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Artículos de investigación científica y tecnológica

FACTORS ASSOCIATED WITH ACADEMIC ENGAGEMENT IN VIRTUAL UNIVERSITY STUDENTS: REVIEW OF THE MAIN THEORIES AND INSTRUMENTS

Factores asociados al compromiso académico en universitarios
de carreras virtuales: revisión de las principales teorías e
instrumentos

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Resumen: El presente artículo busca revisar el concepto de compromiso académico en estudiantes universitarios de programas virtuales, los principales factores psicosociales asociados al mismo, así como de los instrumentos de medición que se han desarrollado para medirlo, tanto en programas de educación presencial como virtuales y a distancia. Inicialmente se recopilaron varios artículos de compromiso académico en el ámbito universitario, en bases de datos en español, inglés y portugués. Posteriormente se hizo un análisis comparativo de estos mediante resúmenes analíticos especializados. A partir de esta revisión se encontró que se han desarrollado varios estudios para medir el compromiso académico en educación básica y superior presenciales, pero hay pocos estudios en programas virtuales; de igual manera, se pudo establecer que los instrumentos existentes en su mayoría se centran en algunos factores psicosociales que explican el compromiso académico en ciertos cursos o a nivel de la carrera en general, pero no consideran la influencia de la familia ni de la institución educativa en el compromiso académico del estudiante. Se hace necesario abordar el compromiso académico de manera más holística y diseñar instrumentos que permitan medirlo contemplando múltiples variables.

Palabras clave: Universidad virtual, aprendizaje electrónico, instrucción basada en internet, compromiso del aprendiz, participación estudiantil.

Abstract: This article intends to review the concept of academic engagement within university students in virtual programs, the main psychosocial factors associated with it, as well as the measurement instruments that have been developed to measure it in both face-to-face and virtual and distance education programs. Initially, several articles on academic engagement in the university environment were collected in databases in Spanish, English and Portuguese. Subsequently, a comparative analysis was conducted using specialized analytical summaries. This review led to several studies that have been developed to measure academic engagement in face-to-face basic and higher education, nevertheless there are few studies in virtual programs. Similarly, it was possible to establish that existing instruments mostly focus on some psychosocial factors that explain academic engagement in certain courses or at the program level in general, but do not consider the influence of the family or the educational institution on the student's

academic engagement. It is necessary to approach academic engagement in a more holistic way and to design instruments that allow it to be measured by contemplating multiple variables.

Keywords: Virtual universities, electronic learning, web-based instruction, learner engagement, student participation.

INTRODUCTION

This article is the result of a documentary review on the concept of academic engagement in the context of virtual higher education.

The topic of virtual academic engagement in higher education was selected for its current relevance. Factors such as the elevated cost of face-to-face university programs and its offer that is limited to large cities has driven positioning of virtual university programs, as well as enrollment of students who work to pay for their studies and reside in rural areas (Areth, Castro-Martinez & Rodriguez, 2015).

From this perspective, the objective of this study is to describe the main factors featured in the academic literature that explain academic engagement of students in virtual programs, as well as instruments that allow its evaluation.

Based on the revision, a conceptualization of academic engagement and of questionnaires that measure it was conducted. In that regard, the article suggests a definition of academic engagement in the virtual university context. Subsequently, the main factors associated with it and that have been developed to measure it are explained. Finally, pending aspects of the topic are identified.

METHODOLOGY

The study's methodology is based on a documentary review of the topic's scientific papers; the initial step was to search for publications that defined the concept in databases such as EBSCO, Scielo, Redalyc, Dialnet and Google Scholar. The information search considered elements such as the term academic engagement and others associated to it, such as student effort, student participation and student involvement, aimed at finding the first publications on the topic in Spanish, English and Portuguese. That search resulted in several publications, which provided definitions of academic engagement in three contexts of formal education, namely: schools, face-to-face higher education and virtual higher education in countries around the world.

To analyze and compare the information obtained in the selected publications, a specialized analytical summary was used to identify the main variables that explain academic engagement in different studies.

Subsequently, the information obtained was organized in categories that account for academic engagement's explanatory factors, such as conceptualization of academic engagement, self-regulation strategies, familial support, teachers' support, institutional support, differences

between engagement in face-to-face and virtual higher education, and instruments to measure academic engagement in virtual education.

RESULTS

Conceptualization of Academic Engagement in the Context of Universities

According to Abello, Diaz, Perez, Almeida, Lagos, Gonzalez & Strickland (2012), when students access higher education they go through academic experiences that can be considered positive or negative. If positive, these could ease its university adaptation process and act as favorable predictors of their academic engagement (Chau & Saravia, 2014) and of their continuation until graduation. Per Silva (2011), a student's academic success depends on education of good quality and on comprehensive attention to him or herself; which is why institutional efforts must be focused on the promotion of top quality education, and student persistence will follow.

In scientific literature, the concept of academic engagement is also known as academic involvement, and overall, it is defined as the level of effort undertaken by a student to learn and take part in academic and extracurricular activities in the learning community of which he or she is a member (Alrashidi, Phan & Ngu, 2016).

According to this definition, it is understood that the higher the student's effort, the higher his or her participation and the expected academic and professional results (Schaufeli, Salanova, Gonzalez-Roma & Bakker, 2002); in the long-term, this effort will bring success in the marketplace and lead to enrollment in postgraduate programs to further knowledge (Cavazos & Encinas, 2016).

Students' academic involvement can be evinced in aspects such as attachment to the educational institution, active participation in class, dedication to their studies, focus on academic work and social integration with people in their university (Peña, Cañoto & Angelucci, 2017). Social integration in the educational institution takes place mostly through cultural, sports or leisure extracurricular activities among others with similar interests (Pozon, 2014).

Consequently, it is not possible to categorically separate students' academic engagement from social or institutional engagement, since are connected they cannot be studied independently, to the extent that choosing a program entails an implicit decision of an institution and a community.

Historically, university students' academic engagement was studied for the first time in the 70's in English-speaking countries (Aspee, Gonzalez & Cavieres-Fernandez, 2018) under the "academic involvement" category, by some researchers (Peña, Cañoto & Angelucci, 2017); among them is Alexander Astin (1999), founder of the Higher Education Research Institute at the University of California, Los Angeles, USA; he also developed the theory of student involvement.

Per Astin's (1999) theory, involvement is the amount of physical and psychic energy employed by university students in their learning process and in other academic experiences. This author proposed that each student has different levels of involvement, and that the effectiveness of educational policies relates to its capacity to increase student involvement in a higher education institution.

Other findings of Astin's (1999) groundbreaking studies in the decade of 1970^[1] included the fact that living in a university community, working in it and bonding with extracurricular activities decreases the risk of desertion; plus the fact that the students feel identified at ethnic, religious, cultural, social or academic levels by other students in their educational institution, encourage them in their studies, despite adversities that may rise.

In the case of students in virtual programs, academic engagement is nowadays limited to participation in class activities and some university wellness activities; this is based on students' lack of time to respond to multiple responsibilities, aside from studying, working, doing chores and taking care of others.

Therefore, it is indispensable for universities to build a true virtual campus in which students can consolidate friendships, visit virtual museums, listen to music from the institutional radio station or share virtual extracurricular activities such as events or workshops. When the offer spans scenarios aside from classrooms, a closer bond can be created between the educational institution and the student, thus increasing student participation, and gradually building academic and institutional engagement.

Nevertheless, it is important to take into consideration that students' academic engagement is not built within the educational institution but at home and since childhood. Parents or tutors teach children the importance of studying as an opportunity to achieve professional and personal development (Guevara, Tovar & Jaramillo, 2013). Likewise, parents or tutors instill study habits and encourage them to persist until their program's culmination (Villafrade & Franco, 2016; Torres & Rodriguez, 2006). This is why higher education institutions offering virtual programs should also organize events aimed at school parents, to speak to them about virtual higher education programs, their advantages and the importance of instilling autonomy throughout their children's learning process, considering that virtual learning requires autonomy and dedication.

Students with high levels of autonomy give meaning to studying and are internally responsible for their academic accomplishments and failures. Those students, per Weiner (1979), perceive a higher degree of control about their performance, which makes them more aware of their accountability in their learning process and of the need to seek help when they are facing hardships.

From the same perspective, authors such as Fredricks, Blumenfeld and Paris (2004) suggest that academic engagement has three dimensions on the psychological level: behavior engagement, emotional engagement

and cognitive engagement. Behavior engagement means following the rules and adhering to the regulations of the educational institution; emotional engagement refers to the students' sense of belonging with the educational institution and its activities; while cognitive engagement is closely connected to self-regulation of their learning process throughout the execution of academic work.

Furthermore, those authors (Fredericks et al., 2004) believe family, community, culture and context affect students' overall academic engagement, as well as self-regulation strategies they implement in their studies and the value they assign to the work they are doing (Ghasemi, Karimi & Heydari, 2018; Montazeri, 2017).

At institutional level, Fredericks et al. (2004) assert that educational institutions which foster community integration have students with higher levels of academic engagement, the same happens when teachers are solid support figures for students, as proposed by Gutierrez, Alberola and Tomas (2018), Bakhshae and Hejazi (2017), and Pan, Donlan y Zaff (2017).

A recent study conducted with university students (Pineda, Bermudez, Rubiano, Pava, Suarez & Cruz, 2014) found that engagement is strengthened to the extent in which educational institutions design and organize learning opportunities to encourage students to invest more effort and dedication in their cognitive tasks and in their social participation (Goswami, Mathew, & Chadha, 2007; Rigo, 2020; Zuñiga, Katerine, & Lunavictoria, 2020).

Those learning opportunities refer to pedagogical experiences that need to be substantiated on the level of academic challenge or difficulty of schoolwork, collaborative or group learning, active learning or applied knowledge learning, familial support (Villafrade & Franco, 2016; Guevara, Tovar & Jaramillo, 2013; Torres & Rodriguez, 2006), teacher's support of students, enrichment or contributions to students' daily lives and university support environment (Pineda et al., 2014).

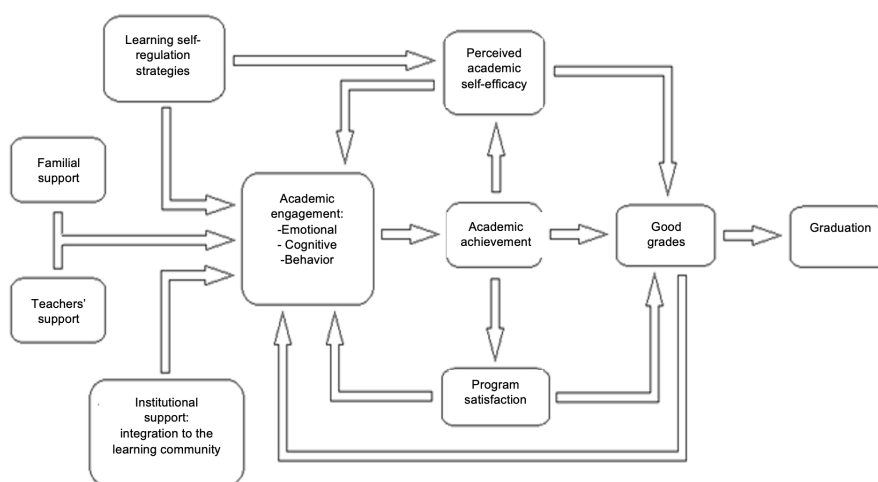


Figure 1.

Scheme of variables affecting academic engagement.

Source: compiled by the authors based on reviewed academic references.

A university student with high level of academic engagement may attain significant academic accomplishments (Gutierrez, Sancho, Galiana & Tomas, 2018; Lei, Cui, & Zhou, 2018), good grades, and an increase in perceived self-efficacy and personal satisfaction with the selected program (Parada & Exequel, 2014). In turn, satisfaction, grades and perceived self-efficacy feed back into the student, thus strengthening academic engagement; as illustrated in Figure 1.

The following is a detailed explanation of existing associations between academic engagement and factors such as self-regulation strategies, familial support, teacher support, institutional support; and the existing differences between academic engagement in face-to-face and virtual higher education programs.

Self-Regulation Strategies and Academic Engagement

Students face adverse situations throughout their professional training, including: low academic performance in some subjects, lack of money to pay for tuition, overlapping school and work schedules, insufficient proficiency in computing platforms, and others concerning access that are related to poor web infrastructure, lack of devices or obsolete devices, and barriers for people with disabilities pertaining the lack of design to fulfill their needs. However, to move forward, students must overcome these difficulties with positive management of negative emotions arising from those difficulties, such as fear, anger or frustration and applying effective solutions.

From this perspective, self-regulated learning strategies allow them to achieve their professional goals (Diaz, Perez, Valenzuela, Muñoz, Rivas & Salas, 2010). Coping strategies are personal resources that enable students' regulation of negative emotions and implementation of timely solutions to the problems they face on a daily basis (Casari, Anglada, & Daher, 2014; Tarabal, Garcia & Coral, 2010; Fernandez, Contini, Ongarato, Saavedra & De la Iglesia, 2009).

Students' self-regulation strategies include: planning strategies, used to analyze the context of learning, its challenges and the course of action to be able to learn and face challenges; execution strategies, used to develop the planning strategies; and evaluation strategies, to verify the accomplishment of envisioned learning, identify errors and for further improvement (Diaz, Perez, Valenzuela, Muñoz, Rivas & Salas, 2010).

In parallel and at an emotional level, students require the deployment of coping strategies to seek support or help from others, including teachers and classmates, overcome their failures and persist at an emotional level until reaching the desired learning (Panadero & Alonso-Tapias, 2014). (Rigo, 2020; Torres-Escobar & Ballesteros-Sanchez, 2019; Vargas-Cubero & Villalobos-Torres, 2018; Zuñiga et al., 2020)

Coping and self-regulation strategies may benefit students' academic engagement since these facilitate the learning process and continuity in their chosen professional program leading to graduation.

Each time a student does planned learning activities and persists in overcoming difficulties, he or she will attain higher grades, acknowledgement by teachers and will feel competent or self-effective in his or her studies (Fernandez, Bernardo, Suarez, Cerezo, Nuñez, & Rosario, 2013).

According to Borzone (2017), higher academic self-efficacy may lead students to satisfactory academic experiences, as students who plan their time and study with dedication get better outcomes. Also, students who are aware of the context and of what the institution has to offer are likely to identify the support, take it and value it (Borzone, 2017). In fact, support –if not provided by the educational institution- is usually looked for online, through options and recommendations between students in learning communities, which helps them solve the problem.

Familial Support and Academic Engagement

Despite not being acknowledged as a relevant factor in the study of academic engagement, family may have a motivational and economic influence on young students in terms of selecting a program in the university (Rojas, 2011; Yang & Chang, 2010), having good study habits and persisting against difficulties. Even for married adults with children, families are a motivation to study with the aim of offering them a long-term better quality of life, as is the case of those enrolled in virtual and distance programs (Chen, Gonyea & Kuh, 2008; Alwaheeb, Abdulrab, Al-Mamary, & Mutahar, 2020; Rigo, 2020; Zuñiga et al., 2020)

It is key that programs implement activities from the area of virtual university well-being, focused not only on students but also to their families, with the goal of having them become familiarized with the academic institution, understand the importance of study as a means to make social and professional progress, and provide psychological support to the student in throughout the selected program.

Teacher's support and academic engagement

In university classes, teachers act mostly as facilitators and guides for students to appropriate knowledge of a discipline or professional based on his or her explanations, yet, it is important to take into account that the effectiveness of learning will depend largely on the interest initiated by the teacher on his or her students with the topics developed (Nuñez, Fajardo & Quimbayo, 2010), by encouraging their best effort in classwork, autonomy in their learning process (Gutierrez, Alberola & Tomas, 2018; Guzman, 2011), and being passionate for the chosen program.

In other words, it is not enough for the teacher to be knowledgeable in certain area or to be a top researcher; an emotional connection with the students is necessary (Sanchez, 2017) for them to regard him or her as an example and to inspire them to study and value the usefulness

of acquired knowledge (Torres-Escobar & Ballesteros-Sanchez, 2019; Vargas-Cubero & Villalobos-Torres, 2018; Zuñiga et al., 2020).

To encourage students, teachers must be receptive, sensitive and relatable, while having constant disposition to solve doubts, guide them to correct their shortcomings and to highlight their accomplishments or positive aspects (Velazquez & Gonzalez, 2017). This is how trust is established between teachers and students, making way for an adequate learning environment that fosters students' academic engagement and drives them to top levels of academic performance, expressed in outstanding grades, innovative research projects and work of the best quality (Norman-Acevedo, 2019; Peña-Garcia, 2019; Vargas-Cubero & Villalobos-Torres, 2018).

Institutional Support and Academic Engagement

Per Vincent Tinto (1988), when a student has difficulties in his or her adaptation process to university, he or she must receive effective support strategies to achieve academic and social integration with his or her peers. One of the strategies is the creation of learning communities (Engstrom & Tinto, 2008), which are groups of students that support other students' academic performance, participate in academic spaces such as research workshops and extracurricular activities to cultivate friendships that make them feel acknowledged as humans (Barrios, Cernadas, Marin, & Sandobal, 2014; Bedoya-Villa & Escobar-Sierra, 2018; Moreno-Guerrero, Rodriguez-Jimenez, Gomez-Garcia, & Navas-Parejo, 2020; Paniagua, Osorio, Contreras, & Castaño, 2018).

Progressively, students with difficulties integrate to the learning community and begin increasing their academic (Supposedly, a greater completion and quality in undertaking academic activities means better results or higher academic accomplishment levels for the student; inversely, when student participation is low, the academic accomplishment level is low as well) and social participation, consequently, their academic goals increase and this feeds back into their academic engagement.

As students move forward in the program and realize they have good academic performance, enjoy the program and have clear professional goals, they will feel the achievement of significant academic goals (Garbanzo, 2007). These goals become motivational agents that help them increase the commitment towards their studies and look for spaces to apply attained knowledge at research, practical or social level with community or volunteering tasks.

Students who attain significant academic accomplishments have the support of their teachers, get positive and frequent feedback on their learning progress and difficulties, feel acknowledged as people and receive guidance by professionals such as tutors or un university well-being, who offer advice on adequate study habits, access to personal training resources and social support networks (Urbina & Ovalles, 2016).

Therefore, academic accomplishments attained by a student do not depend only on their level of individual effort, but on institutional support provided to attain prior learning along the program and professional goals (Urbina & Ovalles, 2016), especially of recent high school graduates who are up to a fresh start in university, since desertion levels are highest in the early years of training (Suarez-Montes & Diaz-Subieta, 2015).

Differences Between Academic Engagement in Face-to-Face and Virtual Programs

Currently, higher education has three modalities, namely: face-to-face, virtual and distance. In the first one, students go to campus to attend classes; while in the second and the third, students study online and sometimes participate in occasional sessions and face-to-face advice.

From the perspective of Chen, Gonyea & Kuh (2008), distance education is a segment that is on the rise due to its low cost and better scheduling and geographical accessibility compared with face-to-face education, nonetheless it requires high levels of motivation and self-discipline by students in order to effectively manage the unstructured quality of this learning environment.

The majority of studies regarding university students' academic engagement have been conducted with face-to-face programs, but relatively few have delved into the causal and explanatory factors of academic engagement in virtual and distance learning, such as the case of Chen, Gonyea and Kuh (2008), Richardson and Swan (2003), and Bullen (1998).

Particularly, Bullen (1998) states that studies on academic engagement in distance education have focused on students' participation in specific classes or courses in a program. As input of his work, Bullen has found that students' participation in virtual courses largely depends on the teacher-tutor as a manager of relationships with students and of collaborative learning among them, just as Picciano (2002).

In that regard, in order for students to realize high levels of participation in online courses, it is important for the teacher-tutor to have background training in that modality, and to develop pedagogical strategies to encourage access to virtual platforms in the collective progression of schoolwork, discuss topics covered in class and transfer the responsibility to lean on each other (Bullen, 1998).

Overall, students enrolled in virtual programs tend to show greater academic engagement in academic activities than students in face-to-face programs, mostly because they are older, work, have clearer professional perspectives and have a higher appreciation for their studies (Chen, Gonyea & Kuh, 2008). However, due to the conditions of the virtual modality, these students don't usually participate in extracurricular or social integration activities, which may eventually undermine students' academic engagement with the educational institution, making it necessary to consider strategies that may lead to its reinforcement.

Instruments to Measure Academic Engagement

There are several instruments to measure academic engagement or involvement, but one of the first to develop questionnaires to measure involvement was researcher Robert Pace (1980; 1982) at University of California, Los Angeles, a colleague of Alexander Astin in the Higher Education Research Institute.

Pace contributed to the development of the College Student Experiences Questionnaire - CSEQ, which evaluates effort and participation experiences of university students; he developed another instrument in 1982 which described students' effort in qualitative terms to identify factors that explain academic success for the National Commission on Excellence in Education of the United States.

Other instruments that are extensively mentioned are Tinio's Academic Engagement Scale (2009) (Tinio's Academic Engagement Scale (2009), made up by 102 items distributed in the components of attachment to the university, attention in class, active participation, dedication, focus on the task and social integration), applied on school students; and the National Survey of Student Engagement (NSSE; Kuh, 2009), a student characterization interview that has been broadly investigated (Aspee; Gonzalez & Cavieres-Fernandez, 2018).

Originally, the National Survey of Student Engagement - NSSE was developed by the University of Indiana in 1998, along with other institutions of higher education, to measure the academic quality of undergraduate programs (Zapata, Leihy & Theurillat, 2018). One of the most recent versions of the instrument, of 2013, is made up of 109 questions clustered in four areas, as follows: level of academic challenge of schoolwork and activities; collaborative learning with peers; quality of teachers' experience; and institutional environment for learning (Zapata, Leihy & Theurillat, 2018).

In Latin America, the study by Portalanza, Grueso & Duque (2017) depicts an adaptation and translation of the Utrecht Work Engagement Scale - UWES-S (This instrument was originally designed to measure work engagement in employees) in a sample of 102 university students of Ecuador; as well as the study by Sanchez-Cardona, Rodriguez-Montalban and Moreno (2016), in a sample of 109 university students in Puerto Rico; and the study by Parra and Perez (2010), in a sample of 164 Chilean psychology students in the first and second year.

Although two of the studies applied the same abbreviated version of the test, the Chilean authors had different factors or variables than the authors from Ecuador and Puerto Rico, as seen in Table 1. Also, items refer to the student's academic engagement in terms of the selected program and studies in general, but do not refer to specific academic and extracurricular activities, with the aim of clearly determining which is the student most and least committed with.

Items	Parra and Perez's (2010) factors	Portalanza, Grueso and Duque (2017) and Sanchez-Cardona, Rodriguez-Montalban and Moreno's (2016) factors
1. My schoolwork as a student makes me feel full of energy.	<i>Factor I – Predisposition to study:</i> Items 1, 2, 5, 6 and 9.	<i>Vigor factor:</i> Items 1, 2 and 5
2. I feel strong and vigorous when I study or go to class.		
3. I am excited with my program.		
4. My studies inspire new things.		
5. When I wake up in the morning, I want to go to class or study.		
6. I am happy when I am doing work related with my studies.	<i>Factor II - Satisfaction with the program:</i> Items: 4, 7 and 8.	<i>Dedication factor:</i> Items 3, 4 and 7.
7. I am proud of being in this program.		
8. I am absorbed in my studies.		
9. I "am carried away" when I do my schoolwork.		
		<i>Absorption factor:</i> Items 6, 8 and 9.

Table 1.

Items and factors of the Abbreviated Version of the Utrecht Work Engagement Scale – UWES-

Source: compiled by the authors, adapted from Portalanza, Grueso and Duque, 2017; and from Parra and Perez, 2010.

In Brazil, a group of academics (Marinho-Araujo, De Souza, Silva, Bisnoto & Rabelo, 2015), developed a Scale of Academic Expectations in Students Entering Higher Education, which measures seven factors organized in 62 items and contributes predictive measurements of university students' academic and social engagement, considering that students' expectations are dependent on clearer objectives thus, they will dedicate more effort to accomplishing them, impacting the level of commitment with academic and social activities by participating in extracurricular and institutional activities to solidify the connection with the university.

Other instruments relate academic engagement with other variables such as the student's psychological needs and academic experiences.

In the case of psychological needs, Pass (2013) developed a 21-item questionnaire to measure academic engagement based on six associated factors: teacher-student relationship, attaining academic achievements, student's frequency participating in academic activities, student's level of academic competition, intensity of the student's academic effort and the student's level of autonomy in class (Norman-Acevedo, Vega, Cabrales, & Alarcon, 2020).

Regarding academic experiences, Marquez, Ortiz and Rendon (2009) translated and adapted Alemida and Ferreira's (1999) Academic Experiences Questionnaire to Spanish, it includes sixty closed-ended questions that assess university students' *personal* experiences concerning their physical and psychological wellbeing; *interpersonal* experiences, in terms of meaningful relationships and extracurricular activities; *program-wise*, adaptation to the program and the students' vocational project; *study-wise*, pertaining academic habits and dedication; and *institutional* experiences, referring to the student's exploitation of university resources.

Some instruments that have been designed to evaluate students' academic engagement in virtual programs are: a survey of social participation, adapted by Richardson and Swan (2003), and a questionnaire of student perceptions and social participation in virtual courses, designed by Picciano (2002).

Richardson and Swan's (2003) social participation survey questions interaction between students and virtual courses, it includes 39 open and closed-ended questions arranged in three parts: the first looks into students' overall experience in the virtual course, the second reviews students' experience in specific academic activities, and the third suggests open-ended questions regarding students' satisfaction with the course.

Similarly, the instrument by Picciano (2002) has 44 open and closed-ended questions that collect information of aspects such as ease to use computing resources to participate in the virtual course, instructor's pedagogical strategies, frequency of participation in virtual activities, quality of virtual material introduced by the course and interaction with other people in the course (Daza-Orozco, 2019; Parra-Mayorga, 2019).

On the other hand, the self-regulation strategies questionnaire in virtual learning contexts referred to by Berridi and Martinez (2017) asks questions associated with four factors, which are: learning planning and control strategies displayed by students, students' motivational attributions in virtual learning contexts, collaborative work strategies with classmates, and support of the virtual schoolwork advisor.

DISCUSSION

Based on the theoretical review of the concept of academic engagement in higher education, several studies that measure academic engagement in face-to-face higher education were found, yet there are few studies on virtual and distance learning programs. In the future, it is necessary to conduct more research on these educational modalities with the aim of strengthening inline academic engagement of university students.

Particularly because students that enroll in virtual programs frequently have multiple responsibilities related to family and work, which may take away time to study; additionally, many of them hardly get involved with other people in the educational community due to their lack of time, which may negatively affect their academic engagement unless measures are applied to prevent it.

It is also important to analyze students' academic engagement, not just in terms of the effort they put into their academic schoolwork or their participation in virtual classes, but also considering how students' academic engagement can be evinced in spaces other than classrooms, such as virtual research workshops (Corpas-Iguaran, 2010), virtual international student events such as congresses, conferences or diploma courses organized by various educational institutions to build virtual communities of professionals to share meaningful resources and experiences (Zanotti & Magallanes, 2015), looking to connect students with virtual postgraduate studies.

Likewise, it was established that existing instruments that measure academic engagement in university students largely focus on some psychosocial factors that account for academic engagement in certain courses or program-wise, but they disregard the family and educational institution's influence in students' academic engagement; therefore it is necessary to develop instruments to measure those variables in virtual university programs.

This type of instrument should: characterize different psychological manifestations of academic engagement, such as students emotional, cognitive and behavioral factors; consider different personal and environmental variables that could eventually influence academic engagement; offer objective criteria to measure students' academic engagement in different types of training activities of virtual academic and extracurricular type; and introduce a profile of each student's academic engagement as input for institutional decision-making processes, e.g., to offer incentives such as scholarships or distinctions to students with top levels of academic engagement or assign them responsibility tasks such as being teacher assistants or in research workshops (Torres & Ballesteros, 2019).

In synthesis, if more studies oriented towards identifying factors that strengthen academic engagement among students in virtual programs are implemented, more effective strategies to attract more students to virtual programs can be implemented with students from rural areas and from other countries who are interested in travel-free virtual internships. In turn, this could enable homologation of virtual degrees between different institutions of higher education.

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