Pandemic and Information and Communication Technologies for Reducing Bias Among University Graduates and Postgraduate Students

Ingrid Maria Manrique Tejada
National University Jorge Basadre Grohmann

Rodrigo Manrique Tejada
Tacna Private University

Alexandra Alferez Manrique
National University Jorge Basadre Grohmann

The objective is to analyze how the pandemic is an opportunity for ICT to facilitate thesis development and reduce the bias of graduates and postgraduates. The five items related to ICT and thesis of the work: Comparison of the influence of academic, social and economic factors on the development of research work of students and graduates of graduate schools of the national universities of Tacna and Arequipa, and development of a proposal for change to improve the indicators of research production 2018, applied to 503 people were analyzed. Members of SOPECIN and Ocean SRL were interviewed, who promote the use of the S.O.S. Thesis and the PRISMA methodology was executed, finding 44 articles. The results give scores of less than what they expect for the use of ICT by the teachers of the dictation of the thesis course, the teaching in the use of repositories and internet resources for the state of the art, the times of documentary procedures and the times of procedures of the reviewers, reviewers and advisers. There was a 316% increase in requests for free access to the S.O.S. Thesis, since the beginning of the pandemic. Authors of the state of the art, conclude on the importance of ICT in the university community. It is concluded that implementing software from the first moment they enter the postgraduate program will provide support for the development of the thesis and will reduce the bias between graduates and postgraduates.

Keywords: pandemic, thesis, web, graduates, postgraduate

INTRODUCTION

From 2018 to 2020, the research entitled *"Comparison of the influence of academic, social and economic factors on the development of research work of students and graduates of graduate schools of the national universities of Tacna and Arequipa and development of a proposal for change to improve the indicators of research production 2018"* was developed, financed with funds Canon Minero of the National University Jorge Basadre Grohmann (UNJBG), and it allowed the publication of the chapter 12 of book Trends in education and training in the knowledge society, called "Influence of academic, social and economic factors, to do the thesis", which contains the results of the position occupied by factors grouped

into social, economic and academic aspects, and concludes that academic factors do not have the first position for the development of the thesis, as it is the social and economic.[1]

As time goes by, the line of research continues, since the Pandemic[2] situation causes changes in all the activities of mankind. It is at the same time that the use of information and communication technologies (ICT) is consolidated, which were already visualized in the work that was developed, as an important factor for the reduction of the bias between the graduates and the postgraduates, since the latter continues in 85% of the time in which he/she finishes and achieves his/her degree after three years.

The Pandemic, as indicated by authors such as Coronel,[3] Bravo[4], Finquelievich[5], Hudiel[6] and others, has caused changes in all educational processes, at all levels, with the integration and consolidation of ICT. Hardware equipment is strengthened in homes and educational institutions to continue with education, since this, as it is no longer face-to-face to safeguard the integrity and health of people, cannot be stopped and is a fundamental part of the economic cycle in a society[7]. The use of ICT platforms, such as Moodle, Chamilo, as well as new forms of exposure, employing Zoom, Meet, Blackboard, M. Teams, among others, allowed the change of people in a new adaptability of their activities to ICT. The higher education level, master's and doctorate, were also affected by this new adaptability.

All of these events strengthen the research proposal that was carried out to use free platforms such as S.O.S. Tesis, and be an alternative that allows the reduction of the bias between graduates and postgraduates in higher university education, since nowadays, its knowledge and use is greater, that is to say, it achieves the highest metrics of usability as indicated by the Peruvian Technical Standards (NTP ISO/IEC-TR 9126-3:2005 SOFTWARE ENGINEERING).[8]

This publication will provide the scope of the methodology and the projection of the possible impact on graduate levels with the implementation of this or other ICTs in the teaching and learning processes.

MATERIALS AND METHODS

For developing this work, we used the results obtained from the research *"Comparison of the influence of academic, social and economic factors on the development of research work of students and graduates of graduate schools of the national universities of Tacna and Arequipa and development of a proposal for change to improve the indicators of research production 2018",* which were processed and analyzed. Of these, the results of the reagents were used in particular:

- Use of ICTs by thesis course instructors
- Teaching in the use of repositories and internet resources for the state of the art in the thesis course.
- Academic motivation to complete the thesis
- Time required to process documents at the university
- Time required for reviewers, examiners and advisors to complete their work

A systematic review was also carried out on ICT-related works in thesis development, applying the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodology. Finally, interviews were conducted with the staff of the company Ocean SRL and members of the Sociedad Peruana de Ciencia e Innovación (SOPECIN) (Peruvian Society of Science and Innovation). In the case of the former, to learn about the use and trend in a full year since the Pandemic; and the latter, to learn about the perception of the use of ICT as a measure to reduce the graduate and post-graduate bias.

RESULTS

During the time of the research with canon funds, the Superintendencia Nacional de Educación Superior Universitaria (SUNEDU)[9] (National Superintendence of University Higher Education) presented statistics on graduate and postgraduate students, showing that less than 15% succeed in graduating. These figures have not yet been updated on the state's web portal. However, according to interviews held with members of SOPECIN, such as Mg. Leonel Rojas Junes and Mg. José Zuzunaga Melgar, founding partners and

university professors in Tacna and Arequipa, this situation should not have changed, especially because the universities, such as the national ones, did not have the necessary consolidated requirements for the continuity of these functions, both in teaching and in the support of courses related to graduate theses. This is confirmed precisely because the number of people who start their thesis development procedures occurs at the beginning of each year, that is, between the months of March and April, dates in which the Peruvian state declares a state of emergency[10] and it can be seen how universities at the national level stop their activities in order to design and establish the necessary strategies to continue with their activities. This is confirmed by the fact that some university professors have recently started their activities with ICT, but if we take into account that SUNEDU had to make changes in the legal regulations in order to continue the activities in the universities, [11]we can conclude that there are several professors and administrative staff who have recently adapted to these facts. In the experience of the authors, it was seen in the university where they work, how topics such as Zoom, Meet, Addons, among others, became a new language for colleagues and co-workers, as well as being responsible for teaching classes, for diploma courses and others that were related to the use of ICT in teaching, aimed at university teachers. It also allows to see how uploading and downloading software were seen as something new. Of the 503 people who were units of study in the work financed with canon funds, 72% were master's degree students and 28% PhD students, who were asked about their situation differentiated in three moments: those who concluded their thesis, those who are in process and those who have not yet started. Applying a Likert scale, where 1 is the lowest score and 5 is the highest, the results were obtained as a general average:

- Use of ICT by thesis course instructors: Fair (3.5 less than expected)
- Teaching in the use of repositories and internet resources for state of the art in thesis course: Fair (3.4 less than expected)
- Time taken to process documents at the university: Fair (3.5 less than expected)
- Reviewers, examiners and advisors' processing times Fair (3.3 less than expected)
- Academic motivation to complete thesis: Good (4.2 what they expect)

It was noted that ICTs were not yet used as a strategy to achieve that the activities have at least one grade of what they expect (4 points) or more than what they expect (5 points), such as the perception of academic motivation to conclude the thesis. This result was analyzed and triangulated with the results provided by B.A. Cintia Revollar Choque Gonzales, partner and administrative manager of Ocean SRL, and Michel Paredes Salazar, ICT manager of the same company, who indicated that, since 2018 the OC Tesis platform is presented for free use, the same that had its metrics indicators, for NTP, internal, with a rating of 4, out of 5 points, which is the maximum, but that it did not have the number of users, that is, usability, as presented with the pandemic, which forced even to pass the OC Tesis platform to S.O.S. Tesis, achieving a flow that reached levels of 316% more requests for free access to the S.O.S. Tesis Platform, having these requests, only from Peru, but also from Colombia, Argentina, Mexico, among other countries. This shows how specialized ICTs can be integrated into the thesis development process in order to reduce the current gap.

The systematic review analyzed Science Direct and Scopus databases, Scielo, ERIC, The Reference and Google Scholar, in which no systematic review articles can be found for the search string Thesis Software. However 44 scientific articles were found, from which the contributions of Barcia[12] , who indicates that accreditations, as an improvement of educational quality, should always consider ICT as a means to achieve constant improvement, are taken into account. In addition, Unwalla[13], who points out that the use of ICT supports the development of theses of engineering students, contributes to this. It is Nicolai[14], who identifies that medical students at LMU Munich, using ICT, can overcome the difficulties that arise at the beginning of their thesis work, such as those related to the problem statement. Situmorang[15], also points out that the use of algorithms aids in the development of computer engineering students' benchmarks. Finally, Teneqexhi[16] indicates that the follow-up process by the reviewers can be optimized if ICTs are used. In the work of co-author Manrique[17], it is already visualized that ICT can be used to standardize the processes and/or outlines of theses, in order to achieve better results for society.

The health sciences, ranked within the Organization for Economic Cooperation and Development (OECD 3), are no stranger to the graduate degree situation. The master's and doctorate degrees of this

OECD are also in that percentage of less than 15% of their degree, being this situation even more critical, since they do not display lines of research that reach patents as results of R&D&I, being OECD 2 (Engineering), which has almost 100% of the patent applications of the national universities.

DISCUSSION

Currently, universities use ICTs in their teaching-learning and administrative activities. Therefore, we agree with the authors Barcia Unwalla, Nicolai and Teneqexhi, who demonstrated that ICT in these activities achieve efficiency and effectiveness for everyone in the university community. According to Coronel, Bravo, Finquelievich and Hudiel, it is considered a fact that teaching-learning and administrative activities have changed due to the pandemic, using ICTs. All these authors limited their studies to their objectives, however, we seek to go beyond what can be given, since the results of interviews, from Ocean SRL and SOPECIN, show a reality that can be an opportunity for the university community. The existence of platforms and/or the processes of new platforms that support the thesis processes, identified by SUNEDU and CONCYTEC, as Research (I) should be considered by the highest university authorities, that is, rectors and vicerectors, since they are not separated. Not only can we think about facilitating the administrative part, but also about how to accompany the research production process. One of the proposals is to take into account a benchmarking of what exists in universities and thus, by means of a weighting board, allow the implementation of the existing ones or initiate, with the intervention of the ICT offices, the design, development and implementation of ICTs. Since the start of master's and doctoral studies is accompanied by a web platform specialized in theses, then the 85% of students who do not graduate will be reduced, since the pandemic has brought with it the consolidation of the use of ICTs in university communities, and with special emphasis on OECD 3, which is Health Sciences and Medical Sciences, because the results obtained, for example those related to the Pandemic, have been given in open access, so that all possible information can be obtained for the benefit of humanity, which has never happened in the world, with any of the other five OECD, since their accession.

ACKNOWLEDGMENTS

The author wishes to thank VIIN de la UNJBG, Mg. José Zuzunaga Melgar, Mg. Leonel Rejas Junes, B.A. Cintia Revollar Choque Gonzales, Tec. Michel Paredes Salazar, and Dr. Ticona.

Translated & edited by American Publishing Services (https://americanpublishingservices.com/).

ENDNOTES

1. Manrique Tejada IM, Manrique Tejada R. Capítulo 12 Influencia de los factores académicos, sociales y económicos, para hacer la tesis. In Tendencia de la educaciòn y la formacion en la sociedad del conocimiento. Primera ed. Cartagena de Indias: Corporación Centro Internacional de Marketing; 2020. p. 428 - 444.
2. Organización Mundial de la Salud (OMS). https://www.who.int/es. [Online].; 2020. Available from: https://www.who.int/es/news/item/27-04-2020-who-timeline---covid-19.
3. Coronel PCP, Herrera DGG, Álvarez JCE, Zurita IN. Las TIC como mediadoras en el proceso enseñanza–aprendizaje durante la pandemia del COVID-19. Revista Arbitrada Interdisciplinaria Koinonía. 2020; 5(1): p. 121-142.
4. Bravo LEC, López HJF, Guerrero KG. Transformación de la educación frente a la pandemia y la ánalitica de datos. Revista Boletín Redipe. 2020; 9(7): p. 91-99.
5. Finquelievich S, Odena MB. Tecnologías digitales y pandemia. ontroversias y Concurrencias Latinoamericanas. 2021; 12(22): p. 71-90.
6. Hudiel SJN. Tendencias en el uso de recursos y herramientas de la tecnología educativa en la educación universitaria ante la pandemia COVID-19. Ciencia y Tecnología El Higo. 2021; 12(22): p. 111-122.
7. Manrique Tejada R, Revollar Choque Gonzales C. Economía Familiar Arequipa: Ocean SRL; 2012.

8. Instituto Nacional de Calidad. NTP ISO/IEC-TR 9126-3:2005 INGENIERIA DE SOFTWARE. Calidad del producto. Parte 3: Métricas internas. [Online].; 2005. Available from: https://tiendavirtual.inacal.gob.pe/0/modulos/TIE/TIE_DetallarProducto.aspx?PRO=81.
9. Superintendencia Nacional de Educación Superior Universitaria. Estadísticas. [Online].; 2021 [cited 2021 abril 27. Available from: https://sibe.sunedu.gob.pe/sibe/portal.
10. Diario El Peruano. https://cdn.www.gob.pe. [Online].; 2020 [cited 2021 marzo 28. Available from: https://cdn.www.gob.pe/uploads/document/file/566447/DU026-20201864948-1.pdf.
11. SUNEDU supervisará educación no presencial de universidades ante las medidas de control y prevención del Covid-19. [Online].; 2020 [cited 2021 abril 30. Available from: https://www.sunedu.gob.pe/sunedu-supervisara-educacion-no-presencial-universidades-medidas-control-prevencion-covid-19/.
12. Barcia Menéndez JJ, Carvajal Zambrano BT. El proceso de enseñanza aprendizaje en la educación superior. Revista Electrónica Formación y Calidad Educativa (REFCalE). 2015 abril 4; 3(3): p. 139 - 155.
13. Unwalla M. Software for Checking Style and Grammar in Scientific Writing. IEEE Potentials. 2017.
14. Nicolai L, Gradel M, Antón S, Pander T, Kalb A, Köhler L, et al. The Doktabörse – An innovative online platform for research projects at the medical faculty of the LMU Munich [Die Doktabörse – Ein innovatives instrument zur vermittlung von promotionsarbeiten in der medizin an der LMU münchen. GMS Journal for Medical Education. 2017.
15. Situmorang BH, Alkausar RR, Harsani P. Classification system of indonesian language thesis documents in computer science department using K-means algorithm. International Journal of Recent Technology and Engineering. 2019.
16. Teneqexhi R, Qirko M, Sharko G, Vrapi F, Kuneshka L. Scanner Based Assessment in Exams Organized with Personalized Thesis Randomly Generated via Microsoft Word. International Association for Development of the Information Society. 2017.
17. Manrique Tejada R. Propuesta de una plataforma de tecnologías de información y comunicaciones como metodología para estandarizar los esquemas de planes de tesis y tesis de pregrado y posgrado en las universidades del Perú-2018 Tacna: Universidad Privada de Tacna; 2018.