



Interdisciplinaria

ISSN: 0325-8203

ISSN: 1668-7027

interdisciplinaria@fibercorp.com.ar

Centro Interamericano de Investigaciones Psicológicas y Ciencias Afines

Argentina

Díaz-Mujica, Alejandro; Sáez-Delgado, Fabiola; Cobo-Rendón, Rubia;
Del Valle, Milenko; López-Angulo, Yaranay; Pérez-Villalobos, María V.
Systematic review for the definition and measurement of self-efficacy in university students
Interdisciplinaria, vol. 39, núm. 2, 2022, Mayo-Agosto, pp. 37-54
Centro Interamericano de Investigaciones Psicológicas y Ciencias Afines
Buenos Aires, Argentina

DOI: <https://doi.org/10.16888/interd.2022.39.2.3>

Disponible en: <https://www.redalyc.org/articulo.oa?id=18070801003>

- ▶ [Cómo citar el artículo](#)
- ▶ [Número completo](#)
- ▶ [Más información del artículo](#)
- ▶ [Página de la revista en redalyc.org](#)

The logo for Redalyc.org, featuring the text 'redalyc.org' in a lowercase, sans-serif font. The 'red' part is in red, and the 'alyc.org' part is in black. A small red icon resembling a stylized 'r' or a drop is positioned above the 'y'.

Sistema de Información Científica Redalyc

Red de Revistas Científicas de América Latina y el Caribe, España y Portugal
Proyecto académico sin fines de lucro, desarrollado bajo la iniciativa de acceso abierto

Systematic review for the definition and measurement of self-efficacy in university students

Revisión sistemática sobre autoeficacia en universitarios: conceptualización y medición

Alejandro Díaz-Mujica¹, Fabiola Sáez-Delgado², Rubia Cobo-Rendón³,
Milenko Del Valle⁴, Yaranay López-Angulo⁵, & María V. Pérez-Villalobos⁶

¹Universidad de Concepción, Chile. <https://orcid.org/0000-0002-3090-5463>
E-mail: adiazm@udec.cl

²Universidad Católica de la Santísima Concepción, Chile. <https://orcid.org/0000-0002-7993-5356>
E-mail: fsaez@ucsc.cl

³Universidad de Concepción, Chile. <https://orcid.org/0000-0002-3350-071X>
E-mail: rubiaco@udec.cl

⁴Universidad de Antofagasta, Chile. <https://orcid.org/0000-0003-3739-1001>
E-mail: mdelvalle@uantof.cl

⁵Universidad Santo Tomás, Chile. <https://orcid.org/0000-0002-3331-6875>
E-mail: yaralopez@udec.cl

⁶Universidad de Concepción, Chile. <https://orcid.org/0000-0002-3697-7978>
E-mail: marperez@udec.cl

Agradecimientos a Proyecto Fondecyt 1161502: modelo explicativo de la permanencia y el abandono de los estudios universitarios, basado en procesos cognitivo-motivacionales

Universidad de Concepción,
Bío Bío, Chile

Abstract

The objectives of this review were: (1) to identify literature published within the last years on self-efficacy in university students; (2) describe and evaluate the employed definitions and measurements; and (3) establish the methodological coherency between the stated definitions and employed measurement scales within the respectively described domains in higher education. A systematic revision was conducted for articles published between 2007 and 2019. Empirical studies on self-efficacy in university students were included. A

total of 66 articles were included. Most of the selected literature defined and measured specific domains of self-efficacy in university students. The reviewed authors defined “self-efficacy” as a set of beliefs connected to specific domains of functioning. Most of the studies presented coherency between the research objective and definition/measurement of self-efficacy. Nevertheless, a notable percentage of the studies lacked coherency, which underscored the need for further refinement and improvement in this area.

Keywords: self-efficacy, university students, higher education, measurement

Resumen

Existe controversia respecto a las definiciones generales y específicas de la autoeficacia. Por otra parte, las definiciones y los instrumentos de medida son indicadores fundamentales de la rigurosidad metodológica de una investigación y de la validez de sus resultados. Al considerar estos elementos, los objetivos de esta revisión fueron los siguientes: (1) identificar la literatura publicada entre 2007 y 2019 sobre la autoeficacia en estudiantes universitarios; (2) describir y evaluar las definiciones y los instrumentos de medida empleados; y (3) estimar la coherencia metodológica entre las definiciones explicitadas y las escalas de medición empleadas para los respectivos dominios en la educación superior. Los datos obtenidos contribuirán a definir con precisión el concepto de “autoeficacia” de acuerdo al objetivo del estudio que se pretenda realizar; fundamentar el requisito de emplear escalas de medición coherentes con los dominios específicos que se estén investigando y, por último, medir y analizar la autoeficacia percibida en dominios determinados. Se tuvo en cuenta la importancia de la noción de autoeficacia en modelos actuales de investigación, se considera que este artículo representa un aporte modesto pero sustantivo al tema.

El método utilizado fue el de una revisión sistemática de artículos publicados entre 2007 y 2019 e indexados en Web of Science, SciELO o Scopus. Se incluyeron estudios empíricos sobre autoeficacia en estudiantes universitarios.

Se incluyó un total de 66 artículos sobre autoeficacia en el contexto de la educación superior, de los cuales 18 emplearon una definición general y 48, dominios específicos definidos dentro de cinco áreas. De las 52 escalas de medición utilizadas, 44 aludían a dominios específicos de autoeficacia, mientras que ocho eran mediciones generales. En cuanto a la coherencia, el 31.81 % de los artículos ($n = 21$) presentaron una coherencia moderada entre el objetivo del estudio y la defini-

ción empleada. Además, el 18.18 % ($n = 12$) no presentó coherencia entre el objetivo del estudio y el instrumento de medida empleado. De esta forma, se concluyó que la mayor parte de la literatura seleccionada definió y midió dominios específicos de autoeficacia en estudiantes universitarios. Los autores revisados definieron la autoeficacia como un conjunto de creencias conectadas a dominios específicos de funcionamiento. La mayoría de los estudios presentaron coherencia entre el objetivo de la investigación, la definición y la medición de la autoeficacia.

Sin embargo, un porcentaje notable de los estudios carecía de esta coherencia: más del 9 % presentaron inconsistencias entre el objetivo de la investigación y la definición de autoeficacia empleada, mientras que el 18 % evidenció incoherencia entre el objetivo de la investigación y la escala de medición empleada. Estas incoherencias disminuyen la claridad del diseño metodológico, limitan el alcance de sus resultados y la replicabilidad de la respectiva investigación. Esto, a su vez, puede impactar negativamente en el diseño de programas e iniciativas de intervención relacionados con la autoeficacia en estudiantes universitarios. Además, aunque se proporcionaron muchas definiciones específicas de contexto para la autoeficacia en estudiantes de pregrado, algunos estudios la definieron y midieron, únicamente, en un sentido general. En cuanto a los instrumentos de medición, se presentaron numerosas escalas para medir formas de autoeficacia específicas. Adicionalmente, algunos estudios buscaron medir la autoeficacia, pero luego emplearon medidas no diseñadas para este fin. Esta información obliga a enfatizar la necesidad de un mayor refinamiento y mejora metodológica en esta área. Para medir de forma válida la autoeficacia en estudiantes, se requiere conceptualizar el dominio específico y consistentemente medirlo con un instrumento coherente con este dominio.

Palabras clave: Autoeficacia, Estudiantes universitarios, Educación Superior, Medición

Introduction

The concept of self-efficacy has been of investigative relevance in psychology since the introduction of the Social Cognitive Theory by Bandura (1997). Perceived self-efficacy, hereafter referred to as simply self-efficacy, can be defined as the beliefs (*i. e.* perceptions, expectations) that individuals hold regarding their ability to organize and implement the actions needed to reach determined goals (Bandura, 1995). In the educational context, self-efficacy refers to the beliefs students hold regarding their abilities to learn or complete a determined task, which involves identifying associated opportunities and challenges (Schunk, 1991).

Research in higher education evidences a positive relationship between self-efficacy and academic performance (Brady-Amoon & Fuertes, 2011; Hen & Goroshit, 2014; Mallick & Singh, 2015). Furthermore, self-efficacy acts as a mediator in relationships between academic performance and motivational cognitive variables, such as self-regulated learning, academic identity, academic satisfaction, vocational orientation, and wellbeing (Becerra-González & Reidl, 2015; Castellanos, Latorre, Mateus, & Navarro, 2017; Joo, Joung, Lim, & Kim, 2014; Komarraju & Dial, 2014; Oriol-Granado, Mendoza-Lira, Covarrubias-Apablaza, & Molina-López, 2017; Priesack & Alcock, 2015; Torres, Real, Mallo, & Méndez, 2015). Self-efficacy also has a noted impact on self-determinant behaviours that benefit adaptation and the personal, social, and academic development of university students, all factors that ultimately facilitate academic success.

Due to the importance and usefulness of measuring perceived self-efficacy in higher education and the vast amount of empirical evidence reported in recent years, a number of authors have conducted systematic reviews of self-efficacy in the context of higher education. These reports have fundamentally focused on systematizing empirical evidence for the rela-

tionship between self-efficacy and academic performance (Multon, Brown, & Lent, 1991), on variables influencing this relationship, on the heterogeneity of reported findings, and on available alternatives for evaluating and effectively improving self-efficacy (Bartimote-Aufflick, Bridgeman, Walker, Sharma, & Smith, 2016). Other systematic reviews have also assessed variables that mediate the relationship between self-efficacy and academic performance (Honicke & Broadbent, 2016), the role of self-efficacy in career development (Lent, Brown, & Hackett, 1994), and the link between self-efficacy and development at distinct levels and in different areas (Casas & Blanco-Blanco, 2016; Rottinghaus, Larson, & Borgen, 2003).

Nevertheless, in-depth analysis is lacking for the different reported definitions of self-efficacy in an educational context, as well for measurements of self-efficacy and the coherency among the proposed measurement requirements/criteria (Bandura, 2006). According to Bandura, perceived self-efficacy is focused on specific domains. Other researchers defend the idea of a general definition and measurement for self-efficacy. In this general sense, self-efficacy has been defined as a belief in one's ability to face adversity in a wide range of stressful or challenging situations, whereas specific self-efficacy would be limited to a particular task (Luszczynska, Gutiérrez-Doña, & Schwarzer, 2005; Scherbaum, Cohen-Charash, & Kern, 2006; Sherer & Adams, 1983). The definition for specific self-efficacy is limited in that the measurement method can affect conclusions drawn for relationships with other variables of interest.

Albert Bandura (2012) has presented some proposals for the construction of scales that evaluate perceived self-efficacy; specifically suggesting that no universal measurement of self-efficacy exists and that scales should be aimed at and adapted to measure particular domains of functioning, with explicit boundaries of situational contexts and consistent conceptual specifications. Bandura further

mentions investigative limitations on this subject, such as coherency between the stated definition of self-efficacy and the measured domain of activity, in addition to incorrect interpretations of self-efficacy as a general trait that is manifested unconditionally. These limitations result in erroneous interpretations when defining and measuring self-efficacy.

Given this background, investigation is needed on how self-efficacy research in the context of higher education has been conducted, with considerations given to how self-efficacy is defined and specifically measured. Nevertheless, available literature has a tendency to measure self-efficacy beliefs in general, with limited attention given to mentioned specific domains; this investigative gap ultimately hinders the identification of self-efficacy components and the discrimination of evaluated domains of interest (Casas & Blanco-Blanco, 2016; García-Fernández et al., 2016). Indeed, studies that present concepts of both general and specific self-efficacies could cause methodological confusion regarding the scope of measurements and operationalization of self-efficacy in students, ultimately affecting investigative conclusions.

Considering the importance that the subject of self-efficacy has for university instructors and research, particular as related to learning processes in higher education, the present study began with the following question: How have self-efficacy beliefs been defined and measured in university students? To respond to this question, the following research objec-

tives were stated: (1) describe employed definitions and measurements in research on self-efficacy in university students, and (2) establish the methodological coherency between the stated definitions and employed measurement scales within the respectively described domains in higher education. Achievement of these objectives will allow for: (1) identifying and updating accumulated empirical evidence regarding the definitions and measurement methodologies for self-efficacy most used by researchers in the context of university education and (2) identifying measurement scales coherent with the type of self-efficacy to be measured, thereby allowing the analysis of specific domains of self-efficacy and providing tools to improve student competencies during their university education.

Method

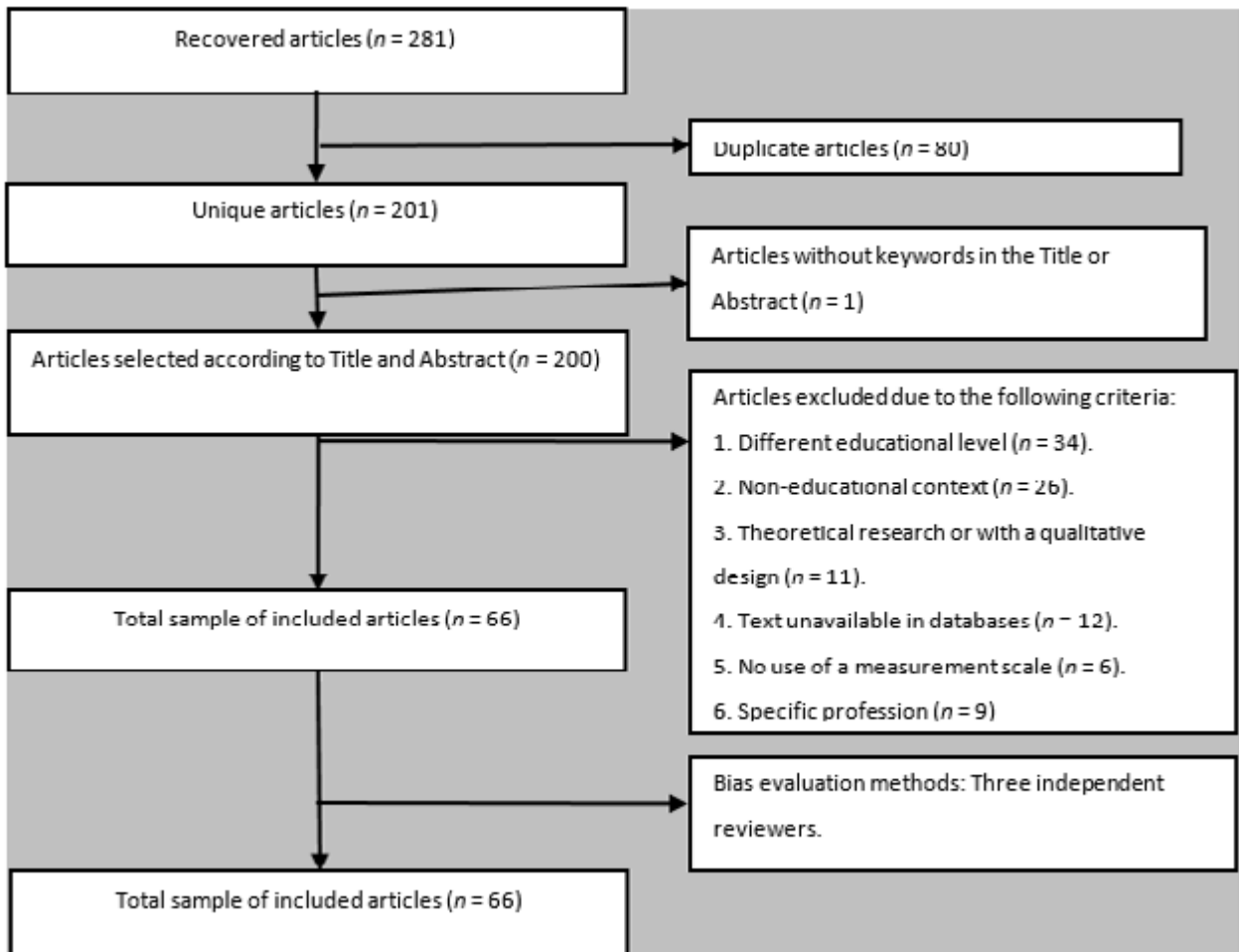
This systematic review was conducted according to preparation and writing guidelines based on protocols, standards and stages described in specialized research on this methodology (Moher, Liberati, Tetzlaff, Altman, & PRISMA, 2009).

Search for and selection of articles to analyze

A process flow diagram was followed to select the articles to be included for review (Figure 1).

Figure 1

Flow diagram depicting the search and inclusion/exclusion processes for the analyzed sources; presented in accordance with the PRISMA declaration



1. Identification stage

This stage consisted of searching for articles related to self-efficacy published between 2007 and 2019 (final inclusion date: July 31, 2019) in the Web of Science, Scopus, and SciELO databases.

The selected start date considers new guidelines proposed by Bandura (2006) for the measurement of self-efficacy. The review began in January of 2007. The keywords used to conduct the search were “self-efficacy” and “higher education” and at least one of the following work-subject categories: “education & educational research” or “psychology, applied” or “education, scientific disciplines” or “education psychology” or “social

sciences” or “developmental psychology” or “clinical / social psychology” or “psychology” or “psychology, multidisciplinary.” The search was conducted using the aforementioned keywords in English, Spanish, and Portuguese.

2. Selection stage

From the list of identified articles, duplicates were eliminated; *i. e.* only unique instances of each manuscript were kept.

3. Eligibility stage

Articles that did not have the keywords “self-efficacy” and “higher education” in the

title and/or the abstract were also eliminated from further analysis.

4. Inclusion stage

Only articles that met the following criteria were included: empirical research, focused on undergraduate students, and with a central theme of self-efficacy in aspects associated with higher education. Studies with the following qualities were excluded from further analysis: theoretical or with a qualitative design, focus on students at other educational levels (*e. g.* elementary or high school, graduate students), focused on other actors in the educational sphere (*e. g.* instructors, researchers), articles with an inaccessible text, and research that did not report the instrument used to measure self-efficacy (this criterion was included to decrease bias in analyses of cohesion between the definition and measurement of self-efficacy). As a result of this phase, a report was generated that

presented the articles excluded and its reason for exclusion based on previously established criteria (<https://figshare.com/s/5661e1bcb-36d53225cef>, List of excluded studies and reasons for exclusion).

5. Bias evaluation phase

The bias evaluation was assessed through two processes: (1) three independent reviewers; and (2) table of excluded articles and reasons for exclusions

Systematization of information for data extraction

Once the article simple was obtained, the information of each study was systematized on a matrix table (<https://figshare.com/s/cc71d2923bbbfbd44c96>). The articles included in this systematic revision were analyzed considering the criteria used to extract the information described in Table 1.

Table 1

Criteria extracted from the selected literature, used to construct the matrix analysis

Column #	Column Title	Description of criteria used to extract information
2	Author and year	Last names of authors and year of publication.
3	Study objective	Summary of the primary objective of each work.
4	Specific domain of self-efficacy	Specific domain investigated (according to the proposed research objective); provided definition of the specific domain and reference cited by the authors (these citations are not included in the reference list for the present review due to limitations of space); and when authors do not define a specific domain and/or provide an explicit definition
5	Instrument used to measure self-efficacy	Name of the scale used to measure self-efficacy, the dimensions of the scale, and the references cited by the authors (these citations are not included in the reference list for the present review).

Column #	Column Title	Description of criteria used to extract information
6	Coherency between study objective and the definition. <i>Definitions (three degrees of coherency were used).</i>	Low: type of self-efficacy not described in the objective or body of the text.
		Moderate: type of self-efficacy not described in the objective, but is described in the body of the text.
		High: type of self-efficacy described in the objective coincides with the concept of self-efficacy used in the body of the text.
	Coherency between study objective and the Scale. <i>Definitions (two categories were used).</i>	Negative: authors measured self-efficacy in a way different to that stated in the study objective. Affirmative: authors measured self-efficacy as stated in the study objective.

Procedure for article analysis

The results were grouped into three parts to describe the findings in relation to the presented research objectives (*i. e.*, identification of self-efficacy studies; definitions and measurements of self-efficacy; and cohesion between definitions and measurements).

Results

The following information was organized to reflect the proposed research objectives: (1) describe the definitions and measurements for self-efficacy used by the included studies; and (2) identify the methodological coherency of the employed definitions and measurements for self-efficacy in undergraduates in the context of higher education.

Identification of studies on self-efficacy in university students

After searching the aforementioned databases using the stated criteria, a total of 66 studies on self-efficacy in university students were identified (Appendix 1). Of these, 30.30 % (n = 20) were published within the last three years, indicating that research on self-efficacy in university students is a current topic of interest in psychology.

Specification of self-efficacy in university students

Of the 66 articles, 48 evaluated specific domains, and, of these, 23 provided definitions. Table 2 presents the total domains identified for evaluating and measuring self-efficacy. These domains were grouped into five areas: university-level studies, technology, social relationships, higher cognitive abilities, and basic abilities.

Table 2
Specific self-efficacy domains for university students

Reference	Domain of self-efficacy	N° of studies	Areas
(Aldridge, Afari, & Fraser, 2013; Alt, 2015; Blanco, Ornelas, Aguirre, & Guedeas, 2012; D’Lima, Winsler, & Kitsantas, 2014; Hen & Goroshit, 2014; Hernández, 2018; Martin, Goldwasser, & Harris, 2017; Matoti & Matoti, 2016; Putwain, Sander, & Larkin, 2013; Rivera & Martínez, 2017; Tladi, 2017; Valle et al., 2015; van Herpen, Meeuwisse, Hofman, Severiens, & Arends, 2017; Zheng, Liang, & Tsai, 2017)	Academic self-efficacy	14	Self-efficacy for university-level study (n = 29; 60.41 %)
(Baglama & Uzunboylu, 2017; Fan, Meng, Billings, Litchfield, & Kaplan, 2008)	Career self-efficacy	2	
(Lin, Liang, & Tsai, 2015; Suprpto, Chang, & Ku, 2017)	Physics learning self-efficacy	2	
(Elliott, Thevenin, & Bigelow, 2017; Majer, 2009)	Self-efficacy for education	2	
(Adi, Leong, & Jikus, 2019; Nielsen, Makransky, Vang, & Dammeyer, 2017; Papinczak, Young, Groves, & Haynes, 2008)	Self-efficacy for learning	3	
(Guerreiro-Casanova & Polydoro, 2011; Sousa, Marucia, & Sancineto, 2013)	Self-efficacy in higher education	2	
(Aguayo, Herman, Ojeda, & Flores, 2011)	College self-efficacy	1	
(Bui, Fung, Kwek, & Rynne, 2017)	Self-efficacy Towards Statistics	1	
(George, Locasto, Pyo, & Cline, 2017)	Autoeficacia para la práctica clínica [Self-efficacy for clinical practice]	1	Self-efficacy for university-level study (n = 29; 60.41 %)
(Roick & Ringeisen, 2018)	Self-efficacy for mathematics performance	1	
(Huffman, Whetten, & Huffman, 2013)	Technology self-efficacy	1	

Reference	Domain of self-efficacy	N° of studies	Areas
(Martínez & Herrera, 2014)	Autoeficacia en el uso de la computadora [Self-efficacy in computer use]	3	
(Rakan, Malek, & Karim, 2010; Wiggins, Grafsgaard, Boyer, Wiebe, & Lester, 2017)	Computer science self-efficacy		
(Askar & Davenport, 2009)	Java programming self-efficacy	1	Technology (n = 7; 14.58 %)
(Papastergiou, Gerodimos, & Antoniou, 2011)	Information and communications technologies self-efficacy	1	
(Tseng & Tsai, 2010)	Online learning self-efficacy	1	
(Iskender & Akin, 2010)	Social self-efficacy	1	
(Tariq, Qualter, Roberts, Appleby, & Barnes, 2013)	Emotional self-efficacy	1	Social relationships (n = 2; 4.16 %)
(Kiliç-Çakmak, 2010; Ross, Perkins, & Bodey, 2013, 2016)	Information literacy self-efficacy	3	
(Wu, 2017)	Self-efficacy in multitasking	1	
(Ornelas, Blanco, Viciano, & Rodríguez, 2015)	Autoeficacia en la solución de problemas y comunicación científica. [Self-efficacy in problem-solving and scientific communications]	1	Higher cognitive abilities (n = 6; 12.50 %)
(Durán-Aponte, Elvira-Valdés, & Pujol, 2014)	Self-efficacy for multiple intelligences	1	
(Amirian & Tavakoli, 2016)	Oral presentation self-efficacy	1	
(Asakereh & Dehghannezhad, 2015)	Speaking skills self-efficacy	1	Basic abilities (n = 4; 8.33 %)
(Ekholm, Zumbrunn, & Conklin, 2015; Prat-Sala & Redford, 2010)	Self-efficacy of student's writing and reading	2	
Total domains identified: (N = 48; 100 %)			

Difficulties arose when comparing the definitions of academic self-efficacy with self-efficacy in learning, in higher education, in career development, and in students. This is due to each alluding to beliefs students hold in regard to an academic activity. In this review, the area

of university-level studies was defined as the beliefs and perceptions of students in dominating cognitive, motivational, emotional, and behavioral processes with the aim of reaching learning objectives, of responding to institutional academic demands, and of achieving

ving academic success. In turn, seven studies comprised the area of technology, which was defined as the beliefs and perceptions of students towards their ability and motivation to do specific computational tasks and towards the use of information and communications technology to solve problems in the sphere of computing and in guaranteeing the successful execution of some specific technological task. For social relationships, two studies evaluated the self-efficacy beliefs held by students in situations requiring emotional restraint, in initiating social contact, and in making new friends within the university environment. In turn, six studies were included within the area of higher cognitive abilities, but none provided an explicit definition for this type of self-efficacy. Finally, the area of basic abilities focused on student beliefs regarding the execution of activities such as writing, reading, and presenting information.

Measurement of self-efficacy in specific domains

Among the 66 analyzed studies, 52 different scales were used to evaluate self-efficacy in university students. Notably, some studies used two or more scales to measure self-efficacy (Prat-Sala & Redford, 2010; Tladi, 2017;

Wiggins et al., 2017; Zheng et al., 2017). Of these 52 scales, eight were designed to evaluate self-efficacy in a general context (15.38 %), and 44 were aimed at evaluating self-efficacy in a specific context (84.61 %). Regarding the structure of the scales, 9 did not have defined dimensions; 14 used a unidimensional structure and 29 were multidimensional. Multidimensional scales were characterized by being organized into dimensions associated with aspects belonging to the specific domain being evaluated.

Coherency between proposed research objectives and the definitions/scales used for self-efficacy

Regarding the coherency evidenced between proposed research objectives and definitions for self-efficacy, 39 studies were highly coherent (59.09 %); 21 were moderately coherent (31.81 %); and six were low (9.09 %). For the highly coherent studies, 15 had the objective of evaluating self-efficacy generally. These studies evidenced coherency between the research objective and the expressed definition for self-efficacy. Table 3 details the detected degrees and percentages of agreement between research objectives and the declared domains of self-efficacy.

Table 3

Coherency between the study objective and definition for self-efficacy beliefs

Degree of coherency	Domains of self-efficacy			
	General		Specific	
	Quantity	%	Quantity	%
High	15	83.33	24	50.00
Moderate	1	5.55	20	41.66
Low	2	11.11	4	8.33
Total	18	100	48	100

Most of the analyzed studies evidenced coherency between the definitions for self-efficacy and the employed measurement scales (n = 54; 81.81 %), thus confirming coherency

between the presented research objectives and measurement scales; nevertheless, 18.18 % of the assessed studies did not present this coherency (Table 4).

Table 4

Coherency between the employed definition of self-efficacy and the scales of measurement

	Domain declared in the study objectives			
	General		Specific	
	Quantity	%	Quantity	%
Coherency present	14	77.77	40	83.33
Low coherence	4	22.22	8	16.66
Total	18	100	48	100

Discussion

Specification of self-efficacy in university students

Specific domains of self-efficacy were used in 48 of the evaluated studies. The majority of these works focused on the perception of self-efficacy in achieving an academic task. The advantage of studying specific domains of self-efficacy resides in the ability to identify components or domains relevant to university schooling in which intervention is required (Casas & Blanco-Blanco, 2016; García-Fernández et al., 2016). Nevertheless, 25 of the assessed studies did not provide a clear definition of the domain analyzed, consequently limiting the validity of the content presented in the respective measurement scales. Scale construction should be based on an extensive conceptual analysis of the domain of functioning (Bandura, 2006). From a psychometric standpoint, analyzing the validity of content in measurement scales can reveal if included items constitute a representative sample for the universe of behaviors that describe the attribute in question (Argibay, 2006).

The theory for measuring self-efficacy (Bandura, 2006, 2012) denotes the importance of establishing definitions for specific domains, specifically since perceived self-efficacy can be different for distinct areas of functioning and in the levels and facets corresponding to

each of these areas. It is therefore important to make explicit and to clearly identify the levels of evaluation and the domain being referenced when conducting measurements of self-efficacy. Despite this relevance, a high percentage of the evaluated reports (52.08 %) did not consider definitions for specific self-efficacy.

Measurement of self-efficacy in university students

Of the 52 identified scales used to measure self-efficacy in university students, 44 (84.61 %) aimed to evaluate specific self-efficacy. This finding further underscores the perspectives of Bandura (2012) regarding the limited explicative and predictive value of general self-efficacy measurements and the poor validity of such scales when applied to a specific domain. General measurements of self-efficacy result in ambiguity as to what exactly is being measured, which can affect the theoretical and practical value of the data presented to further understandings of the subject (Bandura, 2006).

Works were found that, while tagged as measurements of self-efficacy, used scales aimed at measuring other variables. This reveals a problem in the validity of the applied measurement scales. More specifically, two of the included studies used scales to measure the confidence of university students (Matoti & Matoti, 2016; Putwain et al., 2013), and one used the term confidence to support the theo-

retical definition of self-efficacy (Ross et al., 2013). Interestingly, the same creators of the instrument to measure confidence declare that it was designed to globally evaluate academic confidence and that confidence is a term different to and broader than self-efficacy (Sander & Sanders, 2009). A similar inconsistency was detected in some studies that used scales measuring motivation, self-regulation, and attitudes to evaluate self-efficacy (Alt, 2015; Elliott et al., 2017; Nielsen et al., 2017; Tladi, 2017).

Coherency between proposed research objectives and the definitions/scales used for self-efficacy

High coherency was observed between definitions for self-efficacy (general and specific) and the declared research objective of each respective work. Of the analyzed articles, 39 (59.09 %) presented high coherency, 21 studies (31.81 %) presented moderate and six studies (9.09 %) presented low coherency between the stated research objective and the provided definition for self-efficacy. This affected the clarity and expected methodological rigorousness of the research process, ultimately complicating the presentation of results and the possibility of replication. This only further highlights the need for coherency to exist between the definition of self-efficacy and the declared research objectives.

Coherency was found between definitions of self-efficacy and employed measurement instruments. Of all the works analyzed, 54 (81.81 %) evidenced this coherence. Nevertheless, 12 (18.183 %) show low coherence. A lack of coherency was found in studies where authors provided a general definition of self-efficacy but measured a specific domain (Adi et al., 2019; Brown, Peterson, & Yao, 2016; D'Lima et al., 2014; Lee & Mao, 2016; Lopez, 2014; Pool-Cibrián & Martínez-Guerrero, 2013). Two studies (Ornelas et al., 2015; Roick & Ringeisen, 2018) defined a specific domain of self-efficacy (self-effi-

cacy in learning mathematics and academic self-efficacy) but measured other domains (academic self-efficacy and self-efficacy in problem solving and scientific communication). A specific domain was not defined but a scale measuring self-efficacy in one general and one specific dimension was used, which hindered understanding the theoretical approach to self-efficacy (Gbadamosi, Evans, Richardson, & Ridolfo, 2015).

Limitations of this research and theoretical-practical implications

Limitations of this research include: (1) use of only three scientific article databases; (2) identification of articles limited to three languages; (3) use of a single search algorithm; (4) twelve articles out of 66 were not available for analysis; (5) the scope of this review was limited to identifying general and specific scales used to evaluate beliefs of self-efficacy and the coherencies thereof with definitions provided by each respective study; and (6) this systematic revision has focused on self-efficacy in undergraduate students.

Theoretical-practical implications: (1) these findings evidence the relevance of precisely defining self-efficacy and the necessary specificity that employed measurement scales should have. It should be mentioned that the study by Bandura (Bandura, 2006) does not include in-depth requirement recommendations for constructing scales that measure self-efficacy. (2) Future research could incorporate works related to the self-efficacy beliefs of teachers, distinguishing areas of disciplinary knowledge, specific domains and different levels in the context of higher education. New reviews could incorporate detailed analyzes of the methodological and structural characteristics of the scales, and their corresponding psychometric properties, particularly their content validity (Gallegos, Pérez-Acosta, Klappenbach, López-López, Bregman, & López, 2020; López-Angulo, Sáez-Delgado, Arias-Roa, & Díaz-Mujica, 2020). (3) To

monitor and improve learning outcomes, considering the effects of self-efficacy beliefs on motivational, cognitive, and developmental behaviors in university students (Bartimote-Aufflick et al., 2016; Becerra-González & Reidl, 2015; Oriol-Granado et al., 2017; Torres et al., 2015; Sáez, Bustos & Díaz, 2018). (4) It is of utmost importance to precisely identify the area or domain to be evaluated, as well as the methodologies/procedures used to construct the measurement scales (Bandura, 2006, 2012). (5) This preciseness will facilitate an adequate evaluation of self-efficacy in the context of higher education and in the different particular domains of functioning. (6) Clarity on these aspects will also support the development of specific programs aimed at strengthening the academic and personal competencies of university students.

Conclusions

The present systematic review concluded that research on self-efficacy in university students is of investigative relevance in educational psychology. A total of 66 studies met the inclusion criteria. Of these studies, 48 were focused on specific domains previously described by Bandura (2006).

This finding emphasizes the importance of considering self-efficacy as a particular domain of development that can be defined and operationalized. Despite various specific domains for self-efficacy existing in the context of higher education, 23 of the included studies did not define self-efficacy in relation to a specific domain.

This lack of specific definition limited the reach of the investigative results presented by these studies. Furthermore, while many context-specific definitions for self-efficacy in undergraduate students were provided, some studies defined and measured self-efficacy in a general sense. Regarding measurement instruments, numerous scales for measuring specific self-efficacy in university students were presented. Nevertheless, some studies

sought to measure self-efficacy but then employed measurements not designed for this end. In conclusion, more than 9.09 % of the included studies presented inconsistencies in coherency between the research objective and the employed definition for self-efficacy, while 18.18 % evidenced incoherency between the research objective and the employed measurement scale. These incoherencies ultimately affect the methodological rigorosity of research on self-efficacy in university students, which, in turn, could negatively impact the design of related programs and intervention initiatives.

References

- Adi, I., Leong, H., & Jikus, O. (2019). Students' perception and use of English in higher education institutions: Links with academic self-efficacy. *Journal of Applied Research in Higher Education, 11*(1), 36–49. <https://doi.org/10.1108/JARHE-07-2018-0113>
- Aguayo, D., Herman, K., Ojeda, L., & Flores, L. (2011). Culture predicts Mexican Americans' college self-efficacy and college performance. *Journal of Diversity in Higher Education, 4*(2), 79–89. <https://doi.org/10.1037/a0022504>
- Aldridge, J., Afari, E., & Fraser, B. (2013). Influence of teacher support and personal relevance on academic self-efficacy and enjoyment of mathematics lessons: A structural equation modeling approach. *Alberta Journal of Educational Research, 58*(4), 614–633. ISSN: 1923-1857
- Alt, D. (2015). Assessing the contribution of a constructivist learning environment to academic self-efficacy in higher education. *Learning Environments Research, 18*(1), 47–67. <https://doi.org/10.1007/s10984-015-9174-5>
- Amirian, S., & Tavakoli, E. (2016). Academic oral presentation self-efficacy: a cross-sectional interdisciplinary comparative study. *Higher Education Research and Development, 35*(6), 1095–1110. <https://doi.org/10.1080/07294360.2016.1160874>
- Argibay, J. C. (2006). Técnicas psicomé-

- tricas. Cuestiones de validez y confiabilidad. *Subjetividad y procesos cognitivos*, (8), 15-33. ISSN: 1666-244X
- Asakereh, A., & Dehghannezhad, M. (2015). Student satisfaction with EFL speaking classes: Relating speaking self-efficacy and skills achievement. *Issues in Educational Research*, 25(4), 345–363. ISSN: 1837-6290
- Askar, P., & Davenport, D. (2009). An investigation of factors related to self-efficacy for JAVA Programming among engineering students. *The Turkish Online Journal of Educational Technology*, 8(1), 26. <http://www.tojet.net/volumes/v8i1.pdf#page=27>
- Baglama, B., & Uzunboylu, H. (2017). The relationship between career decision-making self-efficacy and vocational outcome expectations of preservice special education teachers. *South African Journal of Education*, 37(4), 1–11. <https://doi.org/10.15700/saje.v37n4a1520>
- Bandura, A. (1995). *Self-efficacy in changing societies*. New York: W.H. Freeman & Company.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. W H Freeman/Times Books/ Henry Holt & Co.
- Bandura, A. (2006). Guide for constructing self-efficacy scales. *Self-efficacy beliefs of adolescents*, 5(1), 307-337. https://doi.org/10.1007/978-94-007-0753-5_2631
- Bandura, A. (2012). On the functional properties of perceived self-efficacy revisited. *Journal of Management*, 38(1), 9–44. <https://doi.org/10.1177/0149206311410606>
- Bartimote-Aufflick, K., Bridgeman, A., Walker, R., Sharma, M., & Smith, L. (2016). The study, evaluation, and improvement of university student self-efficacy. *Studies in Higher Education*, 41(11), 1918–1942. <https://doi.org/10.1080/03075079.2014.999319>
- Becerra-González, C., & Reidl, L. (2015). Motivación, autoeficacia, estilo atribucional y rendimiento escolar de estudiantes de bachillerato. *Revista Electrónica de Investigación Educativa*, 17(3), 79–93. ISSN 1607-4041
- Blanco, H., Ornelas, M., Aguirre, J. F., & Guedeas, J. C. (2012). Autoeficacia percibida en conductas académicas: Diferencias entre hombres y mujeres. *Revista Mexicana de Investigación Educativa*, 17(53), 557–571. <http://www.scielo.org.mx/pdf/rmie/v17n53/v17n53a11.pdf>
- Brady-Amoon, P., & Fuertes, J. N. (2011). Self-Efficacy, Self-Rated abilities, adjustment, and academic performance. *Journal of Counseling & Development*, 89(4), 431–438. <https://doi.org/10.1002/j.1556-6676.2011.tb02840.x>
- Brown, G., Peterson, E., & Yao, E. (2016). Student conceptions of feedback: Impact on self-regulation, self-efficacy, and academic achievement. *British Journal of Educational Psychology*, 86(4), 606–629. <https://doi.org/10.1111/bjep.12126>
- Bui, H., Fung, K., Kwek, A., & Rynne, J. (2017). The impacts of self-efficacy on academic performance: An investigation of domestic and international undergraduate students in hospitality and tourism. *Journal of Hospitality, Leisure, Sport and Tourism Education*, 20(March 2014), 47–54. <https://doi.org/10.1016/j.jhlste.2017.02.002>
- Casas, Y., & Blanco-Blanco, Á. (2016). Una revisión de la investigación educativa sobre autoeficacia y teoría cognitivo social en Hispanoamérica. *Revista de Pedagogía*, 68(2), 27–47. <https://doi.org/10.13042/Bordon.2016.44637>
- Castellanos, V., Latorre, D., Mateus, S., & Navarro, C. (2017). Modelo explicativo del desempeño académico desde la autoeficacia y los problemas de conducta. *Revista Colombiana de Psicología*, 26(1), 149–161. <https://doi.org/10.15446/rcp.v26n1.56221>
- D’Lima, G., Winsler, A., & Kitsantas, A. (2014). Ethnic and gender differences in first-year college students’ goal orientation, Self-Efficacy, and extrinsic and intrinsic motivation. *Journal of Educational Research*, 107(5), 341–356. <https://doi.org/10.1080/00220671.2013.823366>
- Durán-Aponte, E., Elvira-Valdés, M., & Pujol, L. (2014). Validación del inventario de autoeficacia para inteligencias múltiples revisado (iami-r) en una muestra de estudiantes univer-

- sitarios venezolanos. *Actualidades Investigativas En Educación*, 14(2), 399–423. ISSN: 1409-4703
- Ekhholm, E., Zumbrunn, S., & Conklin, S. (2015). The relation of college student self-efficacy toward writing and writing self-regulation aptitude: writing feedback perceptions as a mediating variable. *Teaching in Higher Education*, 20(2), 197–207. <https://doi.org/10.1080/13562517.2014.974026>
- Elliott, J., Thevenin, M., & Bigelow, B. (2017). Promoting CM student success: Establishing an academic performance benchmark given construction-education self-efficacy, motivation and planned behavior. *International Journal of Construction Education and Research*, 13(4), 284–298. <https://doi.org/10.1080/15578771.2016.1249316>
- Fan, J., Meng, H., Billings, R., Litchfield, R., & Kaplan, I. (2008). On the role of goal orientation traits and self-efficacy in the goal-setting process: distinctions that make a difference. *Human Performance*, 21(4), 354–382. <https://doi.org/10.1080/08959280802347122>
- Gallegos, M., Pérez-Acosta, A. M., Klappenbach, H., López-López, W., Bregman, C., & López, W. L. (2020). Los estudios bibliométricos en el campo de la psicología iberoamericana: Una revisión metabibliométrica. Interdisciplinaria. *Revista de Psicología y Ciencias Afines*, 37(2), 95-115. <https://doi.org/10.16888/interd.2020.37.2.6>
- García-Fernández, J., Inglés-Saura, C., Vicent, M., González, C., Lagos-San Martín, N., & Pérez-Sánchez, A. (2016). Relación entre autoeficacia y autoatribuciones académicas en estudiantes chilenos. *Universitas Psychologica*, 15(1), 79–88. <https://doi.org/10.11144/Javeriana.upsy15-1.raaa>
- Gbadamosi, G., Evans, C., Richardson, M., & Ridolfo, M. (2015). Employ ability and students' part-time work in the UK: Does self-efficacy and career aspiration matter? *British Educational Research Journal*, 41(6), 1086–1107. <https://doi.org/10.1002/berj.3174>
- George, L., Locasto, L., Pyo, K., & Cline, T. (2017). Effect of the dedicated education unit on nursing student self-efficacy: A quasi-experimental research study. *Nurse Education in Practice*, 23, 48–53. <https://doi.org/10.1016/j.nepr.2017.02.007>
- Guerreiro-Casanova, D. C., & Polydoro, S. a. J. (2011). Autoeficácia e integração ao ensino superior: um estudo com estudantes de primeiro ano. *Psicologia: Teoria e prática* 13(1), 75–88. http://pepsic.bvsalud.org/scielo.php?pid=S1516-36872011000100006&script=sci_arttext
- Hen, M., & Goroshit, M. (2014). Academic procrastination, emotional intelligence, academic self-efficacy, and GPA: A comparison between students with and without learning disabilities. *Journal of Learning Disabilities*, 47(2), 116–124. <https://doi.org/10.1177/0022219412439325>
- Hernández, L. (2018). Perfil sociodemográfico y académico en estudiantes universitarios respecto a su autoeficacia académica percibida. *Psicogente*, 21(39), 35–49. <https://doi.org/10.17081/psico.21.39.2820>
- Honick, T., & Broadbent, J. (2016). The influence of academic self-efficacy on academic performance: A systematic review. *Educational Research Review*, 17, 63–84. <https://doi.org/10.1016/j.edurev.2015.11.002>
- Huffman, A., Whetten, J., & Huffman, W. (2013). Using technology in higher education: The influence of gender roles on technology self-efficacy. *Computers in Human Behavior*, 29(4), 1779–1786. <https://doi.org/10.1016/j.chb.2013.02.012>
- Iskender, M., & Akin, A. (2010). Social self-efficacy, academic locus of control, and internet addiction. *Computers and Education*, 54(4), 1101–1106. <https://doi.org/10.1016/j.compedu.2009.10.014>
- Joo, Y. J., Jung, S., Lim, E., & Kim, H. J. (2014). Factors Affecting M-Learners' Course Satisfaction and Learning Persistence. *International Association for Development of the Information Society*. ISBN: 978-989-8704-02-3. 10th International Conference Mobile Learning 2014
- Kılıç-Çakmak, E. (2010). Learning strategies and

- motivational factors predicting information literacy self-efficacy of e-learners. *Australasian Journal of Educational Technology*, 26(2), 192–208. <https://doi.org/10.14742/ajet.1090>
- Komaraju, M., & Dial, C. (2014). Academic identity, self-efficacy, and self-esteem predict self-determined motivation and goals. *Learning and Individual Differences*, 32, 1–8. <https://doi.org/10.1016/j.lindif.2014.02.004>
- Lee, P., & Mao, Z. (2016). The relation among self-efficacy, learning approaches, and academic performance: an exploratory study. *Journal of Teaching in Travel & Tourism*, 16(3), 178–194. <https://doi.org/10.1080/15313220.2015.1136581>
- Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior*, 45(1), 79–122. <https://doi.org/10.1006/jvbe.1994.1027>
- Lin, T. J., Liang, J. C., & Tsai, C. C. (2015). Identifying Taiwanese University students' physics learning profiles and their role in physics learning self-efficacy. *Research in Science Education*, 45(4), 605–624. <https://doi.org/10.1007/s11165-014-9440-z>
- Lopez, D. (2014). Gender Differences in Self-Efficacy Among Latino College Freshmen. *Hispanic Journal of Behavioral Sciences*, 36(1), 95–104. <https://doi.org/10.1177/0739986313510690>
- López-Angulo, Y., Sáez-Delgado, F., Arias-Roa, N., & Díaz-Mujica, A. (2020). Revisión sistemática sobre instrumentos de autorregulación del aprendizaje en estudiantes de educación secundaria. *Información Tecnológica*, 31(4), 85-98. <https://doi.org/10.4067/S0718-07642020000400085>
- Luszczynska, A., Gutiérrez-Doña, B., & Schwarzer, R. (2005). General self-efficacy in various domains of human functioning: Evidence from five countries. *International Journal of Psychology*, 40(2), 80–89. <https://doi.org/10.1080/00207590444000041>
- Majer, J. (2009). Self-Efficacy and academic success among ethnically diverse first-generation community college students. *Journal of Diversity in Higher Education*, 2(4), 243–250. <https://doi.org/10.1037/a0017852>
- Mallick, M. K., & Singh, K. (2015). Academic achievement of higher education students: Influence of academic procrastination and self-efficacy. *Man in India*, 94(4), 1091–1103.
- Martin, K., Goldwasser, M., & Harris, E. (2017). Developmental Education's impact on students' academic self-concept and self-efficacy. *Journal of College Student Retention: Research, Theory and Practice*, 18(4), 401–414. <https://doi.org/10.1177/1521025115604850>
- Martínez, J., & Herrera, M. (2014). Propiedades psicométricas de la escala de cómputo para el EXANI. *Revista Electrónica de Investigación Educativa*, 16(2), 68–80. ISSN 1607-4041
- Matoti, S., & Matoti, S. (2016). Measuring the academic self-efficacy of students at a south african Higher Education institution measuring the academic self-efficacy of students at a south african Higher Education Institution. *Journal of Psychology in Africa*, 0237(March), 151–154. <https://doi.org/10.1080/14330237.2011.10820442>
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D., & PRISMA, G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Annals of Internal Medicine*, 151(4), 264–269. <https://doi.org/10.1371/journal.pmed.1000097>
- Multon, K. D., Brown, S. D., & Lent, R. W. (1991). Relation of self-efficacy beliefs to academic outcomes: A meta-analytic investigation. *Journal of Counseling Psychology*, 38(1), 30-38. <https://doi.org/10.1037/0022-0167.38.1.30>
- Nielsen, T., Makransky, G., Vang, M. L., & Dammeyer, J. (2017). How specific is specific self-efficacy? A construct validity study using Rasch measurement models. *Studies in Educational Evaluation*, 53(August 2016), 87–97. <https://doi.org/10.1016/j.stueduc.2017.04.003>
- Oriol-Granado, X., Mendoza-Lira, M., Covarrubias-Apablaza, C.-G., & Molina-López, V.-M. (2017). Emociones positivas, apoyo a la autonomía y rendimiento de estudiantes universitarios: el papel mediador del compro-

- miso académico y la autoeficacia. *Revista de Psicodidáctica*, 22(1), 45–53. [https://doi.org/10.1016/S1136-1034\(17\)30043-6](https://doi.org/10.1016/S1136-1034(17)30043-6)
- Ornelas, M., Blanco, H., Viciano, J., & Rodríguez, J. (2015). Percepción de autoeficacia en la solución de problemas y comunicación científica en universitarios de Ingeniería y Ciencias Sociales. *Formación Universitaria*, 8(4), 93–100. <https://doi.org/10.4067/S0718-50062015000400011>
- Papastergiou, M., Gerodimos, V., & Antoniou, P. (2011). Multimedia blogging in physical education: Effects on student knowledge and ICT self-efficacy. *Computers and Education*, 57(3), 1998–2010. <https://doi.org/10.1016/j.compedu.2011.05.006>
- Papinczak, T., Young, L., Groves, M., & Haynes, M. (2008). Effects of a metacognitive intervention on students' approaches to learning and self-efficacy in a first year medical course. *Advances in Health Sciences Education*, 13(2), 213–232. <https://doi.org/10.1007/s10459-006-9036-0>
- Pool-Cibrián, W., & Martínez-Guerrero, J. (2013). Autoeficacia y uso de estrategias para el aprendizaje autorregulado en estudiantes universitarios. *Revista Electrónica de Investigación Educativa*, 15(3), 21–37. <http://redie.uabc.mx/vol15no3/contenido-pool-mtnez.html>
- Prat-Sala, M., & Redford, P. (2010). The interplay between motivation, self-efficacy, and approaches to studying. *British Journal of Educational Psychology*, 80(2), 283–305. <https://doi.org/10.1348/000709909X480563>
- Priesack, A., & Alcock, J. (2015). Well-being and self-efficacy in a sample of undergraduate nurse students: A small survey study. *Nurse Education Today*, 35(5), e16–e20. <https://doi.org/10.1016/j.nedt.2015.01.022>
- Putwain, D., Sander, P., & Larkin, D. (2013). Academic self-efficacy in study-related skills and behaviours: Relations with learning-related emotions and academic success. *British Journal of Educational Psychology*, 83(4), 633–650. <https://doi.org/10.1111/j.2044-8279.2012.02084.x>
- Rakan, A., Malek, A., & Karim, A. (2010). An empirical investigation into the role of enjoyment, computer anxiety, computer self-efficacy and internet experience in influencing the students' intention to use e-learning: a case study from Saudi Arabian governmental universities. *Copyright The Turkish Online Journal of Educational Technology*, 22(4), 22–34. <https://files.eric.ed.gov/fulltext/EJ908069.pdf>
- Rivera, M., & Martínez, M. (2017). Autoeficacia, participación social y percepción de los servicios universitarios según el sexo. *Revista de Psicología*, 25(2), 1–16. <http://www.semariorepublicano.uchile.cl/index.php/RDP/article/viewArticle/44842>
- Roick, J., & Ringeisen, T. (2018). Students' math performance in higher education: Examining the role of self-regulated learning and self-efficacy. *Learning and Individual Differences*, 65(2016), 148–158. <https://doi.org/10.1016/j.lindif.2018.05.018>
- Ross, M., Perkins, H., & Bodey, K. (2013). Information literacy self-efficacy: The effect of juggling work and study. *Library and Information Science Research*, 35(4), 279–287. <https://doi.org/10.1016/j.lisr.2013.04.008>
- Ross, M., Perkins, H., & Bodey, K. (2016). Academic motivation and information literacy self-efficacy: The importance of a simple desire to know. *Library and Information Science Research*, 38(1), 2–9. <https://doi.org/10.1016/j.lisr.2016.01.002>
- Rottinghaus, P. J., Larson, L. M., & Borgen, F. H. (2003). The relation of self-efficacy and interests: A meta-analysis of 60 samples. *Journal of Vocational Behavior*, 62(2), 221–236. [https://doi.org/10.1016/S0001-8791\(02\)00039-8](https://doi.org/10.1016/S0001-8791(02)00039-8)
- Sáez, F., Bustos, C., & Díaz, A. (2018). Self-efficacy questionnaire of the self-directed-learning readiness. *Avaliação Psicológica*, 17(1), 92–100. <https://doi.org/10.15689/ap.2017.1701.10.13348>
- Sander, P., & Sanders, L. (2009). Measuring academic behavioural confidence: The ABC scale revisited. *Studies in Higher Education*, 34(1), 19–35. <https://doi.org/10.1080/03075070802457058>
- Scherbaum, C. A., Cohen-Charash, Y., & Kern,

- M. J. (2006). Measuring general self-efficacy: A comparison of three measures using item response theory. *Educational and Psychological Measurement, 66*(6), 1047–1063. <https://doi.org/10.1177/0013164406288171>
- Schunk, D. H. (1991). Self-efficacy and academic motivation. *Educational Psychologist, 26*(3–4), 207–231. <https://doi.org/10.1080/00461520.1991.9653133>
- Sherer, M., & Adams, C. H. (1983). Construct validation of the self-efficacy scale. *Psychological Reports, 53*(3), 899–902. <https://doi.org/10.2466/pr0.1983.53.3.899>
- Sousa, H. De, Marucia, P., & Sancineto, C. (2013). Autoeficácia na formação superior e vivências de universitários cotistas e não cotistas. *Avaliação Psicológica, 12*(2), 253–261. ISSN: 1677-0471
- Suprpto, N., Chang, T. S., & Ku, C. H. (2017). Conception of learning physics and self-efficacy among indonesian university students. *Journal of Baltic Science Education, 16*(1), 7–19. ISSN 1648–3898
- Tariq, V., Qualter, P., Roberts, S., Appleby, Y., & Barnes, L. (2013). Mathematical literacy in undergraduates: role of gender, emotional intelligence and emotional self-efficacy. *International Journal of Mathematical Education in Science and Technology, 44*(8), 1143–1159. <https://doi.org/10.1080/0020739X.2013.770087>
- Tladi, L. (2017). Perceived ability and success: which self-efficacy measures matter? A distance learning perspective. *Open Learning, 32*(3), 243–261. <https://doi.org/10.1080/02680513.2017.1356711>
- Torres, C., Real, E., Mallo, S., & Méndez, R. (2015). Percepción de autoeficacia, rendimiento académico y perfil vocacional en estudiantes de 4º de E.S.O. *Revista de Estudios e Investigación en Psicología y Educación, 3*(3), 86–92. <https://doi.org/10.17979/reipe.2015.0.03.139>
- Tseng, S.-C., & Tsai, C.-C. (2010). Taiwan college students' self-efficacy and motivation of learning in online peer assessment environments. *Internet and Higher Education, 13*(3), 164–169. <https://doi.org/10.1016/j.iheduc.2010.01.001>
- Valle, A., Regueiro, B., Rodríguez, S., Piñeiro, I., Freire, C., Ferradás, M., & Suárez, N. (2015). Perfiles motivacionales como combinación de expectativas de autoeficacia y metas académicas en estudiantes universitarios. *European Journal of Education and Psychology, 8*(1), 1–8. <https://doi.org/10.1016/j.ejeps.2015.10.001>
- van Herpen, S., Meeuwisse, M., Hofman, A., Severiens, S., & Arends, L. (2017). Early predictors of first-year academic success at university: pre-university effort, pre-university self-efficacy, and pre-university reasons for attending university. *Educational Research and Evaluation, 23*(1–2), 52–72. <https://doi.org/10.1080/13803611.2017.1301261>
- Wiggins, J., Grafsgaard, J., Boyer, K., Wiebe, E., & Lester, J. (2017). Do you think you can? The influence of student self-efficacy on the effectiveness of tutorial dialogue for computer science. *International Journal of Artificial Intelligence in Education, 27*(1), 130–153. <https://doi.org/10.1007/s40593-015-0091-7>
- Wu, J. Y. (2017). The indirect relationship of media multitasking self-efficacy on learning performance within the personal learning environment: Implications from the mechanism of perceived attention problems and self-regulation strategies. *Computers and Education, 106*, 56–72. <https://doi.org/10.1016/j.compedu.2016.10.010>
- Zheng, C., Liang, J. C., & Tsai, C. C. (2017). Validating an instrument for EFL learners' sources of self-efficacy, academic self-efficacy and the relation to english proficiency. *Asia-Pacific Education Researcher, 26*(6), 329–340. <https://doi.org/10.1007/s40299-017-0352-3>

Recibido: 16 de julio de 2020

Aceptado: 1 de abril de 2022