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Factors Associated With the Development of Research Skills in Graduate Students

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Abstract

The purpose of the research was to determine the incidence of factors associated with the development of research skills in graduate students from public and private universities. A quantitative, basic-substantive, explanatory level methodology was used; the indeterminate population allowed the establishment of a stratified random sample of 384 master's and doctoral students. Multivariate logistic regression was used as a statistic. The results indicated a moderate incidence of 44.4%, according to Nagelkerke's pseudosquare of ,444, and, according to parameter (Wald) estimates, both variables influence the appropriate level.

Keywords: Higher scientific education; higher education; learning; pedagogical skills

Introduction

Cooperative work has become a recurrent methodology to combat difficulties in student learning at all educational levels; however, teachers present many problems due to the existence of deeply rooted individualistic paradigms among students and teachers themselves. Likewise, social skills are linked to the strengthening of cognitive abilities that, together with cooperative work, should give positive results in the

In previous studies, the relationship between social skills and coexistence was determined with a moderate level - Spearman's rho of ,515 - using the sample of 173 students (Ramirez, 2018); but more complex studies such as that of Santiago, Ferraressi and Barham (2018) determined that various factors do not allow the development of social skills; one of them was the lack of support. development of thinking, intelligence and learning.

In various university institutions, it is observed that graduate students have developed social skills that allow them to develop adequately when they work in teams, contributing to their integral development. This motivates research into how the symbiosis between social skills and cooperative work affects the development of research skills.

Also, the study by Dillon and Espinoza (2019) linked social relations with leadership, finding influence at moderate levels. Mejia (2019) found a very strong relationship (rho Spearman of ,903) between social skills and emotional intelligence in a random sample of 91 participants. Mejía (2019) then related these skills to cooperative learning, determining a moderate correspondence (rho

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Spearman of ,585) in a sample of 80 students.

With reference to social skills, they are understood as behaviours observed to an individual in a certain context among a group of people, whose expression of feelings and attitudes is intended to solve problems (Caballo, 2007).

For Peñafiel and Serrano (2010), these are behaviours of a social nature that make it possible to carry out skills that are acquired during life by generating interaction. Similarly, Segura (2002) states that these skills allow to achieve objectives effectively, improving self-esteem and interpersonal relationships. For Castro (2005), they are skills that allow the execution of tasks of interpersonal nature in addition to the person being valued or accepted by the group. Mateos- Aparicio (2009) calls them social competences and psychosocial skills.

These skills are related in the psychosocial field when they are linked to the knowledge proposed by Jomtien, which allows for stable relationships with other people so that they are able to make decisions together, building solidarity (Bravo, 2004). It is important to point out that they help to understand how students acquire the various skills for their personal development that enable them to face and solve the problems that arise (Uribe, Escalante, Arevalo, Cortés and Velásquez, 2005).

For Peñafiel and Serrano (2010), social skills are planned learning processes; however, for Bandura (1982), the individual performs social learning through the observed behaviors of other men, which can be categorized as positive/negative stimuli.

Bravo, Martínez and Mantilla (2005) mention three basic categories of skills: a) interpersonal, b) cognitive and c) emotional. On the other hand, Peñafiel and Serrano (2010) present two factors: 1) interpersonal (instrumental), linked to performance, verbal and non-verbal behaviors that manifest feelings/opinions; and 2) cognitive, linked to thinking, taste, desire that allow solving situations using rational thinking. Among the cognitive indicators we have the use of effective information, capable of transformation, response capacity, problem solving and information processing.

Choque (2006) states that social skills are made up of five components: 1) knowledge of oneself, 2) effective communication, 3) decision making, 4) creative thinking and 5) management of emotions and feelings.

According to the contributions of Caballo (2007) and Peñafiel and Serrano (2010), four dimensions have been proposed:

1) Assertiveness: denominated as the confidence that a person has of himself, where he expresses his thought without prejudice to the rest (Arévalo, Velásquez, Gupio and Uribe, 2001) without threats or punishment, respecting others (Castro, 2005) and (Caballo, 2007) handling criticism assertively (León, Rodríguez, Ferre and Cevallos, 2009) with adequate communication strategies, but with some risk (Peñafiel and Serrano, 2010).

Therefore, assertiveness becomes a positive option in the face of inadequate handling of emotions (Uribe, Escalante, Arevalo, Cortés and Velásquez, 2005). developing modesty, self-control, initiative, confidence and good humor (Rojas, 2004); likewise, these attitudes or behaviors are the product of learning (Peñafiel and Serrano, 2010) through the family and formal education (Mateos-Aparicio, 2009).

2) Communication: thanks to this skill, people transmit thoughts and feelings, as well as interact with other people (Caballo, 2007 and Rojas, 2004). The elements involved are sender/receiver, message/code/code, channel/context/noise (Van-der, 2005); all these elements give meaning to the message (Guijo, 2002) being essential for people's activities (García, 2005). For Castro (2005), the existing levels of communication are the non-verbal skills, where the visual and gestural contacts prevail; the competences of the conversations, that cause attraction in the dialogue, generating motivation and the linguistic skills/persuasion, that allow the control of the dialogue.

3) Self-esteem: set of mental and physical traits that cause the configuration of the personality, depending on the family, social and school (Uribe, Escalante, Arévalo, Cortés and Velásquez, 2005). It is related to the value that one has of oneself (León, Rodríguez, Ferre and Cevallos, 2009) generating acceptance/rejection (Peñafiel and Serrano, 2010).

4) Expression and management of emotions: they guide or direct people's actions (Goleman, 2009); they are reactions that contain facts, perceptions, awareness and modifications (Ellis, 2000) which, complementarily (Feldmad and Blanco, 2013), are associated with various stimuli such as anger, guilt or pride.

For Bisquerra (2003), emotions are produced in the following way: sensation-brain, neurophysiological response, interpretation of received data, response. This is related to demonstrations through social manifestations; however, values have influence because there is always the

protection of the person (Bisquerra and Pérez, 2007).

In addition, emotions can hinder many capacities such as thinking, planning and problem solving (Bisquerra and Pérez, 2007); emotional expression allows the understanding of the person's state, determining his or her maturity (Feldmad and Blanco, 2013); its management implies not giving uncontrolled answers in moments of anger, provocation or fear (Fernández-Berrocal and Extremera, 2006); therefore, it is necessary to become aware of emotions, cognition and behavior (Feldmad and Blanco, 2013; Alwahdani, 2019), when people present instability, they generate conflicts (Ramos, Ravello, Chávez and Sabaduche, 2011). Cooperative work are activities that people carry out to achieve goals and objectives in the learning process, with the teacher's work being the key to their realization (Gutierrez, 2009).

It has the following basic principles: active, constructive/social with affective/subjective components (Fernández, 2004); effectiveness is achieved when members responsibly assume the learning process, adjusting to the competencies outlined in the program (Barkley and Howell, 2007).

The teaching function is fundamental because it designs the teams, proposes the task, establishes contents and objectives, means/materials and the activities through its role of orienting learning. All this is based on the characteristics of the group and the techniques used (Casanova, Álvarez and Gómez, 2009; Selomo, & Govender, 2016).

According to Jhonson, Johnson and Holubec (1999), the dimensions of cooperative work are the following: 1) Positive interdependence, which is the way in which people interrelate, establish stimuli and learn, but also generate competences and obstruction among them. Interdependence generates cooperation to achieve goals and objectives together, also achieving psychological health. Thus, when students carry out these actions they achieve success, forming interdependent teams, sharing resources and efforts, surpassing individual work.

2) Face-to-face promotional interaction; Tamayo, Echeverry and Araque (2012) state that students, by promoting group success, supporting and stimulating each other for the achievement of objectives, generate in them cognitive activities being able to solve problems and, in turn, learn together. This generates feedback in the group, pressure and motivation to learn.

3) Responsibility and personal appreciation strengthen the teams in their learning process and support the student who most needs it. For Díaz (2006), the difficulties of teamwork are the presence of members who do not make contributions, generating negative aspects for the achievement of the goal; therefore, it is essential that people evaluate their responsibility for the good of all and, in this way, avoid conflicts.

Interpersonal skills, for Hernández and Araujo (2007), are learned through teams, in joint work, where discipline is the basis of relationships between people for their acceptance. It is essential to foster and develop social skills in students, so that they can improve these relationships, trusting each other, accepting each other. Group evaluations, where the results of joint work must be permanently evaluated; develop their strengths and reduce errors in order to achieve the objectives.

With reference to university competencies, they will be circumscribed in their contribution to the development of science and technology; besides being closely linked to professional training (García, 2015); likewise, they strengthen the development of skills, values, inducing the development of creativity, responsibility and scientific thought (Fraiha, Paschoal, Pérez, Tabosa, Da Silva and Rocha, 2018).

Thus, "the researcher constructs science philosophically and philosophically ... he moves through logic, semantics, methodology, theory of knowledge, ontology, axiology, ethics and aesthetics of science". (Bunge, 1980, p. 75)

For Ocaña and Valenzuela (2018), they are made up of the following components a) information search, where the relevant information is selected, compiled and organized to help research, highlighting the development of skills, whose search is done in books, scientific journals, among others; b) technological domain, developing the ability to perform operations through ICT, strengthening research capabilities; c) the methodological domain, whose characteristic is based on the relevant use of tools, methods and research techniques, strengthening research capacities; and d) the attitudinal domain, which implies the predisposition of the researcher, expressed by his/her conceptual and procedural domain for the adequate orientation of research.

Therefore, the objective is to determine how social skills and cooperative work affect the development of research skills in graduate students; the hypothesis being that social skills and cooperative work affect the

development of research skills in graduate students.

Method

The research carried out was of a basic/substantive type (Carrasco, 2009), whose characteristic is that it does not make application forecasts; rather, it seeks to expand knowledge. It is substantive because it seeks the explanation or description of specific facts and of an explanatory level because it seeks to establish the incidence among the variables studied (Carrasco, 2009). The design used was the non-experimental one because there was no manipulation of the variables; it seeks the description or explanation of the fact (Carrasco, 2009).

The social skills variable was operationalized by establishing four dimensions and 39 questions or items: (Table 1); The cooperative work variable was operationalized by establishing four dimensions and 40 questions or items: (Table 2); The university competencies variable was operationalized with four dimensions and 26 questions or items: (Table 3).

The population was made up of postgraduate university students from the city of Lima with an undetermined population; therefore, it was a stratified and random sample of 384 participants. The technique used was the survey that allows us to know the different opinions (Méndez, 2008). The instruments used were questionnaires, whose authors are Goldstein, Aguilar and Bravo, and they were also subjected to validity and reliability.

Reliability allows us to measure the degree to which the instruments produce consistent/coherent results (Hernández and Mendoza, 2018). For the first and second instruments, Cronbach's Alpha was used, yielding 0.892. 0978 and 0.912, respectively; that is, strongly reliable. When the instrument measures what it is supposed to measure, it is considered valid (Hernández and Mendoza, 2018), being submitted to the opinion of experts, who consider it applicable.

As a procedure, data was collected from fourth grade classrooms through questionnaires, then the information was processed in Excel tables and the data was scaled; finally, SPSS-26 was used to determine the correlations established in the working hypotheses.

After data processing, descriptive statistics were used, using tables and figures that allow interpretation of the information (Anderson, Sweeney and Williams, 2008). To demonstrate the hypothesis, SPSS-26 and the Multivariate Logistic Regression statistician were used, with 95% confidence and 5% margin of error (Wayne, 2002). The data collected are adjusted to the reported knowledge of the students. In addition, APA 6 standards were used to ensure the rights of the various authors referenced in the research.

Results and Discussion

The results, after processing the data, showed that the social skills variable presents 54.7% at the adequate level and 45.3% at the inadequate level; in the assertiveness dimension, 57.8% is at the adequate level, 41.7% at the inadequate level and 0.5% at the inadequate level; In the communication dimension, 71.4% are of an adequate level and 28.6% are inadequate; in the self-esteem dimension, 55.7% are of an adequate level and 44.3% are inadequate; in the expression and management of emotions dimension, 46.6% are of an adequate level, 50.8% are inadequate and 2.6% are inadequate (Table 4).

The descriptive results show that students entering graduate schools present adequate levels for professional development; that is, they can carry out learning and research activities in an adequate manner for the achievement of their objectives. This is consistent with Mateos-Aparicio (2009) and Castro (2005), since the author's state that skill development allows for activities appropriate to postgraduate studies.

Similarly, Peñafiel and Serrano (2010) point out that social skill make it possible to carry out competencies; furthermore, these skills allow for the effective achievement of objectives, improving self-esteem and interpersonal relationships (Segura, 2002).

The processing of data collected from graduate students resulted in the cooperative work variable that 60.4% is of an adequate level and 39.6% is inadequate; in the positive interdependence dimension, 63.5% is of an adequate level and 35.9% is inadequate; in the promotional face-to-face interaction dimension, 77.6% is of an adequate level, 22.1% is inadequate and 0.3% is inadequate; In the responsibility and personal assessment dimension, 59.4% are of an adequate level and 40.6% are inadequate; in the interpersonal skills dimension, 48.2% are of an adequate level, 51.0% are inadequate and 0.8% are inadequate; in the group assessment dimension, 57.8% are of an

adequate level, 39.8% are inadequate and 2.3% are inadequate (Table 5).

The results indicate that more than 60% work in an adequate cooperative manner, an indication of their awareness that together they can achieve the objectives they set (Gutiérrez, 2009) and, if they do so responsibly, they will comply with the program (Barkley and Howell, 2007). It is here that teachers must establish their guiding role by setting the corresponding task, highlighting the way to motivate the diverse capacities of each member by developing interdependence and cooperation, sharing means, materials and strategies.

Data processing of the variable university competencies resulted in 62.0% being of an adequate level and 38.0% being of an inadequate level; in the information search dimension, 65.6% is of an adequate level, 33.9% is of an inadequate level and 0.5% is inadequate; In the technological domain dimension, 71.1% is of an adequate level and 28.9% is inadequate; in the methodological domain dimension, 68.5% is of an adequate level, 31.3% is inadequate and 0.3% is inadequate; in the attitudinal domain dimension, 58.1% is of an adequate level, 40.1% is inadequate and 1.8% is inadequate (Table 6).

More than 62% of postgraduate students present adequate competences that guarantee, to some extent, the contribution to scientific development and their studies will strengthen cognitive and evaluative skills that contribute to scientific thinking (Fraiha, Paschoal, Pérez, Tabosa, Da Silva and Rocha, 2018).

The general hypothesis test demonstrates the incidence of social skills and cooperative work in the research competences of graduate students as indicated by Nagelkerke's pseudosquare of ,444; that is, a moderate level of influence (44.4%) and, according to parameter estimates (Wald), both variables influence the appropriate level. The specific hypothesis test 1 demonstrates the incidence of social skills and cooperative work in the search for information of graduate students as indicated by Nagelkerke's pessimistic square of ,266; that is, a low level of influence (26.6%) and, according to the estimates of the parameter (Wald), social skills influence the adequate level. The specific hypothesis test 2 demonstrates the incidence of social skills and cooperative work in the technological domain of graduate students as indicated by Nagelkerke's pessimistic square of ,162; i.e., a very low level of influence (16.2%) and, according to estimates of the parameter (Wald), social skills influence the appropriate level. The specific hypothesis test 3 demonstrates the incidence of social skills and cooperative work in the methodological domain of graduate students as indicated by the Nagelkerke pessimistic square of ,225; i.e., a low level of influence (22.5%) and, according to the parameter estimates (Wald), social skills influence the appropriate level. The specific hypothesis test 4 demonstrates the incidence of social skills and cooperative work in the attitudinal domain of graduate students as indicated by Nagelkerke's pseudosquare of ,118; i.e., a very low level of influence (11.8%) and, according to the parameter estimates (Wald), social skills influence the appropriate level (Table 7).

The inferential results are consistent with the statistical results that indicate moderate and low correlations as indicated by the researchers Ramirez (2018) and Santiago, Ferraressi and Barham (2018). Related studies confirmed the findings as those of Dillon and Espinosa (2019) and Mejía (2019).

It should be noted that both variables act together to develop research skills as stated by Caballo (2007) and Peñafiel and Serrano (2010). This will allow the achievement of research objectives (Segura, 2002) and the development of research skills (Uribe, Escalante, Arevalo, Cortéz and Velásquez, 2005).

Conclusion

The research skills of the master's and doctoral students at the various universities in Lima showed that factors such as social skills and teamwork were decisive in developing them, with results of 44.4%. Groups that finished their studies, at the cut-off date, were able to support their research and graduate either as doctor or master.

Let us consider that social skills become a fundamental factor because they allow the interrelation of all peers and teachers, in addition to being able to interact. Likewise, they make collaborative work possible due to the good relations between them, strengthening training work and, fundamentally, research work, whose capacities have been strengthened, in accordance with the descriptive results of 62%. In addition, the influence of these factors is realized when moderate levels are reached in the variables (Wald).

The study generates two lines of research as influential factors, related to the level of teaching skills and research experience, factors that were established according to Pareto's analysis.

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Appendices

Table 1: *Matrix operationalization of variable Social skills*

Dimensions	Indicators	Ítems	Scales measuring	Levels and ranks
Assertiveness	Styles of behavior. Positive assertion. Positive message. Defending your rights.	1tol 12	Never 1 Rarely 2 Sometimes 3 Often 4 Always 5	Inadequate 39 – 91 inappropriate 92 - 143 Adequate 144 - 195
Comunication	Knowing how to listen. Use clear and precise messages. Initiative in communication.	13 to 21		
Self-esteem	He values his body. Knows himself. Recognizes and expresses his feelings. Security and trust.	22 tol 33		
Expression and management of emotions.	He expresses his emotions. Manages his emotions.	34 to 39		

Table 2: *Matrix operationalization of variable cooperative work*

Dimension	Indicator	Ítems	Scale measuring	Levels and Ranks
Interdependence positiva	He perceives the need to link up with his team members.	1 to 8	never 1 rarely 2 sometimes 3 often 4 always 5	Inadequate 40 – 93 Unsuitable 94 - 146 Adequate 147 - 200
Face to face promotional Interaction	Exchange ideas, share experiences and knowledge.	9 to 16		
Responsability and personal valoration	It evaluates the effort, gives feedback, helps to avoid redundant efforts.	17 to 23		
Iterpersonal skills	It considers values in its interaction.	24 to 35		
Grupal Evaluation	Reflects on group work.	36 to 40		

Table 3: *Matrix operationalization of variable skills*

Dimentions	Indicators	Ítems	Scales	Levels and ranks
Information search	Planned search for relevant information in different written sources. Records information in different formats. Assumes a critical attitude towards theoretical approaches.	1 to 7	Undeveloped (1) Unsatisfactory (2) Minimum required (3) Well (4) High (5)	Inadequate Inappropriate Adequate
Technological domain in software	Masters basic office automation programs. Mastery of network management. Mastery in the management of global communication networks and computerized statistical packages to process and analyze data	8 to 12		
Methodológical domain	Appropriately addresses the research problem by defining the objectives and type of study Design the methodological framework of the research Develops tools for information collection	13 to 23		
Domain attudinal	Shows positive and critical disposition towards the investigative task Evidence of emotional control	24 to 26		

Table 4

Results describing the variable social skills

	Social Skills		Dimensions							
			Assertiveness		Comunication		Self-steem		Expresion and management of emotions	
	f	%	f	%	f	%	f	%	f	%
Adequate	210	54.7	222	57.8	274	71.4	214	55.7	179	46.6
Inappropriate	174	45.3	160	41.7	110	28.6	170	44.3	195	50.8
Inadequate	0	0.0	2	0.5	0	0.0	0	0.0	10	2.6
Total	384	100.0	384	100.0	384	100.0	384	100.0	384	100.0

Table 5

Results describing the variable cooperative work

	Cooperative Work		Dimensions									
			Interdependence Positiv		Face to face promotional Interaction		Responsability and personal valoration		Iterpersonal skills		Grupal Evaluation	
	F	%	f	%	f	%	f	%	f	%	f	%
Adequate	232	60.4	244	63.5	298	77.6	228	59.4	185	48.2	222	57.8
Inappropriate	152	39.6	138	35.9	85	22.1	156	40.6	196	51.0	153	39.8
Inadequate	0	0.0	2	0.5	1	0.3	0	0.0	3	0.8	9	2.3
Total	384	100.0	384	100.0	384	100.0	384	100.0	384	100.0	384	100.0

Table 6

Results describing the variable Skills University

	Skills University		Dimensions							
			Information search		Technological domain in software		Methodológical domain		Domain attudinal	
	f	%	f	%	f	%	f	%	f	%
Adequate	238	62.0	252	65.6	273	71.1	263	68.5	223	58.1
Inappropriate	146	38.0	130	33.9	111	28.9	120	31.3	154	40.1
Inadequate	0	0.0	2	0.5	0	0.0	1	0.3	7	1.8
Total	384	100.0	384	100.0	384	100.0	384	100.0	384	100.0

Table 7

Test hypotheses

Hypotheses Sistem	Variables	Juste models	Order square Nagelkerke	Estimates of parameters
General Hypotheses	Social Skills *Cooperative work impacts on research competencies	,000	,444	[Social hability =Adequate] = ,000 [Cooperative Work =Adequate] = ,000
Specifical -1 Hypotheses	Social skills*cooperative work affect the search for information	,000	,266	[Social hability =Adequate] = ,000
Specifical -2 Hypotheses	Social Skills*Cooperative work affects the technological domain	,000	,162	[Social hability =Adequate] = ,000
Specifical -3 Hypotheses	Social skills*co-operative work	,000	,225	[Social hability =Adequate] = ,002

	affect the methodological domain			[Cooperative Work =Adequate] = ,000
Specifical -4 Hypotheses	Social Skills*Cooperative work impacts on attitudinal domain	,000	,118	[Cooperative Work =Adequate] = ,000