

<https://doi.org/10.23913/ride.v13i26.1425>

Artículos científicos

Competencia moral en estudiantes de tecnología y sus diferencias de género

Moral Competence in Technology Students and their Gender Differences

***Competência moral em estudantes de tecnologia e suas diferenças de
gênero***

Víctor Hugo Robles Francia

Universidad Juárez Autónoma de Tabasco, División Académica de Ciencias Económico-
Administrativas, México

vicrob13@yahoo.com.mx

<https://orcid.org/0000-0003-1046-4768>

Rosario del Carmen Suárez Jiménez

Universidad Juárez Autónoma de Tabasco, División Académica de Ciencias Económico-
Administrativas, México

rosariosuarez@ujat.mx

<https://orcid.org/0000-0003-4211-042X>

Lenin Martínez Pérez

Universidad Juárez Autónoma de Tabasco, División Académica de Ciencias Económico-
Administrativas, México

leninmartinez@outlook.com

<https://orcid.org/0000-0001-7656-1865>

Adriana Mariela de la Cruz Caballero

Tecnológico Nacional de México, Instituto Tecnológico Superior de Centla, México

adriana18100@hotmail.com

<https://orcid.org/0000-0001-7155-5204>

Resumen

El propósito del presente estudio fue identificar el nivel de competencia moral en los estudiantes de tecnologías y evaluar si existe una diferencia de género. El presente estudio tuvo un enfoque cuantitativo descriptivo; se ponderó el nivel de la competencia moral de los estudiantes de tecnologías. Debido a que se evaluó en un solo momento, fue transaccional y no experimental. Los participantes fueron 1389 estudiantes de ambos géneros: 738 mujeres y 651 hombres, voluntarios de una universidad tecnológica de Tabasco, México. El cuestionario aplicado para evaluar el juicio moral de los estudiantes fue el “Cuestionario moral emocional”, que evalúa el juicio moral a partir de la culpa y el orgullo. La competencia moral de los participantes arrojó un valor promedio de 32 % (DE = 20 %). Con respecto al género, la competencia moral en mujeres fue de 31.5 % y los hombres obtuvieron un valor de 32.8 %. Los resultados de este estudio hacen posible una evaluación eficaz sobre la actuación y competencia moral de los estudiantes de tecnología. Esta investigación es un precedente para nuevos estudios que permitan identificar el índice de competencia moral emocional de los individuos y con ello contribuir a la disminución de conductas no deseadas en los estudiantes.

Palabras claves: emociones, ética, universitarios.

Abstract

The purpose of this study was to identify the level of moral competence in technology students and to assess whether there is a gender difference. The present study had a descriptive quantitative approach, weighing the level of moral competence of technology students, because it was evaluated in a single moment, it was transactional and not experimental. The participants were 1389 students of both genders: 738 women and 651 men, volunteers from a technological university of Tabasco, Mexico. The questionnaire applied to assess the students' moral judgment was the Emotional Moral Test, which assesses moral judgment based on guilt and pride. The moral competence of the participants was found to have an average value of 32 % (SD = 20 %). Regarding gender, moral competence in women was 31.5 % and men reported a value of 32.8 %. The results of this study make possible an effective evaluation of the performance and moral competence of technology students. This research is a precedent for new studies that allow identifying the emotional moral competence

index of individuals and thereby contribute to the reduction of unwanted behaviors in students.

Keywords: emotions, ethics, university students.

Resumo

O objetivo deste estudo foi identificar o nível de competência moral em estudantes de tecnologia e avaliar se há diferença de gênero. O presente estudo teve abordagem quantitativa descritiva; o nível de competência moral dos estudantes de tecnologia foi ponderado. Por ter sido testado em um único ponto no tempo, era transaccional e não experimental. Os participantes foram 1.389 estudantes de ambos os sexos: 738 mulheres e 651 homens, voluntários de uma universidade tecnológica de Tabasco, México. O questionário aplicado para avaliar o julgamento moral dos alunos foi o "Emotional Moral Questionnaire", que avalia o julgamento moral baseado na culpa e no orgulho. A competência moral dos participantes rendeu um valor médio de 32% (DP = 20%). Em relação ao sexo, a competência moral nas mulheres foi de 31,5% e nos homens obteve um valor de 32,8%. Os resultados deste estudo possibilitam uma avaliação efetiva do desempenho e da competência moral dos estudantes de tecnologia. Esta pesquisa é um precedente para novos estudos que permitam identificar o índice de competência moral emocional dos indivíduos e, assim, contribuir para a redução de comportamentos indesejados nos alunos.

Palavras-chave: emoções, ética, universitários.

Fecha Recepción: Octubre 2022

Fecha Aceptación: Marzo 2023

Introduction

Valdés, Vázquez and Velasteguí (2018) and Inostroza, Santander and Severino (2020), among other authors, have asserted that moral competence is essential in the education of technologists. Hernández and Neri (2020) point out that technology training has typically been emphasized in the male gender and to a lesser extent in women. In this regard, Alfonso and Pino (2010) found that the moral competence of women is higher than that of men due to their greater emotionality. In fact, at the end of the 20th century and the beginning of this millennium, various researchers such as Etxeberria, Etxebarria and Urdaneta (2018) and Pinedo, Pacheco and Yáñez (2017) have discovered that emotions determine moral competence. Even these same authors, among others, have found a predominance of the

emotional part over the cognitive structure in the conformation of moral competence. In this sense, the objective of this research was to evaluate, from basic moral emotions, the moral competence in technology students and to observe if there are gender differences in them.

First of all, it is necessary to point out that the technological universities of Mexico aim to train useful professionals, capable of analyzing and solving problems in their environment (Secretaría de Educación Pública [SEP], 2000). In this way, technological education is oriented towards business practice, to linking its graduates with the labor needs of their region, in other words, positioning them at work with a regional company (Rosas and Mapén, 2016). However, in technological higher education they forget about socio-emotional competencies, especially one that refers to ethical action and performance, moral competence (Hernández and Neri, 2020).

In this sense, it is necessary to point out that in current times it is necessary to reconstruct technological education and human behavior with respect to moral action. That is, correct professional behavior must be predominant in current technological education, since, according to Méndez, Torres and Camatón (2018), actions and experiences in daily life are ethical issues. In this sense, Zeledón and Aguilar (2020) and Rodríguez, Pantoja and Salazar (2010) state that it is necessary to somehow perceive the moral rules and only then is it possible to assess whether a decision is morally correct or not.

In such a way that moral formation at the higher educational level, referring to Esteban, Mestre and Román (2019), can be conceived as the conquest of certain virtues: intellectual rigor, appreciation of authorized voices, honesty, veracity, commitment, respect, among others, that would be part of a morally adequate conduct (Esteban et al. 2019). Likewise, from this perspective, the norms and foundations of the development of people are addressed, including against violence, discrimination and in favor of gender equality (Alfonso and Pino, 2010).

The previous generalizations show the relevance of moral education on the training of technologists in Mexico, whose predominant model is based on competencies and, precisely, moral competency is what allows the individual to act, demonstrating a self-critical performance of their reality and the context. in which it develops from reflection, autonomy and future perspective of their actions in the moral sphere (Valdés et al., 2018; Ormart, Brunetti, Fernández & Esteva, 2013).

In order to establish a theoretical framework for the present empirical study, the cognitive and emotional precepts of moral and emotional psychology are specified. Some

contemporary authors such as Lindauer et al. (2020), Huhtala and Holma (2019) and Conejero, Apodaca, Pascual, Etxebarria and Ortiz (2019) have shown that the emotional structure is more dominant than the cognitive one in moral competence. Even that moral competence implies a sudden emotional reaction and a posteriori reasoning of the instantaneous emotional reaction (Mandler, 1990; Ruiz and Navarro, 2018). In fact, moral competence is defined as an excitation of the mind, gratifying or painful, that initially moves the human being to action and, in a second moment, to profuse and logical meditation on whether his action was good or wrong (Etxebarria et al., 2018).

Likewise, moral competence implies an evolution of moral emotions, painful as guilt, which Demos (2019) and Freud (2019) specify as the result of the effect of the anguish of punishment on the id carried out by the superego and the tensions between the anguish with the self, acting as a painful emotion. Thus, moral guilt is necessary for the author of the bad action and for the observer of that serious action, both for the actor to receive the sentence and for the observer to issue the guilty sentence (Orsi, 2006). Closely linked to guilt is moral horror, which Orsi (2006) exposes as the emotional response to a serious moral offense, something very bad that exhibits human degradation and that drives the observer to stop that reprehensible action. Although the observer's efforts may be in vain, even he will seek to repair the damage, apply justice or seek a punitive measure. (Orsi, 2006).

In addition, moral competence involves pleasant emotions such as pride, which Tracy, Mercadante, Witkower, and Cheng (2020) express as a pleasant sensation, which consciously recognizes the success achieved, something that exalts dignity (Kaufman, 1996; Tracy et al., 2020). Pride, as stated by Árdal (1989) and Tracy et al. (2020), it is pleasant, contrary to guilt, which is painful. Thus, moral emotions, such as guilt and pride, are emotions that dictate an approving or punitive self-assessment of the individual's self, forming positive or negative reinforcement, and that determine moral competence (Árdal, 1989; Sznycer, 2019; Tracy et al., 2020).

On the other hand, human biological growth implies less enjoyment and greater self-awareness of guilt (Mejía, 2002), where habituation to painful emotion can make any pleasant experience mean immense enjoyment, greater than in another person who is not involved. accustomed (Etxebarria et al., 2018). On the contrary, the individual will suffer immense pain if he is not used to suffering, which confirms that guilt and pride are the main motivators of moral competence (Demos, 2019; Illouz, 2009; Tracy et al., 2020).

In this way, moral competence, through its basic emotions of pride and guilt, moves people to respond under moral principles to the demands of their environment and to solve complex daily situations (Lind, 2008; Robles, 2019). Thus, six emotional moral phases of moral competence are established. The first is a utilitarian transaction in which the person avoids feeling the pain of guilt, seeking the pleasurable counterpart of pride. Phase two reflects the search for acceptance of the moral authority and, therefore, feel proud, or else avoid the guilt of not achieving it. In the third phase, the human being feels pleasure in complying with the group rules; he experiences pride of belonging or, conversely, guilt for not meeting expectations. In the fourth, individuals may feel guilty of breaking or proud of complying with social rules. The fifth phase is characterized by an emotional affectation, unpleasant or painful, due to the negative or favorable judgment of a minority. Finally, in phase six, the subject corrects moral principles, because his impulse moves him to feel a superior emotional self-perception, proud of himself. (Gray, 2008; Etxebarria *et al.*, 2018; Shi, 2009).

In such a way, since moral competence implies emotional states, the organic and social differences of men and women would establish emotional differences and, therefore, there would also be differences in their respective moral competence (Deng, Chang, Yang, Huo and Zhou, 2016). For example, Alfonso and Pino (2010) argue that, due to female sensitivity and greater emotionality, women can show greater moral competence compared to men. The role of the latter involves greater physical strength, a supposedly superior rationality and less emotionality, which could give rise to less moral competence compared to women.

In addition, Else-Quest, Higgins, Allison, and Morton (2012) and Kemp, Kennett-Hensel, and Kees (2013) state that women are more communicative and emotional than men. Also, that women express greater fears and that men are more controlled and physically manifest their anger more. This can even be observed despite the fact that internally or biologically their bodies react very similarly (Deng *et al.*, 2016).

In the same sense, Alfonso and Pino (2010) assert that moral mandates, what is correct and the rules, are not applied in the same way for women as for men in different societies, there are social sexual implications of moral behavior. For example, the rules are not applied nor is the moral behavior of a woman judged the same compared to that of a man in an underdeveloped and conservative country in the East as in a developed country in the West.

Finally, it should be considered that technological education is predominantly aimed at men. Hernández and Neri (2020) have found that, in the training of technologists, men register low levels of moral competence. Even Zamora, Sánchez and Hipólito (2016), Hummel, Pfaff and Rost (2018) and Barberá, Pifarré, Real and Esquerda (2015) find lower levels in the technological areas in relation to other areas. However, it is necessary to observe that these evaluations are made based on the conventional precept that moral competence is exclusively cognitive and does not consider any emotion (Robles, 2019).

In view of the previously argued, the need to analyze moral competence in technological education, to observe the gender difference in technology students and to evaluate their moral competence based on elementary emotions, it is reiterated that the purpose of this research was: to evaluate the level of moral competence in technology students through the basic moral emotions, guilt and pride, and to determine if the level of moral competence is the same between men and women.

Method

The present study had a descriptive quantitative approach. The level of moral competence of technology students was weighted and it was observed if there are gender differences between them. Also, because it was tested at a single point in time, it was transactional and not experimental.

Participants

The participants were 1,389 students of both genders: 738 women and 651 men, volunteers from a technological university in Tabasco, Mexico. The partners had an average age of over 21 years (21.07, SD =3.62), 66 students from the first year, 712 from the second, 74 from the fourth and 537 from the fifth.

Instrument

The instrument applied to assess moral competence based on the emotions of students in the technology area was the "Emotional Moral Test" (EMT) by Robles (2019), which tells the story of a young man, named Juan, who commits a crime. involuntary parricide and in self-defense. The EMT quantifies the Emotional Moral Competence Index (EMCI), in addition to the Horror, Guilt subindex (SI-Guilt) and the Pride subindex (SI-Pride) (Robles,

2019). The EMCI measures the consistency of the respondent's answers on a scale of zero to one. The theoretical and empirical validity of the EMT instrument, its EMCI index, as well as its SI-Guilt and SI-Pride subindices, has been demonstrated with an adult population of different ages and by a confirmatory factor analysis in six different populations of the republic. Mexican (Robles, 2019; Robles, 2021). Regarding the present population, the EMT yielded a reliability through the Cronbach's alpha statistic of 0.82, an acceptable value.

Statistic analysis

Descriptive statistics of the demographic data of the participants were calculated: age, gender, school year in attendance; as well as the EMT indices: EMCI, SI-Guilt, SI-Pride, in addition to the horror subindex and the six emotional phases. Additionally, the Kolmogorov-Smirnov normality test was performed. Then, to test the hypothesis, the Mann-Whitney U test was performed. The Statistical Package for the Social Sciences (SPSS) version 23 program was executed for the statistical analysis.

Ethical aspects

This research was developed in accordance with the ethical guidelines of the Institutional and National Research Committee. The informed consent of each participant was obtained, the information of the population was safeguarded, the scientific purpose was communicated to them and individualized reports were issued, when required. In addition, the Helsinki Declaration of 1964 and its consecutive rectifications were complied with.

Results

Through the descriptive analysis, the value of moral competence is shown through the average value of the EMCI of 32% (DE = 20%). The average of the SI-Guilt was 6.01 (DE = 2.38) and the SI-Pride was 5.02 (DE = 2.35) (Table 1).

Table 1. Descriptive statistics of horror, emotional phases, moral judgment and emotions of the participants

	Horror	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	SI-Guilt	SI-Pride	EMCI
Mean	7.40	5.68	5.82	5.56	5.18	5.13	5.74	6.01	5.02	0.32
SD	2.46	2.01	2.07	2.24	2.17	2.20	2.03	2.38	2.35	0.20

Source: Author's own elaboration

Descriptive analysis by gender

Table 2 shows that moral competence through the EMCI by gender was higher in the male, with a value of 32.8%, than in the female, where a value of 31.5% was obtained. Regarding the sub-indices, women obtained a SI-Guilt of 36.84% and a SI-Pride of 29.27%. In the case of the male gender, it obtained a value in the SI-Guilt of 35.22% and in the SI-Pride of 31.16%.

Table 2. Descriptive statistics by gender

Gender		H	S_ju_g	S_ju_p	Index E
Female	Mean	7.55	36.8428	29.2656	0.3149
	N	738	738	738	738
	SD	2.342	14.48453	13.91552	0.20579
Male	Mean	7.23	35.2243	31.1628	0.3279
	N	651	651	651	651
	SD	2.580	14.05173	14.29711	0.19921
Total	Mean	7.40	36.0842	30.1548	0.3210
	N	1389	1389	1389	1389
	SD	2.461	14.30103	14.12235	0.20277

Source: Author's own elaboration

Normality test

The normality distribution of the two gender groups with respect to the EMCI, SI-Guilt and SI-Pride was analyzed using the Kolmogorov-Smirnov test. This test gave values less than 0.05, which determines that they do not comply with normality (table 3).

Table 3. Normality test

	Gender	Kolmogorov-Smirnov ^a		
		Statistical	df	Sig.
EMCI	Female	0.069	738	0.000
	Male	0.066	651	0.000
SI- Guilt	Female	0.069	738	0.000
	Male	0.058	651	0.000
SI- Pride	Female	0.052	738	0.000
	Male	0.052	651	0.000
H	Female	0.353	738	0.000
	Male	0.334	651	0.000
Balance	Female	0.062	738	0.000
	Male	0.068	651	0.000

Source: Author's own elaboration

Consequently, the Mann-Whitney U test was performed for the EMCI, the SI-Guilt and the SI-Pride, and a p value > 0.05 (0.103) was obtained in the EMCI, so the null hypothesis is accepted: EMCI is the same in both groups.

In the case of SI- Guilt and SI- Pride, the null hypothesis was rejected, indicating that the subindices are not the same for both genders (table 4).

Table 4. Mann–Whitney U test

Null hypothesis	Test	Sig	Decision
EMCI is the same for both genders.	U. de Mann-Whitney	0.103	Accept the null hypothesis
SI-Guilt is the same for both genders.	U. de Mann-Whitney	0.030	Reject the null hypothesis
SI-Pride is the same for both genders.	U. de Mann-Whitney	0.012	Reject the null hypothesis

Source: Author's own elaboration

Discussion

Moral competence based on the basic moral emotions of men was slightly higher than that of women, which agrees with what was indicated by the classic studies by Piaget (1976) and Kohlberg (1964, 1968), although the hypothesis test accepted the null hypothesis of their equality. Therefore, the difference in moral competence between genders is not significant.

Likewise, the women expressed a higher level of guilt than the men, this inversely to the results of pride, where the males manifested higher levels than the females, therefore the null hypothesis of equality is rejected. This confirmed what was found by Rebege (2017), that young women show greater guilt than men of the same age. This also confirmed what Mejía (2002) argued, that the female role implies greater self-awareness of guilt in relation to males.

In relation to pride, an inverse behavior was observed regarding guilt, where men expressed greater pride than women. In this sense, it could be discussed, considering the results and what was argued by Deng et al. (2016), that gender differences depend on stimuli, such as the history of parricide and the items of the questionnaire applied, such as sensitive affectations regarding guilt and pride.

Finally, it is pertinent to point out that one of the limitations of this research is the type of population and the number of participants, that is, the students of a technological university in Tabasco, Mexico. Therefore, it cannot be generalized to other types of students, social sciences, humanities, art, among other types of educational institutions. Therefore, it is necessary to carry out more studies in different populations, such as workers and companies, to point out some important groups.

Conclusions

This study provided an evaluation of moral competence based on the emotions of guilt and pride in a population of more than a thousand technology students. It also made it possible to analyze the gender differences in the SI-Guilt and SI-Pride of the participants. Thus, it was observed that the emotional state drives each gender differently; in the case of women, a higher level was obtained in the SI-Guilt, and in the case of men, a higher level of pride was obtained.

The results of this study make possible an effective evaluation of the performance and moral competence of technology students based on moral emotions. An empirical study was shown on the role played by the emotions of guilt and pride in the moral competence of technology students, as well as their differentiated implications in gender.

With the above, it is expected to lay the foundations for new studies that allow the identification of moral competence through the emotions of individuals and thus contribute to the management of the behavior of individuals in different environments.

Contributions to future lines of research

Regarding future lines of research, this study is a precedent for the development of a methodology for carrying out interventions based on moral emotions that allow the improvement of moral competence in technologists or technology students and that can later be replicated in other professionals within various organizational settings.

Acknowledgment

To the National Council of Science and Technology (CONACYT) for supporting the author: Víctor Hugo Robles, in carrying out the postdoctoral stay at the Universidad Autónoma Metropolitana Azcapotzalco (UAM-A) for the development of the project "Intervention in moral-emotional health in the organization", from which the present manuscript derives.

To Dr. Nancy Fabiola Martínez Cervantes of the UAM-A for her guidance and advice on this manuscript.

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Rol de Contribución	Autor (es)
Conceptualización	Víctor Hugo Robles Francia
Metodología	Rosario del Carmen Suárez Jiménez.
Validación	Víctor Hugo Robles Francia
Análisis Formal	Rosario del Carmen Suárez Jiménez.
Investigación	Lenin Martínez Pérez.
Recursos	Lenin Martínez Pérez
Curación de datos	Adriana Mariela de la Cruz Caballero
Escritura - Preparación del borrador original	Víctor Hugo Robles Francia.
Escritura - Revisión y edición	Adriana Mariela de la Cruz Caballero.
Visualización	Rosario del Carmen Suárez Jiménez.
Supervisión	Lenin Martínez Pérez.
Administración de Proyectos	Víctor Hugo Robles Francia