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Reflective learning in higher education: A comparative analysis

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Abstract

A descriptive, exploratory study is presented based on a questionnaire regarding the following aspects of reflective learning: a) self-knowledge, b) relating experience to knowledge, c) self-reflection, and d) self-regulation of the learning processes. The questionnaire was completed by students studying four different degree courses (social education, environmental sciences, nursing, and psychology). Specifically, the objectives of a self-reported reflective learning questionnaire are: i) to determine students' appraisal of reflective learning methodology with regard to their reflective learning processes, ii) to obtain evidence of the main difficulties encountered by students in integrating reflective learning methodologies into their reflective learning processes, and iii) to collect students' perceptions regarding the main contributions of the reflective learning processes they have experienced.

Keywords: Reflective learning; reflective methodologies; self-reflection; self-regulation.

1. Introduction

A central characteristic of transformative learning is the process of reflection, which may be defined as those intellectual and affective activities that lead to exploring experiences in order to develop understanding and appreciation (Boud, Keogh, & Walter, 1985; Tomkins, 2009). Since Schön's publication in 1983 (Schön, 1983), many authors have explored reflective practices in greater depth. This has led them to reflect on initial and continuous training for professionals, particularly in the fields of teaching, health and social work education. On the basis of this rethinking, reflective skills may now be considered essential for professionals, and ways must therefore be found for them to be taught and learnt. It is not only a question of acquiring certain skills, but also of reformulating the relationship between knowledge, practice and human experience.

Kolb (1984), and Kolb and Kolb (2005) posit learning to be knowledge creation through the transformation of experience. According to these authors, learning is a dialectic and cyclical process consisting of five other processes: concrete experience, reflective observation, abstract conceptualization, theorizing and experimentation. Experience is the basis of learning, but learning cannot take place without reflection. At the same time, reflection must be linked

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to action. In respect of this, Schön (1983) described reflective practice as a dialogue between thinking and doing via which the learner becomes more skilled. This involves integrating theory and practice, thought and action (Osterman & Kottkamp, 1993).

Reflective learning is understood as a process that leads to reflection on all sources of knowledge that may contribute to understanding a situation, including personal sources and experience. Although reflective education-focused activities contribute significantly to optimizing the impact of teaching (Mckenna, Yalvac, & Light, 2009), the use of reflective activities has not been fully explored in science, technology, engineering and mathematics (STEM) education.

Use of questionnaires and rubrics have been found to optimize the quantification of learning strategies, especially in terms of multi-method research (Schellings, 2011), metacognitive aspects (Thomas, Anderson, & Nashon, 2008), and methodological skills (Mokhtari & Reichard, 2002; Feldon et al., 2011). The validity of learners' reports depends on the mental episodes used to perform the tasks persisting as objects of focal attention in short-term memory. According to Richardson (2004), the use of questionnaires to complement the tasks may be considered to give an accurate reflection of cognitive processing. However, validation of their use to measure learners' learning strategies in learner-centred classroom environments is still some way off.

Our study quantifies levels of student self-reflection by means of a Self-reported Reflective Learning Questionnaire. The instructional methodology implemented in class used both knowledge-centred and assessment-centred activities. Following McKenna, Yalvac and Light (2009), this teaching approach promotes deeper and more meaningful student learning. Indeed, efficient learning appears when it is concretely situated, as situated learning emphasizes the idea that much of what is learned is specific to the situation in which it is learned (Anderson, Reder, & Simon, 1996; Johri & Olds, 2011). Consequently, it is important to explore students' reflection processes when subjected to dynamic methodologies in a variety of teaching environments. Little research has studied resultant faculty approaches to teaching in reflection contexts focusing on educational innovation.

Our purpose is to obtain students' views on the benefits, obstacles and limitations of incorporating reflective learning methodologies into class and activity design. This information is essential in evaluating the applied experiences. We therefore set out to conduct a study aimed at:

1. Understanding students' views on reflective learning methodologies in relation to self-knowledge, the relationship between experience and knowledge, self-reflection and self-regulation.
2. Obtaining evidence of the main difficulties students encounter in integrating reflective learning methodologies and their own learning processes.
3. Collecting students' perceptions on the main contributions of reflective learning processes.
4. Examining significant differences between different groups of students, depending on their experience in reflective learning activities, regarding their evaluation of the teaching methodology in relation to self-knowledge, the relationship between experience and knowledge, self-reflection on the process of learning and self-regulation.

In order to achieve these objectives, a Self-reported Reflective Learning Questionnaire was designed and implemented. Section 2 provides methodological information on the development and implementation of the questionnaire and analysis of the data obtained, and Section 3 presents the results of its implementation with a group of students.

2. Methods

Professors in four different fields employed different methodologies to promote reflective learning with their students. Specifically, they were aiming to promote students' independent learning, their involvement in the search for resources to improve personal and professional skills, awareness of their own potential, and the development of new attitudes and values. In the field of nursing, a reflective journal was used as a methodological strategy that allowed students to reflect on and learn from their experiences before transforming this learning within the context of real practical experience (Bulman & Schutz, 2008). In the field of psychology, a reflective portfolio was used as a method for teaching and assessment (Pérez Burriel, 2010). In the social education field, activities were based around

reflective learning strategies designed to develop personal and professional skills to prepare students for their subsequent work placement (Pallisera et al., 2012). And finally, in the environmental science field, students worked on independent study and reflection on learning through activities such as solving case experiments, viewing videos, etc. (Casellas et al., 2010; Colomer et al., 2011).

2.1. Development and implementation of the Self-reported Reflective Learning Questionnaire (student version)

A Self-reported Reflective Learning Questionnaire was designed to obtain students' assessment of various aspects of teaching methodologies. The questionnaire consisted of three sections; Section 1: Students' descriptive data (age, gender, faculty, year, and so on). Section 2: Four sections with closed-ended questions. Answers were on a Likert scale (1 = disagree, 5 = strongly agree): i) Knowledge of oneself; ii) Relating experience to knowledge; iii) Self-reflection on the learning process; and iv) Self-regulation of learning. Section 3: Open-ended questions on the main challenges and contributions of incorporating reflective learning into learning processes. The questionnaire was administered to a total of 162 students, who responded anonymously and had the following characteristics: 131 were women (81%) and 31 men (19%), aged 18 to 42 (mean age 21, standard deviation 4, studying the following Bachelor's Degrees at different faculties of the University of Girona: environmental sciences (n = 33), social education (n = 43), psychology (n = 55) and nursing (n = 31).

A reliability analysis was conducted to ensure the reliability of scale items as good development procedures may result in a reasonably reliable survey instrument (Creswell, 2003; Barrera et al., 2010). For the 4 close-ended group questions, the Cronbach's coefficient alpha (Cronbach, 1951; Gliem & Gliem, 2003) was 0.90, ranging from 0.72 to 0.83.

2.2. Data analysis

Data analysis was performed in two phases: an exploratory descriptive phase and a second phase focused mainly on comparing the groups. The SPSS version 19.0 was used to obtain the descriptive data analysis. An ANOVA test was conducted to compare the mean of the groups. A post hoc test was subsequently carried out to identify where the differences lay.

3. Results

3.1. Analysis of closed-ended questions on the Self-reported Reflective Learning Questionnaire

Table 1 presents the analysis of close-ended questions on the Self-reported Reflective Learning Questionnaire, i.e. Section 2, with mean and standard deviation. The mean for the 4 blocks in this section displays higher averages for Block 2 (relating experience to knowledge) and Block 3 (self-reflection on the learning process). In Block 2, the most valued items indicate that on the one hand students believe the methodology has helped them to select the relevant information and data in a given situation, which in turn has helped them to reason / argue their decisions in that situation, and on the other it helps them to relate knowledge to their own experiences, emotions and attitudes. However, they gave low scores to the item suggesting reflective learning helped them formulate and verify hypotheses for a given situation. 20% of the students who responded to this item disagreed.

As for the subject block concerning self-reflection on the learning process, the items receiving high scores refer to reflective methodology helping identify negative attitudes, improve knowledge and skills, and understand that what is learned and how it is learned is meaningful to the person. In the subject block relating to self-regulation of learning, the most highly valued items indicate that students believe reflective learning is used to identify who or what is needed in a given situation in order to learn and evaluate the planning of individual learning. The item receiving the highest scores in the block on self-regulation of learning refers to reflective learning methodology as a facilitator for the in-depth analysis of emotions in everyday and professional situations.

Table 1. Statistics for each close-ended question (mean and standard deviation) and significance level (F and Sig.) for ANOVA comparing faculty results.

Block	Item	Mean	S Dev	F	Sig.
BLOCK 1 Knowledge of oneself	1. Analyze the depth of my reaction to everyday and professional situations.	3.29	.809	2.458	.065
	2. Analyze my emotions in some depth regarding everyday and professional situations.	3.35	.928	4.185	.007
BLOCK 2 Relating experience to knowledge	1. Relate knowledge to my own experiences, emotions and attitudes.	3.56	.912	5.232	.002
	2. Select relevant information and data in a given situation.	3.64	.883	8.044	.000
	3. Formulate contrasting hypotheses for a given situation.	3.24	.911	10.056	.000
	4. Reason and argue decisions in a given situation.	3.68	.875	5.406	.001
BLOCK 3 Self-reflection on the learning process	1. Improve my writing skills.	3.39	1.138	2.515	0.60
	2. Improve my oral communication skills.	3.09	1.133	11.377	.000
	3. Identify positive aspects of my knowledge and skills.	3.52	.947	10.425	.000
	4. Identify negative aspects of my attitudes and areas for improvement.	3.72	.955	17.971	.000
	5. Identify positive aspects of my attitudes.	3.36	.956	10.463	.000
	6. Identify negative aspects of my attitudes.	3.54	.966	14.708	.000
	7. Be aware of what and how I learn.	3.55	.961	4.008	.009
	8. Understand that what I learn and how I learn it is meaningful to me.	3.66	1.042	10.696	.000
BLOCK 4 Self-regulation of learning	1. Plan my learning: the steps to follow to organize material and time.	3.55	.961	4.008	.009
	2. Determine who or what I need.	3.66	1.042	10.696	.000
	3. Regulate my learning, analyze the difficulties I have and solve the problems I found.	3.34	1.118	7.457	.000
	4. Evaluate the planning of my learning, its results and what I need to do to improve them.	3.29	.998	3.676	.014

3.2. Main difficulties encountered by students in integrating reflective learning methodologies into their own learning processes

Students that participated in this application of reflective learning methodologies deemed the experience worthwhile but found it difficult to integrate these methodologies into the dynamics of their learning. Table 2 summarizes the total scores for each open-ended question. The options were not mutually exclusive and students could select a maximum of 3 options. Among the difficulties encountered by students was the fact that reflective methodology requires a working process they are not accustomed to, demonstrating that this methodology is not common in the context of higher education.

Table 2. List of difficulties students encountered integrating reflective learning into the learning process

List of options	Scores (3 options per student)
a) I do not have sufficient skills to work with this methodology	19
b) The level of skills required, such as oral or written skills, was too high for me	22
c) I am used to other types of learning	60
d) I needed more help from the professor	16
e) This methodology is not motivating	43
f) This methodology made me feel uncomfortable	24
g) Other	8

3.3. *Students' perceptions of the main contributions to reflective learning processes*

Table 3 summarizes the total scores for each open-ended question. The options were also not mutually exclusive and each student could select a maximum of three options. The highest score corresponds to option a), i.e., reflective learning has resulted in more complex and enriched knowledge and capabilities, and also in identifying areas for improvement. The results of the study indicate that reflective learning methodology helps students become more aware of their learning process and suggests strategies for improvement. It also helps them to develop new strategies to address the difficulties that arise during the learning process and become more aware of what they have learnt and what they have yet to learn in the future.

Table 3. Students' perceptions of the main contributions to reflective learning processes.

List of options	Scores (3 options for each student)
a) Reflective learning has resulted in more complex and enriched knowledge and capabilities, and also in identifying areas for improvement.	60
b) I now have a better understanding of the complexity of my professional field.	41
c) It helped me discover training needs I was not previously aware of.	46
d) It helped me find new and creative strategies to deal with my shortcomings and difficulties.	43
e) It helped me optimize my strengths and seek to continuously improve.	45
f) Other	2

3.4. Comparative analysis between groups of students

The comparative analysis is based on different variables for each of the items in Block 2. Table 1 shows the overall results for the mean comparison. The first thing to note is that only item 1 of Block 1 "Analyze the depth of my reaction to everyday and professional situations" and item 1 of Block 3 "Improve my writing skills" do not present significant differences, i.e., they have low F values. The remaining items in Table 1 present statistically significant differences between means at a confidence level of 95%. When applying a post hoc test to identify differences between groups, we observe the following: with respect to Block 1, there is no difference between groups, i.e., all groups of students provide a similar assessment of reflective learning as a methodology that allows them to analyze their own behavior and emotions. Differences are only found between the psychology and nursing

groups, in the sense that the former rate it more positively than the latter, especially with regard to effectively analyzing emotions in everyday and professional situations.

With respect to Block 2 (relating experience to knowledge), more differences are found between the group means. In general, students appear to rate the reflective learning methods used in environmental science, psychology and social education more positively than those used in nursing studies when it comes to relating knowledge to experience. This was a surprising finding given that the reflective journal used as reflective methodology is linked to nursing internships. We must ask ourselves why this occurs and what other factors influence student ratings.

With respect to Block 3 (self-reflection on the learning process), the four groups of students all considered reflective learning to have helped them improve their written communication skills. However, other items in this block, such as identifying positive and negative aspects and aspects to be improved in their own knowledge, skills and attitudes, as well as students' understanding of how and what they learn, present significant differences between groups.

Finally, for Block 4 (self-regulation of learning), significant differences were found between the different groups' mean ratings for the first three questions. The fourth item "Evaluate the planning of my learning, its results and what I need to do to improve them" presented low F values. The environmental science and psychology groups score higher on the fourth item. Thoroughly analyzing the reflective methodologies used on these degree courses may be useful in determining what kind of strategies help students better regulate their own learning.

In summary, there is considerable overlap between the groups for the following three items: "Analyze the depth of my reaction to everyday and professional situations" (Block 1), "Improve my writing skills" (Block 3), and "Evaluate the planning of my learning, its results and what I need to do to improve them" (Block 4). The remaining items produced significant differences between groups. Therefore, a more in-depth analysis is needed of why the methodologies used in the groups produce such differences, especially for the group that used the reflective journal in a work placement context.

4. Conclusions

On the basis of the overall results obtained for the questionnaire on different reflective learning methodologies in higher education developed, validated and applied in this research, we conclude that students rate the reflective methodologies implemented positively. The data collection instrument has proved useful in achieving the proposed study objectives, although results highlight that students encounter difficulties adapting to such up-to-date methodologies due to their dynamic nature. Indeed, reflective learning methodologies are not common in higher education in our regional context, and it would appear that they are not implemented in previous levels of education, either. However, our study provides data to suggest that reflective learning methodology helps students become more aware of the learning process; it encourages critical thinking and analysis of their own capabilities, proposing both strategies for improvement and new strategies for addressing challenges arising during the learning process. It also appears to help students identify their own learning needs and become more aware of what their learning may be worth to them in the future. Reflective learning can serve as a useful and appropriate methodology for developing generic skills such as independent learning and adaptation to new professional situations, among others. It therefore gives professors and teachers a clear idea of how to redirect their sharing experiences, tools and feedback with students.

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