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Research competences in university students in virtual learning environments

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Abstract

Research competencies are adopted in higher education, however, little is known about the role of these competencies in the virtual environment. This research is one of the first to describe research competences in postgraduate students in virtual learning environments. An observational design study using the research competences questionnaire was conducted with 89 students. The findings indicate that cognitive and teamwork competences are the most predominant (58.4% and 71.9%) and that the weakest areas are related to technological competences 33.7%, methodological competences 39.7% and project management 22.5%. These findings highlight the need to improve curricula in postgraduate schools where research competences are strengthened by prioritising technological, methodological and project management aspects so that students obtain the necessary skills and abilities and can improve their research processes.

Keywords: research competences, virtual learning environments, research training.

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1. Introduction

Research is increasingly important in higher education for several reasons such as the tendency to improve education quality, as well as the need to produce and spread knowledge properly and competitively in order to train professionals capable of generating it, from a scientific and humanist perspective, to respond to multiple social problems (Rojas & Espejo, 2020; Bucarey, Araya-Castillo & Rojas-Vallejos, 2020).

Scientific research shown in the development of research competences represents one of the pillars of the University as a training institution; however, it is observed that students do not develop these competences (Guamán Gómez, Herrera Martínez & Espinoza Freire, 2020) for different reasons, whether they be financial, institutional, from the teacher or the student (Antúnez Sánches & Veytia Bucheli, 2020). There is a clear curriculum showing a more informative than formative research teaching, where the research attitude is limited to the research methodology teaching. This is why curricula of different training levels should be organised in order to expose the student to situations that make the student question reality and have a scientific attitude and interest in the truth, as well as gain the necessary knowledge and skills to make research guarantee the progress of discipline and practice (Díaz-Barriga Arceo, López-Ramírez & López-Banda, 2020; Rojas Arenas, Durango Marín & Rentería Vera, 2020).

Therefore, universities are immersed in a competence-based education process in order to successfully obtain a professional with knowledge, skills, attitudes and values that allow them –from their comprehensive training– to adequately work, resolve deficiencies arising nowadays in the work environment, and continue learning independently throughout their life. Research competence is implemented if we add the instrument (methodology) to this integration (attitude, knowledge and skill). Thus, the development of these higher education competences would stimulate the future professional intellect, with a scientific behaviour based on the deep knowledge of research as their fundamental way of working (Gayol Gayol, Montenegro, Tarrés & D´Ottavio, 2018; Morales-Carías, 2020).

Nevertheless, the current challenge taken on by the education field, which lies in dealing with a pandemic, like COVID-19, must be recognised. To do so, it is first necessary to understand that education is regarded as the training focused on strengthening individuals' intellectual, moral, and emotional capacities, so that they can respond to their context, and thus, they regulate the society where they live and interact (Talavera & Junior, 2020; Paredes-Chacín, Inciarte González & Walles-Peñaloza, 2020; Portillo Peñuelas, Castellanos Pierra, Reynoso González & Gavotto Nogales, 2020).

It is noted that all levels of education are affected. This is why it is necessary to carry out a radical transformation, going from in-person or blended learning to an exclusively virtual learning environment. This brings to light a series of requirements at institutional level, involving both teachers and students. The incorporation of new technologies into this teaching-learning process is present; so it is necessary to recognise if the used digital tools are suitable to achieve academic quality in institutions and provide students with training based on research competences, giving them the chance to face relevant problems to build scientific knowledge or rebuild the already processed knowledge. In this way, future professionals may incorporate research competences in their daily life, social life and labour development (Enoki Miñano, 2020).

Diverse research works approach the development of these competences in different higher education levels, obtaining results such as the greatest use and access to virtual platforms in the last years (Rodríguez, 2021); as well as a positive opinion of the students on the use of Information

Technologies (Veytia-Bucheli, 2017). In addition, a higher percentage of finished research works, with competences developed for thesis preparation, is shown (Ruiz Bolívar, 2014; Mamani-Benito & Farfán-Sollís, 2020).

Regarding learning, there is an evident improvement in students to select and manage information, as well as a decision-making optimisation, reflective and critical abilities, and the ability to learn autonomously and significantly (Sánchez & Morales, 2014). There is also a clear development of formative research as a cornerstone at universities teaching research courses, in undergraduate and postgraduate studies (Hernández Hernández, Marino-Jiménez, Forton & Sánchez, 2020).

With regard to online education, Sun and Chen (2016) stated that it was developed due to three important factors: flexibility, accessibility and affordability. Training of teachers and students is very important in order to develop research competences through these virtual environments (Tobón-Marulanda, López-Giraldo & Londoño-Arroyave, 2019). They also said that the use of digital support improves times and ways of interaction, facilitating the formative assessment processes and allowing a more continuous, gradual and personalised teaching-learning process (Sánchez & Morales, 2014; Santillán, 2006). Likewise, virtual education showed advantages for students, since they learn based on their interests and ar their own pace (Ozcan & Genc, 2016).

1.1. Research in Higher Education

This study is based on one of the pillars of higher education, especially university education, which states that, in order to achieve the university-society link, teachers must ensure that knowledge produced in the classroom is transferred to specific contexts where students practice. It is about education based on competences that, in short, favours the transferability principle (Tobón, Pimienta & García, 2010).

Research training is linear and fragmented, as shown in the current education system; therefore, it does not encourage students to produce knowledge creatively or motivate them to resolve problems immediately, but it aims to train the professional so that they conducts research works in master's doctoral programs. Thus, research teaching does not guarantee the critical thinking development or the research competence acquisition, such as reading comprehension, ability to question situations, academic papers writing, or the ability to tackle real problems with academic and scientific knowledge.

Differently, formative research shows research as a teaching-learning process tool; that is, its purpose is to disseminate existing information and help the student to include it as knowledge. Formative research may also refers to teaching through research, or teaching using the research method; it thus develops the abilities required for permanent learning, which is necessary for the update of professionals' knowledge and skills (Parra, 2004; Rodríguez Andino, Zabala Espín & Mejía Paredes, 2020). Formative research and research training must interact on a continuous basis. Formative research develops in students the ability to interpret, analyse and synthesise information, search for unsolved problems, critical thinking and other skills such as observation, description and comparison. All of them are directly related to the research training as well.

1.2. Research Competences

In education, the concept and development of competences may have various definitions and connections, so it is necessary to clarify that the theoretical basis of competence must be only one. However, the understanding of competences from a particular field may change and be relative from each specific discipline or science. The traditional definition describes three types of competences: Cognitive (Know), competence referring to the knowledge of data, facts, concepts and principles;

Procedural (Know how to do), it refers to the execution of procedures, strategies, techniques, abilities, skills, etc.; and Attitudinal (Know how to be), it states that constructs mediate our actions and that they are composed of three basic elements: a cognitive component, an emotional component and a behavioural component, which generally are part of the hidden curriculum (Reiban Barrera, 2018).

Additionally, there is the need to foster specific skills where Research Competences are defined as: "Comprehensive actions to identify, interpret, argue and solve context problems in a suitable and ethical manner, including the know how to be, the know how to do and the know how to know" (Tobón, Pimienta & García, 2010).

Research competences guarantee the process of skill acquisition to reflect, abstract, manage information, synthesise, discuss, write and argue about real context problems, in order to know how to identify, formulate, question, plan, develop, lead, execute and report the results of a research work (De Vita, & Mendoza, 2019). To this end, a critical and reflexive attitude is required to detect those problems requiring scientific research and look for an appropriate solution. Therefore, a better work planning and organisation as well as a better use of it are demanded. It is necessary to be objective in judging and more flexible to accept changes caused by the renovation and innovation processes, have more time dedicated to individual study and reading about topics of professional interest, and a reaffirmation of professional motivation as teacher and researcher (Montes de Oca Recio & Machado Ramírez, 2009; Tejada, Tejada & Villabona, 2008).

Various authors evaluate these research competences, considering different indicators to measure their development in research processes. Thus, important works including indicators such as cognitive skills, search for information, technological knowledge of using resources and means, methodological knowledge to research, knowledge on how to report results and research teamwork skill are shown (Oropeza & Mena, 2014).

It should be taken into account that research competences represent dynamic processes and that due to the constant and current use of communication technologies in today's context where virtuality is necessary, they have become more complex, and are part of the educational process of university students, especially postgraduate students.

Based on the review of various theories on research competences, three main areas can be determined:

a) Research competences relevant to the stages of the research process.
b) General competences associated with research
c) Research competencies associated with innovation and development processes.

Based on the identification of the most appropriate indicators to measure research competences, the indicators proposed by Céspedes, Bermúdez, Brenes, Sánchez y Viales (2012), who through a literature review determined the skills necessary to develop research processes, are used to carry out this work:

- Cognitive skills: identify gaps in knowledge and problems related to the study objective.
- Technological skills: required to use technological tools facilitating from the search process to the research analysis, processing, interpretation and writing.
- Methodological skills: show the knowledge of methods, techniques, procedures, and use of tools required to respond to research problems.
- Research management skills: required to effectively manage material, human and funding resources, in a set period of time for the development of research projects.

- Teamwork skills: they are shown in social and interpersonal skills for the talent development in the corresponding research area.

1.3. Virtual Learning Environments

Information and Communication Technologies (ICT) in higher education show new learning and teaching practices, demonstrating a transformation in the training processes of students. Thus, the Conseil supérieur del l'éducation, (2015), stated that this new scenario was increasingly used by universities. However, in the context of the current health emergency as a result of the pandemic, they have become the only means of education.

Moreover, learning processes are developed in virtual learning environments (VLE), which are defined as the set of synchronous and asynchronous interaction environments, based on a curriculum, in which the teaching-learning process is carried out through a learning management system (Zúñiga Rodríguez, 2019). These are spaces designed for training purposes. In these spaces, social interaction is encouraged and students have a participatory and active role to make contributions, increase and reinforce knowledge, thus strengthening the development and mobilisation of competences (Garcia & Trilla, 2007).

Research competences favour the development of the aforementioned skills, both individually and collaboratively. Several studies have demonstrated this in face-to-face environments. However, in virtual environments, there remain some doubts. For that reason, the purpose of this research was to evaluate the development of these competences in virtual learning environments in university students.

1.4. Virtual Learning

ICT has become a powerful tool for virtual education. Consequently, virtual learning drastically replaced face-to-face learning and the student left aside social contact to maintain direct contact with digital devices, and the relationship between teacher and student became asymmetrical (Aguilar, 2020).

Silvio, (2002, p. 33) defines e-learning as a learning tool that follows the sequence of the tasks, respects the learning pace of each individual, favours the students' participation and gives them the feeling of being updated to meet the demands of the professional field in this technological era.

In other words, virtual learning implies a change in the consolidation of knowledge through intelligent systems. The student goes from being an information consumer to an information producer. The role of the teacher is now understood as a guide. Learning is meaningful and at the same time, it seeks to enhance autonomous work in the student (Capdet, 2011) through the correct use of technological resources in the teaching-learning process. It also seeks to create autonomy, criticality and participatory learning in the student (Aguilar, 2020).

1.5. Research Problem

The globalized world requires a rapid adaptation to the new demands of educational institutions, which continue to promote the use of virtual environments for learning as a pedagogical strategy, in order to facilitate the interaction and cooperation of students and teachers (Folgado Fernández, Palos Sánchez & Aguayo Camacho, 2020).

All the above points support the need to systematically address an analysis of formative research competences as an enhancer in virtual learning environments. The purpose of the study is to describe the research competences that postgraduate students have in virtual learning environments.

2. Method

This research has a quantitative approach and an observational design. The type of research is analytical, cross-sectional and prospective.

2.1. Participants

The population under study consisted of postgraduate students studying different master's programmes at a Peruvian private university.

The sample consisted of 89 master's students, of both sexes, mostly men (58.4%) with an average age of 40.20 ± 10.03, studying Master's Degree in Education (32.6%), Medicine (29%), Law (20.2%), Administration (10.1%) and Accounting (7.9%), who were selected through non-probabilistic sampling.

In addition, those selected met the established eligibility criteria. The selection criteria considered were to be students in the last semester of the curriculum who are currently enrolled, had not taken the research courses more than once, who were studying for their first master's degree, and had agreed to participate in the research.

2.2. Instruments

A questionnaire adapted from the one designed and validated by Céspedes et al., 2012 was used. General data were assessed, including variables that measure personal and academic data, as they were considered important when assessing their relationship with the development of research competence. The instrument also used is made up of 42 items, divided into different dimensions according to the levels of mastery of the research competence (see Table 1) and it considered cognitive, technological, methodological, project management and teamwork skills.

Each dimension was measured based on a set of indicators presenting mastery levels of competence: undeveloped, basic, in progress and achieved.

Table 1. Questionnaire Items

Dimensions of Research Competences	Questionnaire Items
Cognitive skills	1 - 9
Technological skills	10 - 16
Methodological skills	17 - 33
Project management skills	34 - 38
Teamwork skills	39 - 42

Adapted from Cespedes et al. 2012

2.3. Procedures

This study sought the voluntary participation of students by giving them an informed consent of participation and the data collection instrument-questionnaire. The participants in the present study did not receive any monetary compensation for their participation.

The general procedure included the evaluation and measurement of research competences through the questionnaire after completion of the last academic semester. The instrument was applied through a form in Google Drive, a customized tool for online surveys.

2.4. Data Analysis

The database generated by the Google form was coded and imported into the statistical software SPSP version 25, where descriptive analysis was performed by creating absolute and relative frequency tables and grouped bar graphs. In addition, in order to analyse the possible association between competences and other variables, such as sex, age and type of master's programme, an inferential analysis was performed, with a confidence level of 95%, determining that there was no association with any of the aforementioned factors.

3. Results

The results were obtained from a sample of 89 master's students, which consisted of mostly men (58.4%) with an average age of 40.20 ± 10.03, belonging to the Master's Degrees in Education (32.6%), Medicine (29%), Law (20.2%), Administration (10.1%) and Accounting (7.9%).

Research competences are mostly in progress (42.7%) and achieved (43.8%), as shown in Figure 1.

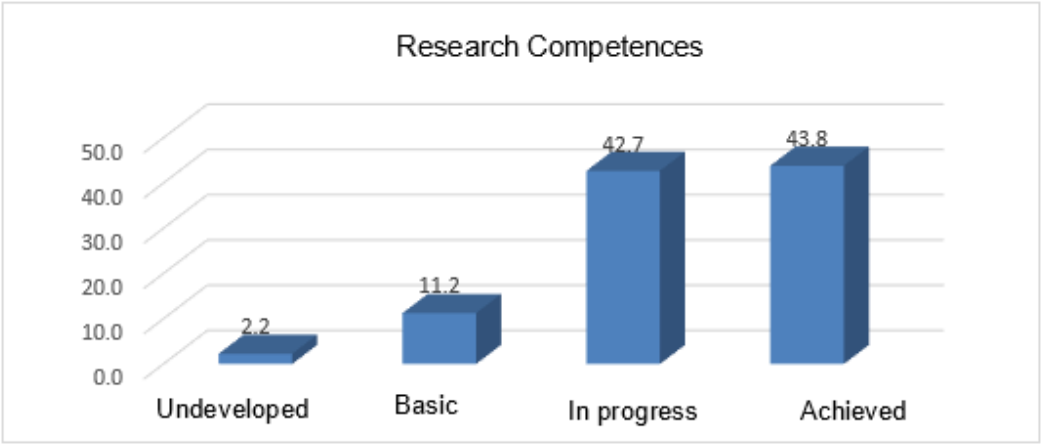

Figure 1. Research competences

When assessing the dimensions of research competences (table 2), it is evident that cognitive and teamwork skills are mostly achieved, representing 58.4% and 71.9% respectively. In contrast, technological skills (36%), methodological skills (42.7%) and project management skills (38.2%) are still in progress.

Table 2. Dimensions of Research Competences

Dimensions	Cognitive skills		Technological skills		Methodological skills		Project management skills		Teamwork skills	
	n	%	n	%	n	%	n	%	n	%
Undeveloped	1	1,1	4	4.5	3	3.4	13	14.6	2	2.2
Basic	10	11.2	23	25.8	13	14.6	22	24.7	3	3.4
In progress	26	29.2	32	36.0	38	42.7	34	38.2	20	22.5
Achieved	52	58.4	30	33.7	35	39.3	20	22.5	64	71.9
Total	89	100.0	89	100.0	89	100.0	89	100.0	89	100.0

In each of the dimensions studied, certain levels of progress were identified in the competences. Thus, in cognitive skills, an established methodological design expressing the procedures for problem-solving is still in progress (44.9%) in these master's students. Skills were achieved in other indicators of this dimension (Figure 2).

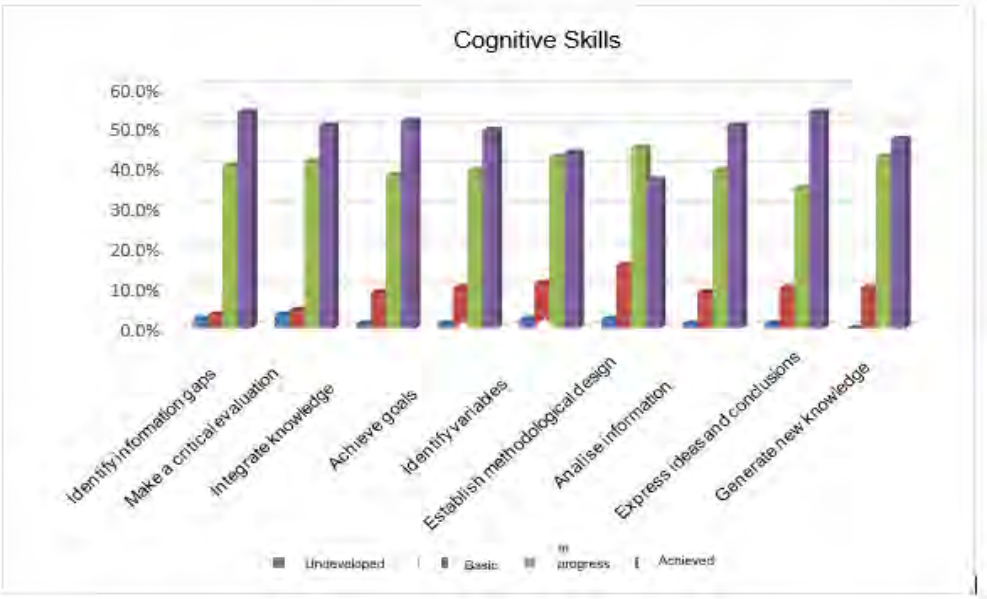

Figure 2. Indicators of Cognitive Skills

Figure 3 shows the indicators measured in technological skills that demonstrate that knowledge of different types of licences for digital computer resources and the consequences of their use (49%), the mastery of a bibliographic management programme such as Zotero, Mendelesy, Endnote, etc., (38%) and the identification of processes for the publication of articles in a journal (36%) are still in progress.

Furthermore, by using some plagiarism detection software or some statistical programme for processing data analysis, considerable results are found in the levels of undeveloped: 29.2% and 25.8%, and in the levels of basic: 30.3% and 27%.

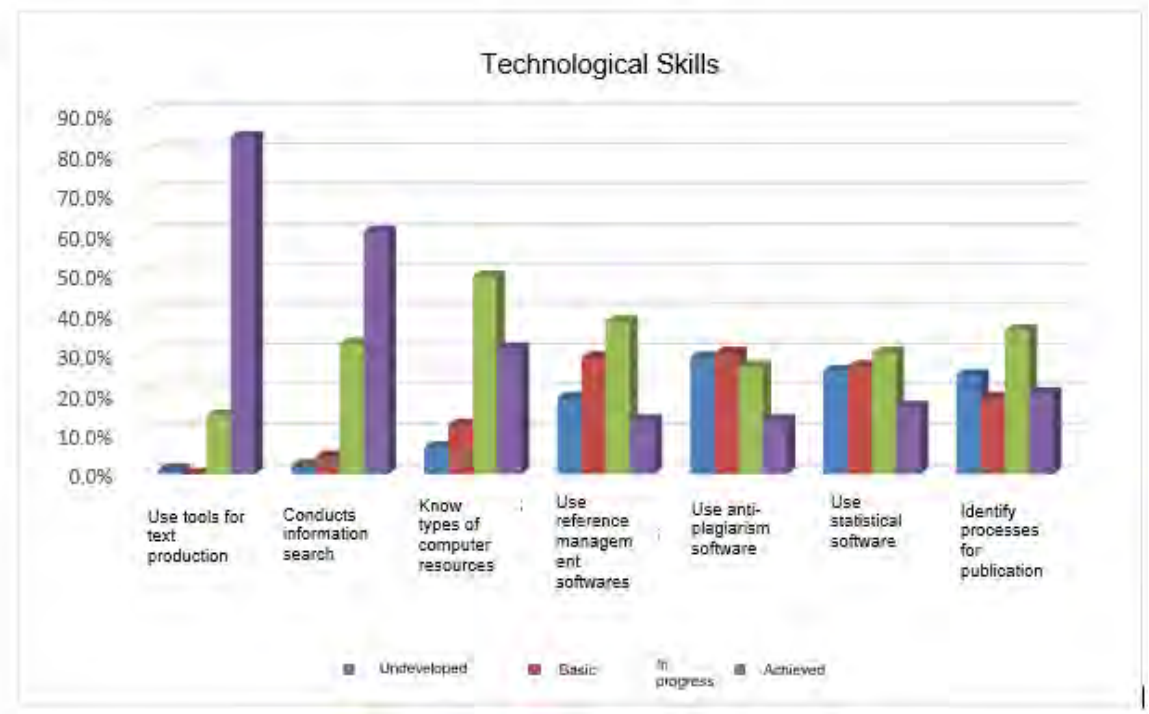

Figure 3. Indicators of technological skills

The methodological skills considered in this study show that the majority of their indicators are under development in 50% of master's students.

Thus, the following indicators should be reinforced: building a state of the art on the topic or field of study, posing research problems based on theories associated with the state of the art consulted, proposing objectives consistent with research questions and problems, defining the type of study, selecting the methodological tools to achieve the proposed objectives, discussing the results within the framework of the proposed theory, presenting conclusions in accordance with the research objectives and preparing the research report in which the problem, theoretical framework, materials and methods, results, discussion, conclusions and recommendations are clearly stated. (Figure 4).

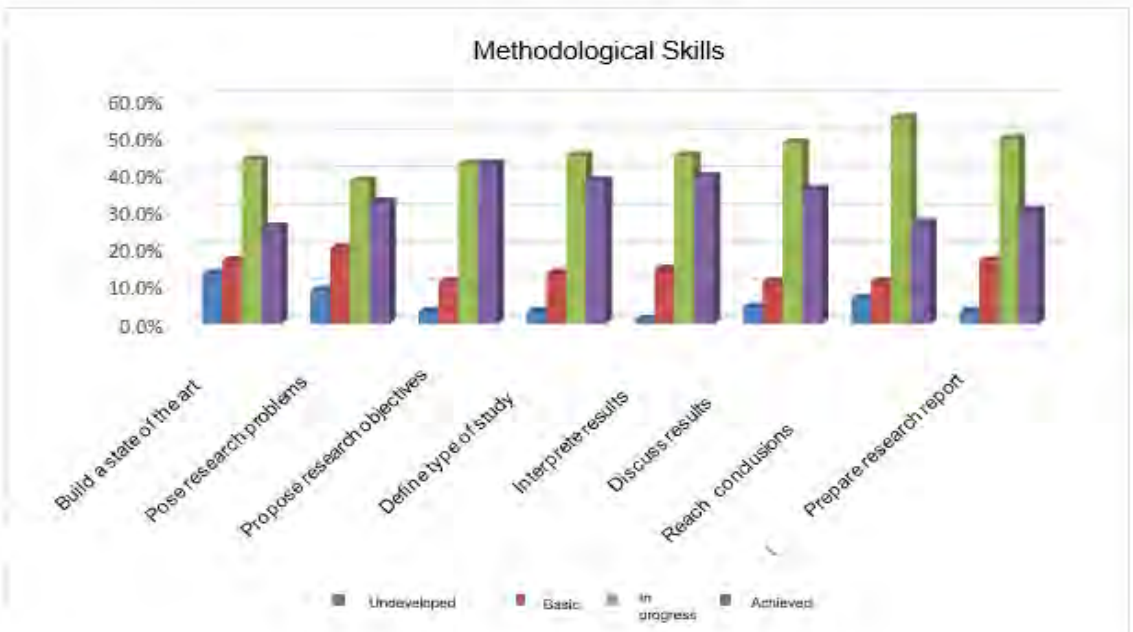

Figure 4. Indicators of methodological skills

Management skill is one of the competences that still needs to be worked on, as the indicators measured show that skills such as designing (41%), managing (38%) and executing a project (42%) are still in progress. In addition, a considerable number of master's students have not developed (25.8%) or are unaware of the different sources of funding or the management of resources for the implementation of research projects. (Figure 5)

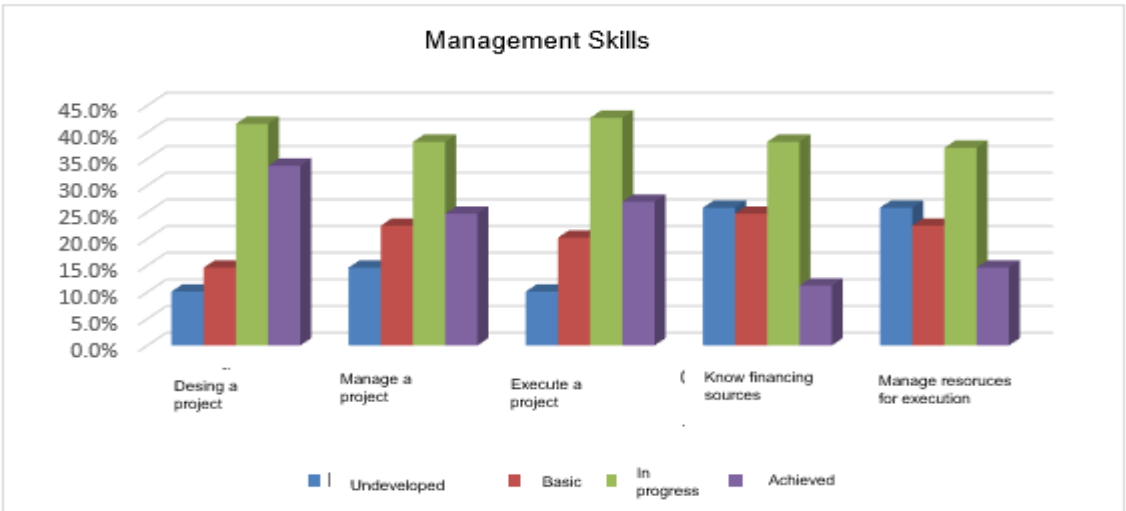

Figure 5. Indicators of management skills

However, teamwork skills show high levels of achievement in all indicators, which shows that most of the master's students, more than 50% in all cases, recognise the contributions and potential of all

team members, take into account the points of view of others, and make constructive criticism, responsibly assume the tasks assigned in their work group and actively collaborate in the planning, and distribute the tasks for the fulfilment of the goals set. (Figure 6)

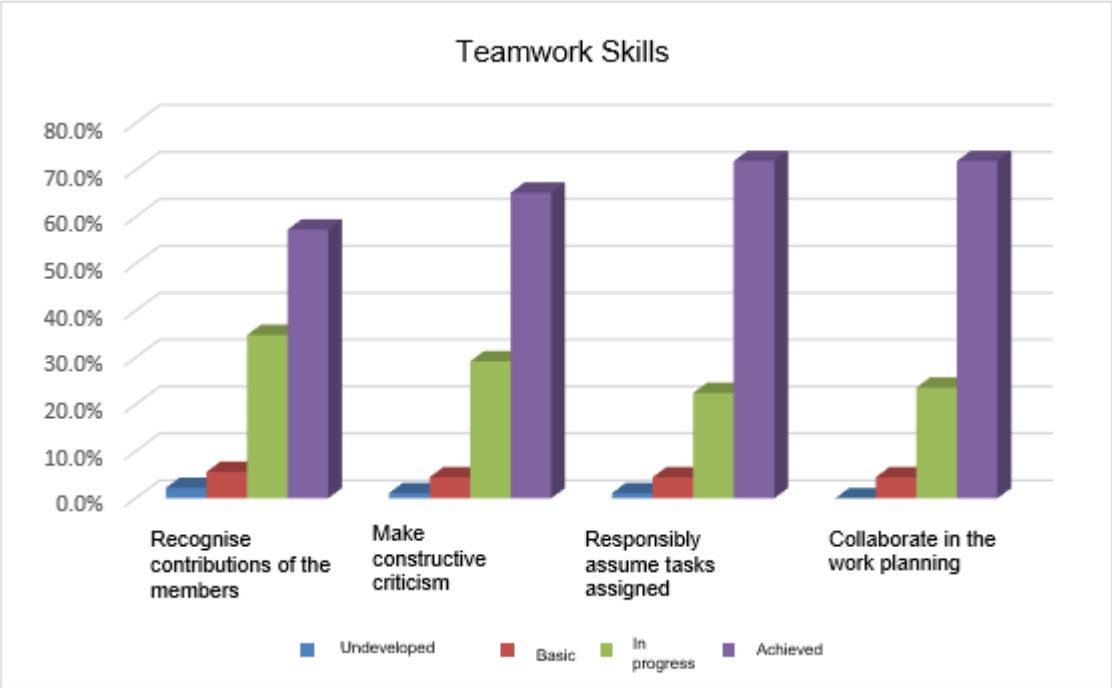

Figure 6. Indicators of teamwork skills

4. Discussion

Virtual learning environments have become the new normal due to COVID-19 and many institutions now rely on digital tools for teaching and learning (Lacka, Wong & Haddoud, 2021; Torres Martín, Acal, El Homrani & Mingorance Estrada, 2021). On the other hand, research competences are needed especially in postgraduate studies (Cardoso & Cerecedo, 2019) because most research works are expected to contribute to the production of knowledge. However, there has been little exploration of this issue (Bullen & Reeve, 2011). In this regard, the aim of this research was to describe the research competences that postgraduate students have in relation to virtual learning environments.

The results found show that research competences are both achieved and in progress. This result is consistent with the findings of Galustyan, Borozdin, Pleshakov, Askhadullina & Radchenko (2020) who analysed groups of graduate students and found that there was still a significant percentage of them who did not have autonomous research competences, which means that they are still in progress. Another important result is that students have no methodological design that is related to cognitive competence. Lacka, Wong y Haddoud (2021) found that the necessary inputs to develop cognitive skills were related to equipment such as having a computer, access to the internet as well as skills and prior knowledge that belong to the communicative-cognitive component and the ability to produce original solutions where it is necessary to have an appropriate methodology (Dabi Toquero, 2020).

In addition, the results show that postgraduate students are deficient in relation to computer resources for information management or search for indexed journals. Previous studies show that knowledge of the use of technological resources is determined by the level of competence of the teachers in this type of tools. If teachers have a high level of knowledge of the use of technological resources, students will consequently acquire greater competences (Torres Martín, Acal, El Homrani & Mingorance Estrada, 2021).

A rather worrying result is that students show low levels in relation to their knowledge of plagiarism detection software and this competence is found to be undeveloped. This result is similar to that found in other contexts where 55.8% (Torres Martín, Acal, El Homrani & Mingorance Estrada, 2021) do not invest time in the use of anti-plagiarism tools and where this problem can be reduced if good practice of detecting plagiarism is considered in the first years of studies (Anderson, 2009).

As for the results of methodological skills, different gaps were found in relation to writing, research construction, problem definition and methodology. This result is consistent with Dabi Toquero (2020) who mentions that research studies require methodological knowledge and that without it, it is not possible to apply scientific research knowledge and that students have no rigorous training in the application of theoretical and methodological knowledge of conducting research.

Teaching methodology to students is important since it ensures the continuity in learning research skills (Romanov, Zlydneva, Kinzina, Ryazanova, Smirnova, & Tsaran, 2020).

Another undeveloped skills are management skills, which means that it is important for master's students to know on leadership, execution and management of resources. In other contexts, the same issues have been found and different pedagogy programmes have been applied with the aim of improving students' confidence, management and self-learning skills (Hegde & Karunasagar, 2021).

A striking finding is that the majority of master's students have a high level of achievement in teamwork skills. This result is different from that of other scenarios where few highly competitive students do not help their peers, which requires proactive intervention in team building, although 80% considered that teamwork stimulates research (Hegde & Karunasagar, 2021).

Some limitations were found in this study. Firstly, the sample was composed of only 89 master's students and it would have been important to increase it. Secondly, as participation was voluntary, it was likely that some participants were motivated or needed to report their experiences. Finally, being a cross-sectional study, the variable was only identified at a single point in time, therefore, longitudinal studies are recommended.

5. Conclusions

Despite this, we consider that this study has broadened the understanding of research competences in virtual environments, all the more so as it seems that this will be the new normal as far as higher and postgraduate education is concerned. We conclude that the master's students possess research competences in a progress and achieved level and that the weakest areas are related to technological and methodological competences. However, this is complemented with a significant percentage of high level of achievement in relation to teamwork.

We also conclude that there are several competences reported as in progress, such as an established methodological design, knowledge and use of digital computer resources and the skills to manage the

design, direction, execution and sources of financing of the project. Therefore, it is important that postgraduate schools reinforce these research competences in their curricula, motivate students to learn them and train teachers for their incorporation into the different subjects.

6. Recommendations

Among the recommendations for future research, we suggest that it is important to consider again the opinion of the students of the same institution on the topics addressed in order to verify the evolution of the levels. On the other hand, it is necessary to develop studies with a larger sample that shows the type of learning activities carried out by students in relation to research competences. It is also important to evaluate the moderating effect of technological skills on the results of research competences. It is also important to evaluate other stakeholders in this process such as faculty and academic support staff to develop a complete view of the entire process. Finally, to develop a holistic view, it is important to encourage case studies that explore postgraduate schools, faculty strategies, the use of technologies and how students are using them.

7. References

Aguilar, F. (2020). From learning in face-to-face scenarios to virtual learning in times of pandemic. *Pedagogical studies (Valdivia)*, *46*(3), 213-223. https://dx.doi.org/10.4067/S0718-07052020000300213

Anderson, I. (2009). Avoiding plagiarism in academic writing. *Nursing Standard, 23*(18), 35–37. https://doi.org/10.7748/ns2009.01.23.18.35.c6739

Antúnez Sánchez, A. G., & Veytia Bucheli, M. G. (2020). Development of research competences and use of technological tools in information management. *Conrado, 16*(72), 96-102. Retrieved from https://conrado.ucf.edu.cu/index.php/conrado/article/view/1219

Bucarey, C. G. J., Araya-Castillo, L., & Rojas-Vallejos, J. (2020). Quality of service as an area of research in higher education. *Interciencia, 45*(7), 329-337. Retrieved from https://dialnet.unirioja.es/servlet/articulo?codigo=7522407

Bullen, C. R., & Reeve, J. (2011). Turning Postgraduate Students' Research into Publications: A Survey of New Zealand Masters in Public Health Students. *Asia Pacific Journal of Public Health, 23*(5), 801–809. https://doi.org/10.1177/1010539511417998

Cardoso, E. O., & Cerecedo, M. T. (2019). Assessment of Research Competences in Postgraduate Students in Administration. *Formación universitaria, 12*(1), 35–44. https://doi.org/10.4067/S0718-50062019000100035

Capdet, D. (2011). *Connectivism and Informal Learning: Analysis from the point of view of a society undergoing transformation.* Barcelona: Universitat Oberta de Catalunya.

Céspedes, J., Bermúdez, L., Brenes, O., Sánchez, Y., & Viales, M. (2012). Research competences in the academic staff of the School of Education Sciences of the UNED, Costa Rica. *Cuadernos de investigación UNED, 4(*2), 273-283. Retrieved from https://revistas.uned.ac.cr/index.php/cuadernos/article/view/16/16

Conseil supérieur del l´éducation. (2015*). La formation à distance dans les universités québécoises: Un potentiel à optimiser*. Retrieved from https://www.cse.gouv.qc.ca/wp-content/uploads/2015/06/50-0486-SO-formation-distance-universites.pdf

Dabi Toquero, C. M. (2020). "Real-world:" preservice teachers' research competence and research difficulties in action research. *Journal of Applied Research in Higher Education*, https://doi.org/10.1108/JARHE-03-2019-0060

De Vita, Y. M. D. N., & Mendoza, R. R. A. (2019). Research Competences of Teachers Constructed during University Education. *Revista Scientific, 4*(13), 200-220. https://doi.org/10.29394/Scientific.issn.2542-2987.2019.4.13.10.200-220

Díaz-Barriga Arceo, F., López-Ramírez, J. L., & López-Banda, E. A. (2020). Personal learning careers and flexible curriculum: the perspective of undergraduate psychology students. Revista iberoamericana de educación superior, 11(30), 3-21. https://doi.org/10.22201/iisue.20072872e.2020.30.585

Enoki Miñano, E. R. (2020). Distance learning in dentistry as an alternative of the university because of COVID-19. *Revista Cubana de Estomatología, 57(*3), e3308. http://www.revestomatologia.sld.cu/index.php/est/article/view/3308

Folgado Fernández, J.A., Palos Sánchez, P.R. & Aguayo Camacho, M. (2020). Motivations, training and teamwork planning for virtual learning environments. *Interciencia, 45*(2), 102-109. Retrieved from https://www.interciencia.net/wp-content/uploads/2020/03/06_6681_Com_Palos_v45n2_8.pdf

Galustyan, O. V., Borozdin, S. A., Pleshakov, M. A., Askhadullina, N. N., & Radchenko, L. A. (2020). Formation of Research Competence of Students by Means of Mobile Education. International *Journal of Interactive Mobile Technologies (IJIM), 14(*14), 205. https://doi.org/10.3991/ijim.v14i14.15047

Garcia, L., & Trilla. (2007). From distance education to virtual education. RUSC. *Universities and Knowledge Society Journal, 4(*1). https://doi.org/10.7238/rusc.v4i1.293

Gayol, M. del C., Montenegro, S. M., Tarrés, M. C., & D´Ottavio, A. E. (2008). Research Competences. Their development in Health Area programmes. *Uni-pluriversidad, 8*(2), Article 2. Retrieved from https://revistas.udea.edu.co/index.php/unip/article/view/950

Guamán Gómez, V. J., Herrera Martínez, L., & Espinoza Freire, E. E. (2020). Research competences as a must for knowledge formation in today's university. *Conrado, 16*(72), 83-88. Retrieved from https://conrado.ucf.edu.cu/index.php/conrado/article/view/1220

Hegde, S., & Karunasagar, I. (2021). Building Research Competence in Undergraduate Students. Resonance, 26(3), 415–427. https://doi.org/10.1007/s12045-021-1139-7

Hernández, R. M., Marino-Jiménez, M., Forton, Y. R., & Sánchez, N. (2020). Research in University Students: Real Needs for the Implementation of a Formative Research Program. *Academia, (20-21),* 154-176. https://doi.org/10.26220/aca.3445

Lacka, E., Wong, T. C., & Haddoud, M. Y. (2021). Candigital technologies improve students' efficiency? Exploring the role of Virtual Learning Environment and Social Media use in Higher Education. *Computers & Education, 163,* 104099. https://doi.org/10.1016/j.compedu.2020.104099

Mamani-Benito, O. J., & Farfán-Sollís, R. (2020). Scientific publication of nursing thesis advisors from three universities in the department of Puno, Peru. *Revista Cubana de Enfermería, 36*(4), e3355. Retrieved from http://www.revenfermeria.sld.cu/index.php/enf/article/view/3355

Montes de Oca Recio, N., & Machado Ramírez, E. F. (2009). Development of research skills in higher education: An approach to their development. *Humanidades Médicas, 9*(1). Retrieved from http://scielo.sld.cu/pdf/hmc/v9n1/hmc030109.pdf

Morales-Carías, C. P. (2020). Importance of contextualized curriculum in the curriculum. *Revista Guatemalteca de Educación Superior, 3(*2),101-110. https://doi.org/10.46954/revistages.v3i2.36

Norman Acevedo, E. E. (2019). New languages for virtual learning tools for learning scenarios. *Panorama, 13*(24), 5–7. https://doi.org/10.15765/pnrm.v13i24.1214

Oropeza, M., & Mena, A. (2014). Model of training and development of research competence in high school education teachers without pedagogical training linked to the distinguished Universidad Autónoma de Puebla. *Didasc@lia: Didáctica y Educación, 5*(1), 85–98. Retrieved from http://revistas.ult.edu.cu/index.php/didascalia/article/view/260

Ozcan, D., & Genc, Z. (2016). Pedagogical Formation Education via Distance Education. *EURASIA Journal of Mathematics, Science and Technology Education, 12*(2), 347-360 https://doi.org/10.12973/eurasia.2016.1205a

Parra, C. (2004). Notes on formative research. *Educación y Educadores, 7*, 57–77. Retrieved from https://educacionyeducadores.unisabana.edu.co/index.php/eye/article/view/549

Paredes-Chacín, A. J., Inciarte González, A., & Walles-Peñaloza, D. (2020). Higher education and research in Latin America: Transition to the use of digital technologies due to Covid-19. *Revista de ciencias sociales, 26(*3), 98-117. https://doi.org/10.31876/rcs.v26i3.33236

Portillo Peñuelas, S., Castellanos Pierra, L., Reynoso González, Ó., & Gavotto Nogales, O. (2020). Emergency remote teaching in High School Education and Higher Education due to Covid-19 pandemic. *Propósitos y Representaciones, 8*(SPE3), e589. http://dx.doi.org/10.20511/pyr2020.v8nSPE3.589

Reiban Barrera, R. E. (2018). The research competences of university lecturers. *Revista Universidad y Sociedad, 10*(4), 75-84. Retrieved from https://rus.ucf.edu.cu/index.php/rus/article/view/980

Rodríguez, Y. C. (2021). Systematic review of instruments to measure research competences in higher medical education. *Revista Habanera de Ciencias Médicas, 20*(2), e3773. Retrieved from http://www.revhabanera.sld.cu/index.php/rhab/article/view/3773

Rodríguez Andino, M. de la C., Zabala Espín, S. K., & Mejía Paredes, R. E. (2020). Evaluation of research competence in the Bachelor's Degree in Early Childhood Education from the student's point of view, Espacios, 41(16), 125–138. Retrieved from https://www.revistaespacios.com/a20v41n16/20411615.html

Rojas Arenas, I. D., Durango Marín, J. A., & Rentería Vera, J. A. (2020). Formative research as a pedagogical strategy: a case study of industrial engineering at the IU Pascual Bravo. *Estudios pedagógicos (Valdivia), 46*(1), 319-338. https://doi.org/10.4067/S0718-07052020000100319

Rojas, M. I., & Espejo, R. L. (2020). Investment in scientific research as a measure of intellectual capital in higher education institutions. *Información tecnológica, 31*(1), 79-90. http://dx.doi.org/10.4067/S0718-07642020000100079

Romanov, P. Y., Zlydneva, T. P., Kinzina, I. I., Ryazanova, L. S., Smirnova, L. V., & Tsaran, A. A. (2020). Continuing education potential to form research competence of students. *Journal of Physics: Conference Series, 1691*, 012227. https://doi.org/10.1088/1742-6596/1691/1/012227

Ruiz Bolívar, C. (2014). Evaluation of an experience in virtual tutoring for a PHD thesis on Education. *Paradígma, 35*(1), 129–148. Retrieved from http://ve.scielo.org/scielo.php?script=sci_arttext&pid=S1011-22512014000100006

Sanchez, J., & Morales, S. (2014). Developing research competences through active methodologies in a B-learning environment. Contextos educativos: *Revista de educación, 17*, 23–44. https://doi.org/10.18172/con.2591

Santillán, F. (2006). Problem-Based Learning as an educational proposal for the economic and social disciplines supported by B-Learning. *Revista Iberoamericana de Educación, 40*(2), 1–5. https://doi.org/10.35362/rie4022522

Silvio, J. (2002). *Virtualization of Universities*. Caracas: Edition IESALC / UNESCO.

Sun, A., & Chen, X. (2016). Online Education and Its Effective Practice: A Research Review. *Journal of Information Technology Education: Research, 15,* 157–190. https://doi.org/10.28945/3502

Talavera, H., & Junior, F. (2020). Education in times of pandemic: Challenges of the 21st century school. Refereed journal of the centre for research and management studies, 44, 176-187. Retrieved from http://www.grupocieg.org/archivos_revista/Ed

Tejada, C., Tejada, L., & Villabona, Á. (2008). Pedagogy for the development of research competences in research incubators from the beginning of undergraduate studies. *Revista Educación en Ingeniería, 3*(6), 38–49. https://doi.org/10.26507/rei.v3n6.61

Torres Martín, C., Acal, C., El Homrani, M., & Mingorance Estrada, Á. (2021). Impact on the Virtual Learning Environment Due to COVID-19. *Sustainability, 13*(2), 582. https://doi.org/10.3390/su13020582

Tobón, S., Pimienta, J. H., & García, J. A. (2010). *Educational sequences: Learning and evaluation of competences*. Estados Unidos: Prentice Hall

Tobón-Marulanda, F. Á., López-Giraldo, L. A., & Londoño-Arroyave, C. D. (2019). Formative research and integrative academic practices within the framework of the University Social Responsibility: An analysis based on mixed methodology. *Entramado, 15*(2), 188-200. https://doi.org/10.18041/1900-3803/entramado.2.5693

Veytia-Bucheli, M. G. V. (2017). Development of research competences in postgraduate students from technological mediation processes. Different point of views on the use of information and communication technologies in education. (pp. 18-43). Retrieved from https://dialnet.unirioja.es/servlet/articulo?codigo=6131277

Zúñiga Rodríguez, M. (2019). Learning communities and the integration of ICTs in the development of educational and research competences in Master's degree in Educational Sciences. Revista Internacional de Tecnología, *Conocimiento y Sociedad, 7(*2), 1–17. https://doi.org/10.18848/2474-588X/CGP/v07i02/1-17