
INNOVATIVE EDUCATION TOOLS FOR DEVELOPING ETHICAL SKILLS IN UNIVERSITY SCIENCE LESSONS. THE CASE OF THE MORAL CROSS DILEMMA

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Abstract: This article presents the feasibility of teaching generic competences (such as those related to moral reasoning aspects) through Science lessons at university level. The authors have implemented a new instrument called “Moral Cross Dilemma” which involves the use of argumentation and moral reasoning within the students of Primary Education Degree (prospective primary teachers). This tool seems to be an effective pedagogical resource in Higher Education Levels. It is a step forward from the well-known dilemma, a consolidated strategy for the development of ethical competences based on argumentative and discursive methodologies. This paper is focused on the description of this technique and applies it for the first time on experimental data.

Moral Cross Dilemma is applicable to environmental conflicts and can be used as a discursive technique for improving the personal ethic level. This work shows empirical evidences from the preliminary implementation within university students.

The experience was carried out on a 47-student sample. They were prospective teachers learning Natural Sciences. The main results revealed no difference and were observed between self-perceived and peer evaluation of the moral status, although the environmental-friendly argumentation position clearly set out higher scoring in the moral reasoning level.

Keywords: *environmental education, European Higher Education Area, ethical learning, moral dilemma.*

1. INTRODUCTION

The use of multidisciplinary tools in the science lessons is a well-known technique for developing different curricular contents: from the argumentation to the dramatization, there is a wide variety of pedagogic instruments which leads to make science easier to understand as well as to develop other desired skills within the students. These skills are currently defined as “competences” and some of them (so-called “generic competences”) are of relevant importance in the European Higher Education Area (EHEA).

Teaching ethics or developing ethical skills (O’Flaherty & Doyle, 2014) along the proposed training process in the EHEA is perhaps one of the most interesting challenges of the new educational scenario and probably the most influent turning point in the teaching-learning paradigm (Román-Suero, Sánchez-Martín, & Zamora-Polo, 2013). Furthermore, moral aspects cannot be split off from the Higher Education Studies because they are a relevant aspect in the integral vision of the citizen formation (Aalberts, Koster, & Boschhuizen, 2012).

This importance has been shown in many previous papers (Edwards, Sanchez-Ruiz, & Sánchez-Díaz, 2009; Zamora-Polo, 2009; Franco-Martínez, Moreno-Losada, Sánchez-Martín, & Zamora-Polo, 2012) and the interest on ethics and science teaching can be found in academic papers since a long time ago (Dispoto, 1977; Zeidler & Schafer, 1984). Moreover, some of our own works demonstrated the indissoluble link between this type of competences and the desirable and proper practice of the graduates (Zamora-Polo, Román-Suero, & Sánchez-Martín, 2010)

Nowadays, it is more than evident that perhaps the most effective tool for enhancing these skills (to some extent professional) are ethical and moral dilemmas (Lozano, Palau-Salvador, Gozávez, & Boni, 2006).

The upward development of students' ethical stage is obviously an improvement in their civic capacity and self-autonomy to make decisions. It is not a secret: university is urged to train professionals able to establish criteria that promote the common goodness, justice, equity and some other consensus values, such as respect for the environment, human rights, democracy and the security and integrity of individuals (Bebeau, Rest, & Narváez, 1999). The constellation of values is what many authors have called *minimum ethics*, following Cortina's terminology (Cortina, 2000).

Ethical dilemmas have been studied primarily in technical degrees, since their implementation in the classroom is possible with a not too deep training in issues of pedagogy or applied philosophy (A Boni & Pérez-Foguet, 2008), so they are an affordable technique for unskilled teachers. Basically, this kind of exercise involves the presentation of a conflict situation (usually conflicting decision criteria are faced to each other: freedom versus safety, common good versus private good, etc.) These and other skills are being taught by educators and researchers as education internal goods (Bencze & Carter, 2011). Initially, it is difficult to know what *morally good* is, because everything depends on the epistemic location from which the decision is made. That position is the one that will mark the evolution of the student during the activity.

An ethical dilemma incorporates the following stages of development:

- a) Contextual narration of the situation.
- b) Discussion and rational defense of positions by the students.
- c) Analysis of the relevant arguments.
- d) Assessment of the level of moral development of students in the light of selected arguments.

It is noteworthy to emphasize that there is no valid and invalid argumentative positions, but all of them are acceptable to a greater or lesser extent from dialectic positions. Thus, it is possible to defend opposed ideas from identical stages of moral development. It is well known that this exercise of the dialogue and the argumentation enhances the ethical and moral skills in students (Hayden & Pickar, 1981).

According to Kohlberg's theory (Kohlberg, 1992), the moral stages are fully described and are depicted in Table 1.

Many concerns have arisen on the Kohlberg's theory (Backman & Gardelli, 2015)

Table 1. Stages and moral levels of moral development according to Kohlberg (1992).

Moral level	Stage	Short description
Pre-conventional <i>Heteronomy</i>	1	Reward and Punishment scheme
	2	Normative relativism
Conventional <i>Identification with the social group</i>	3	Interpersonal expectations
	4	Social laws and common good
Post-conventional <i>Autonomy</i>	5	Priority rights
	6	Universal ethic principles

The main problem of these methods lies in the evaluation. Traditionally, authors involved in the employment of moral dilemmas recommend the use of instruments such as a scoring rubric including variables as analytical, discursive or dialogical skills. Thus, although these are of great interest and usually are also included in the curriculum of the students, they seriously hampers the ethical valuation itself and its promotion. To overcome this drawback, this paper proposes an improved activity based on ethical dilemmas that are intended to assess the level of students' moral development through the use of a moral cross dilemma.

The importance of moral education and ethical skills development is a relevant aspect in the traditional education process, even since the early stages of schooling (Jensen & Chatterley, 1979; Clarkeburn, 2002). This improves the advantages of carrying out these kinds of educative tools within a sensitive community such as prospective teachers. Those will be the ones that probably will develop these moral skills among children.

It is more than evident, according to what is expressed above, that there is a connection between ethics, moral reasoning, education and teaching. But we wanted to focus our interest not in a general education or teaching-learning process, but in a specific didactic praxis. Science education, and environmental education in particular, is the scope of our research. Talking about environmental education is making some specific visions of the nature arise in students. This is even more important when these students are prospective teachers (Oliveira, Akerson, & Oldfield, 2012). Since environmental concerns are a desirable competence in students from both Higher Education students and lower educative levels, it is crucial to promote this value especially in those who will teach

in Primary School (Martin, Summers, & Sjerps-Jones, 2007). For avoiding indoctrination and promoting autonomous reasoning, this and other values should be discovered and integrated by using dialogue-based and argumentative techniques.

In summary, we have focused our attention on the development of ethical skills founded on environmental conceptions, including the promotion of social progress and the preservation of natural environmental heritage. To the best of our knowledge, there are no previous papers on this subject, so this is the first time this kind of methodology is proposed.

This paper is therefore focused on three concomitant aims: a) Present the new methodology of cross moral dilemma and its advantages in the ethical learning, b) Present the particular experience of its application with a group of prospective teachers regarding an environmental-related controversy, and c) Present some interesting results and insights involving the moral perception and self-perception of the students.

In terms of hypothesis, this work is founded on the following ones:

H1 - Students evaluate their own opinions and assign them to a moral reasoning level similarly to how they assess others' opinions.

H2 - There are significant differences in the moral classification of opinions if they are classified according to a strict scoring rubric or just based on personal perspectives.

H3 - Personal opinion ("Against" or "in Favour") will influence the moral perception of the arguments.

2. METHODOLOGY

Since one of the main aims of this work is to show and apply a new methodology in the moral reasoning level assessment, this section presents point by point the Moral Cross Dilemma application in a prospective teachers' classroom.

2.1. SAMPLE DESCRIPTION

The sample universe is constituted by 47 students in a homogenous population of both sexes. It corresponds to a complete group of 3rd Grade in Primary Teacher Degree, according to the EHEA terminology. These

students come from different pre-university instructional paths: the large majority comes from High School, but there are also some of them that come from vocational training and even from other instances (such as those who, being older than 25 and with no previous education but the basic one, have accessed to University through a special exam).

This sample has no special training in environmental education, or in science education. This is the first time they face environmental issues in the university Grade, and this subject is usually understood as a “difficult” one.

2.2. THE MORAL CROSS DILEMMA APPLICATION

First of all, the students are asked by the professor to write down their own opinion on a well-known and socially controversial matter. This should be something that needs no explanation or clarification, and preferably an issue that everybody can talk about. Each opinion must be consigned twice on different paper sheets. Note that students know nothing about moral stages, they just write down what they think on a hot topic.

In our case, the question was:

Is it good for our region (Extremadura) to install an oil refinery in the vineyards?

The environmental implications of this real situation are confronted to a desirable industrial development in a traditionally non-developed region, with an almost permanent absence of the 2nd Economic Sector.

Students must decide a yes/no self-position and give a short argument for this. The exact text must be duplicated in different cards, one of them is collected by the teacher and the other one is kept by the student.

Subsequently, the professor presents a brief exposition of Kohlberg's theory about moral development and moral stages, just for making the students able to identify moral positions.

The core of the activity is a role play where students must defend a given position in a different moral dilemma. The professor reads a text aloud where a conflictive situation is presented, preferable linked to the professional aspect of the students. In our case, this short moral dilemma is presented in Text Box 1.

Text Box 1. An environmental moral dilemma designed for prospective teachers.

The road between the two main cities in our Region is not a dual carriageway, in spite that it presents a high traffic pressure during the whole year. In your class there is an 11-year old student, Michael, whose parents are divorced, and this boy stays with one and another each week separately. The travel takes one hour and a half approximately.

This boy asked you during your lesson why the Regional Government did not convert this road into a dual carriageway. You know that the one official reason is the fact that the road is on a Special Protection Area for Birds, and because of that it is not allowed to enlarge the road or break the ecosystem continuity. But you also know a dual carriageway would enhance the tourism, the market and the economic development for the region.

You replied the boy with the first reason, but the student responded:

- And you, teacher, what do you really think?

The professor has prepared up to six cards with six different arguments, one for each Kohlberg's moral stage. Students are not asked to defend their own opinions, but a prescribed one, which is given to them in separate cards. In groups of 5 or 6 people, each student receives one card where the opinion that must be defended is consigned, except of one person, who will act as secretary. This secretary should observe and listen to the arguments and he/she must assign the corresponding moral status to each given position. The role play ends when the Secretary reveals the correct identification of each person to the exact moral stage. The different arguments are presented in Supplementary Material 1 (SP1).

Once the role play is over, the professor distributes the previously collected cards with the students' opinion on the refinery issue, so each student should retain his/her own card and another one from a colleague. Since they are in disposition of understanding Kohlberg's theory because of the theoretical explanation and the practical performance, now they are asked to complete a questionnaire (Supplementary Material 2, SP2) where they must evaluate the moral status of a) his/her own position and b) the assigned card from another student. This task will be sent to the teacher via e-learning platform.

The analysis of the received data will give us an idea of how students catalogue their own opinion and the other's one, and the reasons they

give for one and another evaluation also show the moral status of each student.

Consequently, for each student we will have up to three scoring rates: one for his/her position according to the teacher's rubric; one for his/her position according to the peer evaluation (a colleague's evaluation) and one assessed by himself or herself. These are the data we will process and analyze afterwards.

3. RESULTS AND DISCUSSION: PERCEIVED AND SELF MORAL EVALUATION

As can be checked from the evaluation sheet (Supplementary material), they were asked for a moral classification of the own opinion about the oil refinery and the evaluation of the colleague's position (anonymously). They are also asked to give a reason for both classifications and a final evaluation of the activity itself.

3.1. FIRST ANALYSIS OF ARGUMENTATION

Figure 1 presents the percentage opinion in agreement/disagreement with the installation of an oil refinery. As can be appreciated, there is not a clear tendency: 56% would be against this industry whereas 44% would agree with this kind of factory. This is important

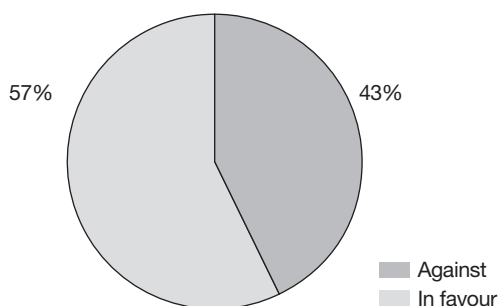


Figure 1. *Would you approve the installation of an oil refinery in the vineyards of Extremadura?* Answers Distribution.

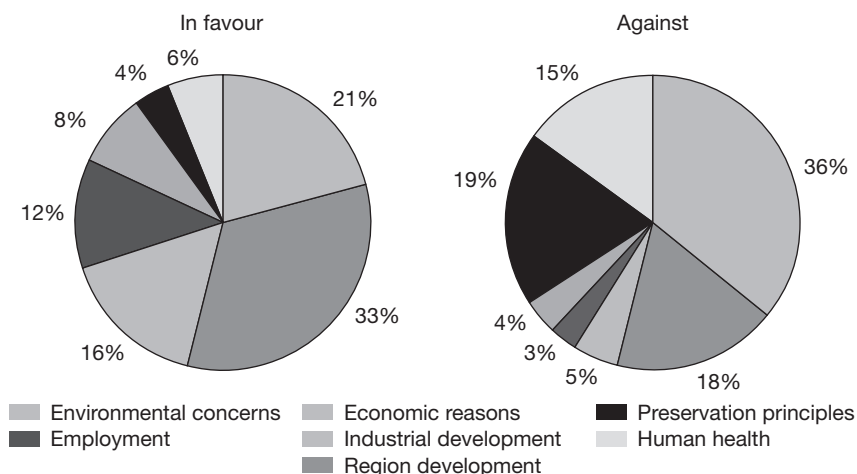


Figure 2. Distribution of arguments in agreement/disagreement positions when asked about the installation of an oil refinery.

for the forthcoming discussion on perceived and moral status self-perception.

Since students were called for giving reasons for their answers, seven categories were established for cataloguing the main argumentation speeches: environmental concerns, employment, economic reasons, industrial development, region development, preservation principles and human health. Figure 2 shows the distribution of such arguments in both positions (agreement/disagreement). It depicts the appearance of at least one reference to each argument, either in the favorable position or in the opposite one.

As can be easily observed, the main arguments are those related to environmental concerns (environmental degradation, contamination or pollution, etc.) and those that have to do with the possible decrease of the unemployment rate. The prevalence of one or another is inverted depending on the argumentative position, being the second one the most important for those students who agreed with the installation of an oil refinery in the vineyards. It should be pointed out that unemployment rate in Extremadura is 28.07% (employment rate of 26.57%) according to the last data (INE, 2015). Human health is only important for 11% and 6% of the asked students, and more global concepts such as economic reasons (richness) or regional development are less considered.

3.2. STANDARD MORAL STATUS

Each student was submitted to three concomitant evaluations of the moral status of the defended argument: one self-evaluation (the student informed of his/her own opinion and classified it into one of the 6 Kohlberg's stages), one external evaluation by a colleague (anonymous peer evaluation) and a model evaluation by the professor. For this last one, a scoring rubric sheet was implemented, according to Table 2.

Consequently, we have three numerical classifications (1-6) for each student and we can analyze different relationships between these data, including the moral self-perception.

First of all, some statistic tests must be implemented for analyzing the influential variables. To this end, we have worked with two variables: kind of evaluation (Auto-evaluation, A; External peer evaluation, E; or Professor evaluation, T) and opinion ("Against" or "in Favour").

An univariate ANOVA test including these two aspects should show the influence of each one on the final response (SPSS, 2005). Significance level was set to p-value equal or above 0.05.

ANOVA inter-subject effects test taking the moral status as a target value gives us relevant information on the three hypothesis, as can be observed in Table 3.

Table 3 shows the p-values of the variables Kind of Evaluation (0.007) and Opinion (0.001). Since they are below 0.05, this means these variables are involved in the explanation of the behavior of the model.

Table 2. Scoring rubric for the student's moral stage assessment used by the teacher.

Scoring statement	He/she looks only for himself/herself (personally or regionally)	He/she justifies a self-centered decision (egoism)	He/she repeats well-known and classical arguments	He/she justifies only from Law's observation	He/she presents a wide view of the common good	He/she wishes for the others the same as for himself/herself.
Kohlberg's equivalent level and stage	Pre-conventional, Stage 1.	Pre-conventional, Stage 2.	Conventional, Stage 3.	Conventional, Stage 4.	Post-conventional, Stage 5.	Post-conventional, Stage 6.

Table 3. ANOVA inter-subjects effect test

Source	Squares sums	F factor	p-value
Corrected model	63.96	5.54	0
Intersection	1339.06	580.37	0
Kind of Evaluation (E)	24.04	5.21	0.007
Opinion (O)	28.87	12.51	0.001
E * O	2.20	0.48	0.621
Error	263.02		

3.3. H1 AND H2. SELF-PERCEIVED MORAL STATUS

If taken separately, one can check that there are statistically significant differences in the assigned moral status between the Teacher Evaluation and the other two Kinds of Evaluation. This is easily appreciated from Tukey's multiple comparisons (Honestly Significant Differences), which are shown in Table 4. The comparison between the evaluation performed by the professor (T) and the other two evaluation models (A and E) are always significant (p-values of 0.021 and 0.005) while the comparison between the moral classification performed by the students (no matter if it is self-evaluation or peer evaluation) gives no difference (p-value of 0.629).

The first two working hypothesis (H1 and H2) are consequently confirmed and give a relevant information: **the students are not affected by the fact that they are evaluating their own opinion or an external one. They proceed honestly in the moral classification of the arguments.**

Table 4. Tukey's HSD on the students' moral status

E1/E2	Mean differences (E1-E2)	Significance (p-value)
A/E	-0.34	0.629
A/T	0.85	0.021
E/A	0.34	0.629
E/T	1.19	0.005
T/A	-0.85	0.021
T/E	-1.19	0.005

Apart from the statistical evidences, this is also shown by the mean values of moral level. In the case of the self-perceived status, the mean score is 4.23 (Conventional Stage). This is very near to the external peer evaluation moral level, which presents a mean score of 4.19.

This is in agreement with the fact that teachers (and also pre-service teachers probably) are usually identified as “moral agents” inside the school institution, as Joseph and Efron (1993) already pointed out. In their study, up to 180 public school teachers were submitted to questionnaires and observations and, as the authors stated out:

(...) individual moralities shape the choices they make and the conflicts that concern them as they function as moral educators; despite their reluctance to directly teach values, the teachers feel a commitment to share their personal ethos (Joseph & Efron, 1993, p. 201).

In addition, the second working hypothesis (H2) is also confirmed by the fact that the mean value of the Professor Evaluation is 3.11, far from the levels achieved by the students themselves.

Homogenous Tukey’s Groups in HSD post hoc test also confirms this, since it establishes two different groups: one for the Professor evaluation (T) and another one for the joint Self-evaluation and External peer evaluation.

According to this fact and bearing in mind that a rubric scoring is more precise than other kind of “emotional subjective scoring”, our conclusion also reinforces the idea of moral education inside an outside school, as Nucci (2016) recently states out. We agree with this author when he declares “Moral education is not simply growth within the moral domain, but addresses capacities of students to engage in cross-domain coordination”.

3.4. H3. INFLUENCE OF THE OPINION IN THE MORAL STATUS OF THE ARGUMENTS. ENVIRONMENTAL CONCERN, PROTECTION AND PRESERVATION AS A HIGH-LEVEL ETHICAL VALUE

It is remarkable that a moral dilemma should not show a clear solution because both positions can be defended from ethically-based arguments (Alejandra Boni & Berjano, 2009). However, the presence of argumentative categories such as Employment or Environmental concerns can

make the analysis of one or another option feasible taking into account the intrinsic reasons of each argumentation. Moral classification of these reasons can confirm the third working hypothesis, as was expressed in a previous section.

ANOVA test showed that Opinion was a significant variable when explaining the general behavior of the model. That is, it is possible to identify significant differences between one and another Opinion ("Against", A; or "in Favour", F), in terms of moral development. For this statement, the kind of evaluation (Self-evaluation, Peer evaluation or Professor Evaluation) is not taken into account and the whole analysis is made on the basis of Estimated Margin Means (EMM). This confirms hypothesis 3 (H3).

From a numerical point of view, this can be expressed taking a look at the average value of the moral evaluation depending on the Opinion. Hence, the mean value (including the three kinds of evaluation) for "Against" position is 4.102, whereas the equivalent evaluation for "in Favour" position is 3.052. In other words, those students that made argumentations against the installation of an oil refinery in the vineyards were able to develop a higher moral status (near post-conventional stage) than those who were in agreement with such industrial installation.

This is coherent if one observes the three kinds of evaluation, as table 5 presents:

This is the proof for considering that students understand the values related to environmental concerns (the main argumentation against the installation of an oil refinery) as of higher moral status than those argumentations about employment and regional development. The tendency is clear in the three cases of evaluation type.

The traditional anthropic paradigm is clearly changing to a new ecological paradigm (*NEP* in Dunlap and Van Liere's terminology, as these authors already pointed out in the last years of the XX Century (Dunlap

Table 5. Mean values for moral development depending on Kind of Evaluation (A, P or T) and Opinion (A, F)

Opinion	Kind of Evaluation		
	A	P	T
A	4.44	4.19	3.50
F	3.05	3.55	2.55

Van Liere, 1978). This change is not only an environmental perception change, but it also affects the internal moral reasoning level of the subject, as our results clearly depict.

3.5. GRAPHICAL ANALYSIS

The numerical considerations of this case can be expressed under a graphical view that conceivably makes the understanding of each hypothesis confirmation easier.

For instance, the representation of the estimated marginal means (Figure 3) shows the mean moral status of the students making differences between Opinion (different lines) and Kind of Evaluation (X-axis), whereas the estimated marginal means are placed on Y-axis.

As can be observed, two almost parallel lines are drawn. The first one (Against position) is placed in higher values of moral development, either for Auto-evaluation, Peer evaluation and Professor evaluation. The second one corresponds to the “in Favour” position and stands below the first

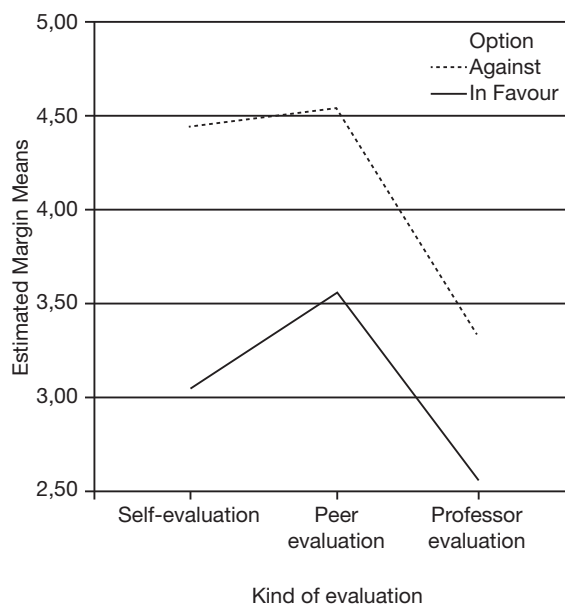


Figure 3. Estimated margin means of moral status of students depending on Opinion and Kind of evaluation.

one in the three evaluation cases. Both lines are not crossed, that means there is a linear and summative influence of each variable, no crossing means no variable interactions (Box, Hunter, & Hunter, 2005). This is a graphical confirmation of Hypothesis 3.

Tukey's analysis is also showed in this graph because the whole model cannot make significant differences between A and P evaluation type, but clear differences can be established between A/P and T evaluation and A and F opinion. These are the graphical confirmations for Hypotheses 1 and 2.

Figure 4 shows the box-plot graphics for each Kind of evaluation. They give the moral development status separately for each Opinion.

As can be easily appreciated, a wide dispersion is observed for the three Kinds of evaluation. This means the students constitute a heterogeneous group in terms of moral status. Auto-evaluation (subfigure 4.1) also presents a larger number of extreme values (stars) and non-typical values (circles) in the case of "Against" opinion. This is remarkable because it reflects the self-view of the students. Three of them presented abnormal

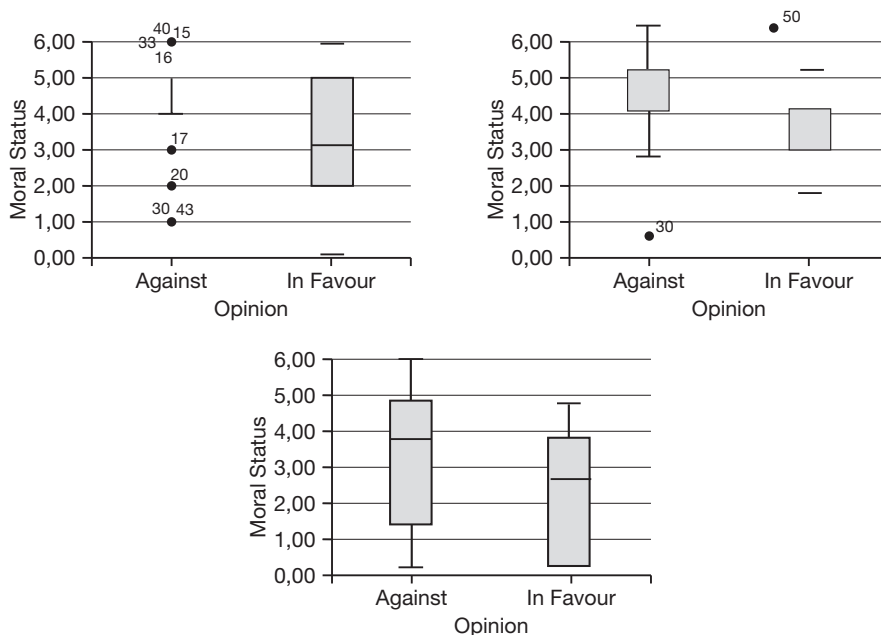


Figure 4. Box-plot for moral development in each type of evaluation and taking into account the Opinion.

extreme auto-evaluations (corresponding to the first two Kohlberg's levels) and five of them also presented non typical values (level 6 and level 3 of Kohlberg's moral scale). The rest of them are mostly around level 5, mainly placed on post-conventional stage. The series of students "In Favour" of the refinery does not present extreme or non-typical data, although their dispersion is wider.

The Peer evaluation is stricter because it presents less wide dispersion in the data. That is, the students have fewer doubts in assigning an exact moral level to each colleague's opinion, either in the case of "Against" and "In Favour".

The third sub-figure (4.3) is the Professor evaluation, it should be most accurate and objective one because of it was carried out taking into account a scoring rubric. Here, the wide data dispersion either in one opinion or in the contrary can be confirmed.

4. CONCLUSIONS AND FURTHER STUDIES

This paper has showed a novel methodology in the evaluation of moral development in university students. This is relevant from the point of view of implementing the moral and ethical education inside the EHEA, the current and different education paradigm.

Moral cross dilemma is introduced here as a feasible tool for this scope. This considers the self-perceived moral status and the peer evaluated moral status for a given dilemma. In addition, it allows to identify how students understand the different arguments for one or another opinion.

This experience showed that environmental concerns are considered of a higher moral status than employment aspects when only one value can be chosen. Students also showed a clear objectivity in the evaluation of their colleagues, since similar arguments and similar moral values were exposed.

These results are promising for continuing with these exercises for environmental and moral education, although many other features (such as argumentation) can be also encouraged. Further studies must include a wider sample both in number and in variety, involving other discipline students, other ages or academic stages and other socioeconomic conditions.

As an initial approach, the methodology must be validated with a broader implementation. In the near future, other Grades from our

universities can be subjected to this pedagogical tool and consequently the instrument should be more robustly tested.

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SUPPLEMENTARY MATERIAL

S1. DIFFERENT ARGUMENTATIVE POSITIONS IN THE MORAL DILEMMA (ROLE PLAY)

Answer 1. Level 1, pre-conventional, Status 1: Reward and Punishment

“Look, Michael, I think the Regional Government should not build a dual carriageway in that place because there is an European Directive Law that does not allow these kinds of construction. If we built it, they could penalize us economically.”

Answer 2. Level 2, pre-conventional, Status 2: Own interests.

“I think the dual carriageway should be built because it would make the traffic better and more fluid. I am sure birds would be able to find new places to live.”

Answer 3. Level 2, conventional, Status 3: Interpersonal expectatives, group belonging.

“The dual carriageway should be built because we are always in the last positions of the economic development. I think it is the best moment for us, to demonstrate the Central Government we can do what we want to in our territory. It is enough of being the “Spanish Garden”.

Answer 4. Level 2, conventional, Status 4: Established social laws.

“I do not know exactly if this road must be built or not, Michael. What I know is that if it is not allowed to pass through a Special Protection Area for Birds, it must be for some important reason. I think we should enforce the law.”

Answer 5. Level 3, post-conventional, Status 5: Social contract.

“I think the dual carriageway should be built up because the level of industrial and economic development in a region depends on the quality of its infrastructures. Considering the benefits and the dangers of enlarging the way, I think the wealth that can be obtained for all the citizens is worth enough to run the ecological risks.”

Answer 6. Level 3, post-conventional, Status 6. Universal ethic rules.

“The dual carriageway, Michael, should not be built because it endangers the ecological equilibrium. This is something which is not desirable either for us or, above all, for our children. We need to search for other development ways that do not mean a risk to the natural richness or biodiversity in our region.”

S2. THE EVALUATION QUESTIONNAIRE

Name and surname:

Colleague's opinion:

Level and Status:

Reason:

Own opinion:
Level and Status:
Reason:

Evaluation of the activity
Numeric evaluation:
Comments:
Did you change your mind or your argumentation on the refinery
matter?

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