Interactive Learning Environments

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/nile20

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To cite this article: Mauricio Federico Zalazar-Jaime, Luciana Sofía Moretti, Zoilo Emilio García-Batista & Leonardo Adrián Medrano (2023) Evaluation of an academic satisfaction model in E-learning education contexts, Interactive Learning Environments, 31:7, 4687-4697, DOI: 10.1080/10494820.2021.1979047

To link to this article: https://doi.org/10.1080/10494820.2021.1979047

Published online: 19 Sep 2021.

INTERACTIVE LEARNING ENVIRONMENTS
2023, VOL. 31, NO. 7, 4687–4697
https://doi.org/10.1080/10494820.2021.1979047

Routledge
Taylor & Francis Group

Evaluation of an academic satisfaction model in E-learning education contexts

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ABSTRACT

The urgent imperative to ''move online'', caused by the recent Covid-19 pandemic, has led to an in-depth study of the psychological factors involved in designing successful online learning experiences. The social-cognitive model of academic satisfaction has been widely researched in conventional educational contexts in different countries. The purpose of this research was to evaluate the adequacy of this model in e-learning education contexts. The method used was path analysis, including as independent variables: social support, informational support, self-efficacy, outcome expectations and progress in goals. The results indicated that the model adjusted satisfactorily, explaining 45% of the variance in academic satisfaction. As a specific finding of this study, in an e-learning context, it can be mentioned that a greater contribution of socio-emotional support was demonstrated with respect to informational support. On the other hand, a weak contribution of outcome expectations on academic satisfaction was verified, aspect that requires furthers research and the development of specific measures for e-learning education context. In summary, the results of this research together provide preliminary evidence favorable to the social-cognitive model of academic satisfaction in virtual environments of university education.

ARTICLE HISTORY
Received 29 September 2020
Accepted 14 August 2021

KEYWORDS
University students; academic satisfaction; information and communication technologies; e-learning; social-cognitive theory

1. Introduction

The urgent imperative to ''move online'', caused by the recent Covid-19 pandemic has led to teaching staff to prepare and deliver their classes from home, with all the practical and technical challenges this entails, and often without proper technical support. Moreover, a significant challenge for university teachers has been their lack of mastering pedagogical content for teaching online. Such knowledge includes technical and administrative aspects of teaching online and more significantly, it includes the pedagogical foundations and knowledge of principles needed to design for, and facilitate, satisfactory online learning experiences (Rapanta et al., 2020). Based on this, the need to develop research that contemplates the role of psychological factors involved in the process of online teaching is highlighted.

The social cognitive theory of career (SCTC, Lent et al., 1994) constitutes one of the frames of reference in educational literature. This model has a wide empirical support of its postulates, highlighting its usefulness for the understanding of diverse aspects of academic and professional development

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(Cupani et al., 2017; Peña Calvo et al., 2015; Wang & Newlin, 2002). Particularly noteworthy is the academic satisfaction model, which emphasizes that the judgments students make during their academic trajectory positively influence integration, academic adjustment, persistence, and psychological well-being (Balkis, 2013; Kuo et al., 2014; Teo, 2010; Tessema et al., 2012; Zalazar-Jaime et al., 2017).

Consistent with Bandura's (1987) theory, the SCTC holds that students who are perceived as competent to perform a task successfully (self-efficacy beliefs), anticipate positive consequences (outcome expectations), become more actively involved in achieving their goals, achieve the progress they are seeking (goal progress) and develop favorable judgments of academic satisfaction. These personal and behavioral variables interact with nearby environmental factors. In particular, a large number of studies have highlighted that supportive environments can foster the development of self-efficacy beliefs, outcome expectations, and the achievement of established goals (e.g. Lent et al., 2013; Hui et al., 2013; Lent et al., 2014; Ezeofor & Lent, 2014; Navarro et al., 2014). Together, these factors (Figure 1) contribute to the students' judgments of academic satisfaction.

One of the characteristics of the SCTC lies in the consideration of the active character of the subject, and not as a mere receptor of environmental influences (Lent et al., 2000). However, the proactive role of individuals does not imply that their behavior is not affected by contextual and environmental factors. In this context, it is important to consider that information and communication technologies (ICTs) have modified the nature of practices, content, channels of interaction, and dissemination of the learning process that can significantly influence how students perceive support, their self-efficacy, and their academic expectations and goals.

As highlighted by Guri-Rosenblit (2005), there are a number of differential characteristics between traditional education and e-learning. In the latter, a predominance of a more active and participative role of the students is observed, where the learning process is adapted according to their needs and time. For this, teachers assume the role of facilitators between the content and the students (Dilamghani, 2001; Graff, 2003; Terrell & Dringus, 2000). As support, different virtual platforms (such as Moodle and Canvas, for example) promote a work environment that favors access to a large amount of information, the reduction of some educational costs (Lehman et al., 2001), and a work modality that favors interest, motivation and interaction through work/discussion groups (Bricall, 2000; Majó & Marques, 2002).

In contrast, in traditional education, teachers play a more active role in the transmission of content, whose formation is sequential and homogeneous, emphasizing the receptive role of these (Bricall, 2000; Lehman et al., 2001; Majó & Marques, 2002). Another aspect that varies substantially between traditional education and e-learning refers to the interaction between peers. In traditional education, the elaboration of knowledge can be developed in an interdependent way, where the sources of learning (vicarious learning and social persuasion, in particular) acquire a role in shaping behavior. In contrast, in e-learning, such learning experiences are restricted and limited by the characteristics of channels such as chat and discussion forums.

Although the literature highlights different lines of research aimed at investigating the degree of student satisfaction depending on the model of traditional learning and mediated by ICT (Abdous &

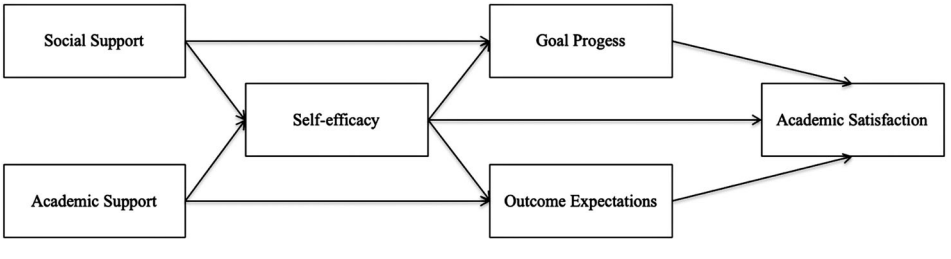

Figure 1. Academic Satisfaction Model (Lent, 2004).

Yoshimura, 2010; Bradford & Wyatt, 2010; Kim et al., 2011; Lu & Chiou, 2010; Roach & Lemasters, 2006; Swan, 2001), research does not consider these variables in a comprehensive manner. To date, there are no studies that have examined the adjustment of the satisfaction model in students studying in virtual learning environments. In fact, the research that evaluated the model proposed by Lent (2004) analyzes exclusively students who attend classes in a face-to-face manner (for example, Ezeofor & Lent, 2014; Hui et al., 2013; Lent et al., 2005; Lent et al., 2012; Navarro et al., 2014; Ojeda et al., 2011; Singley et al., 2010; Zalazar-Jaime et al., 2017). Taking this into consideration, the objective of this paper was to evaluate the academic satisfaction model proposed by Lent (2004) in a sample of university students who were studying in e-learning modality.

2. Methodology

2.1. Participants

A sample of 5686 students with an average age of 31.97 ($SD = 9.68$) from different careers and regions of Argentina was accidentally selected (male = 45.9%; female = 54.1%). It is worth to mention that for the purpose of increasing external validity of the study, we used a heterogeneous sample which means that participants came from 40 different careers. All the participants in this investigation studied through the virtual learning platform called Multimedia Learning System (from now on, MLS), which enables a learning management system based on communication between teachers, students, and among themselves, through learning objects which act as a mediator of the teaching-learning process. The learning objects are the different reading materials, forums, and interactive activities, among others, which aim to develop understanding, reflection, synthesis and transfer of knowledge. In this platform, the student must complete two evaluative instances. In the first one, the teacher explains, through a video hosted in the MLS platform, the instructions and/or problematic situation to be addressed, outlining the necessary topics for its resolution. In a second moment, students make the corresponding evaluation, individually and/or in groups, through a questionnaire of questions or a learning object that the teacher considers relevant. In this way, students take their respective subjects (semester or annual) through the MLS, adapting their study time according to the needs of each student.

2.2. Instruments

Perceived Support Scale (Lent et al., 2007). This instrument has nine items which evaluate to what extent the student's immediate context supports him/her in achieving his/her academic goals. Participants are asked to indicate their level of agreement with each statement ("my friends encourage me to continue my studies," for example), using a five-choice Lickert scale (strongly disagree to strongly agree). Psychometric studies reported by Lent et al. (2007) indicate satisfactory internal consistency (α=.84) and one-dimensional structure. In contrast to the original scale (Lent et al., 2007), an adaptation study of the scale conducted in Argentina (Medrano et al., 2014) observed two underlying factors, with acceptable values of internal consistency (α = .77 for Instructional Support Perception; α = .68 for Social Support Perception). It should be noted that this structure corresponds theoretically to the model proposed by Lee et al. (2011), who differentiate between instructional support (the guidance provided by teachers and tutors for the achievement of learning goals) and social support (support from peers and family members in academic and non-academic subjects).

Self-Efficacy Scale for Learning (SELF-L, Zimmerman & Kitsantas, 2007). This self-report is composed of ten items that assess students' perceived ability to engage autonomously in learning processes such as planning, organizing, and memorizing (e.g. "When you are struggling to remember details of a concept, can you find a way to relate them in order to remember them?") This study used the Argentinean and abbreviated version of the SELF adapted by Bugliolo and Castagno

(2005). This version includes translation studies, analysis of internal structure and consistency, and evidence of validity with external variables with satisfactory results.

Goal Progress (Lent et al., 2007). This scale is composed of nine items, which assess the progress students perceive in their academic goals. Students must indicate using a 5-item Lickert scale (from "I have not progressed at all" to "I have made excellent progress"), to what extent they have exceeded each of the goals stated in the different items. Regarding psychometric properties, the original studies conducted by Lent et al. (2007), highlight a one-dimensional structure and an adequate internal consistency (α=.81). Similarly, the Argentinean validation (Medrano et al., 2017), reported studies of internal consistency, by means of Cronbach's Alpha coefficient, with a high value (α=.89), and adequate evidence of internal structure was also obtained.

Academic Outcome Expectancies (Lent et al., 2005). This scale is composed of 10 items that investigate the possible results expected after graduation. In a study developed by Lent et al. (2005), the authors reported a factorial structure composed of two factors: intrinsic academic expectancies (related to subjective experiences such as interest and satisfaction) and extrinsic academic expectancies (external or tangible reinforcing consequences such as money and respect from others). Participants should respond using a Likert-type scale with 10 response options where 0 represents "strongly disagree" and 9 "strongly agree". In its original version, this scale had internal consistency studies (α = .90), while the Argentinean version reported lower but satisfactory rates of internal consistency (extrinsic expectancies, α = .78; intrinsic expectancies, α = .72), and evidence of internal structure (exploratory factor analysis).

Academic Satisfaction (Lent et al., 2005). This scale is composed of seven items on which the participant must evaluate the level of satisfaction he or she experiences in different aspects of his or her career ("I enjoy my classes most of the time," for example). Examinees must use a Lickert scale with ten answer options to indicate their level according to each statement. Original psychometric studies suggest that the scale has a one-dimensional factor structure and a high internal consistency (Cronbach's Alpha, α=.94), while the Argentinean version (Medrano, 2015) showed satisfactory internal consistency values (α = .85), and evidence of internal structure consistent with the original study of the scale.

2.3. Procedure

The scales used in this research were incorporated into a survey server. In order to obtain the highest possible response rate, the indications made by Fernández et al. (2009) were followed, which mention three criteria to be taken into account when sending online surveys, namely: personalization of the invitation (addressing the participant by name and not anonymously), reminders about the test (warning him/her every two weeks that he/she has not finished the survey, or encouraging him/her to start it) and finally, the use of incentives (referring to the exchange of a reward, economic or symbolic, for the required task). The dissemination was done through emails and messages hosted in the student's online self-management system. Prior to the administrations, the objective of the study was explained, and a note of informed consent was provided to participants, highlighting that the data collected would be handled for research purposes, guaranteeing discretion and anonymity in the use of such data.

3. Results

3.1. Data preparation

SPSS software for Windows 21.0 was used to set up the data for the proposed analyses. First, no missing cases were recorded because the responses to the items were marked as "mandatory" in the making of the online survey. Then, the mean, standard deviation, asymmetry and kurtosis of each variable were calculated. It was observed that all the variables presented an approximate

distribution to normality, considering the criterion of values between ±2 (George & Mallery, 2016; see Table 1). On the other hand, the association between the variables was tested using Pearson's correlation coefficient r. All correlations, except between informational support and progress goals, were statistically significant with weak to moderate r-values, ruling out the existence of an overlap between the variables (Tabachnick & Fidell, 2013) Table 2.

3.2. Evaluation and estimation of the academic satisfaction model through path analysis

The statistical software Mplus 6.12 was used to evaluate the fit of the model, and the maximum likelihood estimator (ML) was used. Different statistics were used to evaluate model fit, Chi-square (χ^2), Comparative Fit Index (CFI), Tucker Lewis index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Values between .90 and .95 or higher for CFI and TLI are considered as fits from acceptable to excellent, while RMSEA values between .05 and .08 are considered as adequate and for SRMR, values below 0.08 indicate a good fit of the model to the data (Hu & Bentler, 1999; Yu & Muthen, 2002). The results indicated that the academic satisfaction model presented an adequate adjustment ($\chi^2 = 347.675$; gl = 2; $p = .000$; CFI = .941; TLI = .981; RMSEA = .174, 90% CI = .159 – .190), explaining 40% of the satisfaction variance.

As shown in Figure 2, the paths stipulated by the SCCT between self-efficacy beliefs about academic satisfaction, and outcome expectancies about goal progress. To adequately understand how one variable relates to another, indirect effects must be considered, which are the product of the two standardized direct effects involved. To evaluate the statistical significance of the indirect effects of the model, the Sobel test was used, which consists of dividing the products of the non-standardized path coefficients by their standard error (Edwards & Lambert, 2007).

By examining the effects, the relationship between the central core of the SCCT is partially verified (see Table 3). That is, self-efficacy beliefs contribute directly to both outcome expectancies (β= .13, p = .01) and goal progress (β= .25, p = .01), while no evidence was found regarding the path between outcome expectancies and goal progress (β= .03, $p > .05$). Regarding direct relationships on academic satisfaction, it was observed that only goal progress (β= .60, p = .01) and outcome expectancies presented significant contributions (β= .16, p = .01); however, self-efficacy beliefs for learning did not show a significant contribution (β= .00, $p > .01$)

The contribution of social support, which was differentiated according to the informative and emotional support, was corroborated. In other words, informational support presented positive and significant contributions with the central constructs of the SCCT, namely, beliefs of self-efficacy (β= .19, p = .01), outcome expectancies (β= .24, p = .01), and negative with respect to goal progress (β= -.12, p = .01). Similarly, emotional support made positive contributions to self-efficacy beliefs (β= .25, p = .01), outcome expectancies (β= .20, p = .01), and negative goal progress (β= .11, p = .01). In terms of indirect effects, the previously mentioned constructs presented a central role in the modulation between socio-emotional support and academic satisfaction (β indirect effect = .14, $p < .01$), while self-efficacy beliefs presented an indirect contribution, through outcome expectancies and goal progress to satisfaction (β indirect effect = .18, $p < .01$).

When examining the magnitude of the total effects, it can be seen that the variables that contribute most to academic satisfaction are social-emotional support (β total=.14), self-efficacy (β

Table 1. Mean, Standad Deviation, Assymetry and Kurtosis of the variables under study.

	Mean	Standad Deviation	Assymetry	Kurtosis
Informational Support	6,12	2,18	.11	−.87
Socioemotional Support	8,12	1,93	−.98	.28
Self-Efficacy for Learning	13,70	3,56	.01	−.71
Outcome Expectancies	15,59	3,21	−.74	.35
Progress Goals	11,08	5,85	−.66	−.49
Academic Satisfaction	11,88	5,73	−.71	−.30

Table 2. Correlation matrix between the scales included in the study.

	1	2	3	4	5	6
1. 1. Informational Support	1	.22**	.24**	.32**	-.02	.21**
1. 2. Socioemotional Support		1	.29**	.29**	.16**	.17**
1. 3. Self-Efficacy for Learning			1	.25**	.26**	.20**
1. 4. Outcome Expectancies				1	.09**	.22**
1. 5. Progress Goals					1	.61**
1. 6. Academic Satisfaction						1

**$p \leq .01$.

total=.18), outcome expectancies (β total=.18) and goal progress (β total=.60). Additionally, the size of the effect of the determination coefficients was estimated. For this purpose, Cohen's (1992) f^2 coefficient was calculated, where, according to this author, the effect sizes (f^2) .02, .15. and .35 are considered small, medium and large, respectively. The constructs of progress goals ($f^2 = .09$) and self-efficacy for learning ($f^2 = .14$) presented a small effect size. Academic outcome expectations ($f^2 = .20$) showed a medium size, while academic satisfaction ($f^2 = .67$) showed a large effect size.

Discussion

The teaching and learning processes have not been unaware of the changes produced by ICTs. Unfortunately, there seems to be a gap between the pace of technological change and the pedagogical strategies that allow their proper incorporation into classrooms. The incorporation of ICTs brings many advantages, since they make possible continuous and personalized training, eliminate spatial–temporal restrictions, and favor communication between the different agents in the educational process. However, developing a working methodology in e-learning contexts does not only imply a technological change. The adoption of a technological innovation will depend on a satisfactory assimilation by users (El-Seoud et al., 2014; Lee et al., 2011).

Judgments of academic satisfaction are a critical variable for understanding students' academic experience (Lent et al., 2013; Zalazar-Jaime et al., 2017). Despite the solid results obtained by the model proposed by Lent (2004), studies carried out are limited to face-to-face environments. The present investigation analyzes for the first time the adjustment of the socio-cognitive model of academic satisfaction in virtual environments.

The results obtained are consistent with those reported by the SCCT (Lent et al., 2015; Lent et al., 2016). First, the effect of perceived academic support on self-efficacy, outcome expectancies, and goal progress is corroborated. It should be noted that both informational and emotional support

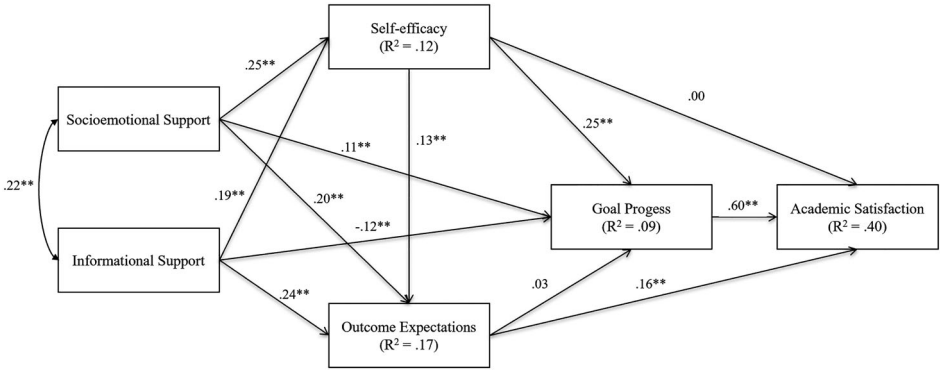

Figure 2. Academic Satisfaction Model in E-learning Education Contexts. Standardized path coefficients and determination coefficients (R^2). Note: **$p \leq .01$.

Table 3. Total effects, direct and indirect, of the Academic Satisfaction Model in E-learning Education Contexts.

	Effect		
Model variables	Direct	Indirect	Total
Socioemotional Support			
on Self-Efficacy	.25**	–	.25**
on Academic Outcome Expectancies	.20**	.03**	.23**
on Academic Goal Progress	.11**	.07**	.18**
on Academic Satisfaction	–	.14**	.14**
Informational Support			
on Self-Efficacy	.19**	–	.19**
on Academic Outcome Expectancies	.24**	.03**	.27**
on Academic Goal Progress	−.12**	.06**	−.06**
on Academic Satisfaction	–	−.01	−.01
Self-Efficacy			
on Academic Outcome Expectancies	.13**	–	.13**
on Academic Goal Progress	.25**	.00	.25**
on Academic Satisfaction	.00	.18**	.18**
Academic Outcome Expectations			
on Academic Goal Progress	.03	–	.03
on Academic Satisfaction	.16**	.02*	.18**
Academic Goal Progress			
on Academic Satisfaction	.60**	–	.60**

** $p \leq .01$; * $p \leq .05$.

presented a significant contribution; however, the perception of social-emotional support presented higher standardized coefficients with respect to informational support. These results indicate that the perception of support, linked to aspects such as empathy and containment, exert a greater influence than the informational aspects on students who perform in e-learning contexts. Moreover, it was the social-emotional support, and not the informational one, which presented a significant indirect contribution to academic satisfaction. These data suggest that the perception of this emotional support is indispensable in technology- mediated teaching contexts. In this sense, it would be relevant to generate environments that encourage this type of support to promote self-efficacy, motivation towards online teaching and academic satisfaction of students (El-Seoud et al., 2014; Zalazar-Jaime & Cupani, 2016).

In addition, as expected, self-efficacy beliefs showed a significant contribution to outcome expectancies and goal progress. These results are consistent with those reported in previous studies of face-to-face students (Flores Kanter et al., 2017; Lent, 2004; Lent et al., 2007). According to Bandura (1997), self-efficacy beliefs have a direct influence on expectations and are involved in the effort students invest in achieving their goals. In this way, students with greater confidence in their abilities often anticipate positive outcomes and invest more time and energy in addressing obstacles to achieving their academic goals. Contrary to what has been hypothesized, self-efficacy beliefs did not show a direct contribution to satisfaction, but rather their impact was mediated by the perception of goal progress.

With regard to outcome expectancies, a slight contribution is appreciated. These results are consistent with those reported in previous research (Ezeofor & Lent, 2014; Feldt, 2012; Medrano et al., 2014). The relationship between expectancies, perceived goal progress, and academic satisfaction is likely to be nonlinear. Indeed, positive outcome expectancies can be a source of motivation for a student to pursue academic goals. However, high expectancies can be a source of dissatisfaction and frustration.

Perceived goal progress was the variable that showed the greatest association with satisfaction judgments. As postulated by the SCCT (Lent et al., 1994), goals act as an internal reference standard for evaluating academic experience, and therefore, the higher the progress perceived by students, the more positive their evaluation of the academic experience. In contrast, the perception of lack of progress on academic goals generates a negative self-evaluation of the

academic experience, which translates into a negative relationship with satisfaction. The relationship between this last construct and the beliefs of self-efficacy for learning deserves special attention.

In general terms, the present study has corroborated the main hypotheses of the academic satisfaction model (Lent, 2004), evidencing the importance of these variables in the academic experience of students who study on platforms mediated by technology. In this sense, this model can serve as a management model to improve the experience of users, developing adaptations that aim to strengthen their beliefs of self-efficacy, the perception of informational and emotional support and progress in their academic goals. Based on these findings and those of other research (El-Seoud et al., 2014), it is possible to posit that teaching platforms that contemplate these variables will have a greater probability of providing more satisfactory academic experiences, increasing motivation, participation, performance, academic persistence, and psychological well-being of students.

However, this study has a number of limitations that should be considered for future research. Although the applicability of the model proposed by Lent has been demonstrated, the study could be enriched if new variables were included. When corroborating the role of emotional support, it is probably useful to evaluate the role of help-seeking. The need of students to interact with peers and teachers (El-Seoud et al., 2014), added to the fact that students manifest feelings of loneliness and isolation in virtual environments (Chiecher et al., 2009), may be a relevant factor. Another relevant construct refers to computational self-efficacy, which highlights the confidence the student has to successfully perform a computer-related task (Marakas et al., 1998; Compeau et al., 1999). Such subjective judgment is of interest in improving skills, through the intervention of learning experiences, in students who have difficulties in performing them (El-Seoud et al., 2014).

On the other hand, several studies (e.g. Fredricks et al., 2004; Skinner et al., 2009; Upadyaya & Salmela-Aro, 2013; Wolters, 2004) have highlighted that academic engagement, due to its multidimensional character (behavioral, emotional, and cognitive aspects), implies not only carrying out academic activities, but also presents a higher level of commitment, motivation, and predisposition to acquire knowledge, even in the presence of certain difficulties. Strengthening this commitment has been seen to be, at the same time, a key mediator between these academic achievements and the personal well-being felt by the student (Yu et al., 2018).

In conclusion, future research should focus on considering the influence on the teaching-learning process via e-learning courses, which have different constructs and variables mentioned, studying them as a whole. This can be fundamental to strengthen the designs and applications of technology-driven learning platforms.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes on contributor

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