get more involved in their own learning. This might be because of its practical and applicable nature
- Development of individual autonomy and ability to work co-operatively
- High likelihood of positive experiences and successful learning, thanks to the formative assessment process through compulsory tutorial sessions
- An authentic approach to teaching practice in a real classroom situation
- Greater knowledge of the students by the teacher through the communication established in the tutorial sessions and the continuous monitoring of the work.

Problems and disadvantages

- The large number of enrolments for a course makes the groups larger and also makes it difficult to monitor all of them properly
- Some students find it hard to make time for teamwork, owing to their high number of class contact hours
- It requires greater effort and dedication on the part of the teachers to review the drafts properly and carry out the necessary tutorial sessions
- Difficulties can occur when the students are not familiar with this teaching methodology. This happens especially among first- and second-year students
- There might be problems of uneven workload and involvement of individuals within the groups. It is important to monitor this closely through the assessment and marking process.

Conclusions

Our experience suggests that POLs are one of the most suitable activities for the development of professional competences and also one of the most motivating activities for students, owing to their strong and close connection to professional reality and to the high level of learning involved.

Nevertheless, various problems appear during the process that must be addressed. Changes will be introduced every year to try to overcome the issues identified during the previous year.

One of the key issues for achieving greater levels of learning is ensuring the success of the project through the formative and continuous assessment processes, as well as carrying out as many group tutorial sessions as necessary. The students are expected to produce the required drafts before the tutorial session. The tutorial sessions are based on these drafts, pointing out those aspects to be improved as well as those that meet the standards. This process of refining and improving drafts ensures the quality of the project.

It may be argued that it is inevitable that if the students keep repeating the work-feedback cycle they will end up with better quality work. This does not mean that all their work is of the highest quality. Some of it is, but some is of lower quality and there are always some who are destined to stay just above the minimum required standards.

However, the results demonstrate that the vast majority of the POL tasks are completed to a level that exceeds the required standards.

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