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INNOVATIVE TEACHING METHODS AND THEIR RELATIONSHIP WITH THE PSYCHOLOGICAL WELL-BEING OF UNIVERSITY STUDENTS: COMPARATIVE ANALYSIS IN FACE-TO-FACE AND VIRTUAL ENVIRONMENTS

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Summary
This study explores the relationship between innovative teaching methods and the psychological well-being of university students in face-to-face and virtual contexts. Through a quantitative-comparative approach, 420 students from three Latin American universities were surveyed who experienced active methodologies such as project-based learning (PBL), gamification and flipped classroom. The Ryff psychological well-being scale (reduced version) and multivariate statistical analysis were used to compare environments. The results show that innovative methods have a significant positive correlation with psychological well-being in both contexts, being slightly higher in face-to-face environments. However, in the virtual environment, flexibility and autonomy also contribute to well-being, although limitations in social interaction are identified. The study offers implications for post-pandemic pedagogical design, suggesting the integration of hybrid strategies that prioritize student well-being.
Keywords: psychological well-being, innovative methods, university education, virtual learning, flipped classroom, gamification, PBL.

1. INTRODUCTION

The psychological well-being of university students has become increasingly relevant in recent decades, especially since the challenges imposed by the COVID-19 pandemic. Factors such as social isolation, academic uncertainty, and prolonged exposure to virtual environments altered the dynamics of traditional learning and set off alarms about mental health in the university environment (Sahu, 2020; Aristovnik et al., 2020). Faced with this context, higher education institutions were forced to rethink not only the means of teaching, but also the pedagogical approach to foster more resilient, participatory, and student-centered learning environments.

In this process of educational transformation, innovative teaching methods, such as gamification, the flipped classroom and project-based learning, have gained prominence. These approaches not only focus on content acquisition, but also promote student motivation, autonomy, collaboration, and sense of purpose, elements directly linked to psychological well-being (Cabero-Almenara et al., 2021; Vlachopoulos & Makri, 2019). Recent literature indicates that the incorporation of these methods can be a protective factor against academic stress and demotivation, by facilitating active and meaningful learning (Bakhmat et al., 2022).

Likewise, the modality in which learning takes place – face-to-face or virtual – represents a critical component to consider. In face-to-face settings, direct social interaction and a sense of belonging to the group have been associated with higher levels of life satisfaction and emotional well-being (De-la-Calle-Durán & Rodríguez,

2021). On the other hand, virtual education, although it has been criticized for generating affective disconnection, has also been shown to favor autonomy, self-regulation, and flexibility, aspects that can also contribute positively to well-being (Bączek et al., 2021; González-Gómez et al., 2022).

However, there is a gap in the literature that systematically compares the impact of these innovative methods on psychological well-being in both modalities. Most studies focus on a single dimension (be it academic performance, motivation or the use of technology), without integrating a holistic view that simultaneously contemplates the teaching methodology and the environment in which it is implemented. Therefore, this study seeks to fill this gap through a comparative analysis that allows us to understand to what extent innovative methods affect psychological well-being in university students, and whether these influences vary depending on the face-to-face or virtual context.

This analysis is crucial for the construction of more inclusive and sustainable post-pandemic pedagogical models. Understanding how innovative teaching relates to students' mental health will allow universities to develop strategies that balance academic quality with emotional care, integrating well-being as a cross-cutting axis of the educational process (Karakose et al., 2022).

2. THEORETICAL FRAMEWORK

Analyzing the impact of innovative teaching methods on the psychological well-being of university students requires integrating diverse theoretical perspectives from pedagogy, positive psychology, and digital higher education. The main constructs involved in this study are developed below.

2.1. Innovative Teaching Methods

Innovative teaching methods have gained prominence in higher education as a response to the challenges of motivation, meaningful learning and skills training in the 21st century. They are characterized by encouraging active student participation, collaborative work, real problem solving, and autonomy in learning (González-Gascón et al., 2022).

Among the most commonly used are:

Innovative Method	Description	Impact Reported in the Literature
Flipped Classroom	The student studies the theoretical content before the class, which is dedicated to solving doubts and activities.	It increases autonomy, improves performance, and reduces stress (Esteban et al., 2021).
Gamification	Use of game mechanics (points, levels, challenges) in educational environments.	It improves motivation, reduces anxiety, and promotes well-being (Romero-Rodríguez et al., 2022).
PBL	Project-Based Learning: Students develop real projects as a means of learning.	It stimulates self-realization, teamwork, and life satisfaction (García-Holgado et al., 2023).

These methodologies are aligned with constructivist and socio-constructivist approaches to learning, where knowledge is actively constructed by the student in interaction with his or her environment.

2.2. Psychological well-being

Psychological well-being, according to Ryff's (1989) multidimensional model, includes six dimensions: self-acceptance, positive relationships, autonomy, mastery of the environment, life purpose, and personal growth. In recent years, this model has been validated in the Latin American university population (Mella & Peralta, 2021; Díaz et al., 2020).

Table 2 summarizes the components of psychological well-being and their relevance in educational contexts:

Dimension	Description	Relationship with learning
Self-acceptance	Positive self-evaluation	Improves self-confidence to participate and expose oneself in class
Positive relationships	Ability to make meaningful connections	Promotes collaborative work
Autonomy	Independence in decision-making	Strengthens self-regulation in virtual contexts
Mastery of the environment	Ability to manage circumstances	Related to adapting to new platforms and strategies

Life purpose	Sense of direction and goals in life	Influences academic motivation
Personal Growth	Openness to new experiences and learning	It favors a proactive attitude in the face of pedagogical challenges

Recent studies highlight that the implementation of active strategies significantly improves several dimensions of psychological well-being, especially personal growth, autonomy, and life purpose (Vallejos et al., 2021; Tóth-Király et al., 2021).

2.3. Virtual vs. Face-to-Face Education and its Relationship with Well-Being

The accelerated move towards virtual environments generated a transformation in the relationship between students and teachers. While the face-to-face environment favors direct interaction and emotional connection, the virtual environment poses challenges of isolation, but also offers opportunities for autonomy and personalization (García-Peñalvo et al., 2020).

Comparative Aspects	Face-to-face environment	Virtual Environment
Social Interaction	High (face-to-face contact, group dynamics)	Medium-low (depending on the type of platform and teaching strategy)
Student autonomy	Media (active role with constant teaching guidance)	High (greater responsibility in organization and follow-up)
Flexibility	Sick leave (fixed schedules, specific place)	High (asynchronous access, personalized pacing)
Emotional well-being	Powered by face-to-face human relationships	Variable: depends on institutional support and instructional design

Several authors agree that, in order to achieve a positive effect on well-being, virtuality must be accompanied by an instructional design focused on the student's emotional experience, with active methodologies and frequent feedback (Zawacki-Richter & Jung, 2022; Pozo-Sánchez et al., 2023).

3. METHODOLOGY

3.1. Research Approach and Design

The present research adopts a **quantitative, non-experimental, cross-sectional and comparative** approach, with the aim of analyzing the relationship between innovative teaching methods and psychological well-being in university students in two different environments: face-to-face and virtual. A structured survey design was used, validated by experts and based on recognized instruments, which allowed data to be collected at a specific time to evaluate correlations and differences between groups (Creswell & Creswell, 2020; Hernández-Sampieri et al., 2022).

The comparative design is based on contrasting two independent groups (face-to-face vs. virtual), keeping constant exposure to similar teaching methods. This approach allows us to examine how the effect of active methodologies varies depending on the educational environment.

Methodological aspect	Description
Approach	Quantitative
Type of study	Cross-sectional comparison
Design	In the experimental
Harvesting technique	Online survey
Method of analysis	Descriptive, inferential statistics (Student's t, ANOVA, Pearson correlation)

3.2. Participants and Sample

A non-probabilistic purposive **sampling was used**, aimed at undergraduate students from three Latin American universities: one in Colombia, one in Mexico and one in Ecuador. Participants had to have taken at least one subject in 2023 under some active methodology (gamification, PBL, flipped classroom).

The final sample was **420 students**, distributed equally between face-to-face (n=210) and virtual (n=210) modalities. Gender balance and diversity of areas of knowledge (social sciences, engineering, health) were sought.

Variable	Categories/Values	n	%
Educational modality	Face-to-face / Virtual	210 / 210	50 / 50
Gender	Female / Male / Other	230 / 180 / 10	55 / 43 / 2

Age (Mean ± SD)	21.4 ± 2.8 years	—	—
Academic Area	Social / STEM / Health	160 / 140 / 120	38 / 33 / 29

This sample design favors comparability and generalization within similar educational contexts in Latin America, especially post-pandemic (Cruz-Padilla et al., 2021).

3.3. Instruments

Two main instruments were applied:

1. **Sociodemographic and pedagogical questionnaire**: designed ad hoc, it included variables such as educational modality, age, gender, academic area and type of active methodology experienced. Validated by three experts in education and psychometrics (IVC content validity index = 0.89).
2. **Ryff Psychological Well-Being Scale (reduced version of 18 items):** adapted and validated for the Spanish-speaking university population (Díaz et al., 2020), with adequate internal reliability (α = 0.81 in this study). Evaluate six dimensions on a 5-point Likert scale.

Instrument	Dimensions evaluated	Source/Validity
Sociodemographic-pedagogical questionnaire	Modality, age, gender, type of methodology	Self-design, CVI = 0.89
Ryff Psychological Well-Being Scale (18 items)	Self-acceptance, autonomy, relationships, purpose, etc.	Díaz et al. (2020); α = 0.81 in this sample

3.4. Procedure

1. **Data collection**: Developed online using Google Forms between February and March 2024. Participation was voluntary and anonymous, after signing a digital informed consent.
2. **Inclusion criteria**:
   - Be an active undergraduate student in 2023.
   - Have taken at least one subject with active methodology.
   - Have studied completely in face-to-face or virtual mode (not hybrid).
3. **Exclusion criteria**:
   - Students who did not complete at least 95% of the questionnaire.
   - Mixed or undefined modalities.

3.5. Data Analysis

The data were processed with **IBM SPSS v.26**. The following analyses were applied:

- **Descriptive statistics**: measures of central tendency and dispersion.
- **Student's t-tests for independent samples**: comparison of means between modalities.
- **Unidirectional ANOVA**: to analyze variations according to type of active methodology.
- **Pearson correlation**: to examine relationships between dimensions of well-being and methodological strategies.

All analyses were performed with a 95% confidence level (α = 0.05).

4. RESULTS

The findings obtained from the statistical analysis of the data collected are presented below. They are organized into three axes: comparison of levels of psychological well-being by modality (face-to-face vs. virtual), analysis by type of innovative methodology, and correlational relationships between variables.

4.1. Comparison of Psychological Well-being by Educational Modality

The **Student's t-test for independent samples** showed statistically significant differences in the dimensions of positive relationships and purpose in life, being greater in the **face-to-face modality**. In contrast, autonomy was significantly higher in **virtual students**.

Well-being Dimension	Face-to-face (M ± DE)	Virtual (M ± DE)	t	p
Self-acceptance	4.12 ± 0.52	4.08 ± 0.57	0.84	.401
Positive relationships	4.36 ± 0.49	4.01 ± 0.63	5.81	**.000**
Autonomy	3.91 ± 0.55	4.25 ± 0.47	-6.19	**.000**
Mastery of the environment	4.18 ± 0.50	4.23 ± 0.51	-1.21	.227
Purpose in Life	4.29 ± 0.43	4.10 ± 0.45	4.33	**.000**
Personal Growth	4.15 ± 0.58	4.13 ± 0.54	0.35	.723

Note: $p < .05$ indicates statistical significance.

These results are consistent with recent research that highlights how the face-to-face context facilitates the development of interpersonal bonds and a more defined sense of purpose, while virtuality enhances autonomous management (Pozo-Sánchez et al., 2023; García-Peñalvo et al., 2020).

4.2. Comparative Analysis by Type of Innovative Methodology

Through a **one-way ANOVA**, significant differences were observed in several dimensions of well-being according to the type of active methodology implemented. Gamification stood out for its effects on personal growth and self-acceptance, while **Project-Based Learning (PBL)** strongly influenced purpose in life and mastery of the environment.

Active Methodology	Self-acceptance	Purpose in Life	Personal Growth	F (global)	p
Flipped classroom	4.01 ± 0.48	4.17 ± 0.46	4.03 ± 0.55	4.08	**.018**
Gamification	4.25 ± 0.50	4.15 ± 0.51	4.34 ± 0.44	6.72	**.003**
ABP	4.09 ± 0.51	4.38 ± 0.41	4.17 ± 0.53	5.34	**.006**

Source: Authors' elaboration based on SPSS.

These findings support what Romero-Rodríguez et al. (2022) have argued, who pointed out that gamification, when well designed, improves the perception of personal progress. PBL, on the other hand, stimulates a sense of purpose by linking learning to real problems (García-Holgado et al., 2023).

4.3. Correlation between the Use of Active Methodologies and Psychological Well-Being

Pearson' s correlations indicated positive and significant associations between the degree of exposure to active methodologies (measured on a scale of 1 to 5) and the dimensions of well-being.

Variable	Self-acceptance	Positive relationships	Purpose in Life
Using Flipped Classroom	.28**	.26**	.32**
Use of Gamification	.35**	.30**	.29**
Use of ABP	.31**	.33**	.39**

Note: **p < .01** indicates significant correlation.

These data suggest that the systematic and reflective use of active methodologies is related to higher levels of well-being in motivational and social aspects, aligning with studies such as that of Vallejos et al. (2021) and Tóth-Király et al. (2021).

5. CONCLUSIONS

The results of this research show that the application of **innovative teaching methods** is positively related to the **psychological well-being** of university students, regardless of the educational modality —face-to-face or virtual—. This conclusion reinforces previous findings indicating that active teaching not only improves academic performance, but also **strengthens key affective and motivational aspects** in the comprehensive education of students (Pozo-Sánchez et al., 2023; García-Holgado et al., 2023).

In particular, it was identified that the **face-to-face modality** favors the dimensions of positive relationships and purpose in life, probably due to direct social interaction, the perception of belonging, and the emotional bond with teachers and classmates. These elements have been recognized by various studies as protective factors against academic stress and promoters of life satisfaction (Zawacki-Richter & Jung, 2022; Romero-Rodríguez et al., 2022). For its part, the **virtual environment** showed a significant effect on autonomy, suggesting that well-structured digital environments can enhance self-directed learning and emotional regulation (Bączek et al., 2021).

Regarding **specific methodologies**, gamification was found **to** be associated with greater personal growth and self-acceptance, in line with research that highlights its ability to generate stimulating, dynamic, and less threatening learning environments (Romero-Rodríguez et al., 2022). Likewise, **Project-Based Learning (PBL)** showed a strong link with purpose in life, evidencing its ability to connect academic learning with real life, which increases the student's sense of usefulness and direction (García-Holgado et al., 2023).

A relevant finding is that not all methodologies have the same emotional impact on all dimensions of psychological well-being, which implies that their application must be contextualized and adapted to the particular needs of students, also considering the type of academic discipline and educational modality. Universities must assume a proactive role in the **planned implementation of methodological strategies** that consider both pedagogical effectiveness and emotional well-being, in line with humanistic and sustainable educational models (Vallejos et al., 2021).

Therefore, higher education institutions are recommended to:

- Promote **hybrid strategies** that integrate the best of face-to-face and virtuality.

- Promote teacher training in **active pedagogies with an emotional focus**.
- Incorporate psychological well-being as a **cross-cutting indicator** in educational quality systems.
- Carry out longitudinal research that evaluates the impact of these methodologies throughout the entire training cycle.

In conclusion, innovative teaching methods should not be understood only as didactic tools, but as **vehicles of educational transformation and integral well-being**, which offer university students not only knowledge, but also emotional health, purpose and life skills.

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