Factors Influencing Students' Peer Feedback Uptake: Instructional Design Matters

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Abstract

Peer feedback is a strategy that allows students to be involved in the assessment process, making them more conscious about the teaching and learning process. However, different instructional designs can influence their learning in different ways. Our paper aims to identify whether peer feedback instructional designs influence students' learning perceptions. We performed a comparative study at a Faculty of Education, tracking students during their first two years of a teacher education program. Students participated in two consecutive peer feedback experiences using different instructional designs. Results show that students perceive that long-term interventions with prior training and double-loop feedback processes are more useful for their performance than a short-term experience without face-to-face training and single-loop feedback processes. Also, they perceive more benefits when they provide feedback rather than when they receive it. Thus, lecturers should take these variables into account when designing peer feedback activities in order to maximise the impact on students' learning.

Keywords: peer feedback, instructional design, peer assessment

Introduction

In higher education, feedback has shown to be a powerful influence on students' development as independent learners who are able to monitor, evaluate, and regulate their own learning (Evans, 2013). Among the different feedback agents, when feedback is provided by peers, it appears especially beneficial for learning, due to its capacity to engage students with cognitive, metacognitive, and interpersonal skills (Huisman, Saab, Broek, & Driel, 2018; Panadero, Jonsson & Alqassab, 2018).

Recently, feedback has been defined as a dialogic process in which assessor and assessee interact (Carless, 2015; Jonsson & Panadero, 2018), and also as a 'process through which learners make sense of information from various sources and use it to enhance their work or learning strategies' (Carless & Boud, 2018, p. 1). Feedback uptake is not a straight-forward activity and requires a series of conditions involving the agents and their skills (both lecturers and students), as well as the characteristics of the instructional design or the learning environment in which learning takes place (Jonsson, 2013; Jonsson & Panadero, 2018; Winstone, Nash, Parker, & Rowntree, 2017). While there is an abundance of literature on how students process feedback uptake when feedback is provided by lecturers (Goldstein, 2004; Huisman, et al., 2018; Jonsson & Panadero, 2018; Winstone & Carless, 2019; Winstone, et al., 2017; Yang & Carless, 2013), regarding peer feedback there is still a need for empirical research. Our paper aims to fill this gap, shedding light on how different instructional designs influence students' perceptions of the benefits of peer feedback on their learning.

Peer Feedback Benefits and Conditions

Peer feedback emerges as a highly effective practice due to its potential to improve learning and performance (Bevan, Badge, Wilmott, & Scott, 2008; Ion, Sanchez & Agud, 2019; Liu & Carless, 2006; Panadero et al., 2018), to support collaborative learning (Phielix,

Prins, & Kirschner, 2010), and to facilitate self-regulation processes. However, more empirical research is needed on this (Brown, Peterson, & Yao, 2016; Panadero, Broadbent, Boud & Lodge, 2019). Peer feedback has been considered 'the learning element of peer-assessment' (Liu & Carless 2006, p.1), with the potential to transform the role of students, requiring them to target, generate and interpret feedback while communicating and engaging with each other (Ion, Cano, & Fernandez, 2017). In addition, peer feedback fosters students' implication in interpretational meaning making about the feedback and the development of their evaluative judgment (Panadero et al., 2018; Steen-Utheim & Wittek, 2017).

In order to maximise the impact of feedback on students' learning, several conditions have to be put in place, including the role of agents involved in feedback provision and reception, the content of the feedback comments, the number of feedback loops or the design of tasks (Winstone, et al. 2017), among others. Importantly, the impact of feedback is different depending on the students' individual characteristics and the implementation context (Panadero et al., 2018), making the understanding of these conditions crucial to increasing students learning (Ion, Sanchez, & Agud, 2019).

The instructional design appears as a central factor for the feedback uptake processes (Goldstein, 2004). When lecturers plan feedback processes they must keep in mind individual and contextual factors that could guarantee a positive impact on students' learning (Boud & Falchikov, 2007). The study conducted by Winstone, et al. (2017) reveals characteristics of the learning environment and curriculum that are potential influencers of feedback uptake, including factors pertaining to the receiver, the sender, the message, and the context in which the message is delivered. Yang and Carless (2013) identify a structural dimension, related to how feedback processes are organised and managed by lecturers and institutions, which can prevent students and lecturers from engaging in dialogic feedback. These factors are

modularised programmes, large class sizes, the multiple demands of academic life, the intensification of workloads, and the imperative to produce research.

When preparing the instructional design, one of the conditions that teachers must take into account is the complexity of the feedback activity. Carless (2019) distinguishes between single- and double-loop feedback processes. One loop implies that the feedback process (assessment-return-changes) only occurs once, whereas in double-loop feedback processes it is repeated until the task is finished. Feedback activities with the single-loop require less time than the ones with several loops. Some of these factors also other feedback practices like peer feedback activities.

Peer feedback processes are mediated by factors related to the students' beliefs, values, motives, goals about feedback and assessment processes (Goldstein, 2004), and their previous experience, because good or bad experiences can mediate future peer feedback experiences (Yu & Hu, 2017). Also, the training in feedback skills can affect the quality of the peer feedback and, indirectly, the extent to which deep learning occurs (Filius et al., 2018). Teacher guidance during the peer process has a positive impact too (Zhu & Carless, 2018).

In addition, another group of factors is linked to the curriculum, assessment, and task design. Evans (2013), in her meta-analysis, notices that the efficacy of feedback is very much dependent on the strength and coherence of the overall assessment design. In addition, Boud (2000) recommends that peer feedback be part of the teaching and learning process, while Filius et al. (2018) point out the necessity of providing enough time to complete the peer feedback process. Finally, when feedback is integrated into learning and the tasks are designed to build on previous completed tasks, and when the links in a sequence are made explicit, students are more likely to draw on information from preceding tasks (Zimbardi et al., 2017).

In the same vein, it is important to note that teachers' and students' perceptions of the factors that can contribute or inhibit the feedback uptake can differ. Dawson et al. (2018) conclude that from the teacher perspective, feedback was made effective primarily through design concerns like timing, modalities, and connected tasks. From the student perspective, feedback was made effective through high-quality comments which were usable, sufficiently detailed, attended to affect, and appeared to be about the student's own work.

The uptake of feedback and the impact on students' learning depends not only on the learning scenarios but also on the position students assume during the peer feedback process: as assessor and assessee. As assessors, the students are involved in reviewing, summarising, clarifying, providing feedback, diagnosing misconceptions, identifying gaps in knowledge, and considering deviations from the ideal (Topping, 1998). These tasks are all cognitively and metacognitively demanding activities that can help consolidate, reinforce, and deepen the student assessor's understanding. As assessee, the role of students is described in a more passive way, as they are considered recipients of peer feedback. Studies conducted by Kim (2009) overcame this perspective and focused on the role of the assessee as an active partner in the peer feedback process, able to engage in dialog with the assessor and taking advantage of the process at least as much as their peer. In addition, the study conducted by Ion, Sanchez and Agud (2019) reveals that students perceive learning more when giving feedback, compared to receiving feedback. All in all, students need to engage actively with feedback, both received and given, and to "make sense" (Carless & Boud, 2018) of it effectively.

Research Aim, Questions and Hypotheses

Our aim is to reveal whether different learning scenarios and conditions involving peer feedback can influence students' learning perceptions. This will be studied by comparing students' perceptions in the context of two different instructional designs, in

which they adopt both the roles of assessor and assessee. Our research questions and hypotheses are:

RQ1. What type of peer feedback instructional design is higher rated? H1: Instructional designs with double-loop feedback processes, long-term delivery, and prior training activities are higher rated.

RQ2. What is the students' perception of providing and receiving feedback in two different instructional designs? H2: Students value providing feedback more than receiving feedback in both instructional designs.

Materials and Methods

Participants

In the first Instructional Design (named ID_1), we collected data from 321 students. In the second Instructional Design (named ID_2), we collected data from 235 students. In ID_1, 86% of the sample were female and 20 years old (M_{ID1} = 20.09*;* SD_{ID1} = 4.59), and they spent 1.80 hours on average (SD_{ID1} = 0.76) providing and receiving feedback in a double-loop feedback activity. In ID_2, gender distribution was similar (89.8% women), of around 21 years old (M_{ID2} = 20.95*;* SD_{ID2}= 2.633), and they spent less time than in ID_1 providing and receiving feedback in a single-loop feedback activity: 1.38 hours on average (SD_{ID2} = 0.7).

Materials

After the interventions, for the purpose of comparing the students' perceptions of the two instructional designs, students filled out the survey "Peer Evaluation Strategies and Feedback" which was created for this study.

The survey was designed considering peer feedback under the theoretical framework of social constructivism, which describes the joint construction of knowledge through discourse and

other interactions between the agents involved in peer feedback processes (Rust, O'Donovan, & Price, 2005).

Communication and social skills appear to be implicit, and communication between agents leads to the development of internal processes as proposed by Vygotsky (1978). Drawing from the Vygotskian concept of scaffolded learning and Topping's (1998) implications of feedback on different learning fields, the survey design (Sanchez, Muñoz, Ion, in press) considers the mechanisms through which peer feedback might generate its effects. The aspects included in the questionnaire are as follows:

1. The impact of peer feedback on students' cognitive and metacognitive development: peer feedback leads to comparisons, reflection, contrasting, communication skills, considering deviation from the standards, and learning through models.
2. The impact of peer feedback on the development of social skills and competencies: development of group work skills, active learning, acceptance of criticism, argumentation, and assertiveness.
3. The impact of peer feedback on future professional skills: the impact of peer assessment on the students' perception of the assessment competencies, their level of confidence in the assessment, their level of confidence in their peers, and conceptions of future professions.
4. The impact of peer feedback on the development of affective features: anxiety, sense of belonging, personal responsibility, and level of acceptance of negative comments.

The instrument included 87 items with a 7-point Likert scale: 42 related to the role of assessor (provision of feedback), 42 to the role of assessee (reception of feedback), and 3 referring to a general vision of the peer feedback activity. In addition, it included socio-demographic data like gender, age, and hours dedicated to providing/receiving feedback. The same survey was administered at the end of ID_1 and ID_2.

Through an exploratory factorial analysis, it was found that the questionnaire had four dimensions: cognitive and metacognitive processes (32 items); interpersonal and intrapersonal factors (28 items); type of feedback (14 items); and perception of peer feedback strategy (13 items). KMO Test result with an index of .955 and Bartlett's Test of Sphericity showed significance of $p<.000$.

The reliability analysis confirmed high values of Cronbach's Alfa (.960 for the first instructional design, .982 for the second one).

Procedure

We performed a comparative study, with a quasi-experimental design, in a Faculty of Education during the academic courses 2016/2017 and 2017/2018. Students participated during their first two years in a Bachelor's degree programme in Teacher Education.

In both instructional designs, we considered different aspects, adopting the typology of peer feedback in higher education proposed by Topping (1998). In Table 1 we summarise the main characteristics of each peer feedback instructional design and the feedback typology used in both.

[Insert Table 1]

The first Instructional Design (ID_1) was implemented in a mandatory year-long course subject carried out with first-year students of the Bachelors' degree programme in Teacher Education. Students developed a long-term feedback activity with three loops, in which they provided and received written peer feedback for each part of a group project carried out during the academic year. During the activity, students had to deliver the project

to a peer group, receive feedback, incorporate it, and deliver the final version to the lecturers at three different moments during the course.

The second Instructional Design (ID_2) was applied to the same group of students during their second academic year, in one mandatory subject carried out during the first term. During the ID_2 students developed a short-term task with a single-loop process. For three weeks students had to develop a group task, send it to a group of peers, receive feedback, incorporate it, and deliver the final version to the lecturer.

In order to engage students in the activity, they received a short training course in the use of feedback at the beginning. In ID_1, students received short face-to-face training and guidance on feedback from their lecturers and a short-written guide with basic guidelines about feedback. In the case of ID_2, lecturers only clarified the requirements and expectations about the task and the feedback process, and offered basic guidelines about how to provide good quality feedback.

Data Analysis

Univariate and multivariate statistical analyses were performed using IBM Statistical Package for the Social Sciences (SPSS v.20). Descriptive analysis and correlational analysis were applied. Specifically, when examining the instructional designs, we analysed the variance by applying ANOVA's test. In the case of the comparison of the perception of achievement in providing and receiving feedback, we applied Wilcoxon's test, which allowed us to look for significance in the comparison between their means.

Results

Findings are organised according to the research questions.

RQ1. What type of peer feedback instructional design is higher rated?

In general, students found feedback useful for learning: 'Providing and receiving feedback are complementary actions, and both are necessary for learning' (M_{ID1} = 5.69*;* SD_{ID1} = 1.41 / M_{ID2} = 5.43*;* SD_{ID2} = 1.34). The results regarding students' perceptions of cognitive and metacognitive dimensions associated with performance showed that providing and receiving feedback was considered as a valuable strategy to develop the tasks assigned and to learn through them (Table 2).

[Insert Table 2]

For instance, students agreed that providing feedback helped them to evaluate their work (M_{ID1} = 5.37*;* SD_{ID1} = 1.19 / M_{ID2} = 5.49*;* SD_{ID2} = 1.20) and learn more actively (M_{ID1} = 5.10*;* SD_{ID1} = 1.33 / M_{ID2} = 4.89*;* SD_{ID2} = 4.83), and receiving feedback was useful to improve the task of their group (M_{ID1} = 5.01*;* SD_{ID1} = 1.55 / M_{ID2} = 4.95*;* SD_{ID2} = 1.57) and meaningful to improve their work (M_{ID1} = 4.94*;* SD_{ID1} = 1.61 / M_{ID2} = 4.79*;* SD_{ID2} = 1.64). When analysing interpersonal and intrapersonal factors, data showed that all items received scores above the mean. The most valued variables in both instructional designs were 'Providing feedback improved my team work skills' (M_{ID1}= 5.12, SD_{ID1} = 1.38*;* M_{ID2} = 5.01, SD_{ID2} = 1.40), 'Providing feedback improved the communication between my teammates' (M_{ID1}=5.00, SD_{ID1} = 1.43*;* M_{ID2} = 5.00, SD_{ID2} = 1.52), 'Providing feedback helped me to assess better my classmates' work' (M_{ID1}=5.31, SD_{ID1} = 1.19*;* M_{ID2} = 5.13, SD_{ID2} = 1.36), and 'Providing feedback helped me to accept my mistakes' (M_{ID1}=5.18, SD_{ID1} = 1.39*;* M_{ID2} = 4.91, SD_{ID2} = 1.47).

In general, the results of ID_1 and ID_2 showed differences in their means, and the values of ID_1 were higher. When applying ANOVA, we observed significant differences in variables like 'Providing and receiving feedback has been an affordable activity' [F (1, 554) = 5.030, p = .025], 'I agreed with the comments I've received' [F (1, 554) = 29.099, p =

.000], "I included the comments I've received" [F (1, 554) = 9.355, p = .002], and 'I'm satisfied with the feedback I've received' [F (1, 554) = 29.439, p = .000].

Regarding questions related to cognitive and metacognitive processes, the means were different, with slightly higher scores in ID_1 (see Table 2). However, after applying ANOVA's test, we observed that these differences were not significant (p>.05). The only variable that had significance is 'Feedback has allowed me to contrast previous knowledge with new knowledge of the subject' in both situations, providing [F (1,522) = 11.694, p = .001] and receiving feedback [F (1, 499) = 4.473, p = .035]. Students considered that feedback allowed them to contrast their knowledge more in the first instructional design than in the second, significantly.

Regarding interpersonal factors, there was no clear tendency in the comparison between instructional designs. Some variables were higher rated in ID_1 and others in ID_2 (see Table 3). Consequently, the differences between instructional designs were not significant, except for three variables: 'Providing feedback helps me to accept my mistakes' [F (1, 521) = 4.568, p = .033], 'Providing feedback helped me to improve my self-esteem' [F (1, 521) = 7.073, p = .008], and 'Receiving feedback increased my faith in others' [F (1, 499) = 4.495, p = .034].

[Insert Table 3]

RQ2. What is the students' perception of providing and receiving feedback in two different instructional designs?

The results of the variable 'I've learnt more providing feedback than receiving feedback' (M_{ID1} = 3.93*;* SD_{ID1} = 1.65 / M_{ID2} = 4.46*;* SD_{ID2} = 1.57) showed that students found providing feedback more valuable for learning than receiving it. This was more perceived in ID_2, since according to ANOVA test, the difference between instructional designs was

significant [F (1,554) = 14.856, p= .000]. In the same vein, when comparing providing and receiving feedback in metacognitive variables, providing feedback was generally better rated (see Table 2 above). According to the Wilcoxon test, the differences were significant in the case of: contrasting previous knowledge with new knowledge (Z_{ID1} = -3.853, p < .000), improving communication skills (Z_{ID1} = -2.186, p < .029; Z_{ID2} = -2.900, p < .004), understanding the evaluation criteria (Z_{ID1} =-3.540, p < .000), learning more actively (Z_{ID1} = -2.730, p < 0.006), evaluating better their own work (Z_{ID1} = -2.030, p < .042; Z_{ID2} = -3.115, p < .002), planning their tasks (Z_{ID1} = -2.110, p < .035), and improving their opinion regarding assessment in university (Z_{ID2} = -2.031, p < .042).

Regarding interpersonal variables, providing feedback was not always the higher value. According to the Wilcoxon test, providing feedback was better rated than receiving feedback in teamwork skills (Z_{ID1} = -2.986, p < .003; Z_{ID2}= -3.070, p < .002), communication between teammates (Z_{ID1} = -2.765, p < .006), assessing classmates' work (Z_{ID1} = -4.533, p < .000), feeling part of the group (Z_{ID1} = -3.971, p < .000; Z_{ID2} = -3.955, p < .000), and being more responsible towards learning (Z_{ID1} = -2.444, p < .015). Meanwhile, receiving feedback was more useful than providing feedback to be motivated to learn (Z_{ID1} = -2.081, p <.037) and to improve their self-esteem (Z_{ID1} = -2.973, p <.003).

In line with the rest of the data, values related to students' perception of the usefulness of feedback were high. In case of the comparison between providing and receiving feedback, results showed differences between their means. Delivering was better considered than receiving, and the variable 'It's been a useful activity to improve others' tasks' showed significant differences (Z_{ID1} = -4.505, p < .000; Z_{ID2} = -3.794, p < .000). In the same vein, the variable 'I'm satisfied with the feedback I provided' was higher rated than 'I'm satisfied with the feedback I received' (Z_{ID1}= 7.519, p < .000; Z_{ID2}= 10.083, p < .000). On the other hand, 'I

consider that providing feedback is important' was only higher rated than receiving feedback ($Z_{ID2} = 3.438$, $p < .001$).

Discussion

In the presented study we have tracked Teacher Education students during two academic courses in order to analyse their perception of the benefits of peer feedback on their learning. The design of each peer feedback process was different: the instructional designs included different numbers of loops, levels of training and guidance on feedback, and time frame to incorporate the feedback.

We began from the premise that peer feedback has a deep impact on students' learning (Kim, 2009; Li, Liu, & Steckelberg, 2010). The incorporation of feedback in a group benefits not only individual student's work but extensively affects the whole group's work, with consequences on cognitive and metacognitive learning aspects, interpersonal and intrapersonal skills, and, consequently, future professional development (Panadero, Jonsson, & Alqassab, 2018; Simpson & Clifton, 2015).

Regarding the first hypothesis about the instructional design, our findings reveal that being involved in long-term peer feedback activities associates positively with students' perceived learning, especially when students provide feedback, compared with when they receive it (Ion, Agud, & Sanchez, 2019; Lundstrom & Baker 2009). This highlights the importance of both providing and receiving feedback for learning, as our participants acknowledged.

Secondly, our findings are in line with previous studies which understand feedback as a long-lasting and cumulative process coherent with the progressive practice of learning (Barker & Pinard, 2014). In that sense, involving students in continuous feedback activities contributes to improving students' learning in all its dimensions. However, this study reveals

that only being involved in long-term peer feedback activities is not enough to improve their learning. Other elements of feedback design are needed, such as feedback loops (Carless, 2019), curriculum design (Boud & Molloy, 2013), or time for students to make use of feedback and incorporate it into their learning capital (Zimbardi et al., 2017). Participants in our study showed higher scores in all the learning dimensions in the instructional design with double-loop feedback process, highlighting that this practice represents an example of a design willing to promote feedback uptake, as compared with single-loop feedback processes (Beaumont, O'Doherty, & Shannon 2011). This preference echoes the studies conducted by Boud and Molloy (2013), which demonstrated the potential of feedback designed as closed loops. Single-loop feedback processes only involve superficial adjusting actions with a limited impact on future learning tasks (Argyris, 1991), compared with double-loop feedback processes in which students have the opportunity to engage in active dialog with their learning and produce changes in their ways of working (Forsythe & Johnson, 2017).

Therefore, double-loop feedback processes better facilitate the feedback uptake compared to a single feedback loop, helping learners to take actions on their learning, to improve over time, and to implement different learning strategies (Carless, 2019). Multiple feedback loops are especially interesting in long-term assignments with different draft submissions, while single-loop appears useful in short-term one-draft submission assignments.

Thus, we accept the H1 proposed: Instructional designs with double-loop feedback processes, long-term delivery and previous training activities are higher rated than instructional designs with single-loop feedback processes, short-term delivery and without explicit training activities.

Regarding the second hypothesis, the study highlights the importance of both providing and receiving feedback for students' learning in all dimensions. While the benefits

of receiving feedback from lecturers are well documented, our study shifts the discussion toward the implications of giving feedback for students' learning (Ion, Agud, & Sanchez, 2018) in peer feedback contexts. In both peer feedback designs, the action of providing feedback is highly evaluated in most cognitive and metacognitive dimensions, which supports feedback's contributions to making students more active and committed to their task, responsible towards their learning, and assertive in their arguments. Active involvement by students is directly linked to students' empowerment (Panadero & Dochy, 2014). Providing comments to improve their peers' work highlighted the educational benefits of peer assessment and increased positive perception of peer feedback as a process in which students are appropriately skilled to contribute (Simpson & Clifton, 2015). Students perceived that the feedback helped them improve their argumentative capacity, connect better with their work team, and improve their communication skills.

Thus, we accept the H2 proposed: Students value more providing feedback than receiving feedback in both instructional designs.

In addition, this study contributes by advancing the discussion regarding the role of receiving feedback in peer feedback scenarios. In both peer feedback designs, students perceived that receiving feedback helped them improve their tasks (Simpson & Clifton, 2015), contributed to the development of cognitive and metacognitive skills (Bautista, Monereo, & Scheuer, 2014), enhanced their active learning and commitment to the tasks (Ion, Sanchez, & Agud, 2019; Liu & Carless, 2006), had important implications for their empowerment in the learning process (Panadero & Dochy, 2014), and improved their group tasks (Gielen & De Wever, 2015). The benefits of receiving feedback are higher in the acquisition of interpersonal and social skills, and the design of the peer feedback process has only a slight impact on it.

Our study has several implications for lecturers, such as the need to design long-term feedback activities, to train and monitor students' engagement with feedback, and to design learning situations in which feedback is part of the formative process, as opposed to just the assessment processes.

The study has some limitations. It was undertaken at a Faculty of Education with a group of pre-service teachers during two consecutive years. We used a quasi-experimental research approach, and other variables not considered might lead to bias in the results. Also, we used a convenience sample and our data is based on students' perceptions, so the findings we present may not be readily transferable to other contexts. Some suggestions for future research include continuing to track pre-service teachers during their whole degree, comparing new data over the years, and gathering new data with evidence of learning.

Conclusions

We have analysed the implications for learning of two different peer feedback scenarios based on the students' perceptions, using data from a survey comprising cognitive, metacognitive, interpersonal, and intrapersonal factors. Students find that the two instructional designs applied contributed to their learning, in the roles of both assessor and assessee. The value of peer feedback is similar for the two instructional designs. However, involving students in long-term peer feedback interventions presented advantages for their learning. Double-loop feedback processes facilitate the feedback uptake, compared to a single feedback loop. Multiple feedback loops are especially interesting in long-term assignments with different draft submissions, while single-loop appears useful in short-term one-draft submission assignments.

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Table 1. Peer feedback instructional design and feedback typology

Instructional design settings		ID_1	ID_2
Training and guidance about how to provide feedback		Two-hour session	Guidance during the process
Task assessment criteria		Established by the lecturer	
Final mark		Established by the lecturer	
Feedback loops (number)		3 loops	1 loop
Subject duration		Whole course	One semester
Appointed time		Two weeks to incorporate feedback and redraft project	One week to incorporate feedback and redraft project
Feedback typology	**Focus**	Formative	
	Type	Written	
	Privacy	Public	
	Contact	Distance	
	Place	Out of class	
	Timing	During the process	
	Directionality	Unidirectional	
	Constellation assessor	In group, negotiated by all the group members	
	Constellation assessed	Group	
	Reward	Without	
	Official weight	Without	

Table 2. *Means and standard deviation of cognitive and metacognitive processes.*

Variables	Type	ID_1 Mean M_1 (SD_1)	ID_2 Mean M_2 (SD_2)
Meaningful to improve my work	G	4.84 (1.465)	4.84 (1.451)
	R	4.94 (1.610)	4.79 (1.635)
Useful to improve the tasks of my group	G	5.12 (1.416)	5.00 (1.317)
	R	5.01 (1.551)	4.95 (1.571)
It has given me more value in the tasks of the subject	G	4.47 (1.483)	4.54 (1.440)
	R	4.56 (1.533)	4.44 (1.490)
Improve my opinion regarding assessment in university	G	4.18 (1.561)	4.30 (1.661)
	R	4.29 (1.588)	4.48 (1.684)
It is a useful learning strategy for me	G	5.00 (1.449)	5.11 (1.452)
	R	4.99 (1.507)	5.03 (1.525)
Helps to integrate the knowledge of the subject	G	4.86 (1.387)	4.75 (1.533)
	R	4.72 (1.585)	4.63 (1.482)
Contrast previous knowledge with new knowledge of the subject	G	5.15 (1.321)	4.74 (1.407)
	R	4.87 (1.474)	4.59 (1.449)
Improve my communicative skills	G	4.73 (1.429)	4.63 (1.538)
	R	4.55 (1.518)	4.32 (1.755)
Clarify my doubts about the subject	G	4.48 (1.483)	4.36 (1.397)
	R	4.52 (1.537)	4.42 (1.482)
Understand the assessment criteria and do the work according to them	G	5.03 (1.438)	5.26 (1.300)
	R	4.78 (1.508)	5.04 (1.419)
Increase the awareness of the objectives of the subject	G	4.71 (1.480)	4.51 (1.417)
	R	4.62 (1.451)	4.53 (1.387)
Understand better the tasks performed	G	4.94 (1.417)	4.75 (1.305)
	R	4.80 (1.391)	4.68 (1.373)
Understand better future tasks	G	4.56 (1.468)	4.56 (1.416)
	R	4.54 (1.453)	4.54 (1.398)
Learning more actively	G	5.10 (1.333)	4.89 (1.418)
	R	4.94 (1.472)	4.83 (1.546)
Evaluate better my work	G	5.37 (1.191)	5.49 (1.201)
	R	5.19 (1.370)	5.19 (1.444)
Improve the planning of my tasks	G	4.79 (1.431)	4.71 (1.351)
	R	4.64 (1.491)	4.69 (1.466)

G = Providing feedback // R = Receiving feedback

Table 3. *Means and standard deviation of interpersonal and intrapersonal factors.*

Variable	Type	ID_1 Mean M_1 (SD_1)	ID_2 Mean M_2 (SD_2)
Increased my faith in others	G	4.06 (1.55)	4.31 (1.54)
	R	4.11 (1.62)	4.42 (1.6)
Improved my acceptance towards others	G	4.28 (1.51)	4.48 (1.58)
	R	4.33 (1.52)	4.51 (1.64)
Improved my team work skills	G	5.12 (1.38)	5.01 (1.4)
	R	4.85 (1.48)	4.75 (1.67)
Improved my reasoning skills	G	4.92 (1.39)	4.89 (1.45)
	R	4.80 (1.49)	4.67 (1.7)
Improved the communication between my teammates	G	5.00 (1.43)	5.00 (1.52)
	R	4.77 (1.5)	4.89 (1.59)
Improved my writing skills regarding my discourse	G	4.90 (1.41)	4.80 (1.42)
	R	4.79 (1.45)	4.67 (1.62)
Helped me to assess better my classmates' work	G	5.31 (1.19)	5.13 (1.36)
	R	4.92 (1.45)	4.95 (1.57)
Made me feel part of the group	G	4.82 (1.51)	4.85 (1.56)
	R	4.46 (1.62)	4.56 (1.72)
Helped me to feel more responsible towards my learning	G	4.94 (1.41)	4.84 (1.45)
	R	4.76 (1.45)	4.75 (1.58)
Helped me to accept my mistakes	G	5.18 (1.39)	4.91 (1.47)
	R	5.04 (1.42)	4.87 (1.64)
Motivated my learning interest	G	4.45 (1.59)	4.33 (1.6)
	R	4.61 (1.56)	4.48 (1.7)
Made me feel good	G	4.36 (1.53)	4.19 (1.54)
	R	4.41 (1.58)	4.26 (1.71)
Helped me to improve my self-esteem	G	3.61 (1.60)	4.00 (1.66)
	R	3.86 (1.72)	4.13 (1.72)
Helped me to be more assertive	G	4.58 (1.49)	4.61 (1.56)
	R	4.55 (1.56)	4.61 (1.65)

G = Providing feedback // R = Receiving feedback