REFLECTIVE PRACTICE APPLICATIONS: "GUIDED WEEKLY REFLECTION PAPERS" EXTENDED FROM ALCALÁ UNIVERSITY (SPAIN) TO DE MONTFORT UNIVERSITY (UK)

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Abstract

Knowledge has to be developed firmly based on reflections and thoughts as much as evidence. Being conscious of this principle, our innovation teaching group from the University of Alcalá has developed a reflective pedagogical approach called Guided Weekly Reflection Papers (GWRP) and implemented it since 2007. In this approach students hand in to the lecturer their "weekly work", in which they schematically express the most important ideas related with the topic presented during the classes, and their reflections and comments on those aspects which they found especially difficult or interesting. Moreover students have to apply the concepts developed during the week to solve some questions or problems proposed by the lecturers to find solutions to real life situations and to explore beyond the walls of the classroom to discover where in the world around them they can find application of the material presented by the lectures.

This innovative pedagogical approach has deeply contributed to the development of the student learning process and consequently been reflected in our teaching practice. The outcomes of the GWRP activity do not depend upon how much students have been studying but upon the level of comprehension of the knowledge we have shared with them. Therefore this strategy is very useful to prove the efficiency and quality of our teaching practice which leads us to continuously improve our way of teaching. Over several years, we have shown our results both in internal meetings in our University and in International Conferences, our colleagues have been caught up by our enthusiasm, which promotes their involvement in our model. Thus, different academics and organizations have adopted our reflective pedagogic strategy. The most recent incorporation of this approach has been implemented by selected academic staff at De Montfort University (DMU), Leicester (United Kingdom). This versatile methodology is being tested in a new university educational environment using a student cohort with a different set of characteristics and academic context compared to previous cohorts.

This communication will describe the adaptation of the GWRP to teaching in the Clinical Biochemistry module delivered as part of two different Bachelor degrees taught at DMU: Biomedical Science and Medical Science and the response of students enrolled in this programmes at DMU. The results of the GWRP implemented in new subjects by the teachers of the innovation group at the University of Alcalá (UAH) will be also analysed.

Keywords: Reflective practice, Guided weekly reflection papers, reflective pedagogical approach, Clinical Biochemistry.

1 INTRODUCTION

Reflection can be defined as an active and conscious process of exploration and finding that involves a periodic stepping back to consider meaning and connection between experience and learning [1-3].

Reflection may guide a search for new understanding and perspective and it is a process of accessing sense-making of people's experience [4].

Our teaching innovation group has developed a reflective pedagogical approach, called Weekly Reflection Papers (WRP) for improving the learning environment as a contribution to the integral formation and meaningful education of the students [5,6]. Evolution of the starting methodology led us to create a more valuable and precious teaching strategy named "Guided Weekly Reflection Papers" (GWRP) [7,8].

The GWRP added a new item to the original WRP in which students wrote and handed in to the lecturer periodically (week, fortnight, topic unit), a clear, schematic and concise exposition of the most relevant concepts studied within this period, as well as a reflection in relation to the difficulty of the subject, the progression of their knowledge or any other point of interest and curiosity [7,8].

This adaptation encourages the students to solve some questions or problems proposed by the lecturers, to find solutions to situations of the real life or to explore beyond the walls of the classroom to discover where around them is it possible to find the material presented by the teachers. Also, to avoid studying the topics as isolated compartments the students have to search for correspondence among related concepts taught in other parts of the same subject or, especially, in other subjects.

The style, organization and structure of the papers is totally free. Both the clarity to express the ideas and the level of personal communication achieved are considered to be key elements in writing the papers. Participation of students was voluntary, but strongly recommended on account of its utility as an innovative pedagogical approach. Once they have been checked, the lecturer returned the papers as soon as possible with a view to clarifying concepts, correcting errors, marking the work and responding to the students' comments [9-11].

Over the years other teachers from different departments or even universities with the same goals and desires, have been caught up by the enthusiasm of our teaching group. Thus our innovative pedagogical approach has been object of interest for several lecturers, among them, academic staff at the De Montfort University (DMU) in Leicester (United Kingdom).

The aim of this communication is to describe the adaptation of the GWRP to teaching in the Clinical Biochemistry module delivered as part of two different Bachelor degrees taught at DMU: Biomedical Science and Medical Sciences. In addition a review of the results of the GWRP implemented in new subjects by the teachers of the innovation group at the UAH is also included.

It is worth noting that the analysis of the results from DMU will allow us to compare diverse ways of learning and to evaluate our teaching strategy as much as to improve our own model of teaching practice, which contemplates reflection and critical thinking approaches as a process to achieve holistic learning.

1.1 Field of study

In the present section we describe the characteristics of the subjects in which this reflective strategy has been implemented in both universities:

- *De Montfort University: Biomedical Science and Medical Science*

  The start-up of a reflective pedagogical approach in the teaching of a Clinical Biochemistry module in order to improve the critical-reflection ability of Biomedical Science and Medical Science students would have associated to important advantages.

  A total of 5 specialised clinical case studies were developed and provided to the students throughout the module, a period of 6 months with reflective exercises provided approximately every 4 weeks. The case studies or Problem-Based Learning (PBL) pedagogic approach were chosen as this can facilitate the acquisition of professional skills, as well as, provide a method of enabling students to acquire rapidly changing medical knowledge.

  The specialised clinical case studies challenged students by providing increasingly challenging questions as the study progressed, i.e. the first case study was easier compared to the last.; and participants needed to use learned concepts acquired during their degree studies (e.g. material from modules such as: Structure and Function of Cells & Tissues; Biochemistry and Cell Biology; or Research and Diagnostic Techniques) to find a "possible" solution to the different questions asked in each clinical case study. For solving these 5 clinical case studies, also named reflective questions, the student needed to perform a small literature review using

appropriate scientific literature databases such as PubMed and check normal ranges and concentrations of different biochemical analysis, biomarkers and tests. These factors could promote the development of ideas in the student and enhance the use of critical thinking, as some elements of the questions do not have a unique answer.

Moreover, students were encouraged to apply the most significant concepts studied during the different Clinical Biochemistry lectures, so the lecturer(s) were able to assess their teaching performance (through an indirect analysis of the level of comprehension, understanding and knowledge achieved by the students), and students the gradual acquisition of knowledge or skills.

Students were asked to provide a short essay style report with their possible answers to the different questions formulated in each reflective question. The exact style and structure of the answer was left to the individual student, but an appropriate scientific writing style with referencing was expected. Both the clarity to express ideas and the level of personal communication achieved are key elements in writing the answer. Once completed, the answer was submitted to the innovative DMU teaching group, and comprehensive feedback provided for three main criteria or elements that were established to analyse if the marking criteria objectives were met: a) ability to extract all the fundamental concepts; b) ability to synthesise information and clarity of expression; and c) ability to reflect and comment. Moreover, a suitable questionnaire was also developed to analyse the objectives of this innovative teaching project, final results of this questionnaire will be obtained at the end of this academic course and used to develop this teaching strategy in future years.

Participation in this project was entirely voluntary and ethical approval was granted by the Research Ethics Committee at De Montfort University (Ref. 1643; 19th October 2015). Students that wanted to collaborate signed a consent form and appropriate information was made accessible through Blackboard, lectures and by information sheets. Participation in this teaching project was strongly recommended on account of the value of reflective practices in the learning process and encouraged though providing an improvement on their final overall module mark (up to 5 marks). These marks were to be awarded depending on full participation and performance in the questions along with completion of the feedback survey.

- *Alcalá University:*

  In the last few years our teaching innovation group has continued carrying out this experience in the new Degrees that have been incorporated at the Alcalá University. This situation has led to a modification and enlargement of the subjects where GWRP was used. Thus in addition to the subjects, the results of which we have described in former papers, we have implemented our GWRP teaching strategy in the new subjects listed in **Scheme 1**.

2 RESULTS AND DISCUSSION

2.1 Evaluating the effectiveness of the introduction of GWRP to Biomedical Science and Medical Science degrees at De Montfort University, U.K.

A total of 23 students participated in this project (which represents approximately 12% of the total population of students enrolled in the module). This represents a relatively poor student participation, which was expected for various possible reasons: a) the novelty of this approach at DMU; b) the difficulty of the case studies proposed; c) the preliminary reticence from students to participate in this project for a lack of understanding of the project; and d) the perception that the project meant extra workload in the crucial final year of study. The lack of understanding can be attributed to the fact that students are used to seeing science teaching as a transmission of knowledge as opposed to the view that science is a way of exploring and understanding the world [7]. Moreover, the fact that they considered this project as “extra-work” should be also considered as a limiting factor for student participation in this project. In addition, final year students are under a lot of pressure because their marks account for 75% of their final degree mark (so they possibly considered that this project was not important enough to spend the time engaging with it, despite the availability of extra marks for successful completion of the project). This has been reflected by the fact that a lot of students contacted the DMU innovation team requesting an extension in the submission deadline of the different reflective questions. Students’ comments were as follows: “*I am currently doing Dr Mark Evans’ question for Monday and have a lot of other work that needs to be in for next week too and am*

finding it really hard". As a result, it was decided to offer a unique final deadline that was prior to the final exam of this module in May 2016. However, this has impacted on the learning of those participants that chose to submit their reports late as they did not have access to much of the feedback provided to improve between case studies.

Table 1 shows the points obtained for the different elements assessed for the 4 first case studies due to time limitations. First case study and marks provided were relatively easy and generous, respectively, in order not to discourage students from participating in this study. Contrarily, their marks showed a gradual reduction in the following exercises mainly due to the difficulty of the exercises and the increasing criticism of their work. The participants' difficulty for analysing clinical case studies and retrieving clinical content observed might be attributed to the fact that even students with a deeper biomedical and scientific knowledge (e.g. biology, biochemistry, chemistry) could struggle to retrieve clinical content and gain clinical knowledge [12]. Thus, Schauber et al. [12] have theorized that the application of basic scientific knowledge (such as biology or biochemistry) to solve clinical cases can be ambiguous as the pathophysiological mechanisms and the clinical manifestations (i.e. signs and symptoms of the disease) may not be conclusive.

Table 1. Points marked for each reflective question and for each element.

	Element A (Ability to extract all the fundamental concepts)	**Element B (Ability to synthesise information and clarity of expression)**	**Element C (Ability to reflect and comment)**
1st Reflective Question	3.1 ± 1.13∗ (2-5) ∗∗	3.05 ± 0.72 (2-4)	2.8 ± 1.51 (1-5)
2nd Reflective Question	2.39 ± 1.10 (0-3.5)	2.36 ± 1.05 (0-3.5)	2.29 ± 0.97 (0-3.5)
3rd Reflective Question	2.92 ± 1.44 (1-5)	2.33 ± 1.55 (0-5)	2.33 ± 1.56 (0-5)
4th Reflective Question	2.25 ± 1.07 (1-4)	1.75 ± 1.35 (0-3.5)	1.75 ± 1.46 (0-3)

∗A.M. = arithmetic mean (results are presented as mean values ± S.D.); ∗∗range of points.

Despite DMU students showing a limited ability to reflect, a more detailed analysis of their reports and progression have shown that, in general, students at the beginning of the project presented limited reflective and critical thinking activities but that this gradually increased during their participation in the project. Thus, it was also observed that students did not appear to comprehensively answer all aspects of the question for the first reflective question, which indicated a lack of understanding, but gradually they replied to all of the questions providing more comprehensive answers and demonstrated deeper critical thinking. These results were similar to those described in the literature for studies that have applied a reflective pedagogical approach in higher education, particularly in health science degrees [13]. However, our results should be taken cautiously as the project has just started and further analysis will be required upon completion of the project and future iterations to make the delivery and interpretation of the project more robust. Regardless of relatively poor student participation, participants' satisfaction and feedback was very good and students were genuinely impressed with the feedback provided as they found it really useful for their learning and studies at DMU. Thus, some students reported: "*Thank you very much for the feedback! I'm glad I've done it to be honest! I will do the rest soon*" or "*Thank you very much for the clear information and description on my paper. I have read through and made some amendments as commented, would you like me to re-send you the answer again?*". However, final impressions and comments on the project from the participants will be collected at the end of this course by providing a specific questionnaire, as previous studies have confirmed the use of questionnaires is an appropriate form to assess the degree of satisfaction of the learning process [14].

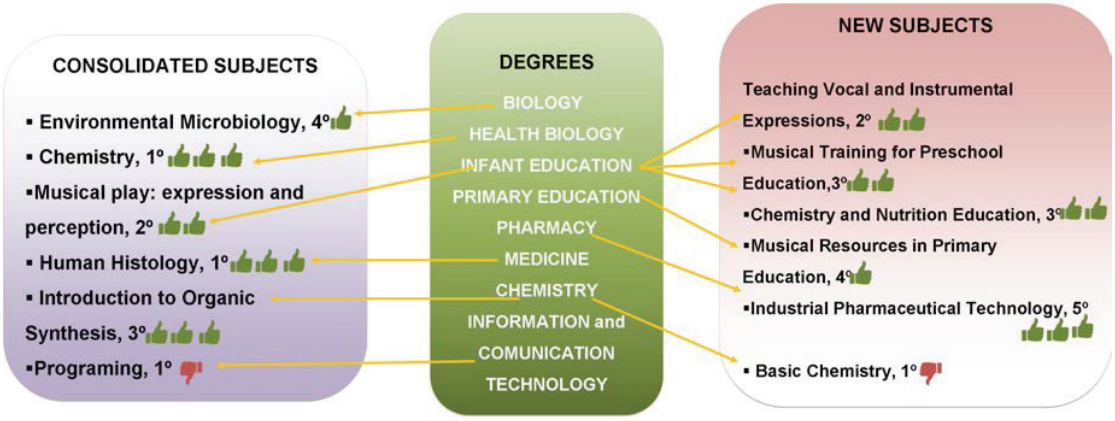
A draft of the questionnaire, which is being designed by DMU's teaching innovative group, can be found in **Table 2**.

Table 2. Feedback questionnaire to evaluate whether the objectives have been met

Question
What do you think of the impact of the reflective exercises on your learning performance?
What do you think of the impact of the reflective exercises on your professional development?
Do you consider that participating in this project has helped you prepare for your final exams?
Overall, do you like the reflective questions proposed? Did you find them difficult or especially challenging?
Overall, do you consider that participation on this project was: impossible due to other commitments, difficult to follow but enjoyable or easy to follow?
Do you think that participation in this project has improved your critical thinking?
Do you consider that you have learnt how to reflect?
Are you happy at having participated in this project? Would you do it again if it was offered to you?
What would you add to or remove from the reflective project?
Any other comments or suggestions for future years?

2.2 Evaluating the effectiveness of the introduction of GWRP to subjects at Alcalá University, Spain

The development of the GWRP tool at the University of Alcalá by our innovation group has implied the adaptation of the strategy to the characteristics and expectations of the students belonging to different degrees, subjects and levels - **Scheme 1**-



Scheme 1. Subjects and Degrees at Alcalá University

As described above the elaboration of GWRP is a voluntary activity, therefore the engagement and response of the students vary with the type and level of studies, and even within the same subject change from year to year. This patron makes difficult to carry out a quantitative analysis and to extract general and objective conclusions. The results obtained are quite different for each subject, having a very positive response in new subjects such as Industrial Pharmaceutical Technology, Chemistry and Nutrition Education as well as in some consolidated subjects such as Introduction to Organic

Synthesis, Chemistry and Human Histology. Contrarily nearly non-existing response took place in Basic Chemistry and Programming, whereas in the rest of the subjects the positive response is due to the "semi-compulsory" character proposed by the teacher.

The acquisition of abilities and competencies in the framework of information literacy has been generally positive, but with results quite unequal. We can affirm that the large majority of our students start developing skills to be able to identify, situate, evaluate, and successfully use the information for completing the GWRP.

3 CONCLUSIONS

The introduction of a reflective pedagogical approach in the teaching of Clinical Biochemistry in order to improve the critical-reflection ability of Biomedical Science and Medical Science students would have associated advantages and disadvantages. Thus, reflective exercises would help students to work on clinical skills and transversal competences such as writing appropriate scientific reports, communication of data, clinical case-problem solving and clinical diagnostics. Moreover, this approach would have helped the participants to identify any possible learning difficulty, problem or misunderstanding with their learning performance by providing prompt feedback that would be critical to adjust personal learning practices and improve performance. Within disadvantages, the creation and introduction of reflective exercises requires a considerable amount of dedication and time for the academic team. Moreover, some difficulties have been observed during the implementation of this pedagogical approach such as some initial reticence from the students to participate in the project as well as confusion about whether the work was summative or formative or if participation was a compulsory, must pass element of the module. This would have been avoided with a more robust planning of the teaching strategy so students would have had a clear picture of the project as well as some prior experience in the introduction of reflection methods which would reduce the amount of additional work needed by the students. Therefore, introducing this teaching pedagogy in health sciences degrees may help students be more self-aware of their learning strengths and weaknesses, which in turn could impact on their final learning performance and marks.

In summary, teacher engagement and commitment in this innovative pedagogical approach is a key factor to improve the teaching-learning process and indicates that teachers with high levels of dedication show more desire to obtain greatest successes in achieving the teaching-learning goals.

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