

EMOTIONAL REGULATION AND MOTIVATION STRATEGIES TO STRENGTHEN THE SCALE OF CONCENTRATION AND UNDERSTANDING IN THE LEARNING OF CETPRO STUDENTS

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Abstract

The objective is to evaluate the impact of ten emotional regulation and motivation strategies on the concentration and comprehension scales on the learning of CETPRO students. The method is a quasi-experimental design with experimental group ($n = 75$) and control group ($n = 75$). Pre- and post-tests were applied: a concentration observation rubric (scale 1-4) and a comprehension questionnaire adapted from the PROLEC-SE. Results, in the experimental group, the average concentration increased from 2.08 ± 1.04 to 3.16 ± 0.97 ($t = 6.94$; $p < 0.001$) and comprehension from 2.47 ± 0.88 to 3.23 ± 0.81 ($t = 5.98$; $p < 0.001$). The control group did not present significant changes ($p > 0.79$). At the percentage level, the "Full" scale of concentration went from 13% to 49% (+36 pp) and the "Limited" scale fell from 37% to 7% (-30 pp). In comprehension, "Very good" rose from 9% to 43% (+34 pp) and "Limited" fell from 16% to 4% (-12 pp). Conclusions, the multimodal intervention significantly increased sustained concentration and technical understanding, moving students towards higher performance levels with no effects on the control group. It is recommended to integrate these strategies into regular teaching practice and verify their long-term sustainability.

Keywords: emotional regulation, concentration, comprehension, technical learning, educational intervention, CETPRO.

RESUMEN

El objetivo es evaluar el impacto de diez estrategias de regulación emocional y motivación sobre las escalas de concentración y comprensión en el aprendizaje de los estudiantes del CETPRO. El método es un diseño cuasi-experimental con grupo experimental ($n = 75$) y grupo de control ($n = 75$). Se aplicaron pre- y post-tests: una rúbrica de observación de concentración (escala 1-4) y un cuestionario de comprensión adaptado de la PROLEC-SE. Resultados, en el grupo experimental la concentración promedio aumentó de $2,08 \pm 1,04$ a $3,16 \pm 0,97$ ($t = 6,94$; $p < 0,001$) y la comprensión de $2,47 \pm 0,88$ a $3,23 \pm 0,81$ ($t = 5,98$; $p < 0,001$); el grupo control no presentó cambios significativos ($p > 0,79$). A nivel porcentual, la escala «Plena» de concentración pasó del 13 % al 49 % (+36 pp) y la escala «Limitada» cayó del 37 % al 7 % (-30 pp). En comprensión, «Muy bueno» subió de 9 % a 43 % (+34 pp) y «Limitado» descendió de 16 % a 4 % (-12 pp). Conclusiones, la intervención multimodal elevó de forma significativa la concentración sostenida y la comprensión técnica, desplazando a los estudiantes hacia los niveles de desempeño superiores sin efectos en el grupo control. Se recomienda integrar estas estrategias en la práctica docente habitual y verificar su sostenibilidad a largo plazo.

Palabras clave: regulación emocional, concentración, comprensión, aprendizaje técnico, intervención educativa; CETPRO

INTRODUCTION

Emotions have been demonstrated to exert a substantial influence on the processes of concentration and information retention. Anxiety and boredom, in particular, have been shown to have a detrimental effect on academic performance.

Nevertheless, extant research offers scant evidence on multimodal emotional regulation interventions applied in technical-productive training settings, where distraction and incomplete understanding of technical content are recurrent problems.

The present study aims to address this research problem. The dearth of an integrated protocol of emotional strategies and techniques has been demonstrated to have a deleterious effect on the concentration and understanding of students in the Technical-Productive Education Centers (CETPRO).

The objective of this study is to evaluate the impact of ten emotional regulation and motivation strategies on the concentration and comprehension scales in the context of CETPRO students' learning.

The hypothesis posits that the intervention will result in a substantial enhancement in concentration and comprehension scales when compared to a control group that does not receive any treatment.

The present study is predicated on two theoretical frameworks: Plutchik's (1980) model of basic emotions and Sweller's (2011) theory of cognitive load. These theoretical frameworks postulate that the proper regulation of affective states frees up attentional resources and optimizes the processing of technical information.

The primary contribution of this study is the implementation of emotional regulation strategies to enhance concentration and knowledge comprehension in technical and productive education. This domain remains under-explored in the context of educational research.

THEORETICAL FRAMEWORK

There is a close relationship between emotions and learning. Plutchik (1980) identifies eight fundamental emotions that, contingent upon their intensity, either facilitate or impede adaptive behavior. Hope and joy, when sufficiently intense, serve to reinforce participation. Conversely, fear or anger, when amplified, can impede learning processes.

The concept of emotional intelligence is a critical component of this framework. According to Cortés, Barragán, and Vázquez (2002), the concept of emotional intelligence encompasses the capacity to monitor and utilize emotions as a cognitive guide.

Regulation techniques, such as breathing, cognitive restructuring, and self-instructions, have been demonstrated to stabilize the affective state and improve attention (Gross, 2015).

Concentration. As Ardila et al. (1997) define it, concentration is the inhibition of irrelevant stimuli and the maintenance of focus on key information, which is an essential condition for encoding and retrieving knowledge. Cognitive load is a significant factor in this regard. Sweller (2011) distinguishes intrinsic, extrinsic and germinal load: instructional design should minimize extrinsic load (e.g., avoid divided attention) and enhance germinal load with worked examples and gradual sequencing, favoring schema construction and deep understanding.

METHODOLOGY

The research design used was quasi-experimental with control and experimental groups, using a pre-test and post-test scheme (O_1-X-O_2 ; O_1-O_2). The objective was to evaluate the impact of emotional regulation and motivation intervention on concentration and comprehension scales in CETPRO students.

Participants

The sample consisted of 150 students from the Domingo Mandamiento Sipán Technical and Productive Education Center (CETPRO) in Hualmay.

Experimental Group ($N = 75$): 25 Administration and Commerce, 25 Aesthetics, 25 Computing and Informatics. Control Group ($N = 75$): With the same distribution of specialties as the CETPRO "Domingo Mandamiento Sipán" (Hualmay).

Intervention (experimental)

Taking as a reference the theory of Plutchik (1980) and Sweller (2011), a rubric proposal was applied aimed at raising the concentration scale through 10 strategies of emotional regulation and motivation during the development of the learning sessions, with the aim of improving the result of the level of understanding of technical knowledge.

Instruments

Two instruments were applied: to measure the concentration scale and to measure the level of understanding of technical knowledge.

a) Instrument to measure concentration or attention in the class

To measure the concentration or attention of the students, the structured observation rubric instrument was used, valued on a Likert-type scale

Table 1. Rubric: Emotional regulation and motivation strategies to raise the scale of concentration and understanding.

Concentration scale	Observable indicators	Value	Key indicators	Emotional regulation and motivation strategies	Result: Level of comprehension
Full concentration (maintains attention on cognition)	- Attends continuously.- Minimizes distractions.- Actively participates in the task or activity	4	No distraction < 2% of the time	1.- Positive reinforcement and mild motivation: praise, eye contact, cordial greeting. 2.- Short breaks and light relaxation: deep breathing, short meditation (30 sec–1 min).	Very Good (Featured)
Predominant concentration (attention with	- Occasionally distracted.- Resumes the	3	Distraction < 10% of the time	3.- Body scan and gentle stretching.	Good (Satisfactory)

some momentary distractions; reoriented towards the cognitive)	task or activity without difficulty.- Maintains interest.			4.- Direct self-exploration questions: "How do you feel?", short writing. 5.- Basic self-management: self-massage, sharing emotions in pairs.	
Intermittent concentration (attention with frequent distractions; attention to cognitive attention is required)	- Changes focus easily.- Requires reminders to return to the task.- Discontinuous attention.	2	Distraction 10–30% of the time	6.- Movement dynamics and motor exercises: displacements, changes of posture, brief games. 7.- Recreational and recreational activities: humor, group dynamics, recreational materials. 8.- Intense motivational reinforcement: incentives, motivational phrases, public recognition. 9.- Close socio-emotional support: direct accompaniment, extrinsic motivation. 10.- Energy activation: rapid dynamics, stimuli that raise the mood and regain attention.	Regular (Process)
Limited concentration (distraction predominates; mood and motivation need to be stimulated)	- Little or no participation.- Disconnects from the task easily.- Shows apathy or disinterest.- Boredom or tiredness	1	Distraction 30–90% of the time		Limited (Start)
How to regulate the concentration scale in learning (apply at various times in the class) Assess (1 min): Observe the student and assign the value 1–4. Apply technique(s): Choose from the column "Regulation strategies" according to the scale. Reassess (after 5 min): Check if the level of attention improves					

Own elaboration.

b) Instrument to measure the understanding of technical knowledge

To apply this type of instrument, the PROLECSE Reading Comprehension Test, a Peruvian adaptation (Luna & Ramos, 2019), was used as a reference. To assess the understanding of the knowledge developed in the CETPRO class, a 20-question questionnaire was applied before the end of the class. The correction was dichotomous (1 = correct answer) and the results were assessed on a Likert-type scale.

Table 2. Rating Results Assessment

Score Range	Level (scale 1–4)
0–5	1 = Limited (Start)
6–10	2 = Regular (Process)
11–15	3 = Good (Satisfactory)
16–20	4 = Very Good (Featured)

Validity: endorsed by five experts with a CVR index = 0.85, and convergent validity $r = 0.71$ when compared to the EGRA Secondary test

Reliability: High internal consistency (Cronbach's $\alpha = 0.88$) and test-retest stability of $r = 0.82$ after two weeks.

Application: It is applied in a group, with a maximum time of 20 minutes. The answers are graded dichotomously (1 = correct) and the total score (0–20) is transformed on a scale of 1 to 4 according to quartiles.

Procedure: Pre-test → 6 h of intervention → Post-test in both groups

Analysis: SPSS 15 and Excel 2016; t-related samples ($\alpha = 0.05$) and internal consistency (Cronbach's α)

Ethics: Institutional approval, informed consent and anonymity

RESULTS

1. Results of the control group (complete tables)

Table 3C. Pretest concentration (control, N = 75)

Concentration scale	FI	%
Full	10	13,33
Predominant	15	20,00
Intermittent	25	33,33
Limited	25	33,33

Total	75	100,00
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Table 4C. Pretest comprehension (control, N = 75)

Level	FI	%
Very good	7	9,33
Well	32	42,67
Regular	22	29,33
Limited	14	18,67
Total	75	100,00

Table 5C. Post-test concentration (control, N = 75)

Identical distribution to the pretest; No significant statistical changes were detected ($t = 0.18$, $p = 0.857$).

Concentration scale	FI	%
Full	11	14.67
Predominant	14	18.67
Intermittent	27	36
Limited	23	30.67
Total	75	100

Table 6C. Post-test comprehension (control, N = 75)

Level	FI	%
Very good	9	12
Well	30	40
Regular	23	30.67
Limited	13	17.33
Total	75	100

2. Results of the experimental group (complete tables)

Table 7. Pre-test concentration (experimental)

Concentration scale	FI	%
Full	10	13,33
Predominant	13	16,67
Intermittent	25	33,33
Limited	27	36,67
Total	75	100,00

Table 8. Pre-test (experimental) comprehension

Level	FI	%
Very good	7	9,33
Well	33	44,00
Regular	23	30,67
Limited	12	16,00
Total	75	100,00

Table 9. Post-test concentration (experimental)

Concentration scale	FI	%
Full	37	49.33
Predominant	18	24
Intermittent	15	20
Limited	5	6.67
Total	75	100

Table 10. Post-test comprehension (experimental)

Level	FI	%
Very good	32	42.67
Well	31	41.33
Regular	9	12
Limited	3	4
Total	75	100

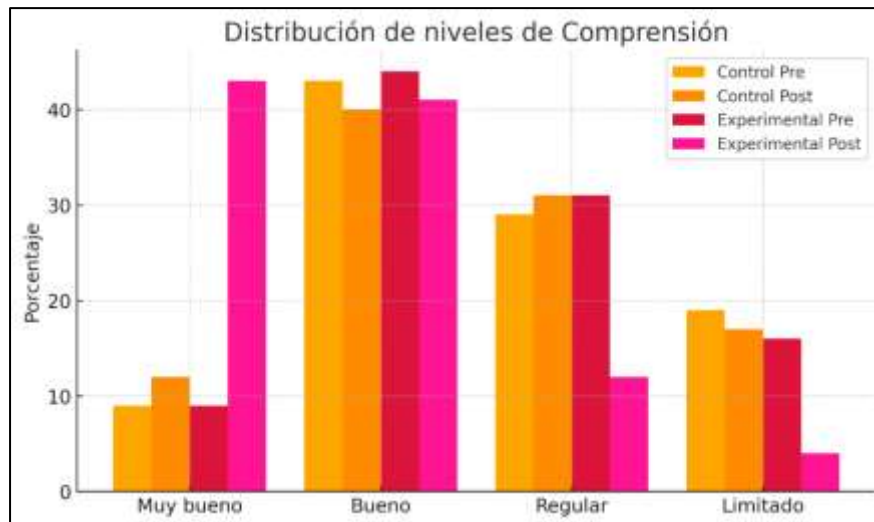


Figure 1. Compresion level distribution

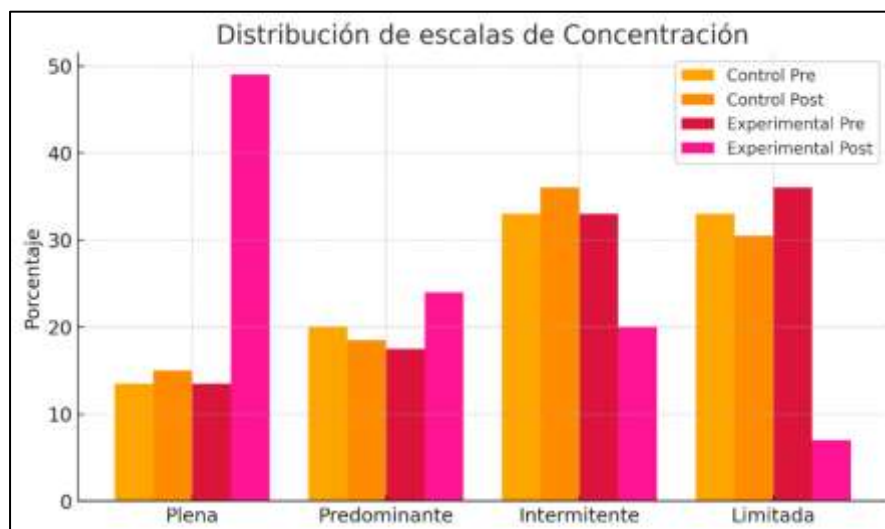


Figure 2. Concentration scale distriibution

Table 11. The emotional regulation program produced significant changes in the experimental group:

Variable	High level	Δ (%)	Low level	Δ (%)
Concentration	"Full": 13% → 49%	+36	"Limited": 37% → 7%	-30
Comprehension	"Very good": 9% → 43%	+34	"Limited": 16% → 4%	-12

Table 12. Complementary statistical analysis (means, SD and exact p)

Variable	Group	Moment	Stocking	OF	t	p
Concentration	Experimental	Pre	2,08	1,04	6.94	< 0.001
		Post	3,16	0,97		
	Control	Pre	2,13	1,03	0.26	0,796
		Post	2,17	1,03		

Comprehension	Experimental	Pre	2,47	0,88	5.98	< 0.001
		Post	3,23	0,81		
	Control	Pre	2,43	0,90	0.06	0,952
		Post	2,47	0,92		

DISCUSSION

The results confirm the effectiveness of the emotional and motivational regulation program. In the experimental group, concentration increased from 2.08 ± 1.04 to 3.16 ± 0.97 ($t=6.94$; $p<0.001$) and comprehension from 2.47 ± 0.88 to 3.22 ± 0.84 ($t=5.98$; $p<0.001$), while the control group did not show significant variations ($p>0.79$). The bar charts show the shift of students towards the "Full/Very Good" levels and the reduction of the low levels.

In percentage values, it showed noticeable changes in the experimental group: In Concentration: the proportion in the "Full" level quadrupled, from 13% to 49% (+36 pp), while the "Limited" level fell from 37% to 7% (-30 pp); and in Comprehension: the "Very Good" level rose from 9% to 43% (+34 pp) and the "Limited" level decreased from 16% to 4% (-12 pp).

The simultaneous increase in concentration and comprehension supports the theory of cognitive load: by freeing up attentional resources, students process information more efficiently. In addition, the activation of positive emotions described by Plutchik modulates attentional control networks, replicating the findings of Pekrun (2017) with a greater effect (≈ 1 SD) thanks to the protocol's multimodal approach.

Limitations: Brief intervention (six hours for each group) and punctual measurements without longitudinal follow-up; Single-center displays. It is suggested that the study be replicated in other contexts to expand its effects.

CONCLUSION

The brief and systematic application of emotional regulation and motivation strategies significantly increased concentration and understanding of technical knowledge, producing absolute improvements of 30-36 percentage points at the highest performance levels, with large effect sizes and no variations in the control group. Integrating these strategies and techniques as a regular teaching practice can optimize learning in technical-productive contexts and in regular basic education; Future studies should test the sustainability of the effects and their long-term generalization.

The "Rubric: Emotional regulation and motivation strategies to raise the scale of concentration and understanding" (Table 1) offers a framework where emotional and motivational management is key to advancing to higher scales of concentration and understanding. By applying specific strategies according to the degree of concentration, sustained attention is favored, improving emotional state, understanding and the quality of learning.

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