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Moral competence in students from three areas of knowledge

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Abstract

Moral competence is the capacity to make moral decisions or judgments and to act in accordance with them. The aim of this study was to measure and compare such competence among law, civil engineering and medical students at Universidade Federal do Paraná. All students enrolled in these courses were invited to take the moral competence test, resulting in 946 valid responses. Medical students had a C-score of 11.4; civil engineering students, 15.9; and law students, 14. There was no increase in moral competence over the successive academic terms, nor according to age and gender, except in medicine, where scores were higher among female students. Although moral competence was lower among medical students, all scores were low and did not increase throughout the courses, suggesting that undergraduate education did not positively influence this competence. Finally, it was concluded that teaching strategies should be included in future educational planning.

Keywords: Morals. Moral development. Students. Educational measurement.

Resumo

Competências de juízo moral em estudantes de três áreas do conhecimento

Competência de juízo moral é a capacidade de tomar decisões ou julgamentos morais e de agir de acordo com isso. O objetivo deste estudo foi avaliar e comparar essa competência entre estudantes de direito, engenharia civil e medicina da Universidade Federal do Paraná. Todos os estudantes matriculados nesses cursos foram convidados a preencher o questionário de competência moral, obtendo-se 946 participações válidas. A competência de juízo moral dos estudantes de medicina revelou escore C de 11,4; de engenharia civil, 15,9; e de direito, 14. Não houve aumento dessa competência ao longo dos semestres, nem com idade e gênero, exceto em medicina, que apresentou melhores escores no gênero feminino. Apesar de a competência do juízo moral ser menor entre os estudantes de medicina, todos os valores são baixos e não se elevaram ao longo dos cursos, mostrando que a graduação não influenciou positivamente. Por fim, concluiu-se que estratégias de ensino poderão ser incluídas no planejamento pedagógico futuro.

Palavras-chave: Princípios morais. Desenvolvimento moral. Estudantes. Avaliação educacional.

Resumen

Competencias de juicio moral en estudiantes de tres campos de conocimiento

La competencia de juicio moral es la capacidad de tomar decisiones o emitir juicios morales y actuar de acuerdo con ello. El objetivo de este estudio fue evaluar y comparar esta competencia entre estudiantes de Derecho, Ingeniería Civil y Medicina de la Universidade Federal do Paraná. Se invitó a todos los estudiantes matriculados en estos cursos a completar el cuestionario de competencia moral, y se obtuvieron 946 participaciones válidas. La competencia de juicio moral de los estudiantes de Medicina reveló una puntuación C de 11,4; de los de Ingeniería Civil, de 15,9; y de los de Derecho, de 14. No se observó un aumento de esta competencia a lo largo de los semestres, ni tampoco con la edad y el género, salvo en Medicina, que mostró mejores puntuaciones en las mujeres. Aunque la competencia de juicio moral fue menor entre los estudiantes de Medicina, todos los valores fueron bajos y no aumentaron a lo largo de las carreras, lo que demuestra que los estudios de grado no influyeron de manera positiva. Por último, se concluyó que podrían incluirse estrategias de enseñanza en la futura planificación pedagógica.

Palabras clave: Principios morales. Desarrollo moral. Estudiantes. Evaluación educacional.

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Research

Kohlberg describes moral competence as *the capacity to make decisions and judgments that are moral* [i.e., based on internal principles] *and to act in accordance with such judgments* [1]. Moral competence may be developed over life through experiences influenced by intellectual, social and educational factors, among others. Thus, according to Bataglia [2], the evolution of such competence depends on both innate traits and interactions between individuals and the environment.

Moral competence influences human behavior and social interaction and aids in decision-making to address moral dilemmas, as it is not enough to have an opinion about something; one must have the capacity to act consistently with formulated and issued moral judgments [2]. Moral competence is particularly relevant for professionals in law, medicine and civil engineering, who deal with complex moral and ethical conflicts daily.

However, there is a shortage of academic studies on the subject, both in Brazil and internationally, especially in law and engineering. In addition, existing research, such as that by Self and Ellison [3], Landsman and McNeel [4], and van Dongen and Raaijmakers [5], uses instruments capable of measuring not moral competence but similar parameters. Such scarcity of studies on the subject, coupled with an interest in comparing the three main fields of professional knowledge—humanities, exact sciences and health—motivated the quest to examine moral competence among medical, law and engineering students.

Studies have shown regression, stagnation or a slight increase in moral competence among medical students during their undergraduate studies, which could be correlated with age, culture or academic environment [6]. Among law students, the only site-specific study reported that undergraduate studies had a negative effect on moral judgment, using a different survey instrument from the one used in this study [4]. As for civil engineering students, no similar research was found.

Given the above, this study measured and compared moral competence among undergraduate students in law, civil engineering and medicine. The hypothesis is that instruction and academic environment may influence the acquisition of moral competence. Therefore, it investigated possible similarities and differences in standards and acquisition between students according to course, academic term, age and gender.

Literature review

An individual's level of moral competence can be assessed by means of different stages. According to Kohlberg, as pointed out by Bataglia, Morais and Lepre [7], there are six stages of moral competence grouped into three levels: pre-conventional, conventional and post-conventional.

In the pre-conventional level, morality is heteronomous, meaning the individual is subject to an external rule or the will of others, with none or minimal authority. In stage 1, the individual obeys social rules out of fear of punishment; in stage 2, that of individualism, moral reasoning is egocentric and follows rules based on self-interest [7].

The conventional level remains heteronomous and includes stages 3 and 4. Stage 3 is characterized by "good" behavior driven by the need to meet social expectations; hence, collective interests become more important than individual ones. Stage 4 is based on maintaining social order and conforming to authority, meaning everyone should collaborate with social organization and institutions [7].

In the post-conventional level, morality is autonomous and includes stage 5, where moral reasoning is guided by social contract and individual rights. It also comprises stage 6, considered the most advanced, characterized by universal ethical principles [7].

The instrument available for measuring moral competence is the Moral Competence Test (MCT), created by Lind in 1977 [8,9]. The MCT measures a person's capacity to use moral judgment in two dilemmas. The subject must analyze different kinds of moral arguments reflecting opinions for and against the character's decision. There are six statements against and six for the decision made in the dilemma, each linked to one of Kohlberg's stages.

Thus, the instrument comprises 24 arguments to be judged. Moral competence is measured by the C-score, with higher scores awarded to individuals who show greater moral competence [9]. It should be noted that the score obtained reflects the respondents' capacity to appreciate the moral quality of an argument, regardless of whether they agree or disagree with it [8]. In other words, counterarguments are the central feature in the MCT and represent the moral task that subjects must face [8].

The two initial dilemmas that make up the test are:

A. Worker's dilemma: A worker decides to break into his company to find evidence of management misconduct and then deliver the information to the authorities.

B. Physician's dilemma: To put an end to his suffering, a terminally ill patient asks the physician to perform euthanasia.

The MCT was translated and validated in Brazil in 2010 by Bataglia [2]; however, during the process, it was noted that the C-score in Brazil was lower than in other Latin American and European countries (except for Mexico, where results were similar to Brazil). When the dilemmas were analyzed separately, it was observed that the worker's dilemma had similar scores across all countries while the physician's dilemma scored below average in Brazil and Mexico. It was concluded that the populations of these countries had difficulty analyzing the issue of euthanasia, and therefore the test showed a lack of equivalence between its dilemmas [2].

Thus, a new dilemma was added to the MCT in Brazil, the judge's dilemma, which made it possible to investigate differences between the two original dilemmas [2]:

A. Judge's dilemma: A person suspected of knowing the details of a future terrorist attack is detained but refuses to speak. To save the lives of innocents, should the judge authorize the torture of this suspect?

The combination of these three dilemmas is called the Moral Competence Test Extended (MCT-xt) [2]. In 2012, Feitosa and collaborators [10] carried out a study using the MCT-xt in the Northeast region of Brazil, in a medical course with more than ten applicants per place. The C-score obtained, after evaluating the possible influences of term, age and gender on moral competence, showed regression of moral competence among eighth-term students compared to first-term students. Among students in the same term, older students had lower C-scores. There was no difference in C-scores between genders.

Therefore, there was a decrease in moral competence among students in that medical course over the academic terms. Further studies are required for more solid conclusions [11]. This outcome raised the question of whether moral regression was an exclusive problem of medical school or if it occurred in other courses, and whether other social factors influenced the assessment [12].

Method

This is a cross-sectional, observational and descriptive study that used the MCT-xt as a survey instrument. Ethical and institutional approvals were obtained with the coordinators of the law, civil engineering and medicine undergraduate courses at Universidade Federal do Paraná, chosen for the easy access to coordinators, classrooms and students, as three of the researchers of this paper are affiliated with that institution. Data were collected in person between March and August 2022.

All students of legal age and regularly enrolled in the law, civil engineering and medicine courses, given at the Curitiba campuses, were invited to participate. Only students under 18 or unable for any reason to answer the questionnaires were excluded.

The purpose of the study was explained to the participants and those who agreed to collaborate signed the informed consent form. They received a hard copy of the survey instrument and instructions on how to complete the test. The estimated time to answer the questionnaire was 15 minutes. Participants who left two or more items of the survey instrument unanswered were excluded.

Besides answering the MCT-xt, participants provided demographic data such as age, gender, course and term. The terms were grouped into cycles, i.e., instruction or internship, according to the curriculum of each course. The obtained data were entered into an electronic spreadsheet and subjected to statistical analysis using IBM SPSS Statistics Version 22.0. The demographics were presented by absolute, relative and mean frequency. The C-score was used for the statistical study of the MCT-xt data, calculated according to the multivariate analysis of variance described by Lind [8,9,11], Feitosa and collaborators [10] and Bataglia, Schillinger and Lind [12]. The following non-parametric tests were used to examine the relationships between C-scores and course, age, gender and cycle.

- Mann-Whitney test (U test) to compare scores from two independent samples;
- Kruskal-Wallis test (H test) to compare scores from three or more independent samples;
- Dunn's multiple comparison test to discriminate differences.

An A level of significance of 0.05 was considered in all the aforementioned statistical tests. To analyze moral competence, the C-score was classified according to Lind's proposition. Scores between 0 and 4.9 mean no moral competence; between 5 and 9.9, some, but very low moral competence; between 10 and 19.9, low moral competence; between 20 and 29.9, sufficient moral competence; and between 30 and 100, high moral competence [13].

Results and discussion

The results were organized based on the objectives stated in the introduction of this paper. Due to space constraints, the discussion focused on inter-course comparisons, although there are results concerning the development of intra-course moral competence, which will be explored in a future study.

The MCT-xt proved to be the most suitable instrument for measuring students' moral competence because, unlike other tests, participants are unable to simulate higher scores [9]. In addition, other tests do not measure moral competence, only moral behavior [10].

From a sample universe of 2,970 individuals, 968 students agreed to participate, or 32.6% of the total. Twenty-two tests were excluded due to incomplete responses, with 946 remaining. Of these, 444 (46.9%) were from medical students, 339 (35.8%) from law students and 163 (17.3%) from civil engineering students.

Table 1 features the demographics of the participants, such as age, course cycle and gender. Regarding course cycle, the samples were divided into two groups: instruction (first three years of civil engineering and law and first four years of medicine) and internship (last two years of undergraduate studies).

This division was important for two reasons. First, some terms have fewer students than others, which could skew the survey data, overestimating or underestimating results. Second, and more importantly, linked to a hypothesis by Bataglia, Schillinger and Lind [12] and Morais and collaborators [13], student immersion in more intense practice, supervised by tutors or advisors, favors the development of reflective skills. The aim of this division was to observe if there is an increase in moral competence throughout the course.

Age is divided according to the mean of the total group, which was 22.8 years (the median was 23 years). Thus, two groups were created: age group below the mean (18 to 22 years), with 508 participants (53.7%), and age group above the mean (above 22 years), with 438 students (46.3%). Regarding gender, 478 (50.5%) identified as female, 458 (48.4%) as male and 10 (1.1%) as other. In terms of course cycle, 697 participants (73.7%) were in instruction and 249 (26.3%) were in internship.

Table 1. Sample breakdown by course, age, course cycle and gender

Total sample							
	Age		Cycle		Gender		
	18-22	>22	Instruction	Internship	Female	Male	Other
n=946	508	438	697	249	478	458	10
%	53.7	46.3	73.7	26.3	50.5	48.4	1.1
Medicine							
	Age		Cycle		Gender		
	18-22	>22	Instruction (1st-8th term)	Internship (9th-12th term)	Female	Male	Other
n=444	167	277	394	50	245	195	4
46.9%	37.6	62.4	88.7	11.3	55.1	43.9	0.9
Law							
	Age		Cycle		Gender		
	18-22	>22	Instruction (1st-6th term)	Internship (7th-10th term)	Female	Male	Other
n=339	214	125	196	143	169	164	6
35.8%	63.1	36.9	57.8	42.2	49.8	48.4	1.8
Civil engineering							
	Age		Cycle		Gender		
	18-22	>22	Instruction (1st-6th term)	Internship (7th-10th term)	Female	Male	Other
n=163	127	36	110	53	64	99	0
17.2%	77.9	22.1	67.5	32.5	39.3	60.7	0

Table 1 shows that the medicine course has the largest number of students. Regarding age, in the medicine course, the sample is more concentrated in the age group above 22 years, while most law and civil engineering students are in the under 22 group. Regarding course cycle, most of the sample is in the instruction stage, with a minority in internships. Nevertheless, both groups are sufficiently represented to analyze moral competence in terms of progress, stagnation or regression.

Lastly, regarding gender, the courses are well balanced, with approximately 50% female and 50% male. In civil engineering, however, the ratio differs: approximately 40% female and 60% male.

Concerning moral competence data, the mean total C-score obtained was 11.4 (9.6 standard deviation) in medicine, 14 (10.5 standard deviation) in law and 16 (10.3 standard deviation) in civil engineering. The Kruskal-Wallis test for independent samples revealed that this difference is statistically significant ($p<0.05$). The differences observed were between medicine and law, and medicine and civil engineering, but not between law and civil engineering.

The scores of the three MCT-xt dilemmas were also tested separately, revealing significant differences between the courses, as in the total score. Considering only the worker's dilemma, a notable difference was found between

medicine and civil engineering, with scores of 38.4 in medicine, 44.3 in civil engineering and 38.8 in law.

Regarding the physician's dilemma, there was a statistically significant difference between medicine and law, with scores of 22.8 in medicine, 27.4 in law and 25.7 in civil engineering. For the judge's dilemma, statistically relevant differences were observed between medicine and civil engineering, and between law and civil engineering, with scores of 28.9 in medicine, 29.2 in law and 37 in civil engineering.

Two aspects are noteworthy in these outcomes. One relates to Lind's proposal [8,9] of classifying scores as low, medium or high, considering only the worker's and physician's dilemmas. In most studies, especially those outside Brazil, only these two dilemmas are considered, for the phenomenon of segmentation between dilemmas (very different results between them) has been especially studied in Brazil, such as by Von Rondon [14], Serodio [15] and Oliveira [16].

The results of this study, considering only the worker's and physician's dilemmas, were as follows: 14.6 in medicine, 18.1 in law and 19.8 in civil engineering. According to Lind's classification [8,9], previously explained, they are all in the low moral competence range (10-19.9).

Based on these findings, it is evident that regardless of the course, students show low moral competence, whether in all three dilemmas or only in the worker's and physician's.

This result corroborates findings from similar studies. Granfield and Koenig [17] argue that law school does not adequately prepare young lawyers for recurring conflicts arising from *being a moral human while defending the ethical obligations associated with the legal profession*. In medicine, Pedraza-Chávez and Pérez-Ramírez [18] observed that only 10% of students fit into the high and very high ranges of moral competence.

Although all courses showed low moral competence, it was observed that medical students exhibit the lowest results. This outcome is found in several other studies, such as those by Bataglia, Schillinger and Lind [12], Pacca and collaborators [19] and Feitosa and collaborators [10], among others.

The hypothesis to explain this is the strong influence of medical culture in education and the gap between medical training and a more humanized approach. Feitosa and collaborators argue that *while the medical profession probably requires more morally competent professionals than any other occupation, medical students are basically trained to develop the necessary technical skills of the profession rather than moral competence* [10].

Another point to be addressed relates to agreement with the dilemmas. It was found that medical students show greater disagreement with the physician's dilemma while law students disagree more with the judge's dilemma. In analyzing Kohlberg's work, Bataglia [2] concludes that the acquisition of moral competence occurs throughout an individual's development and is influenced by intellectual, social and educational factors.

In this context, it is assumed that the academic milieu to which students belong influences their judgment regarding dilemmas specific to their respective fields. Among medical students, there is the belief that if death is not prevented by the physician, the prescribed treatment was wrong [20]. Therefore, death is no longer a natural phenomenon but rather an external matter, and medicine a means of fighting it [21].

That is why euthanasia is more strongly opposed in this group. Furthermore, according to Article 41 of the Brazilian Code of Medical Ethics [22], physicians are prohibited from hastening a patient's death and such a behavior is considered intentional homicide under Article 121 of the Brazilian Penal Code [23], which may also influence students in this field.

Regarding law students' disagreement with the judge's dilemma, the Law School Curriculum Standards [24] include constitutional law as part of the curriculum, which covers the Federal Constitution, including the inviolability of the right to life, equality and security, all of which are violated in cases of torture, as in the dilemma. In addition, textbooks typically studied in law school also discuss and condemn torture, such as those by Agamben [25], who argues that emergency measures used to save the Constitution might spell its demise, as the state of exception could become the norm, which is not ideal.

Although students tend to be more critical within their fields of study, medical students performed the poorest in the physician's dilemma while law students showed the lowest moral competence in the judge's dilemma. That is because the C-score measures the extent to which a subject's judgment on for and against arguments is determined by moral viewpoints rather than opinions [26]. In this sense, given that medical and law students hold stronger opinions regarding euthanasia and torture, they probably judged the arguments according to their own convictions rather than the quality of the arguments.

Lastly, the courses were compared internally considering all three dilemmas, according to age, gender and course cycle. Table 2 summarizes the total C-scores of this breakdown. The 22.8 years mean age was used as a cutoff to divide the groups by age, categorizing students as either above or below that figure. Gender was categorized as female, male or other. Regarding course cycle, the last two years of undergraduate studies were considered internship, while the first three years of civil engineering and law and the first four years of medicine were classified as instruction.

Table 2. Total C-score considering all three dilemmas, according to age, gender and course cycle.

Overall							
Overall	**Age (years)**		**Cycle**		**Gender**		
	18-22	>22	Instruction	Internship	Female	Male	Other
13.1	14.2	11.8	13.1	13.2	13.6	12.6	11.1
Medicine							
Overall	**Age (years)**		**Cycle**		**Gender**		
	18-22	>22	Instruction (1st-8th term)	Internship (9th-12th term)	Female	Male	Other
11.4	12	11	11.2	11.9	12.2	10.5	5.7
Law							
Overall	**Age (years)**		**Cycle**		**Gender**		
	18-22	>22	Instruction (1st-6th term)	Internship (7th-10th term)	Female	Male	Other
14.0	14.7	12.8	14.7	13.1	14.3	13.7	14.8
Civil engineering							
Overall	**Age (years)**		**Cycle**		**Gender**		
	18-22	>22	Instruction (1st-6th term)	Internship (7th-10th term)	Female	Male	Other
16.0	16.4	14.6	15.5	17	17.5	15	–

The data show that there are no significant differences between the instruction and internship cycles in the three courses (law, p=0.171; civil engineering, p=0.261; medicine, p=0.498). This suggests that the courses did not contribute significantly to the development of moral competence. Regarding gender, there was a significant difference in the medicine course, with higher scores for women than men, and no relevant difference in the law and civil engineering courses. Finally, with regard to age, there were no significant differences in the three courses.

Since Lind [8] first published his proposal, studies using the MCT-xt have not aimed to establish a hierarchy or ranking among students or courses.

It should be noted that the proposal to measure moral competence evaluates a group or society with the purpose of improving social interaction. Higher education should be able to train professionals who are competent both technically and ethically, capable of moral reflection and agency. Therefore, an association was expected between length of undergraduate studies and higher moral competence.

The study's limitations should be mentioned. Medical students were more numerous in the sample compared to students from the other courses, as were students in the instruction cycle compared to internship. Therefore, it would be interesting to expand the sample size in future studies to include more students and institutions.

There are many variables involved in the acquisition of moral competence and in the stages, such as socioeconomic and cultural factors, life experiences and illness. Therefore, while university education is a significant influence, it may not fully account for the moral background of students. Nevertheless, this study is unique for being the first to evaluate the most representative courses in the fields of humanities, exact sciences and health in global literature.

Final considerations

It was found that moral competence scores are low among students in the three undergraduate courses examined, with the lowest scores observed in medicine. There was no increase in moral competence throughout the courses, although it is desirable for education to stimulate moral development.

The results of this study are unprecedented, as there were no published studies in the global literature evaluating the most representative courses in the fields of humanities, exact sciences and health. The low moral competence found among law, civil engineering and medical students may result from a combination of variables, which are not exclusive to higher education but part of it. Therefore, even though these results cannot be solely attributed to undergraduate education, they may contribute to the development of moral competence.

These students and future professionals will provide essential services for the population. Hence, teaching strategies should be included in educational planning to stimulate their moral development, and further studies aimed at understanding this subject should be carried out.

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Leda Maria Borba Torchetto Lopes and Beatriz Marcomini Arantes drafted the pre-project, obtained the approvals, collected data and wrote the first draft. Patrícia Unger Raphael Bataglia contributed to the statistical analysis and discussion. Úrsula Bueno do Prado Guirro conceived the research subject, wrote and reviewed the final version and submitted the article for publication.

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