

Personal Development and Growth of Medical Students in Mexico: A Longitudinal Study

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Abstract In response to the health care demands of an ever-changing society, medical schools have included personal development and growth in their curriculum as an essential competency in the training process of their students. The objective of this research was to investigate the development and personal growth using eleven scales of 103 medical students, during their school years starting in their second year till their internship. Descriptive, comparative and correlation analyses were performed. During the study, high scores were observed, although not necessarily the highest of each of the next scales: positive outlook of life, self-esteem, emotional self-knowledge, commitment, creativity, self-confidence, assertiveness and leadership, teamwork and social skills; as well as regular scores in resilience, empathy, self-criticism and heterocriticism. In addition, there were differences between the positive life perspective scores obtained by the students in fifth ($\bar{x}=17.39$, $SD \pm 2.75$) and seventh semester ($\bar{x}=17.06$, $SD \pm 2.49$), with an adjusted p of .044; as well as between the empathy scores obtained by males in the second year ($\bar{x}=8.97$, $SD 1.94$) and internship ($\bar{x}=9.95$, $SD \pm 1.45$), with adjusted p of .048. Women scored lower than men, with $p < .05$, in resilience (in fifth semester), self-confidence (fifth semester and internship), self-criticism and heterocriticism (internship), assertiveness and leadership (internship). Among most scales, statistically significant associations were found, from moderate to high; except in the case of emotional self-knowledge, where some correlations were low. To promote the development and personal growth of students, it is necessary to implement strategies that can be worked simultaneously during the learning process of the different subjects of the curriculum as part of the integral training of the students, which is expected to impact not only their academic performance but also their future professional and personal life.

Keywords: *personal development, personal growth, medical students*

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1. Introduction

To respond to the demands of health care in a rapidly evolving environment [1], medical schools have reformed their curriculum from the perspective of teaching by competencies, among which is usually included the development and personal growth that is vital in the process of training their students; yet this competency has been relatively neglected and, in an academic context with greater predominance of technology,

increasing knowledge and stressful pressures, it is possible that such neglect increases, which can contribute to various health problems and levels of deterioration during the student's training process and in their professional life [2].

Several countries have begun to evaluate aspects of students that account for their emotional and personal growth, as a starting point for the implementation of strategies that promote their comprehensive training. In the case of dental students, for example, it was observed that their self-confidence, self-control and motivation improved their overall academic performance; while their

social skills, empathy and motivation favored mainly their clinical performance [3].

In medical students, those with high levels of empathy have been found to report more personal achievement and professionalism in clinical learning [3,4], as well as less emotional exhaustion and depersonalization [4]. At an older age [5] and higher academic level [5,6], there is greater empathy. Women report more empathy than boys [5,7], as well as a significant increase in this characteristic as they advance school level while men do not [7].

Among the essential factors for the successful implementation of any learning program, student engagement is particularly essential [8]. Some researchers have reported that the medical student's academic commitment and performance can be favored by: using mobile learning devices with interactive exercises [9], working as a team [10], as well as developing skills to use and extend knowledge, maximizing opportunities in self-directed learning environments, developing a positive sense of self, employing assertive communication, and being resilient through peer collaboration [11].

Medical curricula in several countries also reflect their interest in developing leadership skills in their students, because of the impact this feature has on their academic and clinical performance, promoting activities that include: teamwork, resource management, service improvement, demonstration of personal qualities, advocacy of communities without health care, self-knowledge and self-care. With this, they have been developing in the students: qualities typical of doctors, such as leadership, self-knowledge, effective interpersonal relationships and adequate coordination of group activities [12,13].

Another aspect related to the personal growth of medical students is resilience. Those who report very high levels of it have been found to have lower depression and anxiety, as well as higher quality of life in general and in their academic life [14].

Some authors have simultaneously addressed the study of various aspects of the personal growth of medical students and have found low levels of development in their stress management (which includes characteristics such as their flexibility, tolerance to frustration and optimism), decision-making (including problem solving, testing reality and impulse control) and self-expression (emotional expression, independence and assertiveness); as well as moderate levels in their self-perception (self-esteem, self-realization and emotional self-knowledge) and interpersonal area (interpersonal relationships, empathy and social responsibility). They have also observed that freshmen have lower levels of emotional self-knowledge and empathy than those that are in their sixth year; as well as higher self-esteem, interpersonal relationships, problem solving and stress management specifically in stress tolerance and optimism, than those of the last year of school [6].

In Mexico, the competency model is based on the holistic pedagogical current that, in addition to defining the knowledge, skills, attitudes and values of medicine, it emphasizes the expansion of the attributes that stimulate the development of communication and ethics capabilities with an attitude of continuous improvement [15].

Although the curriculum of the Faculty of Medicine where this research was carried out includes the

development and personal growth among its competencies, this is hardly reflected in educational practice. As a first step, it is necessary to evaluate the student's personal growth throughout the career, which will allow to define what kind of strategies are required to work on each school year to promote their integral development. Therefore, the purpose of this research was to know the development and personal growth of medical students from the second year all the way to their internship.

2. Method

2.1. Design and Participants

Five-year longitudinal study, with a sample of 103 medical students (63.1% women) at a public university in Mexico, from the second year of their medical studies until their internship. The preponderance of females observed in the sample, reflected the female/male ratio in that moment, overall in this medical school.

2.2. Instruments

In order to assess the development and personal growth of medical students, a questionnaire was applied that included eleven scales designed and validated in the first phase of this research [16]. The response options of the original version of each instrument were reduced from five to four, leaving a Likert scale as follows: 1=*never*, 2=*almost never*, 3=*almost always* and 4=*always*. The following is each instrument scale with its conceptual definition, as well as the number of items and psychometric characteristics obtained in its new version.

Self-esteem. It refers to the person's assessment of himself. This scale consists of seven items, with an $\alpha=.75$ and 40.2% of total variance explained.

Emotional self-knowledge. Awareness that the individual has about his own feelings and emotions. It contains three items, with an $\alpha=.76$ and 68% of explained variance.

Commitment. The ability of the person to consistently manage himself in his personal and academic activities and improve them; it also refers to the attitudes and behaviors reflected in the achievement of his goals. It comprises six items, with an $\alpha=.75$ and 45.3% of explained variance.

Creativity. The ability of the individual to seek novel solutions and manage himself with effective spontaneity in the face of the situations presented to him. It consists of five items, with an $\alpha=.65$ and 42.4% of explained variance.

Resilience. A person's ability to face problems that affect him or her personally and recover from the emotional conflicts that arise. It includes two items, with an $\alpha=.79$ and 82.7% of explained variance.

Self-criticism and heterocriticism. Flexibility shown by the individual in evaluating their perspectives, activities and emotions to handle themselves more objectively; considering, when the case warrants it, the opinions of others. It comprises four items, with an $\alpha=.63$ and 47.3% of explained variance.

Positive outlook in life. The individual's ability to show a favorable attitude to the various situations of life and act

accordingly. Consists of five items, with an $\alpha=.73$ and 49.1% of explained variance.

Self-confidence. Convincement that one is able to successfully perform a task or choose the right approach to solve a problem. It contains seven items, with an $\alpha=.75$ and 54.8% of explained variance.

Assertiveness and leadership. First it is related to the person's ability to express his or her feelings, desires and opinions, as well as to assert his rights, directly, firmly and honestly; without undermining the feelings, desires, opinions and rights of others. The second has to do with the individual's ability to lead others. It comprises of nine items, with an $\alpha=.71$ and 43.5% of explained variance.

Empathy. Ability to recognize and understand the feelings, needs, and desires of others. It is formed by three items, with an $\alpha=.71$ and 63.6% of explained variance.

Teamwork and social skills. It is the ability of a person to interact harmoniously with others in carrying out productive activities. It contains ten items, with an $\alpha=.82$ and 49% of explained variance.

2.3. Procedure

The longitudinal study began in 2014, with a sample of 119 second-year medical students, who agreed to participate. The first application of measuring instruments was in the classroom. Of the initial participants, 16 (11 women and 5 men) were eliminated because one or more of the scales were not fully answered, on one or even two of the five occasions on which they were applied. The sample for this investigation was eventually constituted by 103 students.

The curriculum of the medical degree is carried out in two modalities: (1) basic and sociomedical education for the first two years and is taught annually (first and second year), because most of its subjects require this period to cover its thematic contents directly at the university; and (2) the clinical teaching (from the fifth to the ninth semester), where the contents are taught in a semi-annual context, sufficient time considered to address them. It should be clarified that the fifth semester is considered a level of transition between the two types of education, while the following four are clinical. The internship is again an annual event.

The eleven scales were applied five occasions. The first, as mentioned before, took place in the classroom, in the middle of the second year of the career. The following applications were carried out in hospitals where students were assigned; generally, towards the end of each semester and internship.

As suggest by Loue [17], in each of the applications, students were reminded verbally and in writing about the nature of the study, the confidential management of their data and that their participation was voluntary.

2.4. Statistical Analysis

The descriptive analysis of the scores of the eleven scales of development and personal growth obtained by the students (both from the general sample, and of that of women and men separately) was carried out during the five periods studied, through the calculation of their means and standard deviations.

Comparative analysis of the scores of each scale was also carried out by: (a) *sex*, with the Mann-Whitney U test, in cases where the data were not normally distributed, and Student's t test when this condition was presented; and (b) *school year* (of the sample, in general, as well as women and men, in particular), through the Friedman test, when the distribution of the data was not normal, and with the Repeated Measures Anova test, when it was; in both cases, two-dimensional analysis and p-value adjustment was performed through the Bonferroni post hoc test.

Finally, the correlation analysis of the scores obtained by the students (both the general sample, and the women and men separately) was carried out on each scale, during the five periods studied, through the calculation of Spearman's correlation coefficient.

In all analyses, the scores obtained by students on each scale are reported with means and their corresponding standard deviations, rather than using medians, because the former allow to review some results more accurately than the latter.

3. Results

3.1. Descriptive Analysis

3.1.1. General

After performing the descriptive analysis of the personal growth of our total sample, it was found that, while most of the average scores of the scales applied varied from one school year to another (Table 1), these differences were not statistically significant, except in the case of positive life perspective, as detailed below in the section on comparative by school grades in general.

The highest positive outlook scores on life were seen in the second year and the fifth semester; in the latter it was also found the highest scores of commitment, resilience, self-confidence, teamwork and social skills. Meanwhile, in the ninth semester the highest scores were of self-esteem, emotional self-knowledge and creativity; and during their internship, those of self-criticism and heterocriticism, assertiveness and leadership, as well as empathy were most noticeable (Table 1).

On the other hand, the lowest scores were found in the second year, in creativity, resilience, self-criticism and heterocriticism, as well as in teamwork and social skills; in the fifth semester the lowest levels of empathy were observed; in the seventh semester, the emotional self-knowledge, commitment, assertiveness and leadership, as well as resilience again were at the lowest; finally, during the internship, the lowest scores of self-esteem, positive outlook on life and self-confidence were present (Table 1).

Regardless of the fluctuations in the scores of each scale over the years of study, except in the case of resilience, empathy, self-criticism and heterocriticism, which presented regular levels of development at different times evaluated; the other aspects of students' personal growth maintained throughout the research scores that can be considered within a high range, without reaching the maximum score of each instrument used (Table 1).

Table 1. Personal development and growth of medical students during the five school grades studied (n=103)

Scale	Grade of school in which the scale was applied									
	2nd year		5th Semester		7th Semester		9th Semester		Internship	
	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD
Self-esteem (7-28)	23.74	2.94	23.83	3.44	23.82	3.28	24.11	3.46	23.71	3.21
Emotional self-knowledge (3-12)	10.41	1.65	10.52	1.71	10.37	1.60	10.66	1.61	10.49	1.72
Commitment (6-24)	19.61	2.50	19.95	3.01	19.41	3.14	19.78	2.87	19.83	2.65
Creativity (5-20)	16.17	2.24	16.25	2.57	16.26	2.40	16.49	2.52	16.39	2.43
Resilience (2-8)	6.17	1.35	6.37	1.34	6.17	1.30	6.29	1.47	6.25	1.38
Self-criticism and heterocriticism (4-16)	13.32	1.86	13.36	2.00	13.38	1.78	13.40	1.83	13.42	1.84
Positive outlook on life (5-20)	17.39	2.44	17.39	2.75	17.06	2.49	17.09	2.59	16.79	2.74
Self-confidence (7-28)	23.88	3.01	23.92	3.74	23.72	2.96	23.90	3.33	23.64	3.28
Assertiveness and leadership (9-36)	29.36	3.80	29.26	4.25	29.06	3.90	29.48	4.17	29.64	3.73
Empathy (3-12)	9.32	1.89	9.23	1.98	9.56	1.71	9.74	1.89	9.77	1.61
Teamwork and social skills (10-40)	32.10	4.55	32.76	4.85	32.34	4.68	32.20	5.01	32.67	4.57

The figures in parentheses, next to each scale, correspond to the range of scores (minimum-maximum) that the student can obtain on that instrument.

3.1.2. Women and Men

In carrying out the descriptive analysis of the personal growth of women and men separately, it was found in both groups that, although most of the average scores of the scales used varied from one

school year to another (Table 2), these differences were not statistically significant; except in the case of empathy in males, as specified below in the section on comparison by school year in women and men separately.

Table 2. Personal development and growth of women and men during their five school years

SEX Scale	Grade of school in which the scale was applied									
	2nd year		5th Semester		7th Semester		9th Semester		Internship	
	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD
WOMEN (n=65)										
Self-esteem (7-28)	23.75	2.92	23.37	3.44	23.65	3.30	24.12	3.02	23.46	3.51
Emotional self-knowledge (3-12)	10.45	1.58	10.32	1.80	10.42	1.59	10.80	1.65	10.45	1.88
Commitment (6-24)	19.98	2.26	19.92	2.76	19.43	3.10	19.98	2.62	19.65	2.78
Creativity (5-20)	16.09	2.10	16.05	2.48	16.12	2.26	16.42	2.01	16.06	2.58
Resilience (2-8)	6.03	1.37	6.15	1.38	6.03	1.31	6.22	1.41	6.15	1.49
Self-criticism and heterocriticism (4-16)	13.20	1.94	13.06	2.14	13.26	1.81	13.22	1.76	13.17	1.78
Positive outlook on life (5-20)	17.22	2.39	17.18	2.59	16.92	2.39	16.98	2.36	16.57	2.88
Self-confidence (7-28)	23.80	2.93	23.40	3.75	23.57	2.96	23.82	3.05	23.11	3.42
Assertiveness and leadership (9-36)	28.94	4.02	28.88	4.47	29.00	3.89	29.54	4.02	29.06	4.03
Empathy (3-12)	9.52	1.85	9.37	1.93	9.69	1.73	9.80	1.79	9.66	1.70
Teamwork and social skills (10-40)	31.77	4.39	32.25	4.91	32.31	4.55	32.05	4.94	32.43	4.86
MEN (n=38)										
Self-esteem (7-28)	23.71	3.01	24.63	3.35	24.11	3.27	24.08	4.14	24.13	2.61
Emotional self-knowledge (3-12)	10.34	1.79	10.87	1.51	10.29	1.64	10.42	1.52	10.55	1.43
Commitment (6-24)	18.97	2.78	20.00	3.43	19.37	3.24	19.42	3.24	20.13	2.44
Creativity (5-20)	16.32	2.48	16.61	2.72	16.50	2.64	16.61	3.23	16.95	2.08
Resilience (2-8)	6.42	1.31	6.74	1.18	6.39	1.26	6.42	1.59	6.42	1.15
Self-criticism and heterocriticism (4-16)	13.53	1.74	13.87	1.63	13.58	1.72	13.71	1.92	13.84	1.90
Positive outlook on life (5-20)	17.68	2.52	17.74	3.02	17.29	2.66	17.26	2.97	17.16	2.48
Self-confidence (7-28)	24.03	3.17	24.82	3.59	23.97	2.97	24.05	3.81	24.55	2.83
Assertiveness and leadership (9-36)	30.08	3.32	29.92	3.83	29.16	3.97	29.37	4.46	30.63	2.95
Empathy (3-12)	8.97	1.94	9.00	2.05	9.34	1.68	9.63	2.07	9.95	1.45
Teamwork and social skills (10-40)	32.66	4.83	33.63	4.69	32.39	4.96	32.47	5.19	33.08	4.04

The figures in parentheses, next to each scale, correspond to the range of scores (minimum-maximum) that the student can obtain on that instrument.

In the case of women, the highest positive outlook scores of life and commitment were observed in the second year; self-criticism and heterocriticism, in the seventh semester; of self-esteem, emotional self-knowledge, commitment, creativity, resilience, self-confidence, empathy, assertiveness and leadership, in the ninth semester; and of teamwork and social skills, in the internship. While the lowest scores for resilience, teamwork and social skills were found in the second year; and the lowest scores in self-esteem, emotional self-knowledge, creativity, empathy, self-criticism and heterocriticism, as well as assertiveness and leadership, were present in the fifth semester; commitment and resilience were down in the seventh semester; and the positive perspective of life and self-confidence, during their internship (Table 2).

As for males, the highest positive life perspective scores, self-esteem, emotional self-knowledge, resilience, self-criticism and heterocriticism, self-confidence, as well as teamwork and social skills, were entered in the fifth semester; and commitment, creativity, empathy, assertiveness and leadership, during their internship. On the contrary, the lowest scores of self-esteem, commitment, creativity, empathy, self-criticism and heterocriticism was observed during the second year; and emotional self-knowledge, resilience, self-confidence, assertiveness and leadership, as well as teamwork and social skills, was observed in the seventh semester; and the positive outlook on life, during their internship (Table 2).

As in the general sample description, regardless of the fluctuations in the scores of each scale over the years of study, except in the case of resilience, empathy, self-criticism and heterocriticism, which presented regular levels of development at different times evaluated; the other aspects of the personal growth of both groups maintained throughout the research scores that can be considered within a high range, without reaching the maximum score of each instrument applied (Table 2).

3.2. Comparative Analysis

3.2.1. By School Year: Global

By conducting the comparative analysis of the scores obtained by the students on each of the scales by school grade, only statistical significance was found in a positive outlook on life, as mentioned above. Initially, the scores of the five school cycles studied were compared, using the Friedman test. Although a statistically significant difference was identified ($\chi^2=10.04$, $p=.040$), when

performing two-dimensional analysis with the Bonferroni test, none of the comparatives per pair obtained an adjusted p equal to or less than .05. Comparatives of all combinations of this variable were then run, first with four school grades and then with three, in which statistical significance was obtained in the Friedman test, but not in the two-dimensional analysis when applying the Bonferroni test. Finally, by comparing the scores of semesters five and seven, as well as internship ($\chi^2=9.40$, $p=.009$), and performing the two-dimensional analysis, a difference was found between the scores obtained by the students on the positive outlook scale of life in fifth ($\bar{x}=17.39$, $SD \pm 2.75$) and seventh semester ($\bar{x}=17.06$, $SD \pm 2.49$), with an adjusted p of .044.

3.2.2. By School Year: Women and Men Separately

Regarding the comparative analysis of each of the scales by school year of women and men separately, there were no differences with statistical significance in women; whereas, in the case of males, only significant difference in empathy was observed. Like the general analysis mentioned in the previous paragraph, this one compared the empathy scores obtained by men in the five school cycles investigated, using the Friedman test. Although a statistically significant difference was identified ($\chi^2=10.87$, $p=.028$), when performing the two-dimensional analysis with the Bonferroni test, none of the comparatives per pair obtained an adjusted p equal to or less than .05. Comparatives of all combinations of this variable were then carried out, first with four school grades and then with three, where statistical significance was obtained in the Friedman test, but not in two-dimensional analysis when applying the Bonferroni test. After comparing the second year, seventh semester, as well as internship scores ($\chi^2=7.79$, $p=.020$), and run the two-dimensional analysis, a difference was observed between the scores obtained by the students on the empathy scale in the second year ($\bar{x}=8.97$, $SD \pm 1.94$) and during internship ($\bar{x}=9.95$, $SD \pm 1.45$), with an adjusted p of .048.

3.2.3. By Sex

After conducting the comparative analysis by sex of the eleven scales, during the five school years, statistically significant differences were observed in the fifth semester in the scales of resilience and self-confidence; as well as during internship, in self-criticism and heterocriticism, self-confidence, assertiveness and leadership. In all these cases, women had lower scores than men (Table 3).

Table 3. Comparative by sex of students' development and personal growth during the five school grades studied (n-103)

SCHOOL GRADE Scale	Women (n=65)		Men (n=38)		Test statistic	p
	\bar{x}	SD	\bar{x}	SD		
FIFTH SEMESTER						
Resilience	6.15	1.38	6.74	1.18	-2.13 ^a	.034
Self-confidence	23.40	3.75	24.82	3.59	-2.14 ^a	.032
INTERNSHIP						
Self-criticism and heterocriticism	13.17	1.78	13.84	1.90	-2.17 ^a	.030
Self-confidence	23.11	3.42	24.55	2.83	-2.20 ^b	.030
Assertiveness and leadership	29.06	4.03	30.63	2.95	-2.10 ^b	.039

a) Mann-Whitney's U test was used, and the reported test statistic is Z.

b) Student t-test was used, and the t value is reported.

Table 4. Correlations between scales of personal development and growth during the study

SCALE 1 Scale 2	School year ^a														
	2nd year			5th semester			7th semester			9th semester			Internship		
	G	W	M	G	W	M	G	W	M	G	W	M	G	W	M
SELF-ESTEEM															
Teamwork and social abilities	.70	.73	.62	.79	.75	.78	.70	.67	.74	.75	.69	.86	.79	.78	.75
Empathy	.54	.63	.43	.52	.52	.59	.50	.46	.58	.56	.44	.72	.52	.49	.57
Assertiveness and leadership	.57	.62	.44	.66	.68	.58	.64	.68	.56	.71	.57	.90	.75	.76	.69
Self-confidence	.77	.81	.63	.85	.83	.80	.83	.84	.81	.84	.81	.86	.84	.88	.79
Positive outlook on life	.84	.84	.83	.83	.80	.82	.75	.71	.79	.76	.71	.77	.84	.82	.86
Self-criticism and heterocriticism	.62	.66	.54	.70	.71	.62	.61	.60	.61	.60	.55	.67	.65	.59	.80
Resilience	.59	.68	.38	.71	.68	.75	.56	.53	.63	.52	.39	.69	.65	.69	.51
Creativity	.77	.80	.69	.79	.79	.71	.78	.76	.80	.68	.58	.76	.83	.83	.82
Commitment	.76	.78	.78	.71	.74	.65	.78	.81	.72	.68	.55	.88	.76	.76	.73
Emotional self-knowledge	.37	.44	.24	.44	.43	.37	.60	.61	.59	.45	.35	.60	.42	.44	.34
EMOTIONAL SELF-KNOWLEDGE															
Teamwork and social abilities	.32	.30	.42	.41	.39	.41	.39	.34	.47	.35	.22	.57	.46	.51	.37
Empathy	---	---	---	.21	---	---	.36	.27	.52	.46	.38	.58	.36	.31	.48
Assertiveness and leadership	.39	.43	.35	.52	.55	.47	.55	.48	.68	.47	.31	.67	.46	.52	.38
Self-confidence	.39	.48	---	.49	.48	.43	.54	.52	.55	.51	.45	.63	.44	.50	.39
Positive outlook on life	.24	.34	---	.45	.38	.51	.46	.45	.49	.35	.31	.42	.35	.38	---
Self-criticism and heterocriticism	.36	.30	.45	.38	.40	---	.49	.45	.56	.37	.26	.61	.44	.50	.47
Resilience	.28	.23	.35	.31	.29	---	.40	.34	.52	.37	.29	.53	.43	.42	.44
Creativity	.36	.37	.35	.39	.37	.39	.54	.50	.62	.47	.37	.65	.41	.41	.46
Commitment	.23	.28	---	.37	.42	---	.55	.60	.48	.46	.30	.60	.41	.44	.34
COMMITMENT															
Teamwork and social abilities	.53	.61	.45	.67	.63	.69	.55	.53	.55	.62	.48	.84	.73	.71	.77
Empathy	.51	.56	.42	.53	.40	.71	.53	.53	.57	.53	.40	.70	.44	.46	.37
Assertiveness and leadership	.41	.48	.36	.61	.59	.63	.57	.65	.45	.65	.45	.87	.62	.67	.52
Self-confidence	.61	.72	.50	.75	.73	.78	.66	.65	.65	.65	.59	.80	.71	.79	.58
Positive outlook on life	.61	.64	.64	.73	.78	.67	.69	.70	.65	.60	.59	.67	.71	.70	.72
Self-criticism and heterocriticism	.53	.58	.50	.59	.56	.62	.49	.50	.43	.49	.36	.72	.51	.55	.46
Resilience	.41	.57	---	.60	.64	.54	.58	.56	.62	.46	.32	.68	.61	.66	.49
Creativity	.59	.65	.56	.65	.62	.60	.67	.67	.67	.63	.55	.76	.72	.77	.60
CREATIVITY															
Teamwork and social abilities	.70	.67	.70	.74	.71	.74	.73	.73	.72	.72	.66	.82	.79	.85	.66
Empathy	.58	.63	.55	.52	.53	.52	.59	.61	.58	.66	.56	.80	.55	.57	.51
Assertiveness and leadership	.66	.61	.73	.72	.69	.72	.64	.62	.69	.69	.61	.81	.77	.78	.74
Self-confidence	.78	.81	.72	.81	.79	.76	.77	.79	.73	.75	.69	.83	.80	.84	.71
Positive outlook on life	.73	.77	.64	.72	.68	.68	.64	.63	.61	.72	.64	.79	.75	.75	.75
Self-criticism and heterocriticism	.64	.62	.68	.68	.71	.57	.66	.72	.54	.57	.53	.63	.64	.60	.71
Resilience	.55	.58	.49	.65	.64	.59	.51	.51	.49	.57	.44	.70	.61	.71	.42
RESILIENCE															
Teamwork and social abilities	.61	.51	.69	.70	.67	.72	.50	.45	.58	.61	.53	.73	.65	.71	.53
Empathy	.41	.39	.52	.54	.58	.58	.46	.47	.50	.57	.42	.80	.41	.42	.39
Assertiveness and leadership	.41	.26	.62	.53	.53	.51	.44	.49	.40	.53	.44	.70	.64	.70	.55
Self-confidence	.58	.59	.55	.71	.68	.71	.55	.51	.62	.61	.48	.77	.66	.72	.58
Positive outlook on life	.64	.73	.46	.64	.63	.57	.62	.58	.68	.63	.60	.66	.58	.66	.43
Self-criticism and heterocriticism	.52	.46	.60	.64	.63	.63	.55	.54	.49	.41	.41	.41	.50	.58	.43
SELF-CRITICISM & HETEROCRITICISM															
Teamwork and social abilities	.61	.56	.69	.79	.80	.80	.61	.72	.44	.56	.55	.62	.59	.62	.56
Empathy	.51	.49	.60	.60	.58	.73	.53	.62	.36	.60	.66	.54	.46	.44	.49
Assertiveness and leadership	.62	.60	.66	.67	.70	.64	.53	.55	.49	.69	.64	.75	.64	.68	.54
Self-confidence	.65	.67	.64	.73	.76	.70	.60	.58	.63	.60	.56	.66	.58	.58	.56
Positive outlook on life	.63	.64	.59	.67	.71	.57	.57	.57	.55	.49	.45	.50	.59	.55	.66
POSITIVE OUTLOOK ON LIFE															
Teamwork and social abilities	.66	.66	.63	.77	.78	.71	.63	.61	.59	.74	.76	.71	.75	.75	.72
Empathy	.44	.51	.37	.52	.49	.58	.49	.49	.50	.55	.43	.70	.43	.38	.50
Assertiveness and leadership	.49	.48	.47	.62	.61	.59	.52	.56	.44	.55	.47	.70	.65	.70	.55
Self-confidence	.73	.77	.65	.79	.75	.76	.72	.72	.72	.74	.76	.72	.74	.79	.66
SELF-CONFIDENCE															
Teamwork and social abilities	.68	.63	.72	.77	.77	.73	.61	.69	.50	.79	.77	.87	.75	.83	.63
Empathy	.49	.50	.52	.55	.54	.64	.46	.43	.54	.61	.51	.75	.53	.52	.57
Assertiveness and leadership	.66	.68	.61	.68	.66	.70	.63	.72	.48	.74	.65	.88	.76	.81	.64
ASSERTIVENESS & LEADERSHIP															
Teamwork and social abilities	.63	.56	.70	.73	.74	.70	.62	.67	.57	.69	.61	.84	.77	.80	.72
Empathy	.42	.40	.51	.49	.44	.60	.63	.59	.71	.63	.54	.73	.52	.50	.56
EMPATHY															
Teamwork and social abilities	.56	.60	.54	.63	.62	.71	.56	.56	.57	.67	.56	.82	.56	.58	.48

a) Spearman's correlation coefficient is reported in each grade, with $p=05$, among the scores obtained by students at the scales listed in the Scale 1 and Scale 2 columns; except cases without statistical significance, which appear with hyphens.

G=correlation between the scores of the scales obtained by the general sample (n-103); W=correlation between the scores of the scales obtained by women (n-65); M=correlation between the scores of the scales obtained by men (n-38).

3.3. Correlation Analysis

As a result of the correlation analysis between the scores of the eleven scales obtained by students in general, as well as women and men in particular, during the five school years studied; for the most part, moderate and high correlations with statistical significance between the scales were found, not only in the same year of application, but between the different times at which they were applied. Here we report and analyze the correlations between scales in the same year of application (Table 4) that, in general terms, obtained the highest correlation coefficients of the entire analysis and reflect the same trend as the associations found in the correlation analysis of scales in all their applications.

Table 4 shows that, as mentioned in the previous paragraph, the scales largely had moderate to high correlations. Low associations in general sample or only in women or men were found mainly in the second year and in the fifth semester, between emotional self-knowledge and scales of empathy, resilience, commitment, positive outlook of life, self-esteem, teamwork and social skills; as well as between resilience and self-esteem scales (in women), and between resilience and assertiveness and leadership scales (for males), in the second year.

4. Discussion and Conclusions

The purpose of this study was to investigate the personal development and growth of medical students at different times in their training. To do this, in the first phase of the research, it was necessary to define which aspects accounted for this competency, so eleven scales were designed to be able to investigate them and to assess their psychometric characteristics [16]. In a second moment, adaptations were made to the eleven scales generated in the first phase and their psychometric characteristics were reevaluated, resulting in the final instrument.

The questionnaire was applied to 103 students, starting in their second year of the medicine until their internship, data were obtained to observe how their personal growth presented itself during the five school years.

Although our young people rather maintained a high positive outlook on their lives, there was a tendency to decline throughout the years, with a statistically significant decline from the fifth to seventh semester. This data matches those of Dolev et al. research [6], where Israeli and Arab freshmen of medicine reported more optimism than their sixth-year classmates. It seems that in both cases and despite the cultural differences between the populations studied, the stress produced by the high academic demands negatively influenced this aspect of their personal development; so it is necessary to encourage students to be more positive and provide tools that motivate them to properly manage their stress.

Unlike the positive outlook on life, although the empathy of our students did not reach high scores throughout the medical career, there was a tendency to increase from the second year to their internship; mainly in males, where this increase was statistically significant. These results are consistent with Esquerda et al. findings [5] in Spain and O'Connor et al. [7] in Ireland, who found

that medical students' empathy increased with the years. Although the scores on empathy would be expected to be higher in these future health professionals, the fact that this characteristic tends to increase during the career is a sign that it is on the right path but that greater efforts are required to improve it because, as Brazeau et al. [4] observed, increased empathy allows for greater personal achievements and professionalism in the clinical field, as well as decreasing levels of emotional exhaustion and depersonalization.

Resilience is another characteristic of our students that also did not show high scores and no clear trend of increase or decrease was observed throughout the study. In the fifth semester, for example, there was an increase of resilience in both women and males, being significantly higher in the latter; however, after subsequent fluctuations in the score, women managed to increase their resilience again during their internship, while in males it decreased returning to the same level as they presented at the start of the study. Hence the relevance of working on resilience in our students is not only to prevent it from declining throughout the career; but also, to improve it considerably because, as Tempiski et al. found in their research [14], students with better resilience tend to present lower levels of depression and anxiety, as well as a higher quality of academic and personal life and a more positive perception of their educational environment.

Other aspects of the personal development and growth of our students that did not score high during the five years of follow-up were self-criticism and heterocriticism, although they did generally maintain a growth trend throughout the career. However, when analyzing the behavior of these characteristics by sex, this trend was not observed, but a fluctuation in scores, where the only constant was that men had greater ability to manage self-criticism and heterocriticism than women, with a statistically significant difference during their internship. Although no research was found to provide on information about factors that may affect the development of these skills in medical students, our study allowed us to identify significant associations of the emotional self-knowledge of our young people with each and every other aspect of their personal growth analyzed here, so strategies can be designed that simultaneously favor the development of various skills that derive not only in better management of the self-criticism and heterocriticism of students but also in their integral training. If they are unable to assess their actions to the fair extent and reflect on the comments or contributions others may make on how they perform, this will limit their personal and professional growth.

On the other hand, students' creativity showed high levels, although not the highest on the scale, with a growth tendency except for women, who had a slight decrease during their internship compared to the second year. Like self-criticism and heterocriticism, creativity has been little researched in medical students; and, again, our study provides information on the association of our young people's creativity with each and every other aspect of their personal growth analyzed here, which will allow the design of strategies that jointly promote the development of various skills that lead not only to a greater creative capacity of students in particular, but also to their personal growth in general.

Although our students also had high averages of self-confidence throughout the research, with fluctuations in the process, they decreased during their internship. However, in the follow-up by sex, males scored higher during internship than in the second year. In addition, there was greater self-confidence in men than in women in each year, mainly in the fifth semester and internship. While our students' scores were generally kept within a considered high range, they did not reach the highest of the scale; so it is necessary to promote the development of their self-confidence to improve it, with special attention on women to reverse the tendency to decrease at the end of the career, in order to favor, among other things, their academic performance [3], their motivation to face the high academic demands, as well as their ability to make decisions and take control of their own learning process. Self-confidence has also been little researched in medical students and, as in the case of self-criticism, heterocriticism and creativity, this is a surprise given the significant associations found in our study between self-confidence and all other aspects of personal growth.

Students' self-esteem exhibited behavior similar to that of self-confidence, i.e. average high scores throughout the study, with a tendency to decrease during internship, except for men. This data again coincides with those found by Dolev et al. [6], where Israeli and Arab freshmen of medicine reported higher self-esteem than their sixth-year classmates. Despite cultural differences between the populations studied, the academic demands of the career seem to have diminished, in both cases, their self-esteem.

Regarding the knowledge that students had about their own emotions, high scores were observed throughout the research, with an increase during internship compared to the second year; except for women, who remained the same. Dolev et al. [6] also found that this feature was higher in their sixth-year students than in the first-year students. As in our study, while the scores were high and an increase was observed at the end of their career, these did not reach the highest level of the scale, so it is necessary to work on our young activities that favor the awareness that they have about their own feelings and emotions.

The students' commitment had a behavior like that of their emotional self-knowledge, i.e. high scores during the years analyzed, with an increase in the last of these; except for women, who scored lower during their internship than in the second year. As in emotional self-knowledge, although the scores were high and there was an increase during their internship; students did not reach the highest score on the commitment scale, so strategies need to be planned and implemented to improve their engagement in their commitment to the activities they do, with special attention to women because of the decline they presented at the end. Although there do not appear to be any research reports in Mexico to prove this, the commitment of medical students has turned out to play a significant role in their learning process, as well as in the successful implementation of educational programs, in countries such as the United Kingdom [9], Australia [11] and the African continent [8].

In terms of assertiveness and leadership, although scores fluctuated throughout the study, there was an increase in these. Both women and men maintained high scores throughout their career, with the scores of latter

being higher, especially during internship. While, in general, students remained at levels considered high, they failed to achieve the highest scores of the scale perhaps because, as in the curriculums of other medical schools, considering assertiveness and leadership as essential characteristics in the profile of the health professional intended to be formed, is not enough to promote their development in our students; so it requires the planning and implementation throughout the career of strategies aimed at generating change, not only cognitive and attitudinal, but also behavioral, which will be reflected in the training of effective and resilient, self-aware health professional leaders who effectively relate to each other and coordinate their activities well with others [12,13].

Like the assertiveness and leadership of our students, their social and teamwork skills showed a high level throughout the study, with an increase during internship. In our Faculty, more and more strategies are being promoted for teamwork in the different subjects and this seems to be reflected in the results of this research. Although scores on this scale were high and there was a slight increase in these when the students arrived at their internship, they did not get the highest scores on the scale. Given the above and the relevance found in other researches of social skills and the ability to work as a team specifically in the clinical performance of medical students [3] and in their training process as professional health leaders [12], among other things, we should continue with the design and implementation of strategies aimed at promoting the development of these skills.

With regard to the correlations found between the aspects that account for the personal development and growth of our students, in general terms, moderate to high associations were observed between them; except in emotional self-knowledge, where correlations were moderate and only in some cases low (especially in the second year and fifth semester). This could also be explained in part to the fact that the curricular in those two moments are considered transitional from one type of information to another, where new skills are expected to be in continuous interaction but that, with proper development, positively influence each other that could help promote the student's personal growth. Some of the revised research found, for example, that implementing strategies aimed at promoting teamwork in the students [10] and a positive sense of self [11], favored their commitment to the study; or that fostering their ability to work as a team and develop their self-knowledge improved their interpersonal relationships and promoted their leadership qualities [12,13].

On the other hand, while it was observed that, in some aspects of the personal growth of our medical students, women tended to have lower scores than boys and, in some cases, their scores decreased during internship; in research such as that of Muller et al. [18] women have been found to respond much better to activities that promote their emotional well-being than the men. So, the inclusion in the curriculum of strategies aimed at promoting personal growth could positively affect the student population in general and perhaps with greater impact on women.

The implementation of these strategies will depend, among other things on: (a) what aspects of personal

growth and at what moments will require greater or less reinforcement; (b) in what modality such implementation will be most convenient, i.e. as independent courses to promote different skills or as strategies integrated into the learning process of the subjects included throughout the curriculum to work simultaneously with thematic content; and (c) whether general strategies that are effective for the entire group can be used or more specific strategies should be planned for groups that require it. All of this will require each medical school to assess the initial status of its students' personal development and growth competency, as well as their ongoing evaluation throughout the career to assess the effectiveness of the strategies implemented and generate the changes that are necessary; in order to ensure the integral training of a health professional able to respond to the high health care demands of a dynamic society and adapt to the changes of an evolving environment at high speed. This study will permit us to continue with this type of study that will complement other studies on stress and even burnout that could develop during their formation.

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Statement of Competing Interests

The authors have no competing interests.

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