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Comparative Analysis of Dual Career Perceptions Among Mexican Divers: A Cross-National Study of University Support Systems in the USA and Mexico

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Abstract

This research examines the experiences and perceptions of university-level Mexican divers, focusing on those pursuing academic degrees while training competitively in either Mexico or the U.S. This research investigates the nature and impact of academic, athletic, and administrative support on dual careers. Utilizing a structural equation modeling partial least squares (SEM-PLS) approach, this comparative analysis scrutinizes how such support influences academic and athletic performance, contributing to their overall well-being and holistic development.

The sample comprises athletes ranging from national competitors to Olympic-level divers, all of whom are engaged in at least bachelor-level academic programs. The primary objective is to delineate and compare the support structures in Mexico and the USA, exploring their efficacy in fostering a balanced and successful dual career path for these student-athletes. The analysis aimed to identify significant disparities in the provision of support across these two countries, assessing its impact on the athletes' educational and professional sports trajectories.

1 Introduction

The Mexican diver's performance in national and international competitions has been remarkable, excelling not only in technical and physical aspects but also in psychological dimensions. As of the conclusion of this study in June 2024, Mexico had secured fifteen Olympic medals for diving since 1948. The development of diving in Mexico can be segmented into three distinct eras: from 1948 to 1979, from 1980 to 2000, and from 2001 to 2024, each marked by a particular training regimen and supported by a specific infrastructure comprising coaches, nutritionists, and physiotherapists. However, there is no formal Mexican diving school that properly documents the eras, following a common methodological order or guidelines[1].

The first stage of diving development in Mexico can be characterized as a trial-and-error period involving Mexican athletes who possess superior abilities. After training in the United States of America (USA), some of these athletes were able to improve their performance levels with coaches, as noted by Mario Tovar [2]. The second stage focused on the massification of diving in Mexico, where the trial-and-error approach continued under the strict guidance of a few coaches but without adhering to a functional, progressive and documented sports methodology.

The third stage involved the integration of Mexican specialists who contributed their expertise as graduates in sports training and who were part of older coaches and athletes' development. The first public book describing a particular approach toward diving basic skills was published by former diver and coach Jorge Carreon [3]. This era also saw support from methodologists and even the involvement of foreign professionals in athlete development. However, despite these advancements, there is still a lack of documented national methodology akin to systematic approaches observed in countries such as China, Australia, the USA, and the UK.

Supported by trainers with academic qualifications, despite the presence of empirical coaches, the Mexican federal government and some state governments have begun to establish diving schools. These institutions are supported by sports methodologists, doctors, and nutritionists. Notably successful are the states with specific and sustained sports promotion programs such as Jalisco, Nuevo León, Baja California, and Baja California Sur. In these regions, athletes receive comprehensive state governmental institutional support, which includes academic education, athletic training, and support for the healthy development of child and adolescent athletes. Each state has started to use a particular methodology and diving school approach. Other Mexican states have also seen developments in this area, particularly since 2001.

In Mexico, individuals under the age of eighteen are considered minors. These minors receive significant support in some Mexican states for their healthy athletic and academic development through Sports Promotion Programs or High-Performance Centers [4]. These programs are designed to nurture athletes who receive basic academic education up to secondary school following a coordinated sports-academia model.

Like in Brazil [5], Mexican competitive divers face a significant dilemma by the age of sixteen, particularly those with highly competitive levels in diving. Balancing their academic studies with sports becomes increasingly challenging as they reach high school. Some athletes choose to forego their education in favor of dedicating themselves fully to their sport, especially as they advance to senior or open categories and reach the university level [4, 5, 6]. At this stage, the pressure intensifies further[6].

Unlike in the United States and other regions, Mexico lacks a comprehensive program for the academic and athletic development of high-performance athletes at the university level; only a few universities, both public and private, deploy dual career programs or support them.

The National Autonomous University of Mexico (UNAM), the country's premier and major university with almost 420,000 community members, offers athletic support programs for students categorized as representative athletes. These programs require participants to be high-performing academic students who clearly prioritize the intellectual and professional development of their undergraduate studies. Support is provided through sports facilities and coaches, some of whom have Olympic experience. However, despite having adequate facilities, universities lack a modern dual career program that allows students to integrate high-level athletic development with their academic pursuits effectively.

Some private universities in Mexico have capitalized on promotional opportunities by integrating high-performance athletes into their student bodies. These institutions make it easier to attend classes or not depend on the athlete competition program, which allows athletes to pursue their undergraduate degrees through remote learning or specialized modalities. This approach enables athletes to continue their sports training without sacrificing educational progress. Notably, these universities prioritize athletic commitments and often offer a reduced timeline for completing degree programs. For example, while a degree at the National Autonomous University of Mexico (UNAM) and other public universities in Mexico typically spans five years, in these private universities, it can be completed in three to four years.

State and autonomous universities in Mexico often possess sports facilities for diving and other athletic activities. However, many of these institutions lack coaches or dual career programs to support athlete students. Conversely, some athletes independently combine their sports practices with academic pursuits by attending their local universities in various states of Mexico, without any formal linkage between their educational institutions and athletic activities.

Another group of Mexican divers has leveraged their standing and performance in international competitions to receive scholarship offers from U.S. universities. In these institutions, athletes experience a conducive and appropriate system for their development, balancing their sports and academic growth. They compete in one of the three main divisions of the National Collegiate Athletic Association, which benefits their healthy athletic and academic development.

Academic education plays a crucial role in the development of athletes. Young divers in Mexico face the challenge of balancing their dual career: sports careers with their university-level academic responsibilities. While the widespread practice of diving is essential for identifying sports talent in Mexico, once a level of technical sports skills is achieved, developing university-level academic talent becomes a necessary component of the healthy development of the student-athlete [7].

In Mexico, although there are few high-performing divers who pursue dual careers with a university education and a sport under the expected period of scholarly necessity to obtain a professional license or diploma to practice it, it would be appropriate to follow previous academic and sports trajectories to have athletes educated at the highest possible level. Adjusting study programs at some Mexican autonomous and state public universities could offer an academic curriculum without granting degrees indiscriminately, maintaining academic integrity that contributes to the country while providing the necessary time and space for students.

2 USA, Brazil, Spain, Denmark, China

Students who are also athletes face challenges in balancing their sports careers with education. Achieving goals at the highest levels of a sport requires intensive training and participation in both national and international competitions, which can make it difficult to reconcile the challenges and constraints of the educational system. Not only do athletes demand high levels of motivation, commitment, resilience, and responsibility, but special arrangements are also needed to prevent talented and elite sportspeople from having to choose between education and sports. These dual career arrangements should benefit the athletes' sports careers, allow for education or even employment, promote the achievement of a new career after the sport, and protect and safeguard the athletes' positions [8].

In Europe, and applicable to Mexico, the age for sports and educational development aligns, with high-level sports specialization typically occurring around the age of eighteen, which is especially pertinent to the scope of this study. Since 2012, European sports policies have targeted talented and elite athletes to engage in a combined career of sports and education. The national governments of most European

Union member states play a significant role in national sports policies through their legal and/or financial frameworks, which should support student-athletes [8].

Mexican public autonomous or state universities require students to attend classes in person at least 80% of the time; otherwise, they may not pass their courses. This requirement applies to both high school and university levels, and some also provide distance education programs. In contrast, private schools in Mexico offer greater flexibility, even justifying absences during periods of training and competition. In some cases, these schools provide mentors and advisors assigned by the institution to support the students.

In public schools in Mexico, exemptions from attending class are granted for international event competitions or official representations of their universities. For instance, at the National Autonomous University of Mexico (UNAM), student-athletes are required to maintain a minimum average grade of 80 out of 100 and must have completed at least 60% of the coursework for the immediate previous academic period and 90% attendance at his/her sport training to be considered representative-level students, i.e. dual career [9]. In private schools, the common requirement is also a grade average of 80 out of 100, but the minimum coursework completion rate is at the discretion of the respective program director.

The academic load in public schools in Mexico features heterogeneous schedules, meaning that there is no standardized, continuous block of classes. Consequently, the school schedule can include subjects in the morning or afternoon, complicating the establishment of a consistent training schedule for athletes. Additionally, access to sports facilities access has fixed training times. For example, if an athlete has academic classes from 10:00 AM to 2:00 PM and then from 4:00 PM to 7:00 PM, they must find time between 08:00 and 10:00 AM for nonaquatic training and then 2:00 PM and 4:00 PM to eat and train, which places them at a disadvantage in training hours compared to athletes who have better support systems.

Consequently, private universities capitalize on the athletic talent of individuals who have an average of ten years of training, recruiting them as students. In contrast, in public schools in Mexico, athletes are required to pass competitive entrance exams to gain admission to universities. This requirement makes the process even more complex and academically demanding for student-athletes.

Drawing on the study by Ericsson et al. [10], which suggested that becoming a high-performance athlete requires an accumulated ten thousand hours of training and dedication to truly demonstrating potential and mastery, public universities in Mexico present significant challenges for their students aspiring to reach high-performance levels in athletics. Unless a student possesses exceptional talent, the academic demands and scheduling complexities of public universities make it difficult to achieve the necessary training hours to excel at an elite level.

The National Collegiate Athletic Association (NCAA) is an organization that regulates athletic programs at many colleges and universities in the U.S. Intercollegiate sports can also be organized by providing

competition guidelines, scholarships, and academic standards. Specifically for sports such as diving, the NCAA classifies its member institutions into three main divisions: Division I, Division II, and Division III. These divisions help establish a level playing field that reflects each school's commitment to its athletic programs [11].

Division I schools have the most competitive programs, with more financial resources and superior athletic facilities. These programs often attract elite athletes to diving and other sports. A diver's level of commitment to both training and competition requires a significant amount of time dedicated to sports and contests in highly competitive national championships, where divers can participate in platform and springboard events [11].

Division II institutions also offer scholarships, but there is a more balanced emphasis on sports, academics, and student life. The programs are competitive, but there is a greater focus on the educational experience of the athlete. Less demanding in terms of time than Division I, which allows athletes more time for their studies and other activities, divers compete in national championships but with a less intensive focus on competition than does Division I [11].

In Division III, the focus is on the overall student experience, and no athletic scholarships are offered. These programs emphasize educational values and personal development; they have the lowest importance in terms of training and competition hours, promoting a healthy balance with academic and personal life; although less intense, these competitions are still competitive and provide a platform for divers to showcase their skills in a more relaxed environment [11].

The regulations and structures of the NCAA ensure that student-athletes maintain a balance between sports and studies, and each division reflects a different philosophy on what that balance should look like. This allows divers to choose a program that best suits their athletic and academic needs and goals [11].

Similarly in two of their 2021 studies, Costa et al highlighted the lack of regulations and support for academic sports careers for divers in Brazil, as well as the lack of institutional policies that promote access to, continuation of and completion of academic training for high-performance athletes. Depending on the family of each diver, they may be able to study a university degree [5, 6]. In addition, "for those over 18 years of age, total dedication to sport can mean entering higher education in the final phase of a sporting career, or only after withdrawing from the sport" [5, p.13]; thus, divers must interrupt their college /university studies to maintain training, as in the first and second Mexico eras of diving.

In their study in Spain, Alvarez et al [12] described the issues surrounding university students as high-performance athletes. The difficulties they encountered were how to balance both the sports and the academic support they requested to meet their needs. Being unable to participate in training activities, they demand greater flexibility in the training process, teacher attention tailored to their particular requirements, and individualized assistance to reinforce the autonomous work they have to do.

In Denmark, Christensen and Sorensen [13] noted that schools that also function as training centers are options for making the school curriculum more flexible, as they look out to provide elite athletes with less presential class time per day and more hours dedicated to training. Additionally, they allow for absences and tests; if a student has a conflict with play dates, nevertheless, the lack of schools in certain cities is a major obstacle to this strategy, and many students need to commute daily or move to schools that offer this possibility of training and unified schooling.

Song et al [14] referred to China as another key player in diving sports, they developed policies related to high-performance student-athletes (HPSA) from the establishment of the People's Republic of China in 1949 to the present. The focus alternated between mass sports and elite sports depending on political, economic, and educational needs [14]. Song et al performed a documentary analysis of 25 specific policies that have been implemented to support the cultivation and management of the HPSA in China, and the aim was to improve these policies by analyzing their strengths and weaknesses to support the long-term development of competitive sports in China [14]. China's approach is highly centralized and policy-driven, with a strong emphasis on the integration of sports and education through government initiatives; the policies specifically target the cultivation of elite athletes from a young age, with a focus on achieving international sports success.

Recent policies have started to emphasize a more holistic development model that focuses not only on sports excellence but also on psychological, social, and academic growth; however, the integration of these two models is still primarily focused on leveraging these athletes to boost China’s international prestige in sports [14].

According to bibliographic research and field and exploratory analysis, Chinese and American institutions tend to have more resources dedicated to developing elite athletes than do many European countries, much more than Brazil and Mexico, where funding and resources can be more limited or spread across a variety of programs.

In Mexico, the development and growth of diving have been sustained since the beginning of this millennium by state governments, which serve as breeding grounds for athletes, including those at the Olympic level. Throughout their development, these athletes may or may not experience the dual career pathway.

The cultural importance of sports also plays a significant role. For example, in the U.S., college sports are a major part of culture and the economy, and any of these sports drive substantial investment in athletic programs. In contrast, in European countries, sports are less commercialized at the university level; in Mexico or Brazil, sport careers have no relevant significance unless the athlete has Olympic attendance or medal; in such cases, this allows them to be awarded high-profile jobs, mainly in government, even if they have no academic skills or university diplomas [15].

The dual career setting varies, with the U.S. having a well-established system through the NCAA that provides a clear pathway for student-athletes. China is working to improve its integration, while Europe is

continuing to vary with a trend toward better support mechanisms. However, Brazil and Mexico lack a proper regulated policies or integrations for student athletes and countrywide systems.

Importantly, in Mexico, Brazil, family values and the environment support most of the student athletes' dual careers, Kay [16] considered the family environment an important factor in the formation of young athletes, especially if the parents were fans of their sports, whether in terms of income or leisure [17]. Aspects linked to a stable economic condition, the level of academic training of the parents, and the presence of the father and mother at home also present themselves as differences in the sports training of young people and the value they attribute to school training.

2.1 Testimonial

To underscore the theoretical discussions outlined in this paper, the inclusion of firsthand accounts is essential. These testimonials, drawn from the perspectives of two divers, serve to provide concrete examples of how well-constructed support systems can significantly enhance both academic and athletic performance. This evidence demonstrates the substantial contributions such systems make to the successful management of dual career paths for student-athletes.

Both interviewees were offered to attend a university in the USA where the integration of education and athletics is seamlessly managed. This opportunity represented an ideal scenario for the student athlete, as it offered a structured environment in which the student could attend classes, participate in training sessions, and receive academic support efficiently, all within a daily routine that concluded at 5 pm with minimal commute time.

The faculty at this institution were notably attuned to the unique requirements of student-athletes, displaying flexibility around competition schedules to ensure that students could represent their university without compromising their academic responsibilities. This adaptability extended to academic advising, where student athletes benefited from dual advisement by one advisor from the academic administration and another from the Athletic Department. The latter played a decisive role in coordinating with professors over the athletes' competition schedules, ensuring that academic requirements were met and providing tutors as necessary.

Remarkably, if competitive events required travel, the athletic department's advisor would accompany the team to proctor exams or oversee assignments, ensuring that the athletes remained in academic good standing relative to their peers.

The interviewee expressed a profound appreciation for the support system at the U.S. University, noting that such an integrated approach to athletic and academic excellence was a pivotal factor in their decision to study abroad. Despite acknowledging superior training quality in Mexico, the lack of a comparable support system in Mexican institutions was a decisive factor in opting to pursue opportunities in the USA.

3 Method

A review of the academic and scientific literature was performed to assess the state of the art and analyze similar problems [18]. Based on the descriptive data, a field study was conducted through direct observation of the subjects of the study.

Given the focus on students who are high-performance Mexican divers attending universities, a nonprobabilistic judgment sampling technique was chosen [19] to identify suitable subjects for the study. Since nonprobabilistic sampling does not require calculations for precision, error, or confidence [20], coaches who had team members enrolled in university and who were considered to have participated in at least one national-level competition in Mexico were selected.

This approach allowed for a broad sample ranging from local university championship levels to Olympic athletes. Field interviews were conducted with coaches at the national, university, and Olympic levels to identify proper samples, as these coaches are aware of which athletes hold sports scholarships in the USA. This approach consequently initiated a snowball sampling effect; each contacted coach was asked to complete the survey with the stipulation that it should be completed by university-level diving students deemed high performing by their respective universities. For United States Mexican scholars, this criterion was applicable to all selected athletes; in Mexico, the athlete needed to have participated in at least one university-level championship at his or her university or a national championship. This latter requirement resulted in the exclusion of novice athletes who had not yet met the basic qualification for high performance or representative level diver.

Field studies and surveys were carried out in the first half of 2024, prior to the Paris Olympic Games. The final sample studied included forty-eight diving dual career student-divers who participated in at least one state or association level competition in Mexico while they were college students including men and women born from 1990 to 2006.

The survey yielded 62 answers, nevertheless, responses from divers born before 1990 were excluded, as were those from individuals who had not competed at a national event or a university-level competition representing their school. The last exclusion criterion was based on the UNAMs' parameter for considering athletes representative of their sports teams [9], since other state or autonomous Mexican universities have no publicly available parameters to be considered. The survey was conducted using Google Forms, an online tool. The data analysis was performed using SMARTpls 4.0 software [21].

4 Research goals

Based on the presented context, the intention is to conduct a seminal analysis of Mexico, a country whose tradition and results in diving at the international level are well recognized. This study aims to analyze dual career pathways from the perspective of students, acknowledging that athletes typically have short career spans. University education could improve quality of life for some Mexican athletes.

The analysis will focus on the cases of Mexican divers studying in the USA and Mexico, aiming to compare the trajectories of healthy personal development within their dual careers. Research address:

1. To explore from the student-athlete perspective, whether dual careers (university and diving) for high-performance Mexican divers who receive academic, administrative, and athletic support perceives a satisfactory balance between academic and athletic performance is needed.

2. To identify, from the perspective of student-athletes, how variables such as administrative and athletic support, the academic performance of the student-athlete, the type of university, and the country influence their diving performance.

3. To analyze this topic from the perspective of the student-athletes, we explore whether the academic and administrative support provided by their university (and country), as well as their athletic performance, impacts their academic performance.

5 Model

In the proposed study, structural equation modeling (SEM) paired with survey methodologies is employed to address the complex nature of the relationships among key variables. SEM is particularly suited for this research because of its ability to analyze multiple dependent relationships simultaneously [22], which is crucial in assessing the multifaceted impact of academic, administrative and sport support provided by universities to student-divers.

The application of SEM facilitates a nuanced exploration of direct and indirect effects. Given the latent nature of study variables [22], such as sport support and performance, academic support and performance, administrative support, and dual career satisfaction, SEM is ideal because it adeptly handles latent constructs. These constructs are often best measured through a composite of indicators derived from survey responses, providing a robust framework for their validation. Additionally, the integration of data from multiple sources, including qualitative insights from open-ended survey responses, enhances the richness of the dataset, enabling a comprehensive analysis of the hypothesized relationships.

The variables and their descriptions are presented as follows:

Table 1. Constructs and variables for the model. Source: The author.

Latent Variable	Observable variable	Description
	Univ	Type of university: USA State, USA private, Mexican private, Mexican State (public), Mexican Autonomous (public)
Academic Support	Acad1	My class schedules at the University are flexible to accommodate my sports training.
	Acad2	The classes I am enrolled in at my university are conducted remotely.
	Acad3	The university assists me in effectively managing my academic and athletic schedules to support my training.
Sport Support	Sport1	My university has clear policies to promote high-performance sports among its students.
	Sport2	I have access to specialized coaches in diving and physical preparation, who help improve my athletic performance.
	Sport3	The training programs offered by the university are suitable for my athletic development, considering my status as a student.
	Sport4	I train within the university facilities.
	Spor5	I primarily train outside the university facilities.
Admin Support	Admin1	I receive effective administrative guidance to balance my academic and athletic responsibilities.
	Admin2	I receive support scholarships for nutrition and food from my university.
	Admin3	I receive scholarship support for sports training and competition uniforms from my university.
Sport performance	SportPerf1	My diving coach holds a bachelor's degree and is an academic at the university where I study.
	SportPerf2	I am satisfied with my overall experience as a university diving athlete.
	SportPerf3	The university sports authorities are concerned with my well-being.
Academic performance	AcadPerf1	I have maintained regular progress in the coursework load of my academic program.
	AcadPerf2	The university provides academic support programs for high-performance student divers.
Dual Career Satisfaction	DCS1	I am able to effectively balance my academic and athletic responsibilities.
	DCS2	I experience low levels of stress related to my studies and athletic training.
	DCS3	I experience a high level of emotional well-being during my time at the university.

Surveys are an indispensable component of this research strategy due to their efficiency in collecting data from a broad spectrum of participants. This approach is vital for ensuring the generalizability of the findings across the diving community in Mexico.

Fernández et al [23] and Niehue et al [24] studied similar contexts; using them as a reference, the proposed model employs SEM with six latent variables—academic support, athletic support, and administrative support received by the divers— each defined by variables that seek to elucidate these constructs.

Additionally, a latent variable for athletic performance is integrated and is posited to be influenced by athletic support, administrative support, and academic performance. Academic performance is assessed through an athlete's perception of academic and administrative support.

Finally, the measurement of satisfaction experienced by the student-divers in their dual career is considered to be influenced by the academic, athletic, and administrative support provided by the university. This satisfaction is also shaped by the athlete's perception of balance, stress, and emotional

well-being during their university tenure; the aforementioned model addresses the objectives of this research.

6 Results

Based on the survey results, descriptive analytics are presented. Table 2 shows the general data. The sample consisted of 35% of Mexican divers studying in the USA and 65% of those studying in Mexico, with 52% male and 48% female participants.

The participants included four Olympic-level athletes, two World University Games participants, twenty-four World Cup participants, and thirty-eight divers who participated in the CONADE games, lending significant relevance to the sample.

The majority of the athletes had more than 15 years of experience in diving. Those with the highest performance and competitive levels are studying at private schools in Mexico or in the United States. All four Olympic divers who participated in the survey received scholarships from private universities in Mexico.

Table 2. Descriptive statistics for the student-divers analyzed. Source. The author.

# Divers		Campus location	University and # of divers		% from total	Academic Degree program, years to graduate	Diver maturity							
							Years of experience as diver	Athlete started diving at his /her University	Number of diving athletes attending this level of tournament					
									Internal University Champ	Nationals	CONADE Games	International	World Cup	Olympic games
Men	20	Mexico	UNAM	10	2%	5	less 5 y	Yes	1	1	1	1	1	
		Mexico	UNAM		14%	5	6 to 10 y	No	7	3	1	1		
		Mexico	UNAM		4%	5	11 to 15 y	No	2	2		1		
		Mexico	Public	2	4%	5	6 to 10 y	No		1	1			
		Mexico	Public		2%	4	11 to 15 y	No		1	1	1		
		Mexico	Private	8	2%	4	6 to 10 y	No		1	1	1	1	
		Mexico	Private		4%	4	11 to 15 y	No		2	2	2		
		Mexico	Private		8%	4	16 to 20 y	No		4	4	4	4	1
		Mexico	Private		2%	3	+ 21 y	No		1	1	1	1	1
	5	USA	Private	4	6%	4	11 to 15 y	No		3	3	3	2	
		USA	Private		2%	4	16 to 20 y	No		1	1	1	1	
		USA	State	1	2%	4	11 to 15 y	No		1	1	1	1	
Women	11	Mexico	UNAM	1	2%	5	6 to 10 y	No	1					
		Mexico	Public	2	2%	4	6 to 10 y	No		1				
		Mexico	Public		2%	4	11 to 15 y	No		1	1	1		
		Mexico	Private	8	4%	4	11 to 15 y	No		2	2	2	1	
		Mexico	Private		10%	4 (and 3)	16 to 20 y	No		5	5	5	3	1
		Mexico	Private		2%	4	+ 21 y	No		1	1	1	1	1
	12	USA	Private	5	2%	4	less 5 y	No		1	1	1		
		USA	Private		2%	4	6 to 10 y	No		1	1	1		
		USA	Private		6%	4	11 to 15 y	No		3	3	3	2	
		USA	State	7	8%	4	11 to 15 y	No		4	4	4	4	
		USA	State		2%	4	16 to 20 y	No		1	1	1	1	
		USA	State		4%	4	6 to 10 y	No		2	2	2	1	
Total	48							Totals	11	43	38	38	24	4

When evaluating the performance of public universities in Mexico, it was observed that the majority of their athletes possessed between six and ten years of diving experience. Within the examined sample,

only one diver competed at the World Cup level. Furthermore, only half of these athletes participated in national competitions, and only two took part in the CONADE games.

Public universities in Mexico that are equipped with diving pool facilities typically schedule training sessions for up to five hours on weekdays during the academic calendar. Consequently, divers are required to adjust their academic schedules to accommodate training sessions. Additionally, during summer or winter breaks, these athletes must seek alternative training venues to maintain their diving programmes.

The CONADE games, organized by the National Commission for Physical Culture and Sport (CONADE), represent the highest level of underage competition in Mexico and feature the top 14 divers in each category and event. In contrast, students from other public universities in Mexico have reached CONADE and even international levels.

The analysis also highlights that, generally, universities in Mexico are not focused on developing and training athletes from scratch. The UNAM population has one outlier, but typically, university athletes in Mexico come from training at different clubs and in the best cases, from a state high-performance diving center.

Approximately 94% of high-performance divers in Mexico who have reached the CONADE games or higher and are pursuing university education and attend private universities in Mexico or schools in the U.S. The remaining 6% are from state or autonomous universities in Mexico.

Table 3. Internal consistency results

	Cronbach's Alpha	AVE	R2	Adjusted R2
Academic Performance	-0.882	0.602	0.726	0.711
Sport Perfomance	0.111	0.374	0.768	0.748
Dual Career Satisfaction	0.140	0.359	0.648	0.618
Academic Support	0.749	0.663		
Sport Support	0.348	0.478		
Administrative Support	0.681	0.621		

The data highlighted that in public universities in Mexico, the average duration to complete an undergraduate degree is five years. In the U.S., the average duration is four years, while in private universities in Mexico, the duration varies between three and four years. Additionally, according to the survey, private Mexican universities provide scholars with the option to study remotely and with flexible schedules.

Regarding public universities in the states of Mexico, few athletes have sport facilities at their school, and their training is conducted at a different location, often under agreement between the school and the training center. In particular, these training sessions outside of the university are designed to provide

access to tools such as water belts and land trampolines, as well as opportunities for comparison with other divers.

Table 4. Collinearity statistics (VIF Variance Inflation Factor) Inner model

Inner model	VIF
Academic Performance -> Sport Performance	3.201
Academic Support -> Academic Performance	2.179
Academic Support -> Dual Career	2.197
Administrative Support -> Academic Performance	2.179
Administrative Support -> Dual career	3.321
Administrative Support -> Sport Performance	3.956
Sport Support -> Dual Caerer	1.947
Sport Support -> Sport Performance	1.938

In terms of administrative and sports support for athletes, UNAM, along with all U.S. schools, provides scholarship support for their student divers, which includes access to physiotherapy, sports psychological support, emergency medical services, nutritionists, and competition uniforms.

Private schools in Mexico offer academic scholarships, uniforms, and additional awards to their athletes. However, the study indicates that athletes from Mexican state public universities lack medical support, nutritionists, methodologists, and physiotherapy, but all training is deployed at high-performance centers or pools with third-party coaches.

Additionally, nearly all divers at private universities in Mexico receive monthly financial support from CONADE, ranging from USD $1,000 to $2,200 based on athletic results. In contrast, divers at public universities in Mexico, including those from UNAM, do not receive CONADE support for diving. However, a UNAM diver who meets all academic attendance and sports performance criteria may qualify for a grant of approximately USD $300 per semester, which is funded by UNAM. This grant must be proposed by the coach and is subject to administrative approval by UNAM [9]. For other public universities in Mexico, since the athletes are older than 18 years and are classified as open or first division, they receive no sports-related benefits or support as a grant.

6.1 Model analysis

For Cronbach's Sport Performance and Dual Career Satisfaction, the values are very low, suggesting poor internal consistency within these constructs. Academic Support shows good internal consistency, whereas Sport Support is marginally acceptable, and Administrative Support is reasonably reliable.

For average variance extracted (AVE), values above 0.5 are generally acceptable, indicating that more than half of the variance in the indicators is accounted for by the construct Academic Performance despite the negative α; this AVE is acceptable, which might suggest that while the items are related, they may be influenced by the university scale, in which includes both Mexican and American schools. The Sport Performance and Dual Career Satisfaction AVE values are both below the acceptable threshold, indicating convergent validity issues. Academic support, sport support, and administrative support are acceptable for marginal AVEs, suggesting decent construct validity.

For R2, these coefficients indicate the proportion of variance in the dependent variable that is predictable from the independent variables; for Academic Performance, R2 = 0.726 indicates strong predictive power, which is surprising given the negative α and suggests that the construct, despite measurement issues, still predicts a substantial amount of variance. Sport Performance: R2 = 0.768 similarly shows strong predictive power, which contrasts with its low α and AVE, indicating potential issues in the operational definition of the construct. Dual Career Satisfaction: R2 = 0.648, moderately strong predictive power, which is reasonable but still suggests room for improvement in measurement practices.

Table 3. Internal consistency results

	Cronbach's Alpha	AVE	R2	Adjusted R2
Academic Performance	-0.882	0.602	0.726	0.711
Sport Perfomance	0.111	0.374	0.768	0.748
Dual Career Satisfaction	0.140	0.359	0.648	0.618
Academic Support	0.749	0.663		
Sport Support	0.348	0.478		
Administrative Support	0.681	0.621		

According to the variance inflation factor (VIF) statistics results, the overall model appears to be valid with respect to multicollinearity, as most VIFs are well below the threshold of concern. These findings suggested that the predictor variables provide distinct, nonoverlapping information about the outcomes.

Table 5. Heterotrait Monotrait ratio (HTMT)

	Academic Perf.	Academic Support	Admin. Support	Dual Career Satisfaction	Sport Support	Sport Perf.
Academic Performance						
Academic Support	0.942					
Administrative Support	1.16	0.857				
Dual Career Satisfaction	1.163	0.993	1.065			
Sport Support	0.572	0.463	0.832	0.568		
Sport Performance	1.077	0.853	1.162	1.503	0.634	

The heterotrait-monotrait (HTMT) ratio is a measure used in structural equation modeling to assess discriminant validity and is the extent to which constructs that are supposed to be different are indeed distinct. The Sport Support latent variable value for other constructs was well below 0.85 in many cases indicating good discriminant validity. The relationships involving Administrative Support, Dual Career Satisfaction, and Sport Performance are concerning since they may overlap. The differences in administrative and support structures between Mexican and U.S. universities could cause the constructs to capture similar yet subtly different phenomena. This might reflect in your SEM-PLS analysis as high HTMT values, indicating less discriminant validity than expected.

With respect to the path coefficients, we can observe three strong relationships among the latent constructs. The first and highest, with a coefficient of 0.749, is between Academic Performance and Sports Performance, showing a positive effect of the former on the second, inferring that being a good student translates into being a good athlete. The other relevant coefficient, 0.612, is the positive effect that Administrative Support has on Academic Performance, explaining that an athlete will exceed an academic level if the university administration grants them some kind of aid. Finally, with a coefficient of

0.589, a positive effect of Academic Support in Dual Career Satisfaction is observed; hence, to equilibrate his activities, the athlete needs help from the academic department of the university.

Although the other relationships between constructs are not strong enough to be considered significant because they have coefficients less than the threshold of 0.5, it is important to mention that they all have a positive effect, except for Sport Support and Sports Performance which even if it is close to zero, is negative. Despite the common guess that this relation means that athletes who are supported do not perform well on competitions, it actually can be interpreted that the opposite occurs: athletes exceed in competitions even though there are no specialized programs for the sport.

The variables associated with the latent constructs are mostly positive and significant, with a coefficient higher than 0.5. Starting with dual-career satisfaction, being able to effectively balance the academic and athletic responsibilities (DCS1) has the most important positive relation with the construct and it also gives sense to the academic support effect on dual-career satisfaction, on the other hand, the university (Univ) in which the athlete is enrolled has a negative effect on the construct, reaching the highest effect possible for the cases of Mexican schools. Regarding the other two variables, low stress levels (DCS2) and high levels of emotional well-being (DCS3), though they are positive indicating that they promote the satisfaction of the athlete, however, the coefficients of both are not high enough to be considered significant.

In the Academic Support construct all three associated variables are significant. Both flexible class schedules (Acad1) and academic assistance in schedule managing (Acad3) are considered vital for the athletes in their academic support because they have a coefficient close to one, moreover, the existence of remote classes (Acad3) is important with a coefficient of 0.5.

Administrative Support is another one of the constructs for which all its associated variables are significant. Having administrative guidance (Admin1) and receiving a scholarship for training and equipment (Admin3) are variables highly regarded by athletes, as the coefficients are close to 0.9. A scholarship dedicated to nutrition (Admin2) is also important for athletes but at a lower magnitude as its value is just above the 0.5 threshold.

Associated with the Sports Support construct there are five variables, 4 of which are significant, and one is marginally significant. Having clear policies to promote high-performance athletes (Sport1) and suitable training programs (Sport3) are the strongest variables, with coefficients close to 0.9; having a specialized coach (Sport2) is also considered important, as it bears a coefficient close to 0.6. On the other hand, training outside of university facilities (Sport5) has a negative impact on the construct; this is natural because if the athlete does not train in university facilities implies a low support for the sport, this variable is also associated with the case in which the athlete trains within university facilities (Sport4), which is marginally significant with a coefficient of 0.486.

The Academic Performance construct is determined by two main variables: a positive effect of the academic support provided by the university (AcadPerf2), which also explains the relationship with the

Administrative Support construct; and a negative effect caused by the university (Univ) which infers that Mexican universities have a negative impact on the academic performance of athletes due to their high academic demand and limited onsite training hours. The variable maintaining regular progress in an academic program (AcadPerf1) has marginal significance, with a value close to 0.5.

Finally, the Sports Performance construct also has two significant variables: being satisfied with the overall experience (SportPerf2) and being satisfied with the university (Univ). The former variable has a positive effect, but the variable associated with the university is shown to have, again, a negative effect on the construct. A nonsignificant effect was observed for individuals with a diving coach with bachelor's degree (SportPerf1) and for whom the sports authorities of the university were concerned about the well-being of the athlete (SportPerf3).

7 Discussion

By analyzing the academic and athletic trajectories of Mexican student diving athletes at various educational institutions, both in Mexico and the United States, several key insights emerge that highlight the complexities of managing dual careers in sports and academics.

First, Mexican student athletes at public universities in Mexico exhibit superior academic performance and professional training. However, while Mexican divers studying abroad in the U.S. they may achieve satisfactory professional development depending on their field of study, their athletic performance tends to decline.

It appears that divers who achieve peak sports performance during their university years predominantly attend private schools in Mexico, often enrolling in distance learning programs in fields related to sports. This trend underscores a significant gap in support systems for high-performance diving athletes at public universities in Mexico, which seems to contribute to less optimal athletic outcomes.

The survey data reveal a disparity in postgraduate trajectories among divers based on their academic discipline in the U.S. Divers who obtained degrees in management or engineering often chose to remain abroad, while those who specialized in sports-related fields generally returned to Mexico. Upon return, these individuals frequently encounter bureaucratic delays in having their degrees recognized by the Mexican Ministry of Education, subsequently affecting their employment prospects.

This situation calls for a more structured approach to athlete development in Mexico, similar to models suggested by organizations such as the NCAA, the Amateur Athletic Union (AAU) and European community guidelines. These models advocate dual careers: the integration of academic opportunities with athletic training to ensure that student athletes can excel in both arenas without having to sacrifice one for the other.

To foster a healthier, more supportive environment for these dual-career diving athletes, it is imperative that both the government and educational institutions in Mexico collaborate to create pathways that

accommodate and nurture the unique needs of high-performance athletes, ensuring their academic and athletic success.

While the initial study did not focus on this topic, field interviews with study subjects and coaches highlight the significant need for the consolidation of a specialized school for Mexican diving. Despite frequent mentions in the media, such an institution effectively does not exist. The interviewees noted that there are individuals with the requisite academic and sports training in universities who have even started publishing basic training manuals on the subject. This finding points to a gap between the perceived and actual support for diving in Mexico, suggesting a potential area for development to nurture talent more effectively.

Tracking the academic and professional trajectories of university diving athletes from public schools in Mexico, it is evident that they often achieve better professional development, despite their initial athletic performance in diving being at the beginner level. The interviews reveal that when faced with the choice between pursuing a professional career or a sports career and considering the high athletic talent of their peers and the lack of support from their institutions, these athletes often opt for the academic route. This decision underscores the critical need for better support systems for athletes in educational institutions to help balance and enhance both their academic and athletic potential.

The limited number of university athletes from public schools in Mexico who have participated in international competitions often did so with additional training outside of their universities or did not train at their university at all. There is tangible evidence of only one federal public university in Mexico that trains divers as part of a national association; there are also emerging initiatives by state universities, particularly in the northern part of the country, aimed at fostering the dual career development of student-athletes. These programs seek to collaborate with state sports facilities to enhance the academic and athletic opportunities available to these students. The study sample included divers from six state universities in Mexico. This highlights a significant gap in institutional support for diving student athletes in public universities across Mexico, suggesting a need for enhanced athletic programmes and facilities that can nurture and develop sporting talent at the university level.

There is a consensus among Mexican university/college divers in the USA that dual athletic and academic development programmes at universities have significantly contributed to their dual career growth as individuals, professionals, and divers. They reported overwhelmingly positive feedback about these programs. Moreover, many interviewees expressed that Mexico should consider adopting this dual system model, recognizing its benefits in fostering well-rounded development in athletes, which enhances their capabilities both in sports and in their professional fields. This feedback underscores the broader suggestion that implementing similar structures in Mexico could elevate the standards and support for athletes, encouraging a more holistic approach to athlete development.

While the initial SEM analysis addressed this issue, it is pertinent to emphasize the perceptions among student divers that university support significantly impacts athletic performance. In the U.S., divers receive comprehensive support from their schools. However, a separate analysis of divers in Mexico and

the U.S., using the same data sample, highlights how training outside university facilities, without supportive scheduling, affects not only sports performance but also academic performance.

Nearly all Mexican student-divers studying in the U.S. report high academic satisfaction, perceiving a genuine concern for their personal development and experiencing a sports direction that is well-aligned with comprehensive administrative support. Although the sample indicated a slight decline in athletic performance, it is important to note that the respondents also reported fewer training hours in the U.S. than in Mexico. However, support for academic improvement, personal well-being, and nutrition was deemed superior in the U.S., reflecting a true commitment to facilitating dual career paths.

In Mexican public universities, the requirements for class attendance and training sessions often conflict in scheduling. It is challenging to align and match schedules without overlapping academic and athletic commitments. This difficulty, as studies from Brazil and Spain show, leads to athletes in Mexico abandoning either their education or diving, thus interrupting their dual career paths.

The influence of academic advancement on the athletic performance of student-athletes is significant. The university in question is the primary driver that determines whether a student continues with their dual career or abandons it. This is not necessarily deliberate oversight by the institutions but could suggest a lack of pedagogical and athletic experience among those responsible for overseeing athletic and academic development at public universities in Mexico, which are typically focused on training students to become professionals.

Given the evidence, if a high-performance diver in Mexico wishes to continue a sports career, choosing a public university in Mexico may be an unsuitable choice; they should either cease their studies or seek a scholarship in the U.S.

Consequently, it would be contradictory for Mexican public universities to demand high-performance athletes without providing necessary support. This might stem from a lack of operational knowledge by the university authorities regarding sports management. Considering that diving is one of the sports that contributes significantly to Mexico's Olympic medals, it would be advisable to implement a pilot program for a dual career path.

The perception of stress among athletes is almost three times greater in Mexican public universities than in Mexican private universities and four times greater than that in U.S. universities. Regarding Mexican private universities, athletes have a positive perception, notably better in terms of academic counseling than do U.S. universities. Interestingly, despite the lack of diving facilities at any private university in Mexico, the perception of dual career satisfaction is comparable to that of U.S. schools.

8 Conclusion

This study embarked on a comprehensive exploration of the dual career pathways of high-performance Mexican divers, with a focus on the interplay between academic, administrative, and athletic support

systems and their resultant impacts on both academic and athletic performance. The findings reveal several critical insights:

From the student-athlete perspective, the provision of combined academic, administrative, and athletic support significantly contributes to a satisfactory balance between academic achievement and athletic performance. This balance is crucial for the overall well-being and success of high-performance divers, affirming the necessity of a holistic support system for facilitating dual career pathways. Mexican public universities need to address this issue to improve the well-being of their students.

Regarding the influences on athletic performance, the study revealed that variables such as the country, type of university and specific support offered, notably administrative and athletic support, are pivotal in shaping the athletic performance of divers. The comparative analysis between universities in Mexico and the U.S. underscored that the structural and cultural differences profoundly affect athletes' training outcomes, with those in the U.S. generally benefiting from a more robust support system that aligns with their athletic and academic needs.

The academic and administrative support structures within universities play a fundamental role in the academic success of student-athletes. The presence of tailored support services, such as tutoring and flexible scheduling, directly correlates with enhanced academic performance, highlighting the intertwined nature of academic and athletic development that Mexican public universities need to improve. Private university divers' perceptions are positive, and the mature USA model confirms a proper planning and progressive development.

In conclusion, the dual careers of student-athletes, particularly those involved in high-performance sports such as diving, necessitate an integrated approach that addresses both their educational and athletic aspirations. Universities that successfully implement comprehensive support systems not only foster better athletic performance but also enhance academic outcomes, thereby contributing to the holistic development of student-athletes. Mexico has a large challenge and opportunity to improve, foster and address this situation.

This research provides a foundational reference for studies analyzing comparative perceptions of dual careers across various sports, employing university models from Mexico in contrast with those from a third country. The methodology and insights derived from this investigation are applicable to a wide range of sports disciplines, offering a template for evaluating how different educational and support structures impact athlete experiences in diverse international contexts.

Declarations

Conflict of interest: The authors have no conflicts of interest that are directly relevant to the content of this article. Accordingly, Daniel Trejo Medina and Fragoso disclosed that a relative was included in the study's sample.

Competing interest: The authors declare no competing interests.

Ethics declarations: In accordance with the Official Mexican National Standard NOM-012-SSA3-2012, which establishes the criteria for the execution of research projects in human beings and given that this article does not contain clinical studies with human participants carried out by any of the authors, no need for ethics approval committee. This is not medical research. Informed consent was obtained from all the student-divers who participated in the survey.

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Author Contributions: DTM: Conceptualization, methodology, original draft writing, proposal for the SEM, formal analysis, discussion, and conclusion. DTF: Model conceptualization, data collection, formal analysis, statistical analysis and draft writing, review, and editing. ARD: Field study, data validation, testimonial collection and review, verification of analysis objectivity and consistency, review and commentary on discussion and conclusions. EOOG: Field study, survey review, data validation, testimonial collection and writing, review and commentary on discussion and overall conclusions. All the authors read and approved the final version.

Availability of data: The data that support the findings of this study are available from the authors upon reasonable request.

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Figures

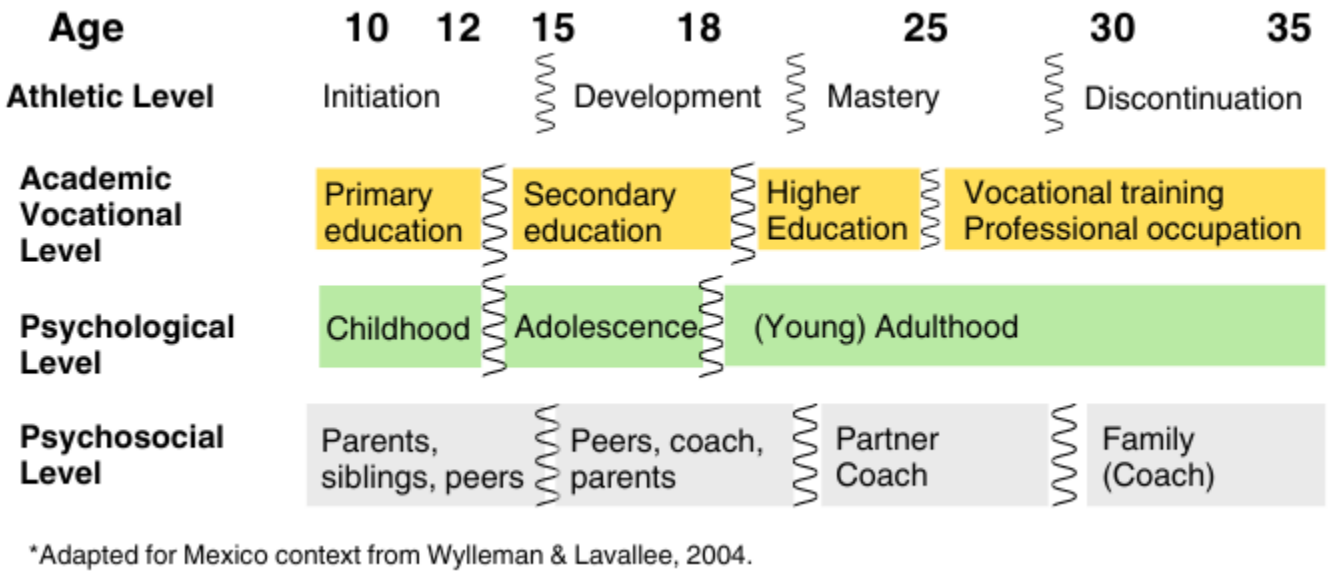

Figure 1

Diver's age and maturity, Mexican perspective. Adapted from Wylleman and Lavallee [15].

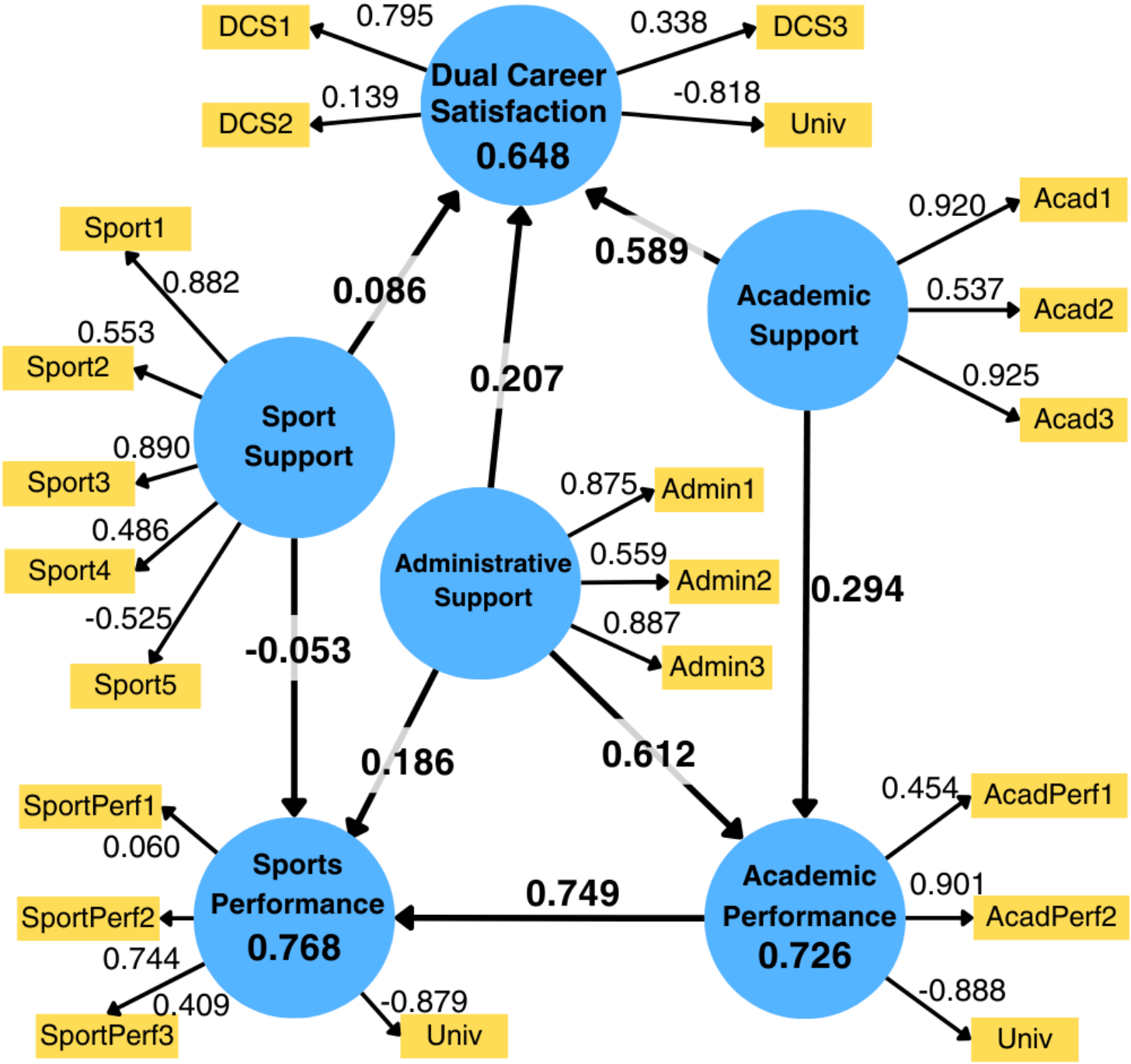

Figure 2

SEM-PLS model for dual-career satisfaction perceptions of Mexican divers.