A Free-Access Applied Statistics Web Page

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Abstract
The Quality, Reliability and Continuous Improvement Institute (QR&CII) is an applied statistics and quality engineering web page, developed as a public service by the Juarez Lincoln Marti (JLM) International Education Project (http://web.cortland.edu/matresearch). The QR&CII publishes and develops materials that contribute to the understanding and study of industrial and applied statistics, for professionals and students interested in this topic. The present paper describes the origin, content and projections of this Web Site, that includes detailed tutorials, Webinars, PowerPoint presentations, peer-reviewed journal articles and final group projects from students of our industrial stats and quality engineering courses, at Syracuse University.

Keywords: Statistics education, industrial applications, reliability, and quality.

1. Introduction

The *Quality, Reliability and Continuous Improvement Institute* (QR&CII) web page is an applied statistics and industrial engineering (https://web.cortland.edu/romeu/QR&CII.htm) free access resource, developed as a public service by the *Juarez Lincoln Marti* (JLM) International Education Project (http://web.cortland.edu/matresearch/). The JLM Project develops and publishes statistical materials that contribute to the education, understanding and study of industrial and applied statistics, for educators, researchers, practitioners and students interested in statistics. It has a Spanish language counterpart (http://web.cortland.edu/matresearch/QR&CIInstPg.htm/) the *Instituto de Estadistica Aplicada y Mejora Continua*, for those who do not read English.

The present paper describes the origin, contents and projections of the QR&CII web page, which includes detailed tutorials, webinars Power Point presentations, peer-reviewed journal articles and course group projects developed by our industrial statistics and quality engineering students at Syracuse University.

The Web Page includes fifty years of this author's statistical work, undertaken in three American academic institutions (SUNY, Syracuse University, IIT Research Institute), including research work done in said institutions, as well as in several countries, during our Fulbright stints (Mexico, Dominican Republic, Ecuador), *Fundayacucho* assignments (Venezuela) and JLM Project activities (Mexico, Spain, Puerto Rico, Colombia, Ecuador, Peru, Brazil and Costa Rica) and in our native Cuba.

With this web page we want to make useful material available to users, and to encourage our peer Academic and Research colleagues to publish their work in the web, for the benefit of future statisticians, educators, researchers and practitioners, as well as for statistics students.

The origins of this endeavor is discussed in "Teaching Engineering Statistics to Practicing Engineers", presented to ICOTS-7, Brazil (Romeu, 2006a). It was later expanded in the paper "A Survey on Ways Engineers Learn Statistics After Leaving College", presented to the ASA in Knoxville (Romeu, 2006b) and "On the Statistics Education of American Engineers" (Romeu, 2012), published in the *Journal of the Reliability Analysis Center*, among other papers from this author, on statistical education.

We describe the challenge of statistical education of engineers in this way: most practicing engineers, during their college days, only take one or two applied statistics courses. They need, therefore, to enhance their statistics education after college, through other means such as short courses, internet readings, self-study, mentoring, etc. A survey of education means employed by engineers collected and analyzed data, later reported by the author, in the mentioned papers, as well as in Romeu (2006a).

The QR&CII web site includes papers used by this author in his graduate engineering courses, as well as peer-reviewed papers and presentations for journals and conferences, reports written for the Reliability Analysis Center (RAC) an Air Force technical center operated by IIT Research Institute, where the author worked as Senior Engineer. And we also include technical material facilitated by several other colleagues.

In rest of this paper we provide a synthesis of the contents of this web site, and of its different topics, that include theory, applications and detailed numerical examples, developed to solve queries submitted to the RAC by practicing engineers, as well as their supporting Power Point presentations.

2. Technical Content of the Web page

The QR&CII web site technical material consists of two types. The first, *called tutorials*, are technical papers, reports, numerical examples and problems solved by this, and other authors that have worked as researchers, consultants and academics, and their peer-reviewed publications. The second type, *called Webinars*, is composed of articles presented to professional events, with their corresponding Power Points, that can be read, while viewing at the same time, their PPT presentation explanations.

We find two main problems of the resources and tutorials currently available in the web: (1) the lack of content assessment (we don't know how is the author qualified to write about the topic), or if the material was peer-reviewed, and (2) lack of sequencing of said information (there is modest information about pre-requisites for its readings, or about related topics). Therefore, it often occurs that users of such materials do not fulfil their statistical needs. One of the objectives of the QR&CII web site is to fill this void.

2.1 Introductory Sections in Spanish and in English

This section presents a series of documents of general character and different sources. These include the course curriculum and sequenced weekly technical readings of our Syracuse University (SU) industrial statistics graduate course (ECS526) taught for many years there. We provide examples of student projects and presentations, which were an integral part of their evaluations. Then, there is an article (Romeu, 2008), explaining this course, that we presented to the ASA/JSM, and later published elsewhere.

We also present the web links of several trustworthy industrial statistics web pages, such as the NIST Handbook DSIAC (Defense Systems Information Analysis Center) tutorials, and several statistics texts, freely available in the web, such as Rice University's and Salcedo's web sites. There are also several web sites of international statistics societies: RSS, ASA, ASQ Reliability and Statistics sections, IASI (Inter-American Stats Institute), and Institute of Industrial Mathematics (ITMATI), among others.

There is also information about the Society of Actuaries exams, the SSRN Library, with its hundreds of research papers, the ACCENDO Reliability library, with 100 relevant papers, and the university rankings, according to Shanghai and to the National Science Foundation (NSF). Finally, there are several articles about university-related topics appeared in The Economist and other journalistic sources.

The QR&CII Spanish and English web sites are very similar. The reason for developing both is two-fold. First, some Latin American colleagues (e.g. from Brazil), feel more comfortable reading English than Spanish, as well as many colleagues in the *Third World* (e.g. Africa, Asia).

3. Technical and Tutorial Publications

This author has spent many years writing tutorials for the different organizations he has worked for: RAC, DACS, and AMTIAC. After retirement, he has continued writing tutorials. All are included in QR&CII.

Determining the Experimental Sample Size deals with practical methods to establish an optimal size (https://web.cortland.edu/romeu/ExperSampSizeQR&CII.pdf)

Infant Mortality in Reliability Studies, for the Weibull, deals with practical methods in Weibull studies (https://web.cortland.edu/matresearch/InfantMortStudyQR&CII.pdf)

Experiencias Practicas en la Educacion Estadistica (in Spanish) deals with statistics education (https://web.cortland.edu/matresearch/Ecs526TutorialQR&CII.pdf)

On the use of Quality Engineering to Improve Systems that Mitigate Hurricane Impact (https://web.cortland.edu/matresearch/QualEngToolsHurricaneMitigation.pdf), including its Power Point (https://web.cortland.edu/romeu/QualToolsTacnyTalk2021.pdf), and the associated TACNY talk given on this paper (https://vimeo.com/656331237)

3.1 Statistical Papers related to the Coronavirus Pandemic

In this section we present a series of papers, developed as pro-bono after the start of Covid-19 in March 2020, and distributed to the scientific community through ResearchGate and LinkedIn:

3.1.1 Introduction, and basic information:

An illustrative Numerical Example:
https://www.researchgate.net/publication/339936386_A_simple_numerical_example_that_illustrates_the_dangesrs_of_the_Coronavarus_epidemic

Its associated U-Tube Video: https://www.syracuse.com/coronavirus/2020/03/how-fast-can-coronavirus-spread-statistics-professor-explains-why-we-need-to-act-now-video.html

A Formal Proposal to contribute to the study of the Covid-19 Pandemic:
https://www.researchgate.net/publication/341282217_A_Proposal_for_Fighting_Covid-19_and_its_Economic_Fallout

Three Engineering Students' PPTs, applying Quality to analyze the spread of Coronavirus:
https://web.cortland.edu/matresearch/Covid-19COPQGrp1.pdf
https://web.cortland.edu/matresearch/Coronavirus_Assess_Grp2.pdf
https://web.cortland.edu/matresearch/Covid-19FTAGrp5.pdf

Previous Quality Engineering Course Experiences in Epidemiology (Ebola and Zika):
https://web.cortland.edu/matresearch/EbolaGageR&R2016.pdf
https://web.cortland.edu/matresearch/2017ZikaVirusFinPres.pdf

Index of all our Covid-19 papers, with hits from LinkedIn and ResearchGate:
https://web.cortland.edu/matresearch/SELECTEDREADINGSRESEARCHGATE.pdf

3.1.2 Design of Experiments (DOE) and Quality Control (SPC) Applications:

Monitoring Community Infection Levels of Covid-19 Virus using Quality Control Techniques
https://web.cortland.edu/matresearch/AplicatSPCtoCovid19MFE2020.pdf

Design of Experiments in Identification of Factors impacting Community Spread of Covid-19
https://www.researchgate.net/publication/341532612_Example_of_a_DOE_Application_to_Coronavarius_Data_Analysis

Fractional Factorial DOEs in Identification of medical treatments that reduce Covid-19 infection
https://www.researchgate.net/publication/344924536_Design_of_Experiments_DOE_in_Covid-19_Factor_Screening_and_Assessment

3.1.3 Reliability and Logistics Applications:
Design and performance evaluation of ICU units, using Reliability
https://www.researchgate.net/publication/342449617_Example_of_the_Design_and_Operation_of_an_ICU_using_Reliability_Principles

A summary of Fault Tree Analysis (FTA) and Failure Mode and Effects Analysis (FMEA)
https://web.cortland.edu/matresearch/FMEA&FTASumaryS2017.pdf

An Example of Survival Analysis of Covid-19 using ICU & Patients Ventilator data
https://www.researchgate.net/publication/342583500_An_Example_of_Survival_Analysis_Data_Applied_to_Covid-19

Statistical Methods to Accelerate Covid-19 Vaccine Clinical Trials using sequential analysis
https://www.researchgate.net/publication/344193195_Some_Statistical_Methods_to_Accelerate_Covid-19_Vaccine_Testing

Survival Methods to Establish Covid-19 Vaccine Life (Length of its Effectiveness)
https://www.researchgate.net/publication/344495955_Survival_Analysis_Methods_Applied_to_Establishing_Covid-19_Vaccine_Life

Covid-19 ICU staff and equipment requirements for patient overflow, using Negative Binomial
https://www.researchgate.net/publication/345914205_Covid-19_ICU_Staff_and_Equipment_Requirements_using_the_Negative_Binomial

3.1.4 Multivariate Analysis (Principal Components; Discriminant Analysis):
Principal Components and Discriminant Analysis of Covid-19 data: Part I
https://www.researchgate.net/publication/341385856_Multivariate_Stats_PC_Discrimination_in_the_Analysis_of_Covid-19

More on Principal Components and Discriminant Analysis of Covid-19 data: Part II
https://www.researchgate.net/publication/342154667_More_on_Applying_Principal_Components_Discrimination_Analysis_to_Covid-19

Principal Components and Discriminant Analysis of Covid-19 data: Power Point
https://web.cortland.edu/matresearch/ApplyPrincCompDSCC-Cov19.pdf

Logistic Regression/Discriminant Analysis in Factor Identification of Covid-19 Clinical Trials
https://www.researchgate.net/publication/346956247_Logistic_Regression_in_Factor_Identification_of_Covid-19_Vaccine_Clinical_Trials

3.1.5 Stochastic Processes Applications (Markov Chains):
A Markov Chain model to study the spread of the Covid-19 virus

https://www.researchgate.net/publication/343021113_A_Markov_Chain_Model_for_Covid-19_Survival_Analysis

A Two-Absorbing-States Markov Chain to study the problem of Covid-19 Herd Immunization
https://www.researchgate.net/publication/343345908_A_Markov_Model_to_Study_Covid-19_Herd_Immunization

A Markov Chain to study the problem of Re-opening Colleges under Covid-19
https://www.researchgate.net/publication/343825461_A_Markov_Model_to_Study_College_Re-opening_Under_Covid-19

GSS/ASA Workshop (U-Tube) on Covid-19 (the last presentation is our Markov Chain model)
https://www.youtube.com/watch?v=ByGEUGbU_JU&feature=youtu.be

A Markov Model to Assess Covid-19 Vaccine Herd Immunization Patterns
https://www.researchgate.net/publication/347441411_A_Markov_Model_to_Assess_Covid-19_Vacine_Herd_Inmunization_Patterns

3.1.6 Socio-economic Analyses of Problems derived from Covid-19:
Fallouts of Off-Shoring (outsourcing) and Tax payers' contributions, to Coronavirus Pandemic
https://www.researchgate.net/publication/341685776_Off-Shoring_Taxpayers_and_the_Coronavarus_Pandemic

A Digression on the Interaction between Race, Ethnicity, Class and Coronavirus.
https://www.researchgate.net/publication/343700072_A_Digression_About_Race_Ethnicity_Class_and_Covid-19

A Digression about Aspects of Clinical Trials for the new Vaccine against Covid-19.
https://www.researchgate.net/publication/346305686_A_Digression_on_Covid-19_Vaccine_Clinical_Trials_and_its_Consequences

A Digression on Covid-19 Vaccine Rollout
https://www.researchgate.net/publication/348607971_A_Digression_on_Covid-19_Vaccine_Rollout

3.2 Webinars
These are papers that include either Zoom or Power Point support, given at their conference presentations.

Webinar on Quality Engineering use to Implement and Improve Systems that Mitigate Impact of Hurricanes. its Powerpoint and its TACNY Sweet Series talk Zoom Presentation.

Webinar on the Uses, Mis-Uses and Abuses behind Polls and Surveys and its PowerPoint

Webinar on the Application of Markov Chains to the study of Covid-19 and its PowerPoint

Webinar on the Summary of a Year of Statistical Work on Covid-19: paper and PowerPoint, given at the 2021 ENBIS Annual Conference.

ASQ Webinar on the Determination of the Sample Size for Testing or Experimentation: Paper and its corresponding PowerPoint given through the Reliability Division/ASQ on Feb. 28, 2017.

ASQ Reliability Division Webinar: Understanding, via Markov Chains, the Uses of Availability and its PowerPoint. ASQ Reliability Division Members can access it through their Web Page.

Webinar on the Organization of an Institute to Support the Education of Practicing Engineers and its corresponding PowerPoint, given to TACNY/Syracuse, and to the ASA/ASQ Spring Research Conference, held at NIST/DC.

Webinar on an application of Design of Experiment implemented to the study of an Aquatic Ecosystem with its corresponding Powerpoint.

Webinar on the application of Statistics and Operations Research Techniques in Data Mining with its corresponding PowerPoint.

Webinar on the Validation of Multivariate Monte Carlo Simulation Studies: Conference Paper with its corresponding PowerPoint.

Webinar on the Monte Carlo Investigation of the Performance of Some Clutter Identification Methods with its corresponding PowerPoint.

Webinar on the Uses of Discrete Event Simulation in Statistical Education with its corresponding PowerPoint.

Webinar about Problems in Teaching Engineering Statistics to Practicing Engineers with its illustrative PowerPoint.

Webinar about the Practical Problems when Developing Software Reliability Models with its PowerPoint.

Webinar on the Statistical Discussion of a Demographic Study of Cuban Freemasons with its PowerPoint.

Webinars developed during Romeu's Fulbright Roster Assignments:

(1) on Methods for Course Administration ; (2) on Tech Methods in International Education and, (3) on Technology Integration into Education

3.3 Technical Articles on Applied Statistics

Web Tutorial on a New Multivariate Normality Goodness of Fit Test with Graphical Applications

Web Tutorial about a Small Sample Empirical Critical Values for a Multivariate Normality GOF Test.

Web Tutorial on a Simulation Approach for the Analysis and Forecast of Software Productivity

Web Tutorial about Problems in Developing Combined Hardware/Software Reliability Models

Web Tutorial on the Determination of appropriate Experimental and Hypothesis Tests Sample Size

Web Tutorial on A Small Sample Monte Carlo Study of Four Systems Reliability Bounds

Web Tutorial on Measurement Problems in the Analysis of Software Productivity and statistical Consequences

Web Tutorial on Using Programmer's Experience as a Classification Variable in the Analysis of Software Data

Web Tutorial about Measuring Cost Avoidance with Messy Reliability Data, using Nonparametric

Web Tutorial about Statistical Assessment of an Experiment To Compare Traditional vs. Laboratory Approaches in Teaching Computer Programming.

Web tutorial on Some Problems and Solutions regarding the Education of Practicing Engineers

Web Tutorial describing a Survey on Ways Engineers Learn Statistics After Leaving College

Over Two Dozen web tutorials, on reliability and industrial statistics problems, with detailed model descriptions and step-by-step numerical examples, are developed by Prof. Jorge Romeu.

Prof. Ron Kenett (http://www.kpa-group.com/en/about-kpa/ron-kenett-cv-page), Past President of ENBIS and Editor of QTQM Journal, has provided the following technical papers: Paper Texts

The corresponding paper presentations can be found in their Power Points

These papers, and other articles on applied statistics, can also be obtained through the Social Science Research Network SSRN

3.4 Short Tutorials on Reliability and Industrial Statistics:
These papers contain detailed model descriptions and step-by-step numerical examples, developed by the author during his tenure as Senior Engineer at the Reliability (RAC), the Software Engineering "(DACS), and the Advanced Materials (AMPTIAC) Analysis Centers. Currently they can be found under the Defense Systems Info Analysis Center (DSIAC), a collection of RAC and AMTIAC technical Journals. These papers (RAC tutorials called START Sheets, published periodically to help the RAC engineering community) are divided into groups, according to their technical topics:

3.4.1 Descriptive Statistics: EDA and Distribution Identification:
AMPTIAC "MaterialEase" Tutorial. IITRI/2000: Data Quality and Pedigree.

Statistics I: Random Variables and Distributions: AMPTIAC

RAC START. Volume 9, Number 6: Empirical Assessment of Normal and Lognormal Distribution Assumptions.

RAC START: Volume 8, Number 2: Statistical Assumptions of an Exponential Distribution.

RAC START. Volume 10, Number 3: Empirical Assessment of the Weibull Distribution.

RAC START. Volume 9, Number 5: Graphical Comparison of Two Populations.

3.4.2 Statistical Inference: Estimation and Testing:
Statistics II: On Estimation and Testing.

RAC START: Volume 9, Number 4: About Statistical Confidence.

RAC START. Volume 10, Number 4: Chi-Square: a Large-Sample Goodness of Fit Test: ChiSq GOF.

RAC START. Volume 10, Number 5: Anderson-Darling: A GoF Test for Small Samples Assumptions: A-D GOF.

RAC START. Volume 10, Number 6: Kolmogorov-Smirnov: a GoF Test for Small Sample Assumptions: K-S GoF.

RAC START. Volume 11, Number 4: Quality Control Charts: QC/SPC.

RAC START. Volume 12, Number 1: OC Function and Acceptance Sampling Plans: OC Plans.

3.4.3 Statistical Modeling: Regression, Analysis of Variance & DOE:
Statistics III: Modeling with Regression and ANOVA.

RIAC RelTique. Volume 1, No. 1: On Regression Analysis.

RAC START. Volume 11, Number 2: Combining Data.

MINITAB and Pizza: A Workshop Experiment.

Statistical Assessment of an Experiment To Compare Traditional vs. Laboratory Teaching Computer Programming.

Design and Evaluation of Aquatic Ecosystems via Discrete Event Simulation.

QSI/Fractional Factorial Designs FF Tutorial.

3.4.4 Reliability Modeling and Analysis:
RAC START. Volume 10, Number 7: Reliability Estimations for Exponential Life.

RAC START: Volume 8, Number 2: About Censored Data in Reliability.

QR&CII Tutorial Series, Volume 1, Number 2: Infant Mortality in Reliability Studies for the Weibull.

QSI Report: About Confidence Bounds for MTTF in Time Truncated life tests.

Pilot Study of the Length of Time (in years) to Demit from Lodge, Using Survival Analysis.

Practical Examples of FMEA, FTA and Failure Data Analysis in Reliability Applications.

RAC START. Volume 10, Number 8: Use of Bayesian Techniques for B-Reliability.

RAC START. Volume 11, Number 5: Understanding Series/Parallel S/P Systems.

RAC START. Volume 11, Number 6: Understanding, via Markov Chains, Systems Availability

Journal of Reliability Analysis Center. Vol. 8, Number 1: A Discussion on Software Reliability SW-R Models.

An Example of Reliability Data Analysis from a Student Group Final Project.

The Defense Systems Information Analysis Center (DSIAC) consolidated most IACS. It has an Internet Library with all these tutorial materials.

3.4.5 Advanced Statistical Topics:
Operations Research and Statistics Techniques: a key to Quantitative Data Mining PowerPoint and Paper.

QR&CII Institute Tutorial. Volume 1, No. 1: Determining the Experimental Sample Size Paper

RAC START. Volume 12, Number 2: Understanding Binomial Sequential Bin/Seq Testing

RIAC RELTIQUE/Start Sheet: Understanding Exponential Sequential Tests.

RIAC RELTIQUE/Start Sheet: Understanding Logistics.

3.4.6 A Mini-Statistics Course in Three RAC Journal Articles:
Reliability Statistics I (pp 9--15): Random Variables and RV Distributions

Reliability Statistics II (pp 4--9): On Estimation and Testing

Reliability Statistics III: On Statistical Modeling of Reliability R-Data

AMPTIAC Textbook for Materials Engineers: A Practical Guide to Statistical Analysis of Data Material Property.

3.4.7 Other Statistical Topics in RAC Journal Articles:
Journal of Systems Reliability Center (SRC), 3rd Qtr. 2005 (pp. 11-21): Determining the Experimental Sample Size.

ASQ Statistics Division Newsletter Vol. 24, No. 1: Fall 2005 (pp. 4--10). About Systems Availability.

ASA/SPES Newsletter. Summer of 2010: Understanding Logistics in Systems Analysis

3.4.8 Other Articles applying Statistics to Topics in History and the Humanities:
Survival Analysis Methods in the Study of Lodge Members Time to Demit

Journal of IASI/Inter-American Statistical Institute. 2017: Statistics in Support of Masonic Historical Studies.

Journal of IASI Inter-American Statistical Institute). 2012: Demographic Study of Cuban Freemasons.

Handbook on Human Rights, ASA 2010 (Ch. 5): Statistical Thinking and Data Analysis in Human Rights

5.0 Quality Engineering Materials

The MFE634 Quality Engineering work shown below, was done by MFE634 student groups under my supervision. These final projects were a required and significant part of their coursework.

MFE634 Syllabus (Quality Engineering) a Graduate Course offered yearly at Syracuse University.

Selected List of MFE634 Student Group Final Project topics.

Intent of the Final Project Topics in MFE634 Quality Engineering Student Groups.

NEQC 2018 Conference presentation PPT describing MFE634 Quality Engineering Final Projects.

PPT discussing several key elements of Quality Engineering.

5.1 MFE Student Group Final Presentations and reports.

PPT of a student project with key elements of Quality Audits.

PPT of a student project with key elements of the Cost of Poor Quality

PPT of a student project with key elements of the COPQ and of FMEAs to International Relief.

PPT of a student project with key elements of Process Capability applied to improving Veterans Administration.

PPT of a student project with key elements of the analysis of an ASQ Chapter using the methods of Six Sigma.

PPT of a student project with key elements of the main components of Design for Six Sigma (DFSS) and QFD Matrices to Design.

Paper on an application of Six Sigma methodology to the study of a Cuban Transition to Pluralism

PPT of a student project with the main components of Six Sigma and QFD Matrices, applied to the Design of an Industrial Process.

PPT of a student project presenting the Analysis and Evaluation of the Cost of Poor Quality (COPQ) in the study of Medicare.

Student Final Project applying Quality Gage R&R methods to help fight the spread of Ebola epidemic.

Student Final Project applying Quality methods to help fight the spread of the epidemic of Zika.

Student Final Project applying Quality Engineering to improve the process of brewing Beer.

PPT of Student Final Project applying Quality Engineering to the improvement of a School District.

PPT of Student Final Project applying Quality Engineering to prevent and mitigate hurricanes Sandy and New Orleans Disasters.

PPT of Student Final Project applying Quality Engineering to prevent and mitigate Power Outage tech and human problems in Puerto Rico.

PPT of Student Final Project applying Quality Engineering to prevent technical and human problems in subway Systems.

PPT of Student Final Project applying Quality Engineering to prevent technical and human problems in Amtrak railway Systems.

PPT of Student Final Project applying Quality Engineering to prevent technical and human problems in River/Canal Systems.

PPT of Student Final Project applying Quality Engineering to prevent technical and human problems in natural disasters in Florida.

PPT of Student Final Project using Quality tools, to mitigate devastations of Hurricanes in Puerto Rico.

PPT of Student Final Project using Quality tools to mitigate the devastations of Hurricane Harvey.

PPT of Final Project using Quality Engineering to identify the "Six Steps in the Quality" Road Map.

PPT of Final Project using Quality Engineering to help mitigate the effects of floods and surges from Hurricanes in the Carolinas.

PPT of Final Project to prevent and mitigate the effects of Bush Fires using COPQ, and Six Sigma, and QFD quality matrices.

PPT of Final Project using Quality Engineering to help prevent and mitigate the effects of terrorism and accidents in Interstate Highways.

PPT using Quality methods to prevent and mitigate the effects of terrorism and accidents in Airports.

PPT of Final Project using Quality Engineering FTA/FMEA and Reliability methods to facilitate Reshoring.

PPT of Final Project using Quality Engineering methods to improve medical services of St. Jude hospital.

PPT of Final Project using Quality Engineering methods to improve Human Conditions in the Prisons.

PPT of Final Project using Design of Experiment methods to prevent violations in Environmental laws.

PPT of Final Project using Cost of Poor Quality and QFD Design Matrix to analyze the causes of a Chilean Mining Accident.

PPT of Final Project using Cost of Poor Quality to prevent and mitigate the effects of Droughts.

PPT of Final Project using Assessment and Evaluation to mitigate the effects of Snow Storms.

PPT of Final Project using quality methods to prevent and mitigate the effects of Mud Slides.

PPT of a Project using quality to mitigate the effects of Bush Fires, and its Final Report.

PPT of Final Project using quality to analyze and mitigate the effects of Volcanic Eruptions.

PPT of Final Project using quality methods to analyze international Supply Chains and Final Report.

PPT of Final Project using quality methods to analyze and improve international Covid Vaccine Distribution. and Final Report.

Research Report on Quality Engineering use to Implement and Improve Systems that Mitigate Impact of Hurricanes. and its Power Point.

TACNY Sweet Series talk on the paper QE in Design of Systems that Mitigate Hurricanes: Zoom Presentation.

5.2 Epidemiology/Covid-19 work
This work was also done by MFE634 Quality Engineering student groups, under my supervision.

Quality Engineering Tools in the Study and Assessment of Systems for the Covid-19 Pandemic.

Project on efficiently Re-opening the Economy: Presentation; Final Presentation; Final Report.

Project on efficiently Shutting Down the Economy: Presentation; Final Presentation; Final Report.

Project on efficiently Rolling Out the Vaccines: Presentation; Final Presentation; Final Report.

Project on efficiently Reopening Schools: Introductory Presentation; Final Presentation; Final Report.

5.3 Previous Epidemiology Experiences Applying Quality Engineering Techniques:
Project for the Prevention and Eradication of EBOLA: Presentation and Final Report.

Project for the Prevention and Eradication of ZIKA: Presentation and Final Report.

Project to Analyze a Possible Extension of MEDICARE TO ALL: Presentation and Final Report.

6.0 Operations Research and Optimization

These papers were developed in my Operations Research courses at Syracuse University and SUNYIT.

Operations Research and Statistics Techniques: a key to Quantitative Optimization.

Detailed Tutorial solving various simple problems in Linear Programming.

"Primal-Dual" Algorithm for the resolution of the Primal-Dual Problem.

Sensitivity Analysis/What If/Post-Optimality applications of LP to Covid-19 and Offshoring.

Student PPT illustrating the optimization process using Sensitivity Analysis.

Student PPT illustrating the optimization process using Transportation Models.

Using "Network Flows" to resolve practical problems in Military Intelligence.

Student PPT illustrating the optimization process using Maximum Flows.

Student PPT illustrating the optimization process using Shortest Path.

Applications of "Goal Programming" to the optimization of multiple and Industrial objectives.

Student PPT illustrating the optimization process using Goal Programming.

Tutorial using the "Branch and Bound" algorithm for Integer Programming.

Student PPT illustrating the optimization process using Integer Programming.

Applications of Linear Programming in the optimization of a Party Political Platform.

7.0 Summary

The QR&CII web page was created to provide reliable technical material to industrial statistics faculty and students, as well as to practitioners and researchers. This is an on-going effort. Therefore, the material reported in this paper covers 50 years of work (to May of 2022). Material created and uploaded at a later date can be found by users directly in said Web Page: https://web.cortland.edu/romeu/QR&CII.htm

References

Croarkin, C. y Tobías, P. (Eds.) (2012). Engineering Statistics Handbook, NIST/SEMAECH. Available in: https://www.itl.nist.gov/div898/handbook/.

Romeu, J. L. (2003). The Juarez Lincoln Marti project: an example of international cooperation in statistics education and research. *Bulletin of the International Statistical Institute 54th Session. Proceedings Volume LX, Book 2.* 20--23 Berlin: International Statistical Institute. Available in: https://www.stat.auckland.ac.nz/~iase/publications/3/3041.pdf.

Romeu, J. L. (2006a). Teaching engineering statistics to practicing engineers. En A. Rossman y B. Chance (Eds.), *Proceedings of the Seventh International Conference on Teaching Statistics. Salvador de Bahia, Brazil: International Statistical Institute.* Available in: https://www.stat.auckland.ac.nz/~iase/publications/17/4A1_ROME.pdf

Romeu, J. L. (2006b). A survey on ways engineers learn statistics after leaving college. *Proceedings of the Joint Research Conference of ASA/JSM*. Knoxville TN: American Statistical Association.

Romeu, J. L. (2008). Teaching engineering statistics with technology, group learning, contextual projects, simulation models and student presentations. *Journal of Educational Technology Systems*, 36(3), 297-304..

Romeu, J. L. (2012). On the statistics education of American engineers. *The Journal of the Reliability Analysis Center (RAC)*, Volume *20,* August of 2012, pages 14 to 20. Available in: http://web.cortland.edu/romeu/StatEdAmerEng2012Q2-art3.pdf

Romeu, J. L. y V. Gascon (2004). Minitab and pizza: a workshop experiment. *Journal of Educational Technology Systems*. *27*(2), 163-169.

Romeu, Z. y J. L. Romeu. (2015). Impacto social y educacional de los programas de solidaridad y entrenamiento pedagógico del Proyecto Juárez Lincoln Martí, en América Latina. *Proceedings of Association for the Study of the Cuban Economy (ASCE).* Available in:

http://web.cortland.edu/Romeu/ASCE2015JLMProjImpSocialV25.pdf.
Salcedo, A. (Ed.) (2013a). *Educación estadística en América Latina: Tendencias y perspectivas.* Caracas: Universidad Central de Venezuela (UCV). Available in: http://institucional.pedagogica.edu.co/admin/UserFiles/10(2).pdf
Salcedo, A. (Ed.) (2013b). *Estadística en la investigación: competencia transversal en la formación universitaria.* Caracas: UCV. See: https://repositorioslatinoamericanos.uchile.cl/handle/2250/184569