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Gender Gap in IT in Latin America

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Panel

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ABSTRACT

The underrepresentation of women in IT related majors such as computer science, computer engineering, and information systems (IS) has been evident all over the world. As a result, many private and public institutions have created programs aimed to increase enrollment, recruitment, and placement of women in the field and reduce the gender gap in the field. Several journal publications about this kind of research can be found in the scientific literature about studies mostly conducted in the United States, Europe, Asia and Australia, but very few publications about this kind of research in Latin American countries is available in the literature despite the fact that in the last ten years, countries in Latin America also developed a variety of programs with the same goal with the support of international organizations like the United Nations Educational, Scientific and Cultural Organization (UNESCO), giant technology corporations like IBM, and local governments. There are very few publications in international scientific outlets about Gender Gap in IT in Latin America. In this panel, seven Latin American academics will share recent related projects they have been part of, compare project results, challenges, and discuss what kind of dissemination practices could be more appropriate.

Keywords

Gender, Women in IT, Latin America, Research Dissemination

INTRODUCTION

The gender gap is a worldwide problem that affects all aspects in the society, but it is especially visible in Science and Technology professions (Trauth, 2017, Wang and Degol, 2016). Only one quarter of the US IT workforce are women (https://www.ncwit.org/summit/2015-ncwitsummit-women-and-it) despite all the systematic efforts made by various stakeholders to attract women to IT related majors such as computer science, computer engineering, and information systems (IS) (Dominguez, 2017, Gupta, et al., 2019);. Studies about the gender imbalance are relevant because they social inclusion (Trauth, 2002, 2017) and help academics and practitioners understand what possible changes can be made to increase equality in diversity in the IT.

The underrepresentation of women in the IT (information technology) majors, including Information Systems and Computer Science majors, has been evident all over the world. As a result, many private and public institutions have funded several programs aimed to increase enrollment, recruitment, and placement of women in IT and reduce the gender gap in the field. Journal publications about this kind of research have been published in the scientific literature about studies mostly conducted in the United States, Europe, Asia and Australia. For example, Wang and Degol (2016) reviewed research from the fields of psychology, sociology, economics, and education over the past 30 years and

identified six explanations for US women's underrepresentation in math-intensive STEM fields. Guzman & Stanton (2008) identified cultural characteristics that influence career choice decisions and women's adaptation to IT Occupational Culture United States. Moreover, the Association of Information Systems digital library, shows about 60 studies published on the topic but none of these studies were conducted in Latin American countries.

In the last ten years, countries in Latin America also developed a variety of programs with the same goal with the support of international organizations like the United Nations Educational, Scientific and Cultural Organization (UNESCO), giant technology corporations like IBM, and local governments. What are the similarities and differences between research published in the literature and Latin American Studies? For example, the American Association of University Women's report, "Tech Savvy: Educating Girls in the New Computer Age," suggests that an emphasis in the IT work environment on masculine values, attitudes, and beliefs dissuades many young women from considering information technology as an attractive career option (Bain & Rice 2006). Another example is Duffy (1973) found that primary sources of information influencing career choice included school experiences and family preferences, and that media information only influenced perceptions of labor markets and compensation. While media portrayals of the IT profession and IT professionals do indeed frequently have substantial negative overtones, empirical evidence seems to suggest that these influences alone would not suffice to drive women away from pursuing a career as an IT professional in developed economies.

The question remains open when it comes to the findings and project results in in Latin American. There are very few publications in international scientific outlets about Gender Gap in IT in Latin America. In this panel, seven Latin American academics will share recent related projects they have been part of, compare project results, and discuss what kind of dissemination practices could be more effective. Although the goal should be achieved worldwide, the situation varies from country to country, and there are differences among the different sectors of society. This problem is particularly severe in Latin America because of the cultural norms that influence female behavior. There are different initiatives and projects that work to engage more women into Science and Technology, but there are not enough formal publications that document those efforts to increase our understanding.

Panel Overview and Objective

Promoting IT careers to women developing countries is very relevant because it can improve the lives of the women and their families. It can also impact the economy and the social aspects of the country (Oreglia & Srinivasan, 2016). The countries in Latin America, despite sharing many common characteristics, also have strong variations that are worth exploring, especially when it comes to an area of research aimed to reduce the gender gap in IT. This panel will be a great opportunity to allow seven active academics share the experience in the last 10 years and identify common experiences, challenges, and main results. In addition, each researcher will discuss what they have done to publish in academic journals and what are the challenges for dissemination. AMCIS is a great venue to promote this kind of discussion and we hope other recognized researchers from the Americas will participate in this panel. The online format will be particularly useful given that most of these participants were not able to participate in these conferences before mainly for lack of funding. The online format will increase collaboration and knowledge sharing in this research.

Panel Design

This panel of Latin American academics who have participated in project related to reduce the gender gap in technology, will discuss their findings and challenges conducting those studies and publishing that kind of research. Each participant will briefly discuss the projects they have been part of, select only the two most relevant, discuss the main goals of those projects, main results and then focus on the challenges identified to publish the research. Having a common structure of their presentations, will give more time to identify similarities and differences, and answer questions from the audience. The first authors will serve as moderator of the panel.

Panelists

Rita Berardi, Ph.D, is a professor at the Federal Technological University of Paraná - UTFPR, Campus Curitiba. She obtained a PhD in Computer Science from the Pontifical Catholic University of Rio de Janeiro developed in collaboration with Universität Koblenz-Landau, West Institute of Semantic Web in Germany. She completed her master's degree in Computer Science at the Pontifical Catholic University of Rio Grande do Sul, held in partnership with Hewlett Packard (HP). Graduated in Computer Science at the Federal University of Pelotas. The research areas that are of mostly of her interest are related to Databases, Data quality, Linked data (or connected data), Semantic

Web and Ontologies. All these areas associated with real problems of practical application, such as smart cities, open data is the main motivation to work with research. In Extension, she is a member of the UTFPR Emilias Project, which aims to increase female representation in computing and discuss aspects related to women's performance in the computing area.

In the last 4 years, Rita has been working on an Extension Project called Emílias- Armação em Bits (http://emilias.dainf.ct.utfpr.edu.br/), which is a Project of the Academic Department of Informatics at Federal University of Technology-Paraná (UTFPR) in Curitiba, Brazil. The Project is related to the National Initiative called Meninas Digitais (http://meninas.sbc.org.br/). The objective of Emilias is to promote Computer Careers to girls in High School and attract them to this College Courses. Also, the second objective of this project is to help girls who are already studying Information Systems and Computer Engineering in our University to not give up and quit their courses. The program in High School involves different actions, such as workshops of basic concepts of Computer Science and activities that highlight women in the history of Computer Science. To retain our female students, we provide talks with women in IT careers doing different jobs and events that help them to share experiences, fears and situations, at least to be listen to. In those 4 years, we reached out to approximately a thousand students. Analyzing that experience, we found that High School girls already have a stereotypical ideas of STEM courses, so we should interact with them before. We also noticed that as important it is to work with student girls, it is also necessary to work with their teachers, so that they help us in this mission of continuing to share experiences about computing. As a result, we will start a new Project called TIChers, with the audience focused in teachers of Elementary School.

Cristiano Maciel, Ph.D, is a professor in the Institute of Computing and in the Graduate Program in Education, both in the Federal University of Mato Grosso – Brazil. He is a researcher and has a management position at the University. At the moment, he is the director of events and special commissions and one of the coordinators of the Digital Girls Program (Programa Meninas Digitais), both in the Brazilian Computer Society (SBC). He is a research productivity fellow at the National Council for Scientific and Technological Development (CNPq), in Brazil. His technical interests are in HCI, digital legacy, electronic government, software engineering, gender and technologies and online education. He has been working for about 10 years on the theme of gender and technologies.

Cristiano has participated in the Digital Girls Program since 2011 [1], being one of the founders of the initiative. Currently, the program has more than 100 projects carried out in different institutions in Brazil. It is one of the largest incentive programs for girls in Latin America, with more than 300 volunteers, and serves approximately 5,000 people annually.

While working on the theme of gender and technologies, Cristiano has participated in outreach projects, attended conferences, supervised graduate researchers and worked as a volunteer in management positions related to the cause. In his state, he participates in the Mato Grosso Digital Girls project.

In 2016, he was awarded as a "Distinguished Associate of SBC" for his actions in the Digital Girls program. In 2018, he and his PhD supervisees were awarded for the best paper "'Black Women in Computing and Technologies: indemnity self-assertion and resistance'"[2] in the Latin American Women in Computing Congress (LAWCC). They were also recognized as "Great partners of LAWCC". In his opinion, everyone, men included, should be engaged in this cause, and understand and support its actions, once men represent a big share of IT professionals.

Gabriela Marín-Raventós, PhD, received a M.Sc. in Computer Science from Case Western Reserve University in 1985, and a Ph.D. in Business Analysis and Research from Texas A&M University, USA in 1993. She has been a Computer Science faculty member at Universidad de Costa Rica (UCR) since 1980. She was Dean of Graduate Studies and Director of the Research Center for Communication and Information Technologies (CITIC), both at UCR. Currently, she is the Director of the Graduate Program in Computer Science and Informatics. She has organized several international and national conferences, and has been chair of several program and editorial committees. From 2012 to 2016, she was President of the Latin American Center for Computer Studies (CLEI), becoming the first woman to occupy such a distinguished position. Since September 2016, she is Vice-President of the International Federation for Information Processing (IFIP), in charge of the Digital Equity Committee.

Her research interests include Gender in IT, Human Computer Interaction, Decision Support Systems, and Smart Cities. Since 2006, she has been working on trying to attract more women to Computer Sciences and STEM careers. In 2009, he became one of the founders of LAWCC, Latin American Women in Computing Congress, and has been its Program Chair many times.

Michelle Rodrigues, MBA, is the Dean of the Engineering School at Universidad del Pacifico in Lima, Peru. She is a professor of Management Information Systems in graduate and undergraduate program in Business Engineering and

Information Engineering (Data Science). Previously she served as Director of academic quality at the graduate school, and Associate dean of in the undergraduate program of Information Engineering. She played various roles at the university as Director of the Master in Supply Chain Management, Master in Agribusiness and Master Economics, Director of academic quality at the graduate school, and Associate dean of in the undergraduate program of Information Engineering. She has been a member of the IBM Women Leadership initiative, Ambassador of Women in Data Science – Stanford university iniciative since 2017, Girls' Day in ICT in support of UNIFE and the Ministry of Transport and Communications, among other initiatives that seek to support the development of women in business, science and technology. She is also part of the SCALE Network for Latin America iniciative of the Center for transportation and logysctics at the MIT, colaborate with the CityScience Group at de MIT Media Lab and the Andorra Innovation HUB.

In this panel, Michelle will discuss her experience in the IBM initiative Women Leadership, and the IBM Camp program where girls from the high school spent 1 week at IBM offices in Lima been training in develop web pages, hands on hardware courses, mentoring in the final project amoung others. She will also talk about conference Women in Data Science, that congregates executives, academics and students for a day, to share experience in the development of the roll on women in the data science. Our main goal is to inspire young students to be more involved in the data science field.

Patricia Cabero Tapia, PhD, is a professor and researcher at the School of Production and Competitiveness of the Bolivian Catholic University "San Pablo" (UCB). She holds a PhD in Economics from the institute of "Technology and Management" at the Technical University of Berlin, where she graduated with honors in 2018. She also completed a master's degree in Innovation and Technology Management from the Brandenburg University of Applied Sciences, and has a bachelor in Computer Sciences from the UCB. Currently, she is coordinating three new under-graduate programs at the UCB, which combine business and information technologies. Previous to her academic career, Patricia Cabero gained extensive work experience in information technologies in Bolivia. She worked in the main Bolivian telecommunications companies, and also in international software development companies based in Bolivia, such as ProcessMaker and TierConnect. On the other hand, she has carried out consultancies and investigations in the IT field for different organizations, including the Bolivian Government, the UNDP and the GIZ.

In addition, Patricia Cabero actively collaborates with several technology communities including GDG, R-Ladies, Women in Data Science (WIDS), Bolivia.ai and the Bolivian Software Libre in topics related to Women in IT. Besides events, members of these communities collaborates with government initiatives oriented to reduce the gender gap in IT, including the initiative of the Bolivian Agency of Information Technologies call "Soy única, soy TIC" (I am unique, I am TIC) which is providing IT training, and empowering young women between 16 and 18 years old across Bolivia. She will present a network analysis of technology communities oriented to reduce the gender IT gap in Bolivia, and an initial assessment of its impact taking into account the social position of active members in these communities.

While in Bolivian tech-companies is evident the existence of a gender gap in IT, there are no studies in Bolivia that explore this problem. But it exists. According to the data published by the Executive Committee of the Bolivian University between 2004 and 2015 women choose STEM courses less than men; women representing only 29.1% in engineering and technology careers in 2015.Technology communities are undertaking different initiatives to reduce gender gap in IT by supporting both young professionals and students to gain technological expertise and skills, networking and counseling through events and professional conversations. For instance, WIDS has about 265 members, and since 2015 are organizing a yearly datathon with the participation of about 30 teams in La Paz. These technology communities also organize events aimed to teach programming skills to school students, and in this way, they motivate girls to pursue later IT related careers.

Nadia Rodríguez, PhD (candidate), earned her Bachelors' degree in Systems Engineering from the Universidad de Lima in Lima, Peru. She earned a Master of Business Administration with a concentration in Finance from the University of St. Thomas in Houston, TX. She is currently a PhD candidate in Strategic Management at the Doctoral Program from the Consortium of Universities in Peru. She was appointed Director of the Systems Engineering Undergraduate Program at the Universidad de Lima in 2015. Nadia is a professional with 20+ years of experience in the USA and Peru working mainly as a consultant and developer of database systems for large organizations.

Her main research work focuses on women's careers in informational technology (IT) or related in Peru. The average proportion of women versus men studying IT or related careers in Peru is in some cases at the global rate of 25% vs 75%, or less. Her research aims to find the reasons of this gap and also ways to reduce it, since this field is filled with

job opportunities that can promote their economic, social, professional, and personal growth, even more in current circumstances due to Covid-19.

She is currently working on two Erasmus+ projects cofounded by the European Union. The first project "InnovaT: Innovative Teaching Across Continents project (2019-2021)" aims to enhance innovation in teaching and learning approaches fostering modernization in higher education institutions in Chile and Peru. The second project "QUALENV: Change the Climate: Assuring the Quality of Environmental Strategies in Latin-American Higher Education (2020-2022)" pursues to increase Latin-American University's contribution to Sustainable Development, through the implementation of systematic practices and quality processes that distinguishes the environmental management systems. Preliminary results of my qualitative study about IT professional women in Peru – as part of my dissertation, indicate that they are all satisfied with their careers and their jobs. The main reasons they are satisfied in order of priority are the possibility for constant learning, access to competitive and rising salaries and their contribution to the organization.

Indira Guzman, PhD, is the Director of Doctoral Programs of the College of Business Administration and Professor of Management Information Systems at Trident University in Cypress, California, USA. Her research has been published in journals such as *The DATA BASE for Advances in Information Systems, Information Technology and People, Women's Studies, the Journal of Digital Information, and the Communication of the Association of Information Systems*. She holds a bachelor's degree in Computer Science from Donetsk National Technical University, a master's degree in Information Management and a Ph.D. in Information Science and Technology from Syracuse University. Dr. Guzman was awarded the prestigious NSF Research Fellowship and is a Fulbright Scholar.

In her research she studied the IT Occupational Culture (ITOC) (Guzman & Stanton, 2009; Guzman, 2008) and how these cultural characteristics influence career choice decisions of young people. In particular, she has conducted research about women's adaptation to ITOC with students in the United States. More recently, she is a co-principal investigator of a project funded by the Sustainable Development Solutions Network (SDSN) Bolivia with researchers at the Catholic University of Bolivia about why women do not pursue IT related majors. She has been a member of the Association of Information Systems for more than 15 years, serves in as Secretary of Latin America and Caribbean Association of Information Systems (LACAIS) Chapter and is an Academic Advocate for the National Center foro Women & Information Technology (NCWIT). In this panel, she will serve as moderator.

Equipment requirements

A videoconferencing tool that allows for multiple participation, as well as screen sharing and recording.

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