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# Motivation and learning strategies in pediatrics residents

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## Abstract

**Background:** *Motivation is an internal mood that moves individuals to act, points them in certain directions, and maintains them in activities, playing a very important role in self-regulated learning and academic performance. Our objective was to evaluate motivation and self-regulation of knowledge in pediatric residents in a third-level hospital, and to determine if there are differences according to the type of specialty and sociodemographic variables.* **Material and Methods:** *All residents who agreed to participate responded to the Motivated Strategies for Learning Questionnaire. Cronbach alpha was performed to determine reliability. The mean value of each subscale was compared with Student's t test or ANOVA, correlation of subscales with Pearson test. A value of $p \leq 0.05$ was considered significant.* **Results:** *We included 118 residents. The questionnaire was highly reliable ($\alpha = 0.939$). There were no significant differences in motivation or learning strategies according to sex, marital status, or age. Those residents studying a second or third specialization had significantly higher scores in elaboration, critical thinking, and peer learning. There were significant correlations between intrinsic motivation and self-efficacy with the development of knowledge strategies such as elaboration, critical thinking, and metacognitive self-regulation.* **Conclusions:** *Our students present average-to-high scores of motivation and knowledge strategies, with a significant difference according to type of specialization. There is a high correlation between motivation and knowledge strategies.* (Gac Med Mex. 2015;151:448-54)

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## Background

Motivation is an inner state that moves us to act, points us in determinate directions and maintains us in certain activities[1]. It is the passion to achieve something and it is comprised of all factors able to arouse, maintain and direct the behavior towards an aim. It started being studied approximately 70 years ago, from the psycho-behavioral perspective, which groups motivation in three theories: mechanistic, organismic and contextualistic[2]. More recently, motivation has started being studied from a neurobiological perspective, across three systems in the ventral striate and orbitofrontal cortex area, anterior cingulate and dorsolateral prefrontal cortex, which interact with each other via the dopaminergic pathway[3]. Some authors have established that dopaminergic pathway activation is dependent of the type of stimulus (reward vs. punishment)[4].

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Motivation is often determined if something is learned and how is it learned and, once we have learned something, motivation is largely responsible for us to continue doing it. Motivation can originate from forces external to the individual and the task to be performed (extrinsic motivation) or can occur internally (intrinsic motivation)[1]. Intrinsic motivation represents the highest possible degree of self-determination and has the highest impact on school performance, a success that is attributed to the fulfillment of three basic requirements: autonomy, competence and relationship.

Motivation depends on the individual's goals[2] and is an essential component of self-regulated learning[5]. Motivation affects learning and performance in at least four forms: it increases the level of energy and activity of the individual, it directs the individual towards certain goals, it favors for the individual to start determined activities and to persist on them, and it affects learning strategies and cognitive processes that are displayed in a task[1].

Motivation can be affected by variables such as emotions, which intervene at the moment of making plans and establishing goals and in the way the individual reacts upon success or failure. Anxiety affects learning in a direct form: while a certain degree of anxiety is beneficial because it activates the student (facilitating anxiety), anxiety in excess can lead the individual to paralysis (debilitating anxiety)[6]. Another factor is the type and complexity of the task. It is essential to provide the students with experiences that are appropriate to their level of development and personal competences; otherwise, debilitating anxiety will be generated. Exposing the student to different activities and tasks (multidimensional exposure) in a fragmented manner is recommended; these should be of an intermediate complexity[1]. Another factor associated with motivation is sex. Cortright, et al. found that females had higher motivation levels in subjects such as English language and music, but low levels for gym classes[7]. Other interesting findings are those reported by Murty, et al., who have determined that learning is influenced by the type of motivation: when it is directed to prevent punishments, declarative learning is favored and it provides evidence of the differential effects of motivation approach and avoidance on spatial learning; conversely, there is higher learning when the stimulus entails a benefit for the individual[8].

In an attempt to understand learning success in some students versus failure in many others, several authors have used the self-regulated learning theory and have found that having appropriate motivations and learning strategies is positively related to academic performance[9]. Over the past few years, a number of authors have studied how students become regulators of their own learning, by constructing their own cognitive and motivational tools to attain efficacious learning[10,11]. Self-regulated students use, among others, cognitive strategies that help them to transform, organize, elaborate and recover information; they have the ability to plan, control and direct their mental processes towards the achievement of personal goals; they have a high sense of academic self-efficacy, as well as positive emotions with regard to their tasks and the ability to control and modify them, by adjusting them to the requirements of the task and the specific learning situation; they plan and control the time and effort they will spend on the task, in addition to being able to create and structure favorable environments for learning and search for help and avoidance of internal and external distractions in order to maintain their concentration, effort and motivation during the performance of academic tasks[12]. Students who pursue learning goals use more deep cognitive and metacognitive strategies, have more adaptive motivational beliefs and show higher levels of effort and persistence, as well as behaviors associated with the search for academic help[13].

As the student maturates and advances in self-regulation, it would be expected for him/her to have intrinsic motivation[14]. However, noteworthy, Kemp, et al. found, in doctorate students, that in up to 30% of cases motivation to pursue a doctorate was based on external interests, which was associated with a superficial focus on learning, a decrease in creativity, reduced persistence with the task and academic performance problems[15], which is probably related to the high dropout rates reported worldwide for students at this level.

The most widely used instrument to assess learning motivation and self-regulation is the one described by Pintrich, et al.[16], the Motivated Strategies for Learning Questionnaire (MSLQ). It comprises six motivational scales and nine learning strategies scales. Its reliability and validity are adequate and consistent between studies[17-19].

Rinaudo, et al.[20], found medium-high motivation, with medium-high scores for learning strategies, in addition to corroborating the significant relationships between intrinsic motivation, task appraisal and self efficacy previously described by Pintrich, et al.[16]. Anais, et al. found high motivation levels, especially concerning the task value and beliefs of control, with higher use of elaboration and organization as learning strategies[21]. In the area of healthcare professionals, the results obtained by Cook, et al. were consistent with those reported by Pintrich, et al.[16] with regard to the reliability

of the instrument, and found that it persists over time (previously, during and post-course). Stegers-Jager, et al.[9] found a clinically significant association between the MSLQ scores and variables such as effort, motivation and satisfaction.

The translation of the instrument used in this study, the CMEA, was performed in Mexico by Ramírez Dorantes, et al., who reproduced the factorial structure that holds the MSLQ. The internal consistence rates were similar to those reported for the MSLQ and even higher in some sub-scales, with a Cronbach's a of 0.90[23].

Studying a medical specialty in Mexico is a long and exhausting process for the student, and requires for him/her to maintain motivated. There are no previous investigations with regard to the study of motivation in medical specialty students in our country and, therefore, we consider studying the subject to be highly important in order to be able to establish strategies leading to better academic education for the students. A better understanding of this phenomenon will allow establishing strategies to keep the students motivated and self-regulated.

## Material and methods

The study was conducted at the CMN Siglo XXI Pediatrics Hospital. All residents assigned to the hospital at the beginning of the 2014-2015 academic cycle and who agreed to participate were included in the study after written informed consent was obtained. All those who were on vacations, sick leave or external rotation at the moment the questionnaire was applied were excluded, and incomplete or unreadable questionnaires were eliminated. The protocol was approved by the Local Research and Ethics Committee with the registry number R-2014-3603-12.

The correct way to fill the CMEA was explained, with answers being recorded in a 7-point Likert scale. There was no time limit to answer the questionnaire. Each participant's demographic data were recorded, including age, sex, marital status, year of residency and specialty.

The obtained data were collected in a database using the SPSS v.20 software. All those negatively stated questions (33, 37, 40, 52, 57, 60, 77 and 80) were recodified so that all had a positive wording, as recommended by Pintrich, et al.[24]. The mean of each scale was estimated for statistical comparisons to be established using Student's t-test and ANOVA. A low score in the sub-scales was considered at a value of 3 or less, a high score at 4 to 7, with a mean estimate of 4.

For inferential analysis, variables were grouped as follows:

- According to age, in 3 groups: 25 to 27 years, 28 and 29 years and more than 30 years.
- According to marital status, in 2 groups: married-civil union and single-divorced.
- According to ongoing specialty, in two groups: core (Pediatrics, Pediatric Surgery and Genetics) and branch specialties.

A p-value $\leq 0.05$ was considered to be significant. Pearson's correlation was used to look for association between sub-scales and the coefficient of determination ($r^2$) was determined.

## Participants

Of a total of 176 residents, 158 students were eligible; 18 were excluded because of being on field rotation, 18 on vacation and 5 on internal rotation; 19 questionnaires were eliminated because they were incomplete. The study included 118 residents, 74% of total eligible students.

There were 87 female residents (73.7%) and 31 males (26.3%), with a mean age of 28.47 years (± 1.96). 73.3% were single; 20.3% were married; 5.1% in civil union and only 0.8%, divorced.

35.6% of residents came from the UNAM and the rest from 29 universities throughout the country. Only 11 residents (9.3%) had their core studies in a private university, while the rest (90.7%) did it in public schools.

There were 73 residents in a core specialty (62 Pediatrics, 8 Pediatric Surgery, 3 Genetics); the remaining 45 (38.2%) studied different branch specialties (3 Anesthesiology, 4 Cardiology, 3 Endocrinology, 2 Gastroenterology, 2 Hematology, 2 Infectology, 5 Intensive Therapy, 2 Nephrology, 2 Neonatology, 4 Pneumology, 4 Neurophysiology, 2 Neurology, 2 Oncology, 2 Otolaryngology, 1 Pathology, 4 Psychiatry and 1 Rheumatology).

As to the academic year, 2 were in the first year (1.7%); 25 in second year (21.2%); 26 in third year (22%); 21 in fourth year (17.8%); 28 in fifth year (23.7%), 12 in sixth year (10.2%); 3 in seventh year (2.5%) and only one in the eight year (0.8%).

## Results

The instrument had a reliability of 0.939 (Table 1); all items contributed adequately to this reliability.

When sub-scales were assessed with regard to motivation, the task value sub-scale obtained the highest average (5.95), whereas test anxiety had the lowest

**Tabla 1. Reliability of the instrument**

| Reliability statistics | | |
|---|---|---|
| Cronbach's α | Cronbach's α based on typified elements | Elements n |
| 0.939 | 0.955 | 81 |

(3.8). In other words, the residents valued more the importance and contents of the course and worried less for taking tests.

As for learning strategies, averages were very similar with each other, with the highest average (5.29) being observed for organization and the lowest (4.33) for peer learning. From these findings, it can be deducted that the students resort more frequently to the use of strategies such as underlining texts and approaches to select relevant information, whereas they engage in less activities to learn with their peers (Table 2).

No statistically significant differences were found in any sub-scales according to sex, marital status or age of the students. However, residents studying a branch specialty had significantly higher scores for elaboration, critical thinking and peer learning (Table 3).

Although the difference was not statistically significant, we found that female residents had higher scores than males in extrinsic goal orientation (5.25 vs. 4.91), test anxiety (3.96 vs. 3.61), organization (5.4 vs. 4.9) and metacognitive self-regulation (4.91 vs. 4.77). Conversely, males had higher scores in critical thinking (5.22 vs. 5.03) and peer learning (4.43 vs. 4.29).

With regard to marital status, married students or living in civil unions had higher scores in intrinsic goals orientation (5.53 vs. 5.38), task value (6.36 vs. 5.82) and control beliefs (5.61 vs. 5.48), whereas single or divorced students had higher scores in test anxiety (3.93 vs. 3.69), rehearsal (4.92 vs. 4.64) and help seeking (4.43 vs. 4.19).

Finally, residents who were studying a second specialty had higher scores in practically all variables: intrinsic goal orientation (5.63 vs 5.29), control beliefs (5.65 vs. 5.42), learning self-efficacy (5.85 vs. 5.5), rehearsal (5.07 vs. 4.71), elaboration (5.56 vs. 5), organization (5.47 vs. 5.17), critical thought (5.48 vs. 4.84), metacognitive self-regulation (5.04 vs. 4.78), time and environment administration (4.76 vs. 4.52), peer learning (4.85 vs. 4) and help seeking (4.55 vs. 4.26).

Correlations between motivation and learning strategies were significant in nearly all dimensions, with the fact standing out that the highest correlations were found in elaboration and the lowest in peer learning. As shown in table 4, learning self-efficacy is the variable that most correlates with learning strategies, with elaboration standing out, followed by intrinsic motivation, which correlates with elaboration and critical thought.

## Discussion

In the present study, the use of the CMEA reproduces the reliability results reported by Ramírez Dorantes, et al. in 2013. Our results were high both for the global instrument (0.939) and for each one of the sub-scales (0.939-0.941), and are even higher than those reported

**Table 2. Motivation and learning strategies sub-scales score averages**

| | | Average | SD |
|---|---|---|---|
| Motivation | Intrinsic goal orientation | 5.42 | 1.07 |
| | Extrinsic goal orientation | 5.16 | 1.13 |
| | Task value | 5.95 | 1.55 |
| | Control beliefs | 5.51 | 0.93 |
| | Self-efficacy for learning | 5.63 | 0.93 |
| | Test anxiety | 3.87 | 1.26 |
| | Rehearsal | 4.85 | 1.20 |
| Learning strategies | Elaboration | 5.21 | 0.99 |
| | Organization | 5.29 | 0.18 |
| | Critical thinking | 5.08 | 0.96 |
| | Metacognitive self-regulation | 4.88 | 0.82 |
| | Time and environment administration | 4.61 | 0.84 |
| | Effort regulation | 4.64 | 0.92 |
| | Peer learning | 4.33 | 1.31 |
| | Help seeking | 4.37 | 0.88 |

**Table 3. Motivation and learning strategies sub-scales score means comparison statistical significance (p-value)**

| | IGO | EGO | TV | CB | SEL | TA |
|---|---|---|---|---|---|---|
| Sex* | 0.954 | 0.155 | 0.724 | 0.919 | 0.565 | 0.196 |
| Marital status | 0.544 | 0.805 | 0.101 | 0.490 | 0.474 | 0.372 |
| Specialty | 0.104 | 0.443 | 0.975 | 0.201 | 0.051 | 0.891 |
| Age† | 0.669 | 0.198 | 0.279 | 0.419 | 0.903 | 0.227 |

| | R | ELA | ORG | CT | MSR | TEA | ER | PL | HS |
|---|---|---|---|---|---|---|---|---|---|
| Sex* | 0.602 | 0.838 | 0.085 | 0.355 | 0.404 | 0.936 | 0.806 | 0.624 | 0.884 |
| Marital status* | 0.267 | 0.766 | 0.9 | 0.541 | 0.476 | 0.719 | 0.455 | 0.968 | 0.191 |
| Specialty* | 0.114 | 0.002 | 0.191 | 0.000 | 0.197 | 0.124 | 0.674 | 0.001 | 0.082 |

IGO: intrinsic goals orientation; EGO: extrinsic goals orientation; TV: task value; CB: control beliefs; SEL: self-efficacy for learning; TA: test anxiety; R: rehearsal; ELA: elaboration; ORG: organization; CT: critical thinking; MSR: metacognitive self-regulation; TEA: time and environment administration; ER: effort regulation; PL: peer learning; HS: help seeking.
*Student's t-test.
†ANOVA.

by Pintrich, et al.[16] in their second original study and other authors such as Anais, et al.[21] and Sabogal[25].

Our students showed medium-high levels in nearly all sub-scales. With regard to motivation, we found a slightly higher orientation towards intrinsic than extrinsic goals. Task value, learning self-efficacy and control belief, in that order, obtained the highest scores, which is consistent with observations reported by Anais, et al.[21]. These findings mean that, although the students confer a higher intrinsic value to learning and studying, and consider having control and self-sufficiency on the process, they still need external sources to encourage them to learn in an important manner. These findings are noteworthy since, in view of their level of education and maturation that comes with age, these students would be expected to attribute less importance to extrinsic motivation. This phenomenon could be explained by the type of school education received, which in our country has been of the behaviorist type, with external rewarding of achievements and competence between

**Table 4. Sub-scales' Pearson's correlation and coefficient of determination**

| | | RE | ELA | ORG | CT | MSR | TEA | ER | PL | HS |
|---|---|---|---|---|---|---|---|---|---|---|
| IGO | Pearson's correlation | 0.312 | 0.548 | 0.425 | 0.577 | 0.497 | 0.428 | 0.346 | 0.322 | 0.315 |
| | Sig. (two-sided) | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 |
| | Coefficient of determination | 0.097 | 0.300 | 0.180 | 0.332 | 0.247 | 0.183 | 0.119 | 0.103 | 0.099 |
| EGO | Pearson's correlation | 0.368 | 0.393 | 0.354 | 0.349 | 0.390 | 0.228 | 0.189 | 0.250 | 0.265 |
| | Sig. (two-sided) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.013 | 0.041 | 0.006 | 0.004 |
| | Coefficient of determination | 0.135 | 0.154 | 0.125 | 0.121 | 0.152 | 0.051 | 0.035 | 0.062 | 0.070 |
| TV | Pearson's correlation | 0.360 | 0.438 | 0.385 | 0.398 | 0.469 | 0.302 | 0.308 | 0.071 | 0.228 |
| | Sig. (two-sided) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.446 | 0.013 |
| | Coefficient of determination | 0.129 | 0.191 | 0.148 | 0.158 | 0.219 | 0.091 | 0.094 | 0.005 | 0.051 |
| CB | Pearson's correlation | 0.304 | 0.462 | 0.375 | 0.440 | 0.427 | 0.334 | 0.246 | 0.064 | 0.192 |
| | Sig. (two-sided) | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.007 | 0.492 | 0.037 |
| | Coefficient of determination | 0.092 | 0.213 | 0.140 | 0.193 | 0.182 | 0.111 | 0.060 | 0.004 | 0.036 |
| MSR | Pearson's correlation | 0.409 | 0.673 | 0.543 | 0.618 | 0.620 | 0.491 | 0.377 | 0.327 | 0.355 |
| | Sig. (two-sided) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | Coefficient of determination | 0.167 | 0.452 | 0.294 | 0.381 | -0.384 | 0.241 | 0.142 | 0.106 | 0.126 |
| TA | Pearson's correlation | 0.201 | 0.150 | 0.274 | 0.055 | 0.122 | -0.148 | -0.088 | 0.248 | 0.169 |
| | Sig. (two-sided) | 0.029 | 0.104 | 0.003 | 0.553 | 0.189 | 0.109 | 0.344 | 0.007 | 0.067 |
| | Coefficient of determination | 0.040 | 0.022 | 0.075 | 0.003 | 0.014 | 0.021 | 0.007 | 0.061 | 0.028 |

RE: rehearsal; ELA: elaboration; ORG: organization; CT: critical thinking; MSR: metacognitive self-regulation; TEA: time and environment administration; ER: effort regulation; PL: peer learning; HS: help seeking; IGO: intrinsic goals orientation; EGO: extrinsic goals orientation; TV: task value; CB: control beliefs; SEL: self-efficacy for learning; TA: test anxiety.

peers, instead of continuous personal growth being fostered, or by the presence of deficiency needs, defined by Maslow as those that can only be satisfied by external sources, which include, among others, physiological, safety, love and belonging and esteem needs[1]; i.e., a resident who has these needs not covered can see the specialty as a source to satisfy them, as a way to attain a good economic status, a spouse or acceptance in a group. These results are similar to those reported by Kemp, et al.[15], who found motivation to be based on external interests in up to a third part of doctorate students, which probably explains the high dropout rate. We consider that these findings have to be taken into account in order for those responsible for the residents' education to implement strategies fostering intrinsically motivated students; these will result in students having significant learnings when they become cognitively involved with the task, make conceptual changes when required, persist in spite of failure and assess their own progress[1,2,7,14], among other advantages.

Test anxiety was the sub-scale with the lowest scores, which is a positive finding, since high levels of anxiety may lead to performance deterioration. Of note, sex and marital status were found to negatively influence in this regard, probably because our sample was composed of these age groups. These findings are consistent with other studies with regard to the phenomenon of Medicine feminization and higher levels of anxiety in the female sex[26,27]. Marital status has also been identified as an important factor in persons' mental health. Some studies have found married individuals to experience less anxiety and depression because they have psycho-emotional support to face problems[28]. Other studies have found that, rather than the fact of being married, quality of the marriage is what determines the individual's mental health[29].

As to learning strategies, similar to findings reported by Anais, et al.[21], the best scores were obtained for organization and elaboration, which enable deeper processing of study materials by having information grouping strategies that facilitate remembering it and allow for connections between new and previous knowledge to be established. We also found medium-high scores for effort regulation, which implies that our students have developed skills that will allow for them to keep updated in the future and struggle against the uncertainty of the profession.

The lowest scores in this category were found in the peer learning and help seeking sub-scales. Although these scores were around 4.33 and 4.37, it would be desirable for them to be higher, since seeking help both with peers and teachers favors cooperative and collaborative learning, which leads to higher motivation and performance, to more time dedicated to the tasks and to reach higher levels of reasoning and critical thinking, in addition to giving rise to more positive, supportive and committed relationships between students, which produce more social integration, make learning more enjoyable, improves individual self-esteem and reinforces the ability to face adversity and tensions, which is highly useful among residents, since the specialty itself represents an endless number of adversities that have to be overcome if reaching the goal is desired[30]. Therefore, in order to promote collaborative learning, promoting the key elements of this process among residents is suggested, including positive interdependence, individual accountability, promoting interaction, social skills and group processing, which can be achieved by linking them to each other, together with strategies on how to make summaries in couples, how to investigate and solve problems in groups and how to hold debates, among others[31].

As we expected, branch specialty students showed higher levels of elaboration, critical thinking and peer learning, all belonging to the learning strategies area. We consider this to probably be due to the fact that the higher the level of education, the higher the commitment with learning, since there is more emotional maturity, in addition to the fact of being focused on a specific area of knowledge, and having less work taking care of patients allows for the students to critically evaluate their knowledge in order to strengthen it based on the knowledge acquired during the specialty and that obtained later during the branch specialty, while allowing for them to interact more with their grade peers and to establish better work relationships with them.

Rinaudo, et al.[20] and Pintrich, et al.[5] reported a significant relationship between intrinsic motivation, task value and self-efficacy. We found intrinsic motivation to positively correlate with control beliefs, self-efficacy for learning, elaboration and critical thinking; i.e., those students with challenge, curiosity or mastery of the subject as their source of motivation and who want to learn for the pleasure of doing it see themselves as more capable to control their learning and carry out the tasks that this implies, and at the same time to develop more often deep cognitive strategies associated with the attainment of learning goals, such as the ability to elaborate knowledge from known and new data and to make critical evaluations of the studied subject in order to improve it.

Although in this study there was a 26% attrition rate, we consider the results to be valid, since, with regard to the use questionnaires, a response rate higher than 60% is considered to be adequate, as long as attrition is random, as in the present study.

Taking into account our results, we consider the implementation of strategies to increase intrinsic motivation in our students to be essential, since this is associated with deep learning, increased performance and positive well-being, unlike extrinsic motivation. It is highly necessary to guide teachers of all courses on strategies to promote intrinsic motivation in their students, as suggested by Kusurkar, et al.[32] and Belland, et al.[33].

By achieiving the fostering of intrinsic over extrinsic goals, the students will be able to actively participate in their learning, activating and maintaining their behavior, affection and cognition towards the attainment of their goals, thus achieving to be self-regulators of their learning.

The role that the teacher has played up to this moment in the transmission of knowledge has to be put aside in order to make way for strategies that force the students to take control of their learning in order to ultimately develop the ability of learning how to learn. The academic body's knowledge on teaching has to be reinforced and updated in order to further support the students in this process.

## Conclusions

In Pediatrics residents of the CMN Siglo XXI Pediatrics Hospital, there was a medium-high level of motivation, with a slight predominance of exrtinsic motivation. The highest scores were obtained in task value, self-efficacy for learning and control beliefs and there were low levels in test anxiety.

As to learning strategies, the most resorted to were elaboration, organization and critical thinking, which are cognitive and deep metacognitive strategies.

Significantly higher scores were observed for elaboration, critical thinking and peer learning among residents of a branch specialty.

There was a significant correlation between motivation and learning strategies.

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