



Research Article

Learning Approaches in Dental Students: An Instrumental and Profiles Analysis

Nancy Beatriz Mendel^a, Florencia Anabel Motta^b, Camila Scheinsohn^b, Agustín Freiberg Hoffmann^{c*}

[a] Faculty of Dentistry, University of Buenos Aires. Buenos Aires, Argentina.

[b] Faculty of Psychology, University of Buenos Aires. Buenos Aires, Argentina

[c] National Scientific and Technical Research Council- University of Buenos Aires. Buenos Aires, Argentina.

Abstract

Students' learning approaches are described as different modes, procedures, or strategies that students use to process the information they need to learn. This paper analyzes the learning approaches in students of Dentistry using the Revised Two Factor Study Process Questionnaire (R-SPQ-2F). It is proposed, on the one hand, to analyze the internal structure of the instrument, and on the other, to examine approaches to students and their relationship to academic performance. 752 dental students participated. As a result, adequate evidence of the instrument's internal validity was obtained -confirmatory factor analysis, internal consistency, and factorial invariance analysis. Besides, a latent profile analysis obtained two learning approach profiles. One profile, with a deep approach over the surface, and the other, with similar levels of both. Then an analysis of average differences found that students who mostly employ the deep approach have higher academic performance than those with similar levels of both approaches. These results show that while it is important to promote the adoption of the deep approach in students, it is necessary to consider both -deep and surface-, as they are not exclusive. Although learning approaches are measured independently, in practice students combine features of both by forming their learning profiles.

Keywords: Dental students; psychometric properties; R-SPQ-2F; latent profile analysis; academic performance.

Table of Contents

Method

Results



Discussion
Conclusion
References

Psychological Thought, 2024, Vol. 17(2), 431-449, <https://doi.org/10.37708/psyct.v17i2.928>

Received: 2023-12-11. Accepted: 2024-07-30. Published (VoR): 2024-10-31.

Handling Editor: Natasha Angelova, South-West University "Neofit Rilski", Blagoevgrad, Bulgaria. *Corresponding author at: Universidad de Buenos Aires. Buenos Aires, Argentina.

E-mail: agustinfreiberg@yahoo.com.ar



This is an open access article distributed under the terms of the Creative Commons Attribution License (<https://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Increasing enrolment at the higher education level is a topic of global interest, as well as achieving good academic results during their journey (UNESCO, 2009).

Locally, it is observed that students experience difficulties in moving through the university system in different careers (Fundación Libertad, 2019; Ministerio de Educación, 2021). Specifically, in the Dentistry career, there is an average desertion of 16% among first and third-year students during the period 2009-2015 (CONEAU Global, 2018). Similarly, there is also a decrease in the total number of graduates, a significant reduction being observed in 2017 with 11% less than in 2016 (CONEAU Global, 2018).

The problem of academic failure, delay, and dropout is considered a multidimensional phenomenon and has been studied in relation to different variables (Stăiculescu & Richițeanu-Năstase, 2018; Trejo-Sánchez, 2019). These variables include learning approaches.

Learning approaches

Student approaches to learning (SAL) are described as different ways, procedures, or strategies that students use to process the information they need to learn (Biggs & Tang, 2011). The learning outcome is influenced by the student's learning approach based on their individual characteristics and their perception of the factors involved in the educational context – institutional environment, teaching methodology, and type of evaluation, among others – (Biggs & Tang, 2011; Freiberg-Hoffmann & Romero-Medina, 2019; Soler-Contreras et al., 2017).

The work of [Marton and Säljö \(1976\)](#) at the University of Gothenburg, Sweden, gave rise to the study of learning approaches in the educational field. These authors focused on demonstrating the importance of quality versus quantity of learning ([Soler-Contreras et al., 2017](#)). Their initial work was done with college students, as they allow access to more accurate and objective information about the introspective process that occurs when dealing with learning tasks. The authors, through experimental design, were the first to classify the ways in which subjects learn. To this end, they identified qualitative differences between students when reading an article. From these results, two types of information processing emerged: a surface approach and a deep learning approach ([Freiberg-Hoffmann & Romero-Medina, 2019](#); [Soler-Contreras et al., 2017](#)).

Marton and Säljö's model was resumed time later by [Biggs \(1989\)](#), and [Entwistle and Ramsden \(1983\)](#), who incorporated a third dimension of learning, called achievement approach. The three approaches are described below: In the surface approach, the student perceives the task as a requirement and tries to solve the course activities with minimal effort. Do not have interest in understanding the meaning of the content he needs to learn, nor in seeking connections between new ideas and his previous knowledge ([Freiberg-Hoffmann & Romero-Medina, 2019](#)). The main motivation is to pass the subjects by memorizing the contents and then reproducing them in the exams ([Biggs & Tang, 2011](#)). It should be noted that, for [Biggs \(2005\)](#), memorizing is not always related to the use of a surface strategy. Memorization corresponds to a surface approach when used instead of understanding, associated with a low cognitive level.

From an emotional point of view, students with a predominantly surface approach tend to present negative feelings such as anxiety, boredom, concern about the time spent on the task, and fear of failure, turning learning into a burden ([Biggs, 2005](#)).

The deep approach describes students using strategies related to understanding the content to be learned, such as reading in-depth, interpreting, reflecting, debating ideas, using analogies, extending the study material, theorizing, and formulating hypotheses ([Biggs, 2005](#); [Soler-Contreras et al., 2017](#)). Motivation is intrinsic, based on interest in the task. These students solve the activities voluntarily and with the aim of learning for personal development ([Biggs & Tang, 2011](#)). The feelings of these students are positive, such as intrinsic interest and academic satisfaction. This approach produces quality learning results ([Biggs, 2005](#)).

The third approach describes students employing learning skills associated with academic success. This approach is associated with extrinsic motivation, aimed at improving self-esteem through success. These students seek the highest grades and compete with their peers. The strategies used relate to organizing time and space, self-discipline, systematization, planning, and distribution of time (Biggs, 1989). This approach is observed in advanced courses. This third dimension has been highly questioned from an empirical point of view because it is highly correlated with the deep dimension. It is for this reason that, in some cases, it has been ignored when operationalizing learning approaches (Biggs et al., 2001; Kember & Leung, 1998).

One of the most widespread instruments that operationalize the two dimensions of approaches –deep and surface– is the Revised Two Factor Study Process Questionnaire (R-SPQ-2F; Biggs et al., 2001). This is a short questionnaire composed of 20 items that have been adapted to the academic context of Argentina (Freiberg-Hoffmann & Fernández-Liporace, 2016). It should be noted that so far, the psychometric properties of the questionnaire have not been tested on samples of dental students.

Learning approaches in college students

Several research analyzes the importance of learning approaches within the field of university education. On the one hand, some studies conclude that learning approaches greatly influence academic performance (Barca-Lozano et al., 2008), while other studies have failed to verify this relationship (Bacon, 2004; de la Fuente et al., 2008; Recio-Saucedo & Cabero Almenara, 2005). According to another research, different careers present different types of relationships between approaches and performance, in some cases being null (Muñoz & Gómez, 2005). These results show a partial effect of learning approaches on performance (Biggs & Tang, 2011).

Regarding the effect that learning approaches have on academic performance, many researchers have found that the deep approach is positively associated with student performance while the surface approach is negative (Bliuc et al., 2011; de la Fuente et al., 2008; Gargallo-López et al. 2013; Soto-Carballo et al., 2012). They also establish that the deep approach is a good predictor of academic success (Diseth, 2007; Ruiz-Lara et al., 2008). While it is often associated with a surface approach with low academic performance, it should be considered that a deep approach only leads to high performance when evaluation tasks require a deep level of understanding (Entwistle & Peterson, 2004).

In relation to students in the careers of Dentistry, some studies conducted internationally found that students of all years mostly employ a deep approach (Shah et al., 2016). On the other hand, a comparative study between careers found a greater use of the deep approach in favor of dental students (Klimenko et al., 2012). Other works found a positive association between age and deep approach and reverse with surface approach (García-Berbén, 2005; López-Aguado & López-Alonso, 2013).

Locally, few studies have analyzed learning approaches in dental students. Thus, in a work developed at the National University of Tucuman with students in the first year of their career, a greater presence of the surface approach was observed (Salim & de Santos, 2013). For its part, another study conducted at the National University of La Plata with students of the first, third, and fifth years of the Faculty of Dentistry noted that the average score of the deep approach was higher than the average of the surface approach in all years (Saporitti et al., 2020).

Due to the few backgrounds recorded on the topic of learning approaches in students of Dentistry in Argentina, and, that there is still no work done with samples of students of the Autonomous City of Buenos Aires, it is that the present study is intended to examine this variable in dentistry students from the University of Buenos Aires. To this end, the following aims are set out: 1) analyze the internal structure of the Revised Two Factor Study Process Questionnaire in students of Dentistry of the Autonomous City of Buenos Aires, 2) investigate statistically significant differences in learning approaches between different courses, 3) examine the learning approaches profiles of students of the Dental career, 4) study statistically significant difference in academic performance by the type of approach profile.

Method

Participants

752 students (78% women) from 19 to 57 years of age ($M = 24.18$; $SD = 3.99$) from different courses of the career (28.3% second year, 21.7% third year, 19.1% fourth year, 14.4% fifth year, 16.5% sixth year).

Instruments

Sociodemographic and Academic Survey: Data were collected on gender, age, school, career, year, year of entry into the career, and total approved subjects. The last two variables were included to estimate an index that positively correlates with academic performance. To achieve this, the ratio between the total of subjects approved and the number of years the

student has been studying the degree was calculated (Miguel-Díaz & Arias-Blanco, 1999). Revised Two Factor Study Process Questionnaire (R-SPQ-2F; Biggs et al., 2001). An adapted version of the instrument was applied to college students in Buenos Aires (Freiberg-Hoffmann & Fernández-Liporace, 2016). The questionnaire assesses the deep and surface learning approaches through 20 items (10 per dimension) to be answered using a Likert scale of five answer options ranging from Never -1- to Always -5-. The local adaptation of the instrument provided content, face, and construct -factorial, exploratory, and confirmatory studies- validity evidence. The dimensions extracted from the local study showed similarly relevant, explaining the surface approach a 27.9%, and the deep approach a 20.9% of the common variance, totaling 48.8%. The questionnaire also presented adequate test-retest reliability ($r > 0.70$) and internal consistency (ordinal alpha ≥ 0.70) for each of its dimensions.

Procedures

The present study was endorsed by the Dean and the Ethics Committee of the School of Dentistry -Res. 024/2019 CETICA-FOUBA-. The data collection was carried out with written authorization from the teachers of the selected subjects. The data collection was carried out within the usual class hours. Students were informed by printed consent about their voluntary and anonymous participation at the beginning of the administration. They were specified that they would not receive individual reimbursements or financial and/or academic remuneration for their collaboration. They were also informed that they could stop responding at any time in the administration. The confidentiality of the results and the anonymity of the data were always ensured.

Data Analysis

Structure and internal consistency analysis: A confirmatory factor analysis was carried out to verify whether the empirical data matched the two-factor theoretical model proposed by Biggs et al. (2001). For this purpose, polychoric correlation matrices were calculated, and the robust maximum likelihood estimation method was applied, because categorical items were worked (Freiberg-Hoffmann et al., 2013; Schumacker & Lomax, 2016). The adjustment was interpreted using the Comparative Fit Index (CFI), Tucker-Lewis index (TLI), and Root Mean Square Error of Approximation (RMSEA). CFI and TLI values above .90 and RMSEA below .08 are indicators of adequate adjustment (Jordan-Muñoz, 2021).

Subsequently, the internal consistency of the dimensions was estimated using McDonald's Omega coefficient (Anselmi et al., 2019).

The metric equivalence of the model was tested by a factorial invariance analysis among students at different stages of their careers. The students of 2nd and 3rd years were grouped as entrants and the students of 4th, 5th, and 6th year as advances. Three nested models were tested progressively imposing different levels of constraints - configural, metric, and scalar. The CFI and RMSEA indices were used to interpret the results of the analysis, where differences between models less than .01 and .015 respectively are indicators of adequate metric equivalence of the internal structure of the instrument among sub-samples. (Putnick & Bornstein, 2016).

An ANOVA one way was applied to test differences in approaches according to the year students were studying. The Brown-Forsythe statistical was used, robust in relation to the failure to meet the assumptions of normality and homoscedasticity (Karagöz & Saraçbasi, 2016).

To get to know the profiles of approaches presented by students of Dentistry, the deep and superficial approaches were included in a latent profile analysis. The model adjustment was interpreted using the Bayesian Information Index criterion (BIC), for which low values indicate a better model fit. Furthermore, the Vuong-Lo-Mendel-Rubin (VLMR) and Lo-Mendell-Rubin (LMR) statistics were considered, the significant values of which indicate significant improvements compared to models of a larger number of classes (Petersen et al., 2019; Schreiber, 2017; Weller et al., 2020).

Then, to know the performance differences according to the profiles a t-test analysis was carried out. The robust t-Welch was applied. In addition, the coefficient Cohen's d was calculated to determine the size of the effect.

Results

It began by analyzing the structure and internal consistency of the R-SPQ-2F. To do this, a 2-factor structure was tested using a confirmatory factor analysis (Figure 1).

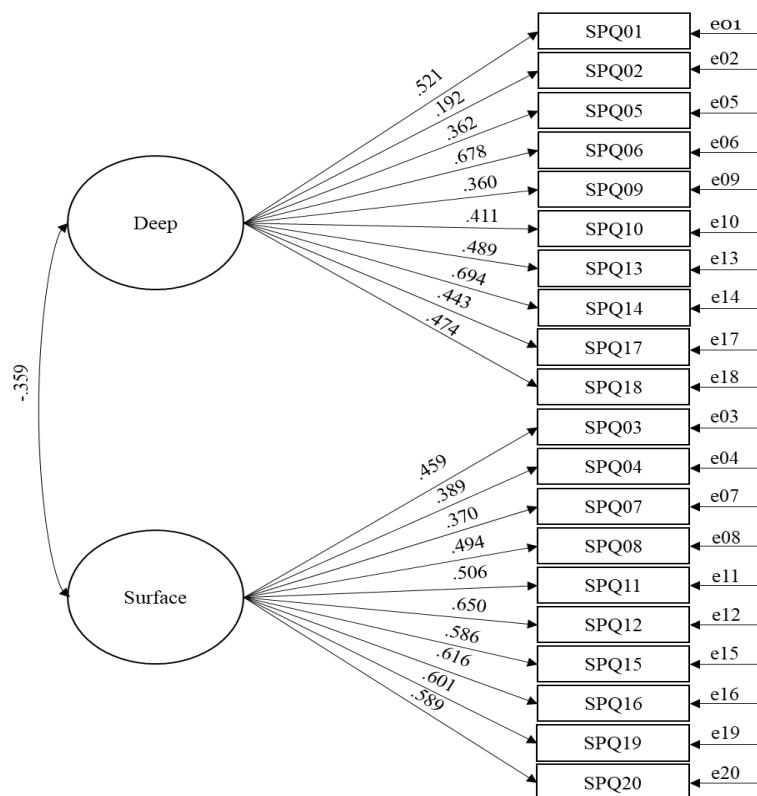


Figure 1. 2-factor model of the R-SPQ-2F

An appropriate adjustment of the empirical data to the theoretical model was obtained (CFI= .931; TLI= .922; RMSEA [CI 90%] = .055 [.050-.060]).

The internal consistency of the dimensions was then analyzed. Appropriate indices of .736 were obtained for the deep approach and .795 for the surface.

Subsequently, the metric invariance of the model was tested among students who were studying different courses in their careers. For this purpose, they were grouped into entrants - 2nd and 3rd year- and advanced - 4th, 5th, and 6th year-. Three models were tested: Configural -without imposing restrictions-, Metric -constraining factorial loadings-, Scalar -constraining factorial loadings and intercepts-. Appropriate metric equivalence of the tested model was observed (Table 1).

Table 1.*Factorial invariance analysis of the R-SPQ-2F*

	CFI	RMSEA	Δ CFI	Δ RMSEA
Configural	.916	.063 [.058-.068]	-	-
Metric	.910	.064 [.058-.069]	.006	-.001
Scalar	.905	.063 [.058-.069]	.005	.001

After analyzing and verifying an adequate internal structure of the instrument, differences in learning approaches between students in different career years were analyzed. An ANOVA test was carried out for this purpose, which found no statistically significant differences.

Subsequently, learning approach profiles in students were examined by analyzing latent profiles with the total sample of students. Models of 2, 3, and 4 classes were tested. The 2-classes model was retained as it obtained better-fit indices (Table 2). The 2-classes model presented the lowest BIC values. Furthermore, as observed in the VLRM and LRT indices, the 2-classes model shows statistically significant improvements ($p < .01$) compared to the 3-classes model. Finally, it should be noted that the 2-classes model has the greatest theoretical coherence compared to the 3 and 4 classes.

Table 2.*Goodness of fit indices*

Classes	LL	BIC	VLRM	p	LRT	p
2	-4566.63	9179.63	-4601.05	< .001	65.53	< .001
3	-4557.49	9181.21	-4566.63	< .001	17.41	< .001
4	-4552.89	9191.88	-4557.49	.195	8.75	.213

LL= Loglikelihood, LRT= Lo-Mendell-Rubin Adjusted Tests

Going to the interpretation of the model it is observed that class 1 (65%) has a larger size than class 2 (35%). By analyzing the probability of response to the indicators in each latent variable, it was found that class 1 grouped students with a predominantly deep approach and a lower presence of the surface approach. Class 2, in turn, included those students with a pair presence of both learning approaches (Table 3).

Table 3.
Latent profile analysis of learning approaches

	Probability of response	
	Class 1	Class 2
Class probability	.650	.350
Deep	32.44	28.62
Surface	20.21	27.90

Significant differences in academic performance were analyzed from the identified profiles. A t-test was applied to verify statistically significant differences in favor of profile/class 1 ($M1 = 2.34$, $SD = .99$; $M2 = 2.15$, $SD = .95$; $t(459.62) = 2.54$, $p = .011$; $d = .195$).

Discussion

The internal structure of the R-SPQ-2F was first analyzed through a confirmatory factor analysis to obtain appropriate fit indices. According to this result, it is possible to assert that the theoretical model of two factors is verified from empirical evidence. On the other hand, acceptable indices of internal consistency were observed for both dimensions, exceeding the value of .70 in both cases. This would indicate not only that the content of the items is representative of each dimension and homogeneous in relation to the rest, but also, that it would not be redundant since the coefficients are below .95 (Panayides, 2013).

Subsequently, the metric invariance of the model was tested between two groups of students from different moments of their career, classifying them into entrants and advanced. This analysis verified an adequate metric equivalence of the model between the two groups, providing more evidence in favor of the generalization hypothesis. This result suggests that there is no differential behavior of the instrument when assessing students from different moments of their careers.

The findings obtained in this paper coincide with those in the previous local study (Freiberg-Hoffmann & Fernández-Liporace, 2016) and with research conducted in other countries (Afari & Khine, 2018; Dolmans et al., 2010; Mogre & Amalba, 2015; Mokhtar et al., 2010; Munshi et al., 2012; Stes et al., 2013).

About the remaining aims, it began by examining differences in approaches between students in different years of their dental careers. No statistically significant differences were observed for either of the learning approaches. This would indicate that the different courses have similar characteristics. These characteristics of the context are consistent with the presence of what [Biggs \(2005\)](#) calls aligned teaching, where the teaching methods are congruent with the objectives proposed in the curriculum and the evaluation methods confirm the achievement of those goals.

As for the analysis of the profiles, one profile was observed with a greater presence of the deep approach, and the other with a similar level of deep and surface approaches. On the contrary, there is no profile where the surface approach prevailed. The strong presence of the deep approach in both profiles would imply that students would have a qualitative conception of learning, that is, they would study to satisfy their desire for knowledge, interested in understanding conceptual meanings and their relationship with other theoretical notions. It can also be inferred that their strategies would be based on the reading and discussion of the various topics of study, and the formulation of hypotheses about how ideas can be articulated. These students would solve the different problems or clinical situations that arise adequately, reasoning from different principles to arrive at some of the possible paths, to the expected result ([Freiberg-Hoffmann et al., 2017](#)).

The greater presence of a deep approach to students is expected and desirable in the university context, as it is the approach that is most relevant to a higher-quality learning process. It also implies better regulation of metacognitive processes and a greater capacity to process information meaningfully in response to the demands of the context ([Bernal-García et al., 2019](#); [Ruiz-Lara et al., 2008](#)).

The findings of this work coincide with those in other research carried out, both with students of Dentistry ([Haghparast et al., 2017](#); [Klimenko et al., 2012](#); [Saporitti et al., 2020](#); [Shah et al., 2016](#)), as well as with other careers ([Aguilar-Rivera, 2010](#); [Montealegre-Lynett et al., 2014](#); [Recio-Saucedo & Cabero Almenara, 2005](#); [Riveros-Pérez et al., 2011](#)).

Finally, differences were analyzed between students with a deep approach profile and students with an equal presence of both approaches, based on academic performance. A statistically significant difference was observed in favor of students with the predominance of the deep approach. This would allow us to infer that students who have better academic

results would be those who face learning situations by applying critical analysis and trying to understand concepts to be able to solve problems actively before, for example, clinical situations or theoretical examinations. These students would be characterized by using strategies such as reflection, discussion with others, or hypothesis formulation, which involves the use of higher-level cognitive processes that would enable them to greater academic effectiveness (Biggs et al., 2001).

While, as the findings of the present study show, it is important to promote the adoption of the deep approach in students, both approaches -deep and surface- need to be considered as they are not exclusive. Although learning approaches are independently measured, in practice students combine features of both by forming their learning profiles (Baeten et al., 2010). Both approaches represent different ways of learning, which are present in each student, as not all academic tasks require the use of the same type of approach to be addressed effectively. This allows students, depending on the type of activity, to decide which approach is the most appropriate, and the greater use of one approach over the other will depend on the kind of tasks that each academic discipline requires (Argos et al., 2013; Freiberg-Hoffmann et al., 2017).

Limitations

Going now to the limitations, it is important to mention that students who were enrolled in the first year of the university cycle were not included in the sample because the priority was given to working with students with a minimum degree of permanence in the career chosen by them. Their inclusion, however, would have made it possible to understand the learning approach of students entering the university system. On the other hand, because this research presents a cross-sectional design, it was not possible to evaluate the evolution of approaches in the students themselves over time. This could have provided information related to the possible changes that approaches would have had as students advance in their careers. In this regard, it would be interesting to undertake a longitudinal study to observe these possible changes.

Conclusions

In conclusion, the present research makes a double contribution to the university field, especially to the career of Dentistry. First, it provides an instrument, with adequate evidence of validity and reliability, to assess learning approaches in students of the dental career. Secondly, useful information has been provided for planning changes in teaching strategies



and evaluation methods used by teachers. Furthermore, the knowledge gained from this research could also contribute to the design of workshops and courses aimed at improving the learning skills of students.

Funding/Financial Support

This work was supported by the National Agency for the Promotion of Research, Technological Development and Innovation (PICT–2020–SERIEA–00087) as well as another funding grant (PIP #11220200100352CO) from the National Scientific and Technical Research Council (CONICET).

Other Support/Acknowledgement

The authors have no support to report.

Competing Interests

The authors have declared that no competing interests exist.

References

- Afari, E., & Khine, M. S. (2018). Cross-cultural adaptation of R-SPQ-2F: validation and psychometric properties. *International Journal of Quantitative Research in Education*, 4(3), 255. <https://doi.org/10.1504/IJQRE.2018.10013497>
- Aguilar-Rivera, M. (2010). Learning Approaches in the University: A study case. *Revista de Psicología UCA*, 6(11), 67–86. <https://revistas.uca.edu.ar/index.php/RPSI/article/view/2490>
- Anselmi, P., Colledani, D., & Robusto, E. (2019). A Comparison of Classical and Modern Measures of Internal Consistency. *Frontiers in Psychology*, 10. <https://doi.org/10.3389/fpsyg.2019.02714>
- Argos, J., Ezquerra, P., Osoro, J. M., Salvador, L., & Castro, A. (2013). Assessment of students' learning outcomes in the EHEA: their practices, preferences and evolution. *European Journal of Investigation in Health, Psychology and Education*, 3(3), 181–194. <https://doi.org/10.1989/ejihpe.v3i3.41>
- Bacon, D. R. (2004). An examination of two learning style measures and their association with business learning. *Journal of Education for Business*, 79(4), 205-208. <https://doi.org/10.3200/JOEB.79.4.205-208>
- Baeten, M., Kyndt, E., Struyven, K., & Dochy, F. (2010). Using student-centred learning environments to stimulate deep approaches to learning: Factors encouraging or discouraging their



- effectiveness. *Educational Research Review*, 5(3), 243–260.
<https://doi.org/10.1016/j.edurev.2010.06.001>
- Barca-Lozano, A. B., do Nascimento Mascarenhas, S., Brenlla-Blanco, J, Rioboo, A. & Enríquez, E. (2008). Motivation and learning in the pupil of secondary education and academic development: an analysis from the diversity and educational inclusion. *Amazónica*, 1(1), 9-57.
<https://dialnet.unirioja.es/servlet/articulo?codigo=4030112>
- Bernal-García, M. I., Lamos-Duarte, A. F., Vargas-Rivera, O. I., Camargo-Villalba, G. E., & Capacho, N. S. (2019). Enfoques de aprendizaje, rendimiento académico y factores relacionados en estudiantes que cursan último año de los programas de la Facultad de Ciencias de la Salud [Learning approaches, academic performance and related factors; in students that curve last year of the programs of the faculty of health sciences]. *Educación Médica*, 20, 10–17.
<https://doi.org/10.1016/j.edumed.2017.11.008>
- Biggs, J. & Tang, C. (2011). *Teaching for quality learning at university*. McGraw-Hill.
- Biggs, J. B. (1989). Approaches to the enhancement of tertiary teaching. *Higher Education Research and Development*, 8(1), 7-25. <https://doi.org/10.1080/0729436890080102>
- Biggs, J. B. (2005). *Calidad del aprendizaje universitario [Quality of university learning]*. Narcea.
- Biggs, J. B., Kember, D., & Leung, D. Y. P. (2001). The Revised Two Factor Study Process Questionnaire: R-SPQ-2F. *British Journal of Educational Psychology*, 71, 133- 149.
<https://doi.org/10.1348/000709901158433>
- Bliuc, A. M., Ellis, R. A., Goodyear, P., & Hendres, D. M. (2011). The role of social identification as university student in learning: relationships between students' social identity, approaches to learning, and academic achievement. *Educational Psychology*, 31(5), 559– 574.
<https://doi.org/10.1080/01443410.2011.585948>
- CONEAU Global (2018). *Anexo informe de evaluación de la carrera de Odontología de la Facultad de Odontología de la Universidad de Buenos Aires [Annex evaluation report of the Dentistry career of the Faculty of Dentistry of the University of Buenos Aires]*.
<https://www.coneau.gob.ar/archivos/anexos/IF-2018-22680600-APN-DAC-CONEAU.pdf>
- de la Fuente, J., Pichardo, M., Justicia, F., & Berbén, A. (2008). Learning approaches, self-regulation and achievement in three European universities. *Psicothema*, 20(4), 705-711.
<https://www.psicothema.com/pi?pii=3544>

- Diseth, A. (2007). Approaches to learning, course experience and examination grade among undergraduate psychology students: testing of mediator effects and construct validity. *Studies in Higher Education*, 32(3), 373–388. <https://doi.org/10.1080/03075070701346949>
- Dolmans, D. H., Wolfhagen, I. H., & Ginns, P. (2010). Measuring approaches to learning in a problem based learning context. *International Journal of Medical Education*, 1, 55–60. <https://doi.org/10.5116/ijme.4c50.b666>
- Entwistle, N. J., & Peterson, E. R. (2004). Learning styles and approaches to studying. *Encyclopedia of applied psychology*, 2, 537-542. <https://doi.org/10.1016/B0-12-657410-3/00487-6>
- Entwistle, N. J., & Ramsden, P. (1983). *Understanding student learning*. Croom.
- Freiberg-Hoffmann, A., & Romero-Medina, A. (2019). Approaches and Study Skills Inventory for Students (ASSIST). Its validation for undergraduates from Buenos Aires, Argentina. *Acción Psicológica*, 16(2), 1–16. <https://doi.org/10.5944/ap.16.2.23042>
- Freiberg-Hoffmann, A., & Fernández-Liporace, M. M. (2016). Enfoques de Aprendizaje en Estudiantes Universitarios Argentinos según el R-SPQ-2F: Análisis de sus Propiedades Psicométricas [Learning approaches in Argentinian university students, according to R-SPQ-2F: Analysis of their psychometric properties]. *Revista Colombiana de Psicología*, 25(2), 307–329. <https://doi.org/10.15446/rcp.v25n2.51874>
- Freiberg-Hoffmann, A., Fernández-Liporace, M., & Ledesma, R. (2017). Enfoques de aprendizaje en estudiantes universitarios de Buenos Aires [Learning approaches in university students from Buenos Aires]. *Pensando Psicología*, 13(21), 19. <https://doi.org/10.16925/pe.v13i21.1711>
- Freiberg-Hoffmann, A., Stover, J. B., de la Iglesia, G., & Fernández-Liporace, M. (2013). Polychoric and tetrachoric correlations in exploratory and confirmatory factorial studies. *Ciencias Psicológicas*, 7(2), 151–164. <https://doi.org/10.22235/cp.v7i1.1057>
- Fundación Libertad. (2019). *Radiografías de las universidades argentinas [X-rays of Argentine universities]*. https://libertad.org.ar/web/wp-content/uploads/2019/09/CISE_Radiografia_Universidades.pdf
- García-Berbén, A. B. (2005). A study of approaches to learning in students of Educational and School Psychology. *Revista Electrónica de Investigación Psicoeducativa y Psicopedagógica*, 6(2), 109 – 126. <https://doi.org/10.25115/ejrep.v3i6.1163>
- Gargallo-López, B., Almerich-Cerveró, G., Suárez-Rodríguez, J. M., García-Félix, E., Pérez-Pérez, C., & Fernández-March, A. (2013). Approaches to learning in excellent and average university students. Their evolution through the first year of university. *Bordón*, 65(2), 75-96. <https://recyt.fecyt.es/index.php/BORDON/article/view/brp.2013.65205/11422>

- Haghparast, H., Ghorbani, A., & Rohlin, M. (2017). Dental students' perception of their approaches to learning in a PBL program. *European Journal of Dental Education*, 21(3), 159–165. <https://doi.org/10.1111/eje.12195>
- Jordan-Muiños, F. M. (2021). Valor de corte de los índices de ajuste en el análisis factorial confirmatorio [Cut-off value of fit indices in confirmatory factor analysis]. *Psocial*, 7(1), 66–71. <https://www.redalyc.org/articulo.oa?id=672371335005>
- Karagöz, D., & Saraçbasi, T. (2016). Robust Brown-Forsythe and Robust Modified Brown-Forsythe ANOVA Tests Under Heteroscedasticity for Contaminated Weibull Distribution. *Revista Colombiana de Estadística*, 39(1), 17–32. <https://doi.org/10.15446/rce.v39n1.55135>
- Kember, D., & Leung, D. Y. P. (1998). The dimensionality of approaches to learning: An investigation with confirmatory factor analysis on the structure of the SPQ and LPQ. *British Journal of Educational Psychology*, 68(3), 395-407. <https://doi.org/10.1111/j.2044-8279.1998.tb01300.x>
- Klimenko, O., García-Jimenez, H., Ramírez, B. L., & Muñoz, N. A. (2012). Study on the practices of teaching and learning approaches in some faculties of the Cooperative University of Colombia, Medellín. *Revista Psicoespacios*, 6(9), 58-92. <https://doi.org/10.25057/21452776.90>
- López-Aguado, M., & López-Alonso, A. (2013). Learning approaches: theoretical and research review. *Revista Colombiana de Educación*, 64, 131–153. <https://doi.org/10.17227/01203916.64rce131.153>
- Marton, F., & Säljö, R. (1976). On qualitative differences in learning: I-outcome and process. *British Journal of Educational Psychology*, 46(1), 4–11. <https://doi.org/10.1111/j.2044-8279.1976.tb02980.x>
- Miguel-Díaz, F., & Arias-Blanco, J. (1999). La evaluación del rendimiento inmediato en la enseñanza universitaria [The evaluation of immediate performance in university teaching]. *Revista de Educación*, 320, 353–377. <https://sede.educacion.gob.es/publiventa/detalle.action?cod=7982>
- Ministerio de Educación (2021). *Síntesis de información estadísticas universitarios 2020-2021* [Synthesis of information university statistics 2020-2021]. https://www.argentina.gob.ar/sites/default/files/sintesis_2020-2021_sistema_universitario_argentino.pdf
- Mogre, V., & Amalba, A. (2015). Approaches to learning among Ghanaian students following a PBL-based medical. *Education in Medicine Journal*, 7(1). <https://doi.org/10.5959/eimj.v7i1.319>
- Mokhtar, S. B., Choo, G. S., Husain, M. Y., & Rahman, S. (2010). The Bahasa Melayu R-SPQ-2F: A Preliminary Evidence of its Validity. *Procedia - Social and Behavioral Sciences*, 7, 151–155.

<https://doi.org/10.1016/j.sbspro.2010.10.022>

- Montealegre-Lynett, G., Núñez-Rodríguez, M. L., & Salgado-Horta, D. (2014). Enfoques de aprendizajes y variables de orden sociocultural en estudiantes del área de la salud de una institución de educación superior en Colombia [Learning approaches and sociocultural variables in students of the health area of a higher education institution in Colombia]. *Acta Médica Colombiana*, 39(4), 368–377. <https://doi.org/10.36104/amc.2014.317>
- Muñoz, E., & Gómez, J. (2005). Enfoques de aprendizaje y rendimiento académico de los estudiantes universitarios [Learning approaches and academic achievement in college students]. *Revista de investigación educativa*, 23(2), 417-432. <https://revistas.um.es/rie/article/view/97781/93811>
- Munshi, F., Al-Rukban, M., & Al-Hoqail, I. (2012). Reliability and validity of an Arabic version of the revised two-factor study process questionnaire R-SPQ-2F. *Journal of Family and Community Medicine*, 19(1), 33. <https://doi.org/10.4103/2230-8229.94010>
- Panayides, P. (2013). Coefficient Alpha: Interpret With Caution. *Europe's Journal of Psychology*, 9(4), 687–696. <https://doi.org/10.5964/ejop.v9i4.653>
- Petersen, K. J., Qualter, P., & Humphrey, N. (2019). The Application of Latent Class Analysis for Investigating Population Child Mental Health: A Systematic Review. *Frontiers in Psychology*, 10. <https://doi.org/10.3389/fpsyg.2019.01214>
- Putnick, D. L., & Bornstein, M. H. (2016). Measurement invariance conventions and reporting: The state of the art and future directions for psychological research. *Developmental Review*, 41, 71–90. <https://doi.org/10.1016/j.dr.2016.06.004>
- Recio-Saucedo, M. A., & Cabero-Almenara, J. (2005). Approaches to learning, academic achievement, and satisfaction of students in virtual environments. *Revista de Medios y Educación*, 25, 93–115. <https://www.redalyc.org/pdf/368/36802510.pdf>
- Riveros-Pérez, E., Bernal, M., & González, N. (2011). Prevalence of learning approaches in Medical Physiology students: Revised Study Process Questionnaire in Two-Factors (R-SPQ-2F). *Biosalud*, 10(2), 37-47. <https://revistasojs.ucaldas.edu.co/index.php/biosalud/article/view/4738>
- Ruiz-Lara, E., Hernández-Pina, F., & Ureña, F. (2008). Enfoques de aprendizaje y rendimiento institucional y afectivo de los alumnos de la titulación de ciencias de la actividad física y del deporte. [Learning approaches and institutional and affective performance of students of the physical activity and sports sciences degree]. *Revista de Investigación Educativa*, 26(2), 307–322. <https://revistas.um.es/rie/article/view/93941/90581>



- Salim, R., & de Santos, M. L. (2013). Evaluation of approaches, learning motivations and strategies in first year Odontology students (UNT). *Cuadernos de educación*, 9. <https://revistas.unc.edu.ar/index.php/Cuadernos/article/view/836>
- Saporitti, F. O., Seara, S. E., Tomas, L. J., Papel, G. O., & Conte, M. C. (2020). Enfoques de aprendizaje en los alumnos de 1, 3 y 5 año de la Facultad de Odontología de la UNLP. [Learning approaches in 1, 3 and 5 year students of the Faculty of Dentistry of the UNLP]. Paper presented in *III Jornadas Sobre Las Prácticas Docentes En La Universidad Pública*.
- Schreiber, J. B. (2017). Latent Class Analysis: An example for reporting results. *Research in Social and Administrative Pharmacy*, 13(6), 1196–1201. <https://doi.org/10.1016/j.sapharm.2016.11.011>
- Schumacker, & Lomax, R. (2016). *A beginner's guide to structural equation modeling*. Routledge.
- Shah, D. K., Lochan Yadav, R., Sharma, D., Kumar Yadav, P., Islam, N., Khatri Sapkota, N., & Kumar Jha, R. (2016). Learning approach among health sciences students in a medical college in Nepal: a cross-sectional study. *Advances in Medical Education and Practice*, 137. <https://doi.org/10.2147/AMEP.S100968>
- Soler-Contreras, M. G., Cárdenas-Salgado, F. A., Hernández-Pina, F. y Monroy-Hernández, F. (2017). Enfoques de aprendizaje y enfoques de enseñanza: origen y evolución [Approaches to learning and teaching: origin and evolution]. *Educación y Educadores*, 20(1), 65-88. <https://doi.org/10.5294/edu.2017.20.1.4>
- Soto-Carballo, J., García-Señorán, M. D. M., & González-González, S. G. (2012). Approaches and learning strategies: a binomial to understand the performance in secondary education. *Revista de Investigación en Educación*, 10(2), 95-108. <https://revistas.uvigo.es/index.php/reined/article/view/1931/1842>
- Stăiculescu, C., & Richițeanu-Năstase, E. (2018, October 26-27). University dropout. Causes and solution [Paper presentation]. *Menthal Health: Global Challenges of XXI Century. II International Conference on Mental Health Care*. https://www.researchgate.net/publication/334193821_University_dropout_Causes_and_solution
- Stes, A., De Maeyer, S., & Van-Petegem, P. (2013). Examining the cross-cultural sensitivity of the Revised Two-Factor Study Process Questionnaire (R-SPQ-2F) and validation of a Dutch version. *PLoS ONE*, 8(1), e54099. <https://doi.org/10.1371/journal.pone.0054099>
- Trejo-Sánchez, K. (2019). Outline of an integrative evaluation of the main factors that affect learning. *Revista Boletín REDIPE*, 8(10), 24-34. <https://revista.redipe.org/index.php/1/article/view/828/760>

UNESCO (2009). *2009 World Conference on Higher Education: The New Dynamics of Higher Education and Research for Societal Change and Development*. Paris.

Weller, B. E., Bowen, N. K., & Faubert, S. J. (2020). Latent Class Analysis: A guide to best practice. *Journal of Black Psychology*, 46(4), 287–311. <https://doi.org/10.1177/0095798420930932>

About the Authors

Nancy Beatriz Mendel, Mg, is a dentist, and specialist in dentistry and pediatrics. Specialist in Orthodontics. Master in Teaching in University by University of Buenos Aires. Assistant Professor of the Chair of Integral Dentistry Children (Faculty of Dentistry, University of Buenos Aires). Professor of Odontopediatrics I and II at the Universidad Católica de Argentina. Director of the Career Specialization in Dentistry for Children and Adolescents (Argentinian Catholic University). Director of the School of Odontopediatrics of the Argentine Circle of Odontology. Assistant Professor of Orthodontics at University J. F. Kennedy (Argentina).

Florencia Anabel Motta, Lic, is a Psychologist at the University of Buenos Aires. She is an Assistant professor in the subject Theory and Technique of Exploration and Psychological Diagnosis Module I, Section II of the University of Buenos Aires.

Camila Scheinsohn, is an advanced degree student of the Psychology major at the University of Buenos Aires. She is a student assistant professor in the subject of Neurophysiology at the University of Buenos Aires.

Agustín Freiberg-Hoffmann, PhD, is a Senior Research at the National Scientific and Technical Research Council (CONICET). He is an Associated Professor at the University of Buenos Aires, specializing in Psychometrics, also in charge of PhD and Magister courses on Research Methodology and Academic Writing. His interests in his major field — Psychometrics and Psychological Assessment— are aimed at analyzing different educational environments as well as self-regulated learning in undergraduates.

Corresponding Author's Contact Address [\[TOP\]](#)

2353, Gral. Juan Lavalle str., C1052AAA

Buenos Aires, Argentina.

Email: agustinfreiberg@gmail.com

