ISLP Newsletter
Newsletter of the International Statistical Literacy Project
2 (12) December 2020

Statisticians During a Year of a Global Pandemic

Marjo Bruun*

The field of statistics has been well featured in the media over the past year.

Statisticians all around the world have been making huge efforts to provide citizens with reliable, truth-based data. Relevant information regarding the virus and its spread has been vital as we have managed the situations within our countries all throughout the different phases of the virus. Some examples of this important work are featured in this Newsletter.

Statistical literacy has been both valued and developed during the crisis. Statistical offices have also noticed a growing demand towards the statistics that show how the pandemic and its prevention has affected the society. We have faced changes in travel, consumption, business, employment, bankruptcies, cost of housing, national economies, and so on. This has caused citizens to grow a true interest in statistics: their quality, timeliness, and content. There is a real interest in statistical literacy in the air.

Statistics Finland, as well as the ISLP Project, sees statistical data as an important tool to increase human readiness in crisis. When statistics, and the reliable data they produce, is used in decision-making, it increases democracy and the citizen's understanding of the state of their country and other nations.

Statistics Finland has been a long-term supporter of the ISLP Project. Recently, the ISLP has received some wonderful support from the Finnish Statistical Society, too. On behalf of both Statistics Finland and the ISLP Project, I'd like to send my warmest thanks to the Finnish Statistical Society, and the project's 146 country coordinators who have done amazing work in their countries. We hope that as many NSOs and statistical societies as possible will support the International Statistical Literacy Project and its different activities.

Seasonal greetings and a Happy New Year to All!

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ISLP Newsletter 2/2020 in brief.. ▶▶

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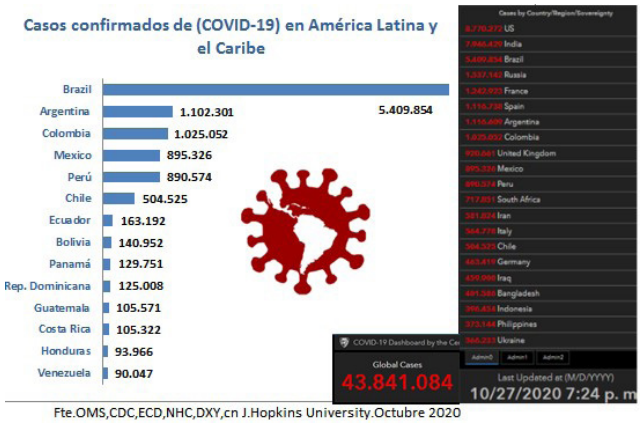
ARGENTINA

Latinoamérica en Tiempos de Pandemia

Adriana D´Amelio*

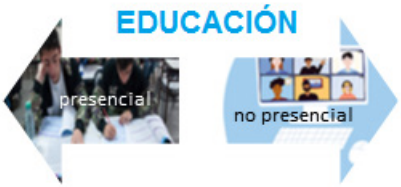
Más que nunca las estadísticas están en la vidriera y en todos los medios de comunicación, mal o bien todos hacen uso de las mismas, día a día se presentan datos con respecto a la Pandemia que azota al mundo entero. Desde los ámbitos gubernamentales, las áreas fundamentalmente de salud y educación son el punto de partida en la toma de decisiones.

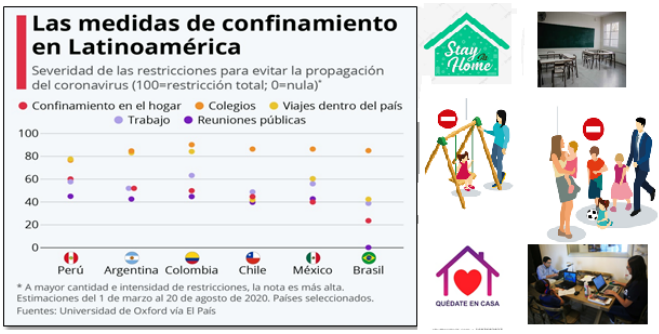
La pandemia en Latinoamérica ha afectado a muchas personas. En diferentes momentos se han desatado los picos en los países y las cifras los están posicionando entre los de mayor contagio a nivel internacional.



Esta realidad tiene mucho que ver con la densidad poblacional y las medidas que los gobiernos fueron tomando respecto al tema.

Las medidas de confinamiento fueron similares, sin embargo como lo muestra el gráfico, los contagios crecieron y la atención en los sistemas de salud en algunos se vio desbordada y en otros paulatinamente va sucediendo lo mismo.





Según datos de la Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura (UNESCO), a mediados de mayo de 2020 más de 1.200 millones de estudiantes de todos los niveles de enseñanza, en todo el mundo, habían dejado de tener clases presenciales en la escuela. De ellos, más de 160 millones eran estudiantes de América Latina y el Caribe. Cabe la pregunta si el Sistema Educativo de cada país estaba preparado para enfrentar la pandemia.

El educador español Lorenzo García Aretio, sostiene que “la educación a distancia no es un fenómeno de hoy; en realidad ha sido un modo de enseñar y aprender de millares de personas”; además, señala que “se basa en un diálogo didáctico mediado entre el profesor (institución)

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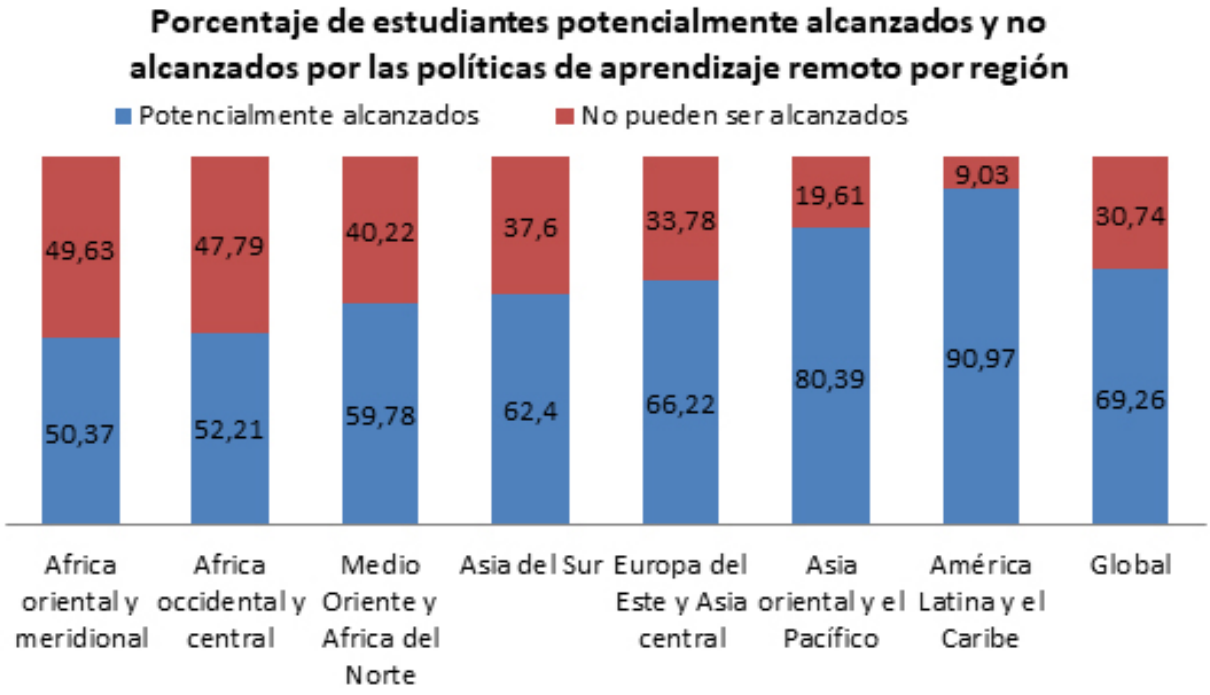
y el estudiante que, ubicado en espacio diferente al de aquél, puede aprender de forma independiente y también colaborativa" (García, 2014).

La variedad de soluciones que los países han elegido para impartir educación a distancia ha revelado la falta de preparación de contenidos o modelos pedagógicos, y las inequidades en cuanto al acceso a las tecnologías de docentes, estudiantes y sus familias", opina Romina Kasman, del Programa Oficina Regional de Educación para América Latina y el Caribe de la Unesco.

De las regiones segmentadas (no incluye Europa Occidental ni América del Norte), América Latina y el Caribe tienen la proporción más baja de estudiantes a los que no se puede llegar (9%), pero, "esto no significa que podamos concluir que se llegó al 91% de los niños".

Las clases remotas a través de Internet tenían el potencial de llegar únicamente al 24% de los alumnos.

Uno de los elementos principales de esta forma de enseñar y aprender sin presencialidad, es la **flexibilidad**. Esta característica tiene que ver, fundamentalmente, con poder pensar de otra manera las propuestas que se habían diseñado para el formato presencial del aula. Tal vez, se trata de volver a planificar, priorizando aquellos contenidos que son significativos de enseñar y aprender en el aquí y ahora.



Fte: Elaboración propia en base a AFP. Agosto 2020.

Otro eje central de esta nueva forma de "hacer escuela" es la reconfiguración del espacio y el tiempo, que ya no son los del aula física. Se trata de una forma distinta de dar lógica a la propuesta didáctica, y de hacer viable "la clase en pantuflas", tal como menciona Inés Dussel, reconocida pedagoga argentina, para referirse a esta forma de enseñar y de aprender desde el hogar.

La evaluación de los aprendizajes también se vio afectada debido a los nuevos paradigmas en todos los niveles. En los casos de Argentina y Perú, sus ministerios de

Educación resolvieron que no se calificará a los estudiantes durante el confinamiento, sino que se realizará una **evaluación formativa**.

La comunicación, la colaboración y la creatividad, son otros de los elementos centrales de esta nueva lógica de la educación; en la que tanto docentes como estudiantes han tenido que emplear distintos dispositivos, formas de acceder a la conectividad y de vincularse con sus colegas y pares. Se utilizaron plataformas digitales, zoom, meet, etc.

La reunión se realizó con el objetivo de motivarnos mutuamente en la participación del concurso de póster. Muchos nos conocíamos otros no y este espacio fue propicio para comunicarnos, intercambiar opiniones que de otra manera o en otro tiempo no se nos hubiera ocurrido.

Reunión del ISLP con coordinadores de Latinoamérica con los representantes Brasil: Mauren Porciúncula, Costa Rica: Edwin Chavez, Panamá: Elisa Mendoza, México: Hugo Hernández, Colombia: Liliana Mendoza, Chile: Hugo Alvarado, Argentina: Liliana Tauber, Venezuela: Audy Salcedo, Argentina: Juan José Sosa, México: Laura Laura Mora Reyes. Luego se incorporó Bolivia: Alvaro Chirino Gutierrez.

The Role of Literacy

La pandemia de COVID-19 ha golpeado con más fuerza a los menos favorecidos y pone de relieve la dura realidad de la desigualdad educativa. Los jóvenes y adultos analfabetos probablemente serán los más afectados por los impactos educativos, sociales y económicos del COVID-19. Esta pandemia nos muestra la urgencia de invertir en la alfabetización para todos, jóvenes y adultos.

tanto hombres como mujeres, logren la alfabetización en lengua y matemática.

No podemos dejar a nadie atrás. Debemos garantizar la continuidad del aprendizaje. Debemos invertir en oportunidades de aprendizaje abierto y a distancia. Debemos ayudar a los maestros a encontrar nuevas formas

de llegar a quienes carecen de las

habilidades básicas de alfabetización (escribe la Princesa Laurentien de los Países Bajos, enviada Especial de la UNESCO sobre Alfabetización para el Desarrollo).

Esto es esencial si queremos avanzar en el cumplimiento de los compromisos asumidos por los líderes mundiales en la adopción de la Agenda 2030 para el Desarrollo Sostenible, y cumplir con el Objetivo de Desarrollo Sostenible 4 sobre educación en particular, con el propósito de garantizar que todos los jóvenes y una proporción sustancial de adultos.

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Latin America in the Time of Pandemic

Adriana D´Amelio*

More than ever, statistics are on the stained glass window and in all media, either wrong or well all use them, data are presented day by day with regard to the pandemic that is taking place in the whole world. From the government level, the main areas of health and education are the starting point in decision-making.

The pandemic in Latin America has affected many people. At different times, peaks in countries have broken out and are being positioned among the most contagion internationally.

In fact it has a lot to do with population density and the measures that governments were taking on the issue.

The confinement measures were similar, however as the graph shows, contagions grew and attention in health systems in some was overwhelmed and in others gradually the same thing is happening.

The Spanish educator Lorenzo García Aretio, states that "distance education is not a phenomenon of today; it has actually been a way of teaching and learning thousands of people"; In addition, he notes that "it is based on a mediated didactic dialogue between the teacher (institution) and the student who, located in a space different from where the teacher is, can learn independently and also collaboratively" (Garcia, 2014).

According to data from the United Nations Educational, Scientific and Cultural Organization (UNESCO), by mid-May 2020, more than 1.200 million students at all levels of education worldwide had ceased to have face-to-face classes at school. Of these, more than 160 million were students from Latin America and the Caribbean. It is wondered whether the Education System in each country was prepared to deal with the pandemic.

The variety of solutions that countries have chosen to provide distance education has revealed the lack of preparation of educational content or models, and inequities in access to technologies for teachers, students and their families," says Romina Kasman, from the UNESCO Regional Office for Education for Latin America and the Caribbean Program. From the segmented regions (not including Western Europe and North America), Latin America and the Caribbean have the lowest proportion of students that cannot be reached (9%), but, "this does not mean that we can conclude that 91% of children were reached."

Remote classes via Internet had the potential to reach only 24% of students.

One of the main elements of this way of teaching and learning without present classes is flexibility. This characteristic has to do, fundamentally, with being able to think differently about the proposals that had been designed for the classroom format. Perhaps, it is about re-planning, prioritizing those contents that are meaningful in teaching and learning now and here.

Another central axis of this new way of "doing school" is the reconfiguration of space and time, which are no

longer those of the physical classroom. It is a different way of giving logic to the didactic proposal, and of making viable "the class in slippers", as mentioned Inés Dussel, recognized Argentine pedagogue, to refer to this way of teaching and learning from home. The evaluation of learning was also affected by new paradigms at all levels. In the cases of Argentina and Peru, their ministries of education ruled that students will not be graded during confinement, but a formative evaluation will be carried out.

Communication, collaboration and creativity are other central elements of this new logic of education; in which teachers and students have had to employ different devices, ways of accessing connectivity and linking with their colleagues and peers. Digital platforms such as, zoom, meet, etc. were used.

The meeting was held with the aim of motivating each other in the participation of the poster contest. Many of us knew each other not and this space was conducive to communicating, exchanging opinions that otherwise or otherwise would not have occurred to us.

The role of Literacy

The COVID-19 pandemic has hit the underprivileged more strongly and highlights the harsh reality of educational inequality. Illiterate youth and adults are likely to be most affected by the educational, social and economic impacts of COVID-19. This pandemic shows us the urgency of investing in literacy for all, young people and adults.

We cannot leave anyone behind. We must ensure continuity of learning. We must invest in open and distance learning opportunities. We must help teachers find new ways to reach those without basic literacy skills (writes Princess Laurentien of the Netherlands, UNESCO Special Envoy on Literacy for Development).

This is essential if we are to make progress in meeting the commitments made by world leaders in the

adoption of the 2030 Agenda for Sustainable Development, and to meet Sustainable Development Goal 4 on education in particular, with the aim of ensuring that all young people and a substantial proportion of adults, both men and women, achieve literacy in language and mathematics.

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AUSTRALIA

COVID-19-related Research: Australia

Peter Howley*

The importance of statistics is acutely evident in the proliferation of research relating to COVID-19.

When I visit schools or interact with teachers, students and the broader community, as part of inspiring interest in statistics and the National Schools Poster Competition, I inform them of the practice of statistics – revealing industry and other related applications of statistics. This includes my own personal experiences.

I've been involved in the following recent articles relating to Australia's experience of COVID-19, which may be of interest: one more mathematically-oriented, the other an application in healthcare.

As background, COVID-19 presented itself in Australia around 25 January 2020. Preventative measures to minimise transmission were increasingly imposed by the Australian Government from 1 February 2020 – this included self-quarantining and travel restrictions followed by a general trav-el ban from 20 March 2020 with Australia closing its borders to all non-residents. Social distancing rules followed from the end of March, along with a mandatory closure of non-essential services, with some states closing their borders, precluding interstate travel; all places of social gathering closed with cafes and restaurants limited to takeaway and public gatherings limited to two people if they were not from the same household. The only acceptable reasons for leaving homes com-prised: shopping for essentials, medical or compassionate needs, exercise and work or education purposes.

One of the co-authored Australian articles, 'Modeling the dynamics of the covid-19 population in Australia: A probabilistic analysis' by Eshragh, Alizmar, Howley, Stojanovski, considered a novel method of dynamically modeling and forecasting the COVID-19 pandemic in Australia. The 'partial-ly-observable stochastic process' predicted known and unknown cases with a high degree of accu-racy across the March-May 2020 period, and in a timely manner using limited data; a valuable re-source to guide government decision-making and assess the effectiveness of scenarios. The article is currently being considered following reviewer comments for publication in PLOS-One; a preprint is available via this link.

The second co-authored article, 'Increased paediatric presentations of severe diabetic ketoacidosis during COVID-19 pandemic' by Lawrence et al, highlights the increased rate of severe diabetic ke-toacidosis at pre sentation of new-onset type 1 diabetes (T1D) during the March-May COVID-19 pandemic at a local large hospital, compared with same periods in previous five years. Initial T1D presentation with such a severe, but avoidable, complication increases the chances of morbidity and mortality and extends hospital resources. These results suggest the need for complementary system approaches (advocacy, education and direction) to accompany pandemics and related pre-ventive measures (closedowns, restrictions in movements), to ensure people don't otherwise re-frain from visiting hospitals in a timely manner.

The above likely align with many readers' own publications and research – perhaps there is some potential for future collaboration!

Wishing the world safety, consideration and tolerance,

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National Statistics Poster Competition – Australia: Why Should Kids Have All the Fun?

Peter Howley*

Australia's National Schools Poster Competition (NSPC) is in its 6th year as a national activity fol-lowing its 2014 pilot!

Thanks to support from the Australian Bureau of Statistics (ABS), a fresh and engaging SSA NSPC website www.ssapostercomp.info with additional supporting resources has been created – please have a look and let me know your thoughts about the content and resource links.

With the current environment, online activities become all the more important to help school stu-dents keep connected and engaged.

The Australian NSPC provides an opportunity for Stage 2 to 6** students to work in teams and undertake and report upon an investigation in poster format via technology. Much like workplaces do all around the world, collaborating across technologies is a valuable skill to develop.

We have created a new Community Division!

Released to coincide with Inspiring Australia's National Science Week, via the Hunter Innovation and Science Hub (https://hish.org.au/events/), this division is open to all members of the commu-nity.

Expanding the hugely successful annual National Schools Poster Competition, this new Community Division of the initiative enables teams of 2 to 5 participants (of any ages or relationship) to con-duct a small-scale version of a real-world investigation, engaging core statistical, STEM and cross-functional skills.

Teams may comprise of families, friends, relatives, associates, etc from within the same household or across multiple households.

We aim to inspire interest from adults who may wish to collaborate with their family and children on a project, or who may enjoy such pursuits but lack the conduit to explore and have their ideas heard.

It may be for those who are retired, on parental leave, in any workplace and/or otherwise general-ly interested in testing their skills as part of addressing a question of interest to them, long-held or otherwise.

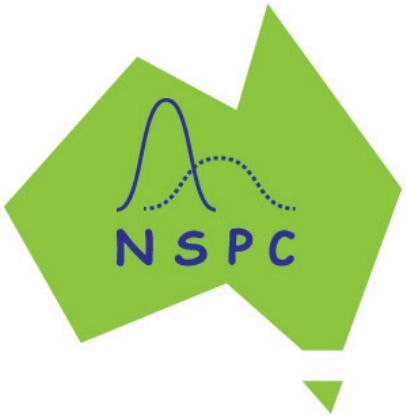

Fig 1. Australia's National Statistics Poster Competition Logo

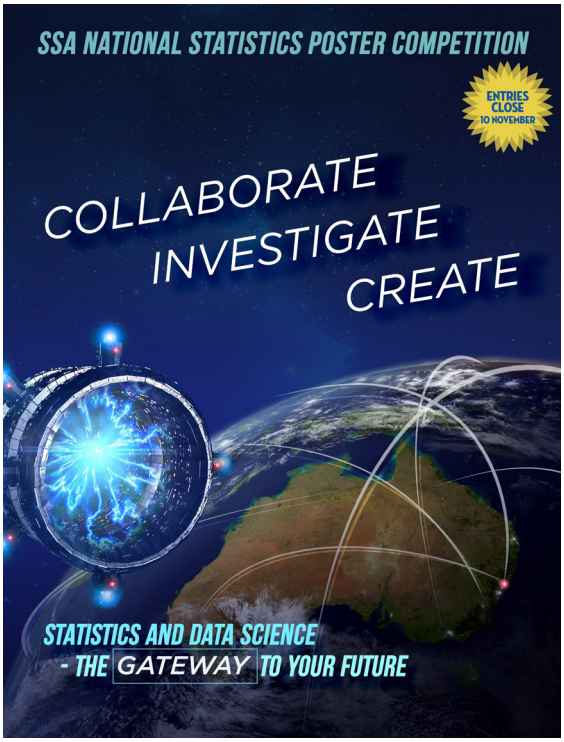

Fig 2. NSPC Promotional poster

Submissions are due 10 November for all divisions. I look forward to sharing the results!

** Stages 2 to 6 in Australia represent Grades 3 to 12 (latter is final year) and encompasses those aged 7–18.

Wishing the world safety, consideration and tolerance,

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Latinoamerica – Introducción

Latinoamérica ha sido uno de los sectores más afectados en todos los aspectos con motivo de la pandemia producida por el Covid-19, millones de estudiantes no han tenido clases y muchos otros han abandonado. En los artículos siguientes se describe la situación general y de algunos países latinoamericanos frente al Covid-19.

Edwin Coordinador de Costa Rica nos explica los efectos de la pandemia sobre el sistema educativo costarricense respecto a los docentes, las brechas sociales, la deserción, la incidencia en las universidades, además de los efectos perjudiciales para la enseñanza de la Estadística y la Probabilidad en el país.

Mauren Coordinadora de Brasil nos cuenta el trabajo colaborativo que vienen realizando desde casi 10 años y cómo fue creciendo en los últimos años. Así surgió el grupo MoSaiCo Edu grupo que tiene como objetivo socializar las prácticas pedagógicas y los conocimientos docentes relacionados con la Educación Estadística. Esta forma de trabajo a favorecido en estos tiempos en dónde el análisis y la reflexíon sobre las prácticas aúlicas desde el nivel inicial en la enseñanza y alfabetización estadística es uno de los propósito de este grupo.

BRAZIL

Formação Colaborativa de Professores até em Tempos de Pandemia - Grupo Mosaico edu – Litoral Sul Do Brasil

Mauren Porciúncula*
Karla Schreiber
Thays Votto
Gabriela Braz

No litoral sul do Brasil, em 2018, Pedagogos, professores de Matemática e de Estatística, bem como professores em formação inicial, reuniram-se e fundaram o Grupo Colaborativo de Formação de Professores em Educação Estatística – MoSaiCo Edu (Figura 1). Este grupo tem como objetivo a socialização de práticas pedagógicas e conhecimentos docentes relacionadas à Educação Estatística.

Figura 1: Logotipo do Grupo MoSaiCo Edu
Fonte: Acervo dos autores (2018).

Figura 2: Primeiro encontro do Grupo MoSaiCo Edu no LabEst
Fonte: Acervo das autoras (2018).

O Grupo MoSaiCo Edu, é sediado no Laboratório de Estudos Cognitivos e Tecnologias na Educação Estatística – LabEst (Figura 2), da Universidade Federal do Rio Grande – FURG.

O MoSaiCo Edu foi inspirado em pesquisadores que desenvolveram estudos relacionados à formação docente em contextos colaborativos (CONTI, 2015; OLIVEIRA, 2016; VERAS, 2010; COELHO, 2010; 2017; FERREIRA, 2003; 2013; FIORENTINI, 2004; 2010). Especificamente nos princípios relacionados à colaboração, propostos por Fiorentini (2004), a saber: a) voluntariedade, identidade e espontaneidade; b) liderança compartilhada ou corresponsabilidade; c) apoio e respeito mútuo.

Desde 2018 o Grupo MoSaiCo Edu, já contabilizou 12 encontros, com a participação total de 22 professores, atuantes em diferentes níveis de ensino. Desta forma, o Grupo se tornou uma atividade de Extensão que visa a Formação de Professores e a consequente qualificação dos processos de Ensino. O MoSaiCo Edu também gera dados que compõem o corpus de pesquisa de doutoramento de pós-graduandas do Grupo de Pesquisa em Educação Estatística – EduEst, tais como a pesquisa de Karla Priscila Schreiber, relacionada à mobilização e à construção de práticas e conhecimentos, na perspectiva da Educação Estatística, dos professores que participam do MoSaiCo Edu.

O contexto colaborativo possibilita que sejam "criadas oportunidades para o professor explorar e questionar seus próprios saberes e práticas, bem como para conhecer saberes e práticas de outros professores, permitindo-lhe aprender por meio do desafio das próprias convicções" (FERREIRA, 2013, p. 152). Ademais, a colaboração também pressupõe a partilha de responsabilidades entre os integrantes do grupo, sem que haja a imposição de uma hierarquia (FIORENTINI, 2004). Este processo, que pode levar certo tempo, requer que todos os integrantes do grupo assumam a responsabilidade pela proposição e desenvolvimento das atividades, tendo em vista os objetivos comuns (FERREIRA, 2003; FIORENTINI, 2004).

A constituição de autonomia do Grupo MoSaiCo ainda está em processo de desenvolvimento, relatam a professora Dra. Mauren Porciúncula, responsável pelo LabEst, onde o Grupo é sediado, bem como a professora e doutoranda Karla Priscila Schreiber, proponente do Grupo. Elas destacam que, em todos os encontros, buscam o compartilhamento de responsabilidades, em detrimento de hierarquias.

Fundamentado em princípios colaborativos, o Grupo MoSaiCo Edu, entre 2018 e 2019, desenvolveu suas atividades por meio da leitura e socialização de textos que versam sobre a Educação Estatística, e os documentos curriculares, como a Base Nacional Comum Curricular – BNCC (BRASIL, 2018). Também nesses encontros, foram compartilhadas experiências pedagógicas,

Figura 3: Grupo MoSaiCo Educação Infantil e Anos Iniciais e grupo de pesquisa EduEst
Fonte: Acervo pessoal das autoras (2020)

concepções sobre as aprendizagem e dificuldades dos discentes em conceitos estatísticos e probabilísticos, bem como aspectos relativos à formação e à carreira profissional docente.

Em 2020, com a pandemia do COVID-19, o Grupo MoSaiCo Edu organizou-se em dois espaços distintos, que por vezes se entrelaçam: o primeiro, com professores que atuam na Educação Infantil e Anos Iniciais do Ensino Fundamental; e outro, com professores que já participavam do MoSaiCo Edu, entre 2018 e 2019, pós-graduandos do EduEst, professores da Educação Básica e professores em formação que atuam no Programa de Letramento Multimídia Estatístico – LeME nos Anos Finais do Ensino Fundamental.

MoSaiCo Edu - Educação Infantil e Anos Iniciais

No contexto da Pandemia, em maio de 2020 o Grupo MoSaiCo Edu tornou-se também um espaço colaborativo de formação de professores específico para docentes que atuam na Educação Infantil e Anos Iniciais. Esta iniciativa foi uma proposição da professora e doutoranda Thays Votto, que a partir dos resultados de sua dissertação de mestrado (VOTTO, 2018), observou a necessidade de possibilitar um espaço de formação continuada em Educação Estatística, específico para esse nível de ensino. Desde então já ocorreram 5 encontros, dos quais participaram três professoras da Educação Infantil e Anos Iniciais, Thays que também é professora da Educação Infantil, bem como pesquisadores e pós-graduandos do LabEst (Figura 3).

A partir do enfoque metodológico da investigação-ação (CARR, 1991; LATORRE, 2005), o MoSaiCo Edu Educação Infantil e Anos Iniciais vem sendo constituído, enfatizando o seu caráter cíclico com a espiral dialética – entre ação e reflexão sobre práticas pedagógicas acerca da Educação Estatística.

Durante esse momento de distanciamento social devido ao Covid-19, o principal aspecto considerado pelo grupo de formação MoSaiCo Edu Educação Infantil e Anos Iniciais, além dos princípios colaborativos já citados, é a interação, por meio do "estar junto virtual" (VALENTE, 2005).

Os referenciais teóricos que vêm orientando o trabalho com o Grupo MoSaiCo Edu Educação Infantil e Anos Iniciais, são o Educar pela pesquisa de Pedro Demo (1997), incluindo aspectos referentes ao cotidianizar a pesquisa, compreendida tanto como um princípio científico, quanto pedagógico. Neste contexto, como ressalta Freire (2002), não há ensino sem pesquisa, nem pesquisa sem ensino. Ademais, o grupo também tem se dedicado a estudar sobre a ludicidade, como um fenômeno interno do sujeito (BROUGÉRE, 1988; LUCKESI, 2002).

Em encontros síncronos, por meio da plataforma Zoom Meeting, desde maio, ocorreram cinco encontros, nos quais foram abordadas as seguintes temáticas: apresentação da pesquisa e metodologia do grupo; estudos acerca da Estatística na BNCC; Socialização de práticas pedagógicas envolvendo a pesquisa escolar científica; estudo e adaptação de um instrumento sobre estratégias pedagógicas lúdicas; socialização de artigos sobre práticas pedagógicas de Estatística nos Anos Iniciais; planejamento de atividades estatísticas a serem enviadas para os alunos neste momento de distanciamento social.

Figura 4: equipe Leme e Equipe SMED
Fonte: Acervo pessoal das autoras (2020)

Figura 5: equipe Leme e Supervisora FCC
Fonte: Acervo pessoal das autoras (2020)

O grupo planejou colaborativamente, para o segundo semestre de 2020, discutir aspectos relacionados à ludicidade, e práticas pedagógicas estatísticas na Educação Infantil, bem como práticas para sala de aula, quando o distanciamento social findar.

MoSaiCo Edu – Anos Finais do Ensino Fundamental

O segundo espaço estabelecido para o MoSaiCo Edu, em tempos de Pandemia, foi instituído a fim de atender as demandas do Projeto de Letramento Multimídia Estatístico – LeME, desenvolvido com o foco nos Anos Finais do Ensino Fundamental, em parceria com a Secretaria Municipal de Educação de Rio Grande – SMED (Figura 4) e subsidiado pela Fundação Carlos Chagas (Figura 5). O grupo é constituído por alunos de graduação, voluntários e componentes do Programa de Educação Tutorial Saberes e Conexões Estatísticas – PET SabEst, e pesquisadores do EduEst e professores da rede Municipal de Rio Grande/RS.

O projeto contemplado pelo MoSaiCo Edu, teve sua implantação no 02/2019, com a inserção dos alunos de graduação nas escolas municipais estipuladas pela SMED. Dessa forma, foram desenvolvidas oficinas do LeME para a escola. A responsável pelo contato com as escolas como, equipe diretiva e corpo docente, para organização do cronograma das oficinas e reuniões com os graduandos participantes do projeto, foi a doutoranda Gabriela Braz, sob a orientação da Profa. Mauren Porciúncula. Neste período os encontros do MoSaiCo Edu foram realizados com os alunos de graduação, inseridos nas escolas e alunos de pós graduação do EduEst, responsáveis pelo eixo de pesquisa do projeto.

Atualmente devido ao período de quarentena, o MoSaiCo Edu engloba integralmente o projeto LeME (SMED/ FCC), por meio da proposição de um espaço de discussões e contribuições para o ensino de Estatística nos Anos Finais do Ensino Fundamental. Um novo cronograma está sendo criado para atender as demandas dos professores da rede municipal de ensino, bem como os demais participantes do projeto. Assim, para este momento atípico, as reuniões serão realizadas de modo remoto, priorizando o processo colaborativo, na perspectiva de promover estudos, discussões, relatos de experiências, abarcando dilemas e sucessos no ensino de Estatística.

De modo a contribuir com o processo de pesquisa, que envolve o grupo e o projeto LeME, alguns recursos serão utilizados como meio de coleta de informações que podem vir a responder questões atinentes a defasagem no ensino de Estatística, além da evasão e reprovação escolar. Como recurso, será solicitada a escrita de um diário de campo, com o registro dos encontros com o grupo e do desenvolvimento de atividades e estratégias de ensino de Estatística nas aulas, mesmo que temporariamente virtuais. Ademais, as reuniões serão

gravadas e transcritas com a finalidade de obtenção de dados referentes aos discursos dos participantes do grupo.

O desenvolvimento do LeME no MoSaiCo Edu, tende a contribuir com a formação de professores em atuação na rede municipal, com os professores em formação, graduandos da FURG, e com as pesquisas em andamento do Grupo EduEst. Outrossim, o MoSaiCo Edu Anos Finais, tem a intenção de contribuir na promoção do Letramento Estatístico de alunos e professores, ao desenvolver habilidades e competências específicas para que eles possam compreender, de forma reflexiva e crítica, informações que diariamente são veiculadas nas mídias, contribuindo para o desenvolvimento do sujeito nos âmbitos escolar, profissional ou pessoal (GAL, 2002).

Mais informações sobre o Grupo MoSaiCo podem ser obtidas no site: https://mosaico.furg.br/

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Collaborative Development of Teachers In Pandemic Times – Grupo Mosaico Edu – South Coast Of Brazil

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On the southern coast of Brazil, in 2018, Teachers of the Early Years and Mathematics and Statistics Professors, as well as teachers in training, founded the Collaborative Group for the Development of Teachers in Statistical Education- MoSaiCo Edu (Figure 1). This group aims to socialize pedagogical practices and teaching knowledge related to statistical education.

The MoSaiCo Edu Group is based at the Laboratory of Cognitive Studies and Technologies in Statistical Education- LabEst (Figure 2), at the Federal University of Rio Grande- FURG.

MoSaiCo Edu was inspired by researchers who developed studies related to teacher training in collaborative contexts (Conti, 2015; Oliveira, 2016; Veras, 2010; Coelho, 2010; 2017; Ferreira, 2003; 2013; Fiorentini, 2004; 2010). Specifically in the principles related to collaboration, proposed by Fiorentini (2004): a) volunteering, identity and spontaneity; b) shared leadership; c) mutual support and respect.

Since 2018 the MoSaiCo Edu Group has already had 12 meetings, with a total of 22 teachers participating, from all levels of education. The Group HAS becOme an official activity of the University. MoSaiCo Edu also generates data that make up the postgraduate doctoral research corpus of the Statistical Education Research Group- EduEst, such as Karla Priscila Schreiber's research, related to the mobilization and construction of practices and knowledge, in Education Statistics, of teachers who participate in MoSaiCo Edu.

The collaborative context allows "opportunities for the teacher to explore and question their own knowledge and practices, as well as to learn about the knowledge and practices of other teachers, allowing them to learn through the challenge of their own convictions" (FERREIRA, 2013, p 152, our translation). In addition, collaboration also presupposes the sharing of responsibilities between members of the group, without imposing a hierarchy (FIORENTINI, 2004). This process, which can take some time, requires all members of the group to take responsibility for the proposition and development of activities, in view of the common goals (Ferreira, 2003; Fiorentini, 2004).

The constitution of the MoSaiCo Group is still in the process of development, report Professor Dr. Mauren Porciúncula, responsible for LabEst, where the Group is based, as well as Professor and PhD student Karla Priscila Schreiber, proponent of the Group. They emphasize that, in all meetings, they seek to share responsibilities, and to avoid hierarchy.

Based on collaborative principles, the MoSaiCo Edu Group, between 2018 and 2019, developed its activities through the reading of texts on Statistical Education, and the curriculum documents, such as the Common National Curricular Base- BNCC (BRASIL, 2018). Also, in these meetings, pedagogical experiences were shared, conceptions about students' learning and difficulties in statistical and probabilistic concepts, as well as aspects related to teacher training and professional career.

In 2020, with the COVID-19 pandemic, the MoSaiCo Edu Group organized itself in two distinct spaces, which are sometimes intertwined: the first, with teachers working in Early Childhood Education; the second, teachers who already participated in MoSaiCo Edu, between 2018 and 2019, postgraduate students from EduEst, and teachers of Basic Education and teachers in training who work in the Statistical Multimedia Literacy Program- LeME in the Final Years of Elementary School.

Mosaic Edu - Early Childhood Education and Early Years of Elementary School

In the context of Pandemic, in May 2020 the MoSaiCo Edu Group also became a collaborative space for teacher training specifically for teachers working in Early Childhood Education and Early Years of Elementary School. This initiative was a proposition of professor Thays Votto, based on the results of her master's dissertation (VOTTO, 2018). She noted the need to provide a space for continuing education in Statistical Education. Since then, there have been 5 meetings. Three teachers of Early Childhood Education and Early Years of Elementary School participated, also Thays who is also a teacher of Early Childhood Education, and researchers and graduate students of LabEst (Figure 3).

The methodological approach of action research (CARR,

1991; LATORRE, 2005), the MoSaiCo Edu Early Childhood Education and Early Years of Elementary School has been established. This is based on the cyclical character with the dialectic spiral, and on the action and reflection on pedagogical practices about Statistical Education.

During this moment of social distance due to Covid-19, the main aspect considered by the development group MoSaiCo Edu Early Childhood Education and Early Years of Elementary Education, in addition to the collaborative principles already mentioned, is interaction, through "being together virtual" (VALENTE, 2005).

The theories that have been guiding the activities of the MoSaiCo Edu Group Early Childhood Education and Early Years of Fundamental Education, are Education through Research by Pedro Demo (1997), which considers research, both as a scientific and pedagogical principle. In this context, according to Freire (2002), there is no teaching without research, nor research without teaching. In addition, the group also studies playfulness, as an internal phenomenon of the subject (BROUGÉRE, 1988; LUCKESI, 2002).

In synchronous meetings since May, through Zoom Meeting platform, we have already had five meetings, with the following themes: presentation of the research and methodology of the group; studies on Statistics at BNCC; socialization of pedagogical practices involving scientific school research; study and adaptation of an instrument on pedagogical activities; socialization of papers on pedagogical practices in Statistics in the Early Years; planning of statistical activities to be sent to students in this moment of social distance.

The group collaboratively planned, for the second half of 2020, to discuss aspects related to playfulness, and statistical pedagogical practices in Early Childhood Education, also practical for the classroom, when the social distance ends.

MoSaiCo Edu - Final Years of Elementary School

The second space established for MoSaiCo Edu, in times of Pandemic, was instituted in order to meet the demands of the Statistical Multimedia Literacy Project - LeME, developed with a focus on the Final Years of Elementary Education, in partnership with the Municipal Department of Education Rio Grande- SMED (Figure 4) and with the support of the Carlos Chagas Foundation (Figure 5). The group is made up of undergraduate students, volunteers and members of the Tutorial Education Program Knowledge and Statistical Connections - PET SabEst, and researchers from EduEst and teachers from the Municipal Basic Education of Rio Grande / RS.

The LeME project, contemplated by MoSaiCo Edu, was implemented in February 2019, with the insertion of undergraduate students, teachers in training, in public schools. Since then, LeME workshops have been developed in schools. The person responsible for contacting schools, such as the management team and faculty, for organizing the schedule of the workshops and meetings with the students participating in the project, was PhD student Gabriela Braz, under the guidance of Profa. Mauren Porciúncula. During this period, MoSaiCo Edu meetings were held with undergraduate students, inserted in EduEst schools and postgradute students, responsible for the research lines of the project.

Currently due to the quarantine period, MoSaiCo Edu brings together members of the LeME project (LABEST / SMED / FCC). It is a space for discussions and contributions to the teaching of Statistics in the Final Years of Elementary School. A new schedule is being created to meet the demands of public school teachers, as well as other project participants. Thus, for this atypical moment, the meetings are being held remotely, yet it maintains the collaborative principles, in the perspective of promoting studies, discussions, reports of experiences, including dilemmas and successes in the teaching of Statistics.

In order to contribute to the research process, which involves the group and the LeME project, data are collected in order to answer questions related to the teaching and learning of Statistics, in addition to school dropout and failure. To constitute the research corpus, the researchers write a field diary about the meetings. Teachers also record narratives about the development of statistics teaching activities and strategies in class, even if temporarily virtual. In addition, the meetings will be recorded and transcribed for the purpose of obtaining data regarding the speeches of the group participants.

The development of LeME at MoSaiCo Edu, tends to contribute to the development of teachers working in the public network, with teachers in training, undergraduate students at FURG, and with research carried out at the EduEst Group. Furthermore, MoSaiCo Edu,

in the Final Years of Elementary Education, intends to contribute to the promotion of Statistical Literacy of students and teachers, by developing specific skills and competences so that they can understand, in a reflexive and critical way, of the information that is conveyed daily in the media, contributing for the development of teachers in schools, either professionally or personally (GAL, 2002).

More information about the MoSaiCo Group can be obtained at: https://mosaico.furg.br/

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COSTA RICA

Efectos del COVID 19 en el Sistema Educativo de Costa Rica y en la Enseñanza de la Estadística

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Resumen

El presente ensayo realiza una descripción de los efectos que sobre el sistema educativo costarricense ha dejado la pandemia ocasionada por el SARS-Cov-2. Se da un énfasis sobre la educación preuniversitaria (primaria y secundaria) pública debido a que ha sido la más afectada por la crisis.

Hasta el momento, se pronostican consecuencias poco alentadoras para lo que queda del curso lectivo 2020 y se prevé que dichas consecuencias pueden dejar rastros para muchos años.

Palabras clave: efecto del COVID 19 en la educación, crisis en educación por SARS-Cov-2

1. Efectos de la pandemia sobre el sistema educativo costarricense

La pandemia ocasionada por el COVID 19, al igual que en la mayoría de los países del mundo, ha afectado drásticamente a Costa Rica en todos los ámbitos, con consecuencias negativas inmediatas sobre la salud, la economía, la educación[1], entre muchas otras. Entre las decisiones tomadas estuvo la interrupción del curso a mediados de marzo, y la reanudación, en forma no presencial, en la segunda mitad del mes de abril, con cerca de un mes de suspensión, mediante estrategias virtuales y de educación a distancia. Para ello, se desarrolló una estrategia de mediación pedagógica que se denominó "*aprendo en casa*" cuyo propósito era articular la política educativa y política curricular vigentes, mediante el uso de recursos tecnológicos y acciones a distancia para seguir garantizando la educación a todos los sectores del Ministerio de Educación Pública (MEP, 2020a).

La estrategia aprendo en casa no se puede catalogar como virtual en el sentido estricto debido a que no estaban dadas las condiciones tecnológicas para todos los actores. Por esta razón, se combinan herramientas virtuales mediante la articulación del equipo del MEP y del Instituto Costarricense de Electricidad (ICE), que permite el uso de la plataforma Microsoft Teams, no solamente para los procesos de capacitación y reuniones entre docentes, sino también para la atención de grupos de estudiantes. Sin embargo; para la atención de los estudiantes que no puedan hacerlo por este medio, los docentes deben hacerles llegar los materiales utilizando otros recursos que incluyen correos electrónicos, redes sociales o mediante material impreso que se entrega en las instituciones educativas. El trabajo estudiantil se ha concentrado en la resolución de una serie de actividades que se organizan mediante guías de trabajo que se entregan y deben devolverlas al docente.

La implementación de la estrategia, ha generado un gran esfuerzo y sacrificio de parte del personal docente, quienes además de requerir la capacitación permanente en el uso de recursos tecnológicos y otros recursos para la enseñanza a distancia (que la gran mayoría no conocía), deben atender subgrupos de estudiantes mediante distintas estrategias en diferentes momentos e incluso, apersonarse a las instituciones educativas en durante una o dos veces al mes para entregar materiales a quienes no tienen acceso virtual.

Aunque, en primera instancia esta estrategia se estaría implementando por un período relativamente corto; ante la incertidumbre sobre la evolución de la pandemia, a medianos de años se decidió no reanudar clases presenciales durante el 2020 y continuar con la estrategia *aprendo en casa*.

Principales efectos

- **Diferentes formas de acercamiento docente**

Tal como se indicó antes, los recursos por los docentes tienen contacto con los estudiantes son distintos y,

aunque no se ha medido la efectividad de cada uno, sería de esperar que también hubiera importantes diferencias en acceso y calidad. Por ejemplo, el MEP procuró conferir cuentas de correo electrónico institucional a los estudiantes del país, así como vincularlos con *Microsoft Teams*; no obstante, menos de la mitad de los estudiantes ha a ella; con grandes diferencias entre diferentes niveles y modalidades educativas. Algo similar podría estar ocurriendo con quienes utilizan las otras vías de comunicación.

- **Ampliación de la brecha urbano-rural y público-privado**

Los cambios generados en la relación de los estudiantes con el sistema educativo van a reducir drásticamente las expectativas académicas iniciales, tal como lo han reconocido las mismas autoridades del MEP. Sin embargo, no todos los sectores se ven afectados de la misma manera. Por ejemplo, estudiantes y docentes de instituciones educativas en zonas urbano-marginales o rurales, tienen una situación muy diferente de otras zonas que tienen mejores condiciones de conectividad que les permite desarrollar la propuesta educativa de una manera más eficiente. De igual forma ocurre con las instituciones privadas quienes, al contar con mayores recursos, les ha permitido diseñar una estrategia de virtualización por donde los docentes mantienen contacto directo con los estudiantes, pueden así desarrollar acciones didácticas más dinámicas y efectivas del que se realiza en el sector público.

Cuando se piensa en los efectos que, estas diferencias entre sectores educativos pueden generar en el logro de los objetivos educativos y en el cumplimiento de las propuestas curriculares, se potencia el peligro de ampliar aún más la brecha de conocimiento entre los diferentes sectores del país, con un grave perjuicio a las clases de menores recursos.

- **Deserción estudiantil**

Según información proporcionada por las autoridades del MEP, se indica que, para la segunda mitad de agosto 2020, hay un número aproximada a los noventa y un mil estudiantes (cerca del 5% de estudiantes que iniciaron el curso lectivo) sobre los cuales no se cuenta con información desde que se suspendieron las clases presenciales. Desafortunadamente la mayoría de ellos corresponden a estos sectores menos favorecidos económicamente.

- **Suspensión de pruebas nacionales**

Otra consecuencia de la pandemia ha sido la suspensión de las pruebas nacionales que se aplican a estudiantes que cursan los últimos años de la educación secundaria (prueba FARO[2]). Esto trae una complicación adicional, porque en la educación formal hay una generación de estudiantes que podría estar finalizando la denominada "Educación Diversificada" que concluye la secundaria sin haber realizado pruebas nacionales que certifiquen el conocimiento y habilidades adquiridas en el proceso, lo cual es inédito en más de treinta años.

- **Efecto en carreras universitarias**

Las universidades, a pesar de contar con mayores recursos humanos, tecnológicos y económicos para potenciar la virtualidad con respecto a las instituciones preuniversitarias, también han tenido que diseñar diferentes estrategias para realizar su labor con la menor afectación en materia educativa. Las carreras universitarias que requieren de mayor dinamismo práctico y presencial mediante talleres, laboratorios, giras, entre otros; son las que más se han visto perjudicadas, debido a que no se han podido realizar estas actividades; lo que posiblemente conlleve una extensión de la carrera para los estudiantes y también un fuerte detrimento en su formación.

2. Efectos de la pandemia en la enseñanza de la estadística y la probabilidad

- **Los datos de la pandemia como recurso didáctico**

La presencia de la pandemia en el país ha permitido una generación de datos sin precedentes en salud, educación, economía, seguridad, entre muchas otras. Todos estos datos se resumen en diferentes representaciones o indicadores estadísticos que aparecen cotidianamente en los medios de comunicación. Toda esta información ha estado a disposición de la ciudadanía y, en medio de la crisis, constituyen valiosos insumos para quienes tienen la tarea de enseñar Estadística y Probabilidad en los diferentes niveles educativos. Un uso de los datos en la toma de decisiones como, por ejemplo, el efecto de las medidas sanitarias para la contención del virus, que se puede catalogar como exitosa en el país, son evidencia de la importancia que tiene un uso eficiente en el manejo de la información.

Este cúmulo de información unido a las medidas que las diferentes autoridades del país han impuesto para combatir el avance de la enfermedad, también constituyen un importe insumo para educar a la población estudiantil sobre el comportamiento ciudadano y las consecuencias de no hacerlo. Por ejemplo, hay una relación entre el irrespeto a normas sanitarias y el contraer el virus, con ejemplos como mediante en una fiesta una sola persona contagió a más de 15. O también, la disminución de la probabilidad de adquirir el virus mediante el uso de una mascarilla, con datos similares al estudio realizado por la universidad de McMaster de Canadá (Alarcón, 2020). Un tercer ejemplo, corresponde a

los efectos de las medidas sanitarias para combatir el COVID 19 han generado en la presencia de otras enfermedades, por ejemplo, las diarreas u enfermedades respiratorias, las cuales para el mes de abril se reportaba una disminución del 30% en diarreas respecto a la misma fecha en el 2019 (Informa-Tico, 2020).

Los anteriores son apenas algunos ejemplos que pueden ser utilizadas como un valioso recurso didáctico para ser discutido junto con los estudiantes, para el lograr habilidades para en el análisis de datos en un contexto real.

- **Efectos perjudiciales para la enseñanza de la Estadística y la Probabilidad en el país**

Los estudios de Chaves (2007 y 2008) demostraron que el proceso el proceso de enseñanza de la estadística no era efectivo en el país, por lo que no se promovía una adecuada alfabetización en temas de análisis de datos y de fenómenos aleatorios. Al respecto, el Consejo Superior de Educación de Costa Rica, lleva a cabo la denominada Reforma de la Educación Matemática aprobada en el año 2012 e incluyó la Estadística y la Probabilidad como áreas de interés fundamental que deben ser abordadas desde los primeros años de la educación primaria hasta la conclusión de la educación secundaria. Con la reforma del 2012 se pretendía realizar un abordaje de estas disciplinas, en forma progresiva, mediante la estrategia didáctica de resolución de problemas, la que involucra etapas que incluyen la recolección, sistematización, organización, resumen e interpretación de datos mediante diferentes técnicas estadísticas. Desde el punto de vista metodológico, la Estadística y la Probabilidad, tienen un gran potencial para implementar en el aula la resolución de problemas en contextos reales, que constituye un pilar básico de la reforma. Esto debido a que no se concibe un análisis estadístico cuyos datos no respondan a situaciones concretas de la realidad o que simulan la realidad. Es claro entonces que el trabajo estudiantil trasciende la construcción de representaciones, el uso de fórmulas u otras estrategias. El área estadística involucra el uso de esas técnicas para un análisis integral de los datos para dar respuesta a las interrogantes del problema que dio origen a estos datos (MEP, 2012). Del mismo modo, el aprendizaje de las probabilidades se concibe en el análisis de problemas en contextos lúdicos o reales (o que simulan la realidad). Se pretende modelar y analizar probabilísticamente ciertos fenómenos relacionados con estos problemas que involucran la incertidumbre y el azar (MEP, 2012).

Desafortunadamente, el desconocimiento disciplinar y didáctico que muchos docentes nacionales tienen sobre la Estadística y su enseñanza; aunado a una ausencia de voluntad política desde el mismo MEP, los principios establecidos en la Reforma Matemática para la Estadística y la Probabilidad no han sido una prioridad durante los ochos años que tiene de vigencia dicha reforma.

Este problema se incrementó como consecuencia de la pandemia. Para el año 2020, en el mes de junio, en respuesta a la crisis que atraviesa el país, el MEP estimó que únicamente se podían lograr aproximadamente el 50% de los objetivos y contenidos curriculares en las diferentes asignaturas. El otro 50% quedaría para distribuir en el año 2021, situación que pareciera imposible de lograr sin afectar el funcionamiento de ese año. Para este propósito se publicó en su página Web (MEP, 2020b) plantillas para cada año educativo en donde incluye, entre otras cosas, la distribución temática que debe ser abordada por asignatura y para cada una de ellas la priorización de áreas temáticas.

Hemos visto la oportunidad que representaban los datos de la pandemia para facilitar la enseñanza de la Estadística y la Probabilidad, y la posibilidad de aprovechar los análisis que se pudieran realizar para conectar con otras áreas matemáticas u otras asignaturas disciplinares. No obstante, en contraposición con esto, dentro de los once años escolares correspondientes a la educación académica y los doce años de la educación técnica, el MEP decidió no incluir un solo contenido del área Estadística. Mientras que en Probabilidad solamente aparecen contenidos aislados en el décimo año de la educación académica.

Además de la contradicción anterior, se envía un mensaje a la comunidad educativa sobre el poco peso que las autoridades ministeriales otorgan a la enseñanza de la Estadística y la Probabilidad, y peor aún, genera un efecto nocivo sobre las diferentes generaciones de estudiantes que cursan actualmente el sistema educativo formal, debido a que un año sin el desarrollo de habilidades y conocimientos estadísticos genera un rezago en el resto de su formación.

3. Conclusión

El año 2020 va a dejar enormes consecuencias en el sistema educativo costarricense. La pandemia debida al SARS-CoV-2, al igual que en otros países, llegó en un momento en que no se esperaba y, por ende, no estaban dadas las condiciones para enfrentar una crisis de esta magnitud.

Producto de lo anterior, las autoridades educativas del país han tenido que improvisar estrategias para en-

frentar la crisis; sin embargo, a pesar de los esfuerzos ministeriales y de la abnegación de muchos docentes, el futuro del curso lectivo es incierto. Existe un reconocimiento que la estrategia propuesta es insuficiente para alcanzar siquiera el 50% de los objetivos del 2020; pero incluso la efectividad de esos objetivos es cuestionable, con efectos diferentes entre los sectores sociales. En primer lugar, la estrategia aprendo en casa debió ser improvisada sobre la marcha, en donde ni los estudiantes ni los docentes estaban preparados para este tipo de estrategia. En segundo lugar, las limitaciones tecnológicas de todo tipo ponen en duda, la formación que reciben los estudiantes. Tercero, la ausencia de una estrategia evaluativa para determinar el logro de los conocimientos y habilidades básicos correspondientes con los contenidos curriculares que se desarrollan, imposibilitan entonces la valoración del trabajo que se está realizando. Cuarto, la alta deserción escolar que se ha presentado deja entrever que un importante sector estudiantil no ha podido ser incorporado a esta nueva estrategia de enseñanza.

En el área de la enseñanza de Estadística y la Probabilidad el problema es peor aún, debido a que los objetivos y contenidos curriculares correspondientes el curso lectivo 2020 fueron erradicados casi en su totalidad, dejando así entrever la poca importancia que se le otorga a estas áreas, a pesar de que la Reforma de la Educación Matemática en Costa Rica le otorgó un papel igual de preponderante que otras áreas disciplinares como la Geometría o el Álgebra.

En síntesis, el panorama actual es bastante pesimista en materia educativa, la crisis actual posiblemente amplíe la brecha educativa entres sectores sociales y afecte la formación de jóvenes de varias generaciones. Se requerirá de una política educativa emergente y decidida, que pueda realizar las transformaciones que otorguen el derecho a la educación gratuita y universal en todos los estratos sociales del país, en busca de la igualdad de oportunidades.

1 Las escuelas y colegios públicos vinculadas con el Ministerio de Educación Pública (MEP) (y la mayoría de las instituciones privadas) el calendario escolar de cada año inicia en la primera quincena de febrero y finaliza en la segunda semana de diciembre.

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Pauliina Ilmonen

The Role of Statisticians During Global Crises

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Lauri Viitasaari**

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We are facing an enormous global crisis that affects us all. There are millions of COVID-19-cases and the burden on healthcare sector is overwhelming. The global economy is suffering. As we are dealing with a new virus, lack of basic knowledge complicates modelling and predicting the spread of the virus. Collecting data is vital and statisticians have a key role in the management of this crisis.

In general, a statistician is not a policy decision maker, but statisticians have a crucial role in decision making. The role of statisticians during global crises is to collect and analyze data, and construct mathematical models. Statistical analyses are tools that can be applied in predicting possible outcome scenarios and their effect on policy making. A statistician should be objective. Her own political agenda should not influence the statistical analysis she conducts. She must be able to deliver unbiased information regardless of possible political pressure. Moreover, during global crises, decision making has to be fast, putting statisticians under pressure to provide analyses within strict time restrictions.

Mathematical models are essential in providing statistical predictions. Several approaches can be taken when modelling the same phenomena. Simple models, usually requiring only a small number of parameters, can provide rough approximations of reality. One can, naturally, construct more detailed models, but that is at the cost of complexity leading to a larger number of parameters. For example, during the corona crisis, simple SEIR-models have been applied in modelling the spread of the pandemic. Simultaneously, more detailed agent-based simulation models, that take into account the mobility of people, have been applied in modelling the effects of interventions. While, in general, more detailed models are seemingly more accurate, large amount of parameter estimations may lead to instability. A model provides good predictions only if the model parameters are tuned correctly.

Even simple descriptive analyses require accurate data. During emerging crises availability of data may be very restricted. It could be that essential data simply do not exist or they are not easily accessible. For example, in order to get an accurate picture of the current pandemic, it is essential to estimate different characteristics that describe the severity of the situation, such as the reproduction number, case fatality rate, infection fatality rate, the proportion of asymptomatic cases and the proportion of cases that require hospitalization. However, estimation of these parameters is challenging during an ongoing pandemic. Statisticians worldwide have faced severe difficulties in obtaining adequate data needed for these descriptive statistics. Moreover, predictive models are also built on these parameter estimates. As parameter estimation involves uncertainties and models might be sensitive to that, it is advisable to simultaneously consider several different models instead of relying on just one model. During these times statisticians simply have to do their very best to provide as much insight on the situation as possible with the limited resources available. Statisticians, economists, virologists, and other experts, together with decision makers, are working towards finding a way out of this crisis. We all have the same goal.

During global crisis it is important that we learn from each other. That is why it is tempting to compare the situation in different countries and assess the effectiveness of different policies. This is problematic since registration of data is not sufficiently standardized. For example, registration of COVID-19-cases and COVID-19- related deaths differs from country to country. Moreover, registration policies have also changed in different countries at different time points. This makes comparison of the prevalence and mortality rates very challenging, and complicates assessing the effect of different interventions. We have to develop international standards that allow reliable comparison of data. A crisis is an opportunity to learn and be better prepared in the future.

Statisticians do not only analyze data. Statisticians have to be able to communicate their findings to the decision makers and to a general audience. Promoting statistical literacy is of paramount importance, but progress requires time. It is important that people unfamiliar with statistical vocabulary obtain accurate and understandable information. This is especially important during an emerging crisis. Statisticians must learn to communicate clearly and understandably irrespective of the audience and their level of statistical literacy.

We have learnt and we are learning from the current global crisis. As information accumulates, statisticians have learnt, and they learn to develop more and more accurate models. Every day we obtain more and more data. We have to ensure that statisticians have access to that data. We have to ensure that their objective analyses are heard and understood.

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Florence Nightingale – Promotor of Statistical Literacy

M. Eileen Magnello*
Summarized by Jussi Melkas**

This year marks 200 years since Florence Nightingale's birth. Nightingale is known as the developer of British nursing, but she was also a remarkable applier and visualizer of statistical thinking. The following text is a summary of M. Eileen Magnello's article ***'The statistical thinking and ideas of Florence Nightingale and Victorian politicians'****. Publishing permission has been given by Eileen Magnello to use her article that first appeared in the journal of Radical Statistics, Issue 102 (2010), pp 17–32.*

The statistical methods and ideas of the Belgian astronomer and social statistician **Adolphe Quetelet** (1796–1874) and the medical statistician, **William Farr** (1807–1893) provided a statistical channel for the health reforms that Nightingale vigorously campaigned to see implemented. Her statistical innovations were astutely observed by Karl Pearson (1857–1936) who remarked in 1924 that

were I a man of wealth I would see that Florence Nightingale was commemorated, not only by the activities symbolised by the 'Lady of the Lamp', but by the activities of the 'Passionate Statistician'. I would have found a Nightingale Chair of Applied Statistics to carry out the ideals expressed in her letters.

Nightingale regarded science and statistics as a substitute religion; statistics was for her 'the most important science in the world'. She took much enjoyment from assembling statistical compilations, and she wrote with a passionate conviction for sanitary reform. She further maintained that 'to understand God's thoughts, we must study statistics for these are the measure of His purpose'. She shared with Francis Galton the idea that 'the statistical study of natural phenomena was the "religious duty of man"'. Nightingale's ideology was rooted in the theology of the eighteenth-century clergyman, William Derham, from whose ideas she developed her view that 'we learn the purpose of God by studying statistics'. Moreover, her religious outlook offered her a way to establish the legitimacy of statistics in her work and life, within a religious Victorian culture. The study of statistics was thus a moral imperative and a religious duty: it was the surest way of learning the divine plan and directing action in accordance with it.

Like so many Victorians during this time, Nightingale felt empowered by the pervasive passion for statistics, which gave them a new tool to enumerate, classify and, ultimately, understand the social conditions of English society. A number of literary Victorians were, in equal measures, captivated and exasperated by the ubiquitous

presence of statistics in their lives. Thomas Carlyle's ***Chartism***, Charles Dickens's ***Hard Times***, George Elliot's ***Middlemarch*** and Elizabeth Gaskell's ***Cranford*** exemplified how this new language of statistics infiltrated the vernacular of the Victorians. Dickens did not speak contemptuously about statistics, but he argued against the spurious usage of statistics, especially when it was used to justify the unequal distribution of wealth.

Nightingale's statistical ideas and innovations came to fruition when she was working as a nurse during the Crimean War, which enabled her to implement life-changing polices. Whilst she volunteered her services to the war, her lifelong friend and Secretary at War, **Sidney Herbert** (1810–1861), eventually asked her to be 'Superintendent of the female nursing establishment in the English General Military Hospitals in Turkey' for the British troops fighting in the Crimean War, and to take a group of thirty-eight nurses with her.

Once Nightingale arrived in the Crimea, she found herself amid utter chaos in the hospital at Scutari: there were no blankets, beds, furniture, food, or cooking utensils, but there were rats and fleas everywhere. Highlighting how the British failed to respond adequately to the exigencies of war, the indefatigable and first wartime reporter for ***The Times***, William Howard Russell, remarked that the French were far better organised in medical matters.

Nightingale drew the government's attention to matters that went far beyond her ambit and exposed the administrative incompetence and disorganisation of the British military. Her exceptional capacity for large-scale organisation and the implementation of administrative reform enabled her to do the job efficiently.

Nightingale was dismayed by the statistical carelessness as well as the appalling lack of sanitation she found in the military hospitals. The medical records were in a deplorable state, as none had been maintained in a uniform manner. Moreover, there was a complete lack of co-ordination among hospitals and no standardised or consistent reporting. Each hospital had its own nomenclature (a system of words used to name things in a particular discipline) and classification of diseases, which were then tabulated on different forms, making comparisons impossible. Even the number of deaths was not accurate; ***hundreds*** of men had been buried, but their deaths were not recorded.

One of the first books Nightingale wrote, ***Notes on Matters Affecting Health, Efficiency, and Hospital Administration of the British Army*** (1858), provided statistical evidence that showed how much of the mortality was due to the conditions of the hospitals. She compared the death rates of the army in peacetime with the civilian rate and concluded that, 'our soldiers are enlisted to die in barracks'. The statistical data Nightingale collected during the first seven months of the Crimean campaign were later analyzed with the help of William Farr. Shortly after the General Register Office was set up in 1832, the first Registrar General and novelist, Thomas Henry Lister (1800–1842) recruited William Farr (1807–1893) to compile the statistical records. Farr's legacy with his colleague Thomas Rowe Edmunds (1803–1899) was 'the creation of the modern discipline of vital statistics and using these statistics to assess public health and welfare'.

Given the amount of time Nightingale spent with Farr computing and analysing death rates, she eventually became quite competent with undertaking this work on her own. When she sent Farr the death rates she computed from her Crimean data in May 1857, he replied, ***"I have read with much profit your admirable observations. It is like a light shining in a dark place."*** He was quite enthusiastic about the diagrams and accompanying descriptions he received later that year, letting her know that 'your speech is the best that ever was written on diagrams or on the Army'. For Nightingale, the statistical evidence she accrued from her mortality rates in civilian and military hospitals enabled her to conclude that the relationship between unsanitary living condition and endemic diseases (such as typhus, typhoid and cholera) was the principal reason for such high mortality rates. Moreover, the Crimean data revealed that during the war more troops died from these diseases and unsanitary living conditions than in London during the Plague of 1655. Nightingale and Farr discovered there was an annual mortality rate of 60 percent for these soldiers. Between the ages of 25 and 35, the mortality rate in military hospitals was double that in civilian life.

Nightingale developed a flair for devising graphic methods, including her well-known polar area graph which was similar to the pie chart created by the Scottish economist William Playfair (1759-1823) in 1801. Her **polar area graph**, which is equivalent to a modern circular histogram (used for illustrating grouped cyclic data), was cut into twelve equal angles, where each slice represented one month of the year, which, as you can see, revealed changes over time.

Nightingale's Polar Area Graph

In her Notes on Matters Affecting theHealth, Efficiency and Hospital Administration of the British Army (1856)

If we look at the polar area graph, we can see that the area of each coloured wedge, measured from the centre, is in proportion to the statistic it represents. The blue outer wedges represent the deaths from contagious

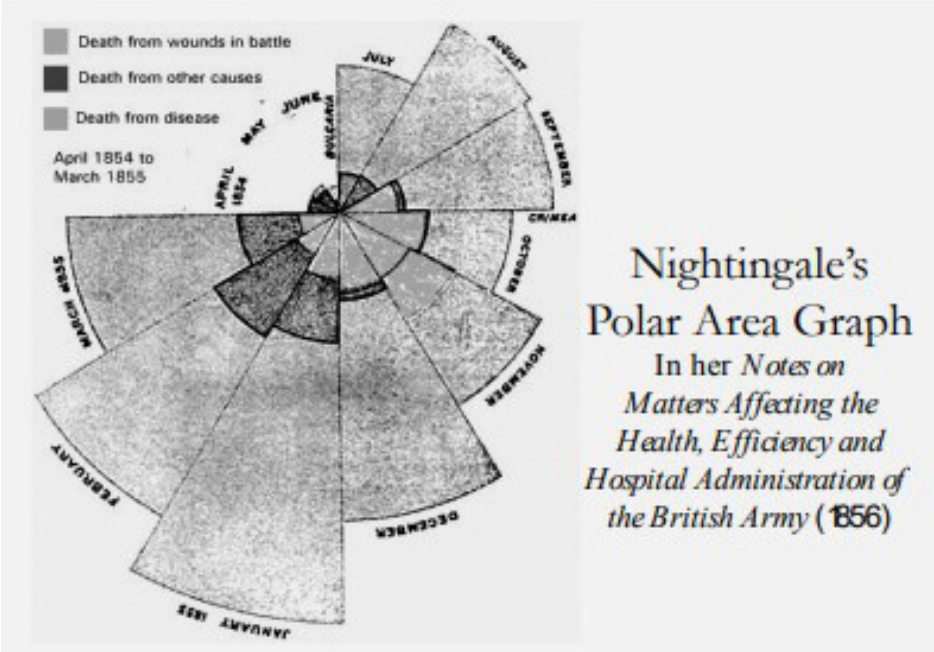

Fig 1. Reprinted with the permission of M. Eileen Magnello

diseases, such as cholera and typhus. The central red wedges show the deaths from wounds. The black wedges in between represent deaths from all other causes. If this rate had continued, and troops had not been replaced frequently, then disease alone would have killed the entire British Army in the Crimea. Her graph not only dramatized the extent of the needless deaths among the soldiers during the Crimean War, but it was used as corrective tool to persuade the government and medical profession that deaths were preventable if sanitation reforms were implemented in military and civilian hospitals.

Nightingale had long been aware that although Members of Parliament had access to an enormous amount of statistical data, they made no use of this information, if only because their university educations had not provided training about statistical methods. Nightingale argued that ministers legislated without knowing what they were doing, and that the men who were to govern and legislate needed to be taught statistics to understand the significance of the bewildering amount of statistical material they routinely received.

Although Florence Nightingale is rightly acknowledged and highly venerated for her role in reforming nursing in the mid-nineteenth century, she clearly deserves more recognition than she has received for revolutionizing nursing through her use of statistics. She brought about these fundamental changes through her dedication to her many prodigious statistical reports on standardizing hospital statistics and by implementing the use of medical statistics in the nursing profession. This investigative work led to a decline in the many preventable deaths that occurred throughout the nineteenth century in English military and civilian hospitals. Her pioneering use of evidence-based medicine became a powerful directive in garnering support from the medical community and the government. Nevertheless, it has to be said that Nightingale's statistical innovations and achievements are as important in the twenty-first century as they were in the mid-nineteenth century. Certainly, making statistical data accessible by using diagrams and charts is imperative for the medical sciences. Moreover, the development of randomized clinical trials in the mid-twentieth century and the growing reliance on evidence-based medicine in the twenty-first century demand an understanding of contemporary statistical methods, which will enable nurses to make informed decisions about current medical research and their patients.

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GRENADA

Workshop in Grenada

James Cochran*

The United Nations, the European Commission, the Organisation for Economic Co-operation and Development (OECD), the International Monetary Fund, and the World Bank established PARIS21 in 1999 to promote better use and production of statistics throughout the developing world. Since its creation, PARIS21 has successfully developed a worldwide network of statisticians, policy makers, analysts, and development practitioners who are committed to evidence-based decision making. This network supports PARIS21's objectives of reducing poverty in low and middle-income countries, achieving national and international development goals, and developing a culture of Management for Development Results (MfDR). During the spring of 2019, representatives of the Partnership in Statistics for Development in the 21st Century (PARIS21, https://paris21.org/about-paris21), contacted me with an interesting proposition.

Yu Tian and Millicent Gay Tejada, the PARIS21 representatives who reached out to me, have very interesting backgrounds and experiences. Mr. Tian is a Policy Analyst who is responsible for monitoring global support to statistics and global statistical literacy, reporting of SDG (Sustainable Development Goal) indicators, measuring use of statistics in policy making, and other analytical tasks. Ms. Tejada, who has since left PARIS21, was the Project Officer for Asia and the Pacific and was responsible for developing the statistical strategy for the region. Mr. Tian and Ms. Tejada had tracked the development of the Handbook on Statistical Methodology by the National Statistics Office of Mongolia and a team of US colleagues that included me[1,2], and they hoped that a similar approach could be taken to improving statistical literacy and growing statistical capacity in Caribbean countries. They asked that I work with them on this initiative.

I had worked with colleagues on statistics/operations research/analytics literacy and capacity building projects in several other nations[3-19] (Uruguay, South Africa, Colombia, India, Kenya, Argentina, Nepal, Cameroon, Tanzania, Croatia, Fiji, Moldova, Cuba, Tunisia, Mongolia, and Bulgaria), so I was eager to work with Mr. Tian, Ms. Gay, and their PARIS21 colleagues on this initiative. We worked together to determine the slate of topics to be covered, and then decided that our first efforts would focus on high school education in Grenada. Mr. Tian and Ms. Tejada proposes a three-day workshop for high schools teachers on effectively teaching introductory statistics to officials in the Grenadian government, and the Grenadian National Statistics Office and Ministry of Education swiftly and enthusiastically indicated their eagerness for the proposed project and their wiliness to serve as host.

We also made preliminary plans to organize and execute similar workshops across the Caribbean and Central America over the following few years, organize the participants of these workshops into workgroups that would be responsible for developing chapters for a Handbook on Statistical Methodology oriented to the region, and establish a recurring Caribbean and Central American conference on teaching statistics effectively. Contingent on the success of this plan, we also hoped to ultimately extend the program to developing regions outside the Caribbean and Central America, and we would consider replicating the program for operations research.

I then recruited a team of innovative and respected statistics instructors to create material and teach in the workshops. The team includes:

- Anna Bargagliotti, Loyola Marymount University
- Beth Chance, Cal Poly San Luis Obispo
- Christine Franklin, University of Georgia
- Kaycie Maddox, Northeast Georgia Regional Educational Service Agency
- Roxy Peck, Cal Poly San Luis Obispo
- Lynne Steuerle Schofield, Swarthmore College
- Nathan Tintle, Dordt University

This talented team developed material at the high school level on:

- Motivation- Why teach/study the material in this module?
- Organization and Flow- How can/should coverage of the key concepts be organized?
- Key Concepts- How can each of the key concepts and terms in this module be effectively covered?
- Examples- How can this material be applied to real problems?
- Helpful Hints- What else can we suggest for this module?

for modules on

- Data Visualization and Descriptive Statistics
- Probability for Statistics
- Basic Statistical Inference
- Regression Analysis
- Experimental Design and Sampling

The team decided that Dr. Chance, Dr. Tintle, and I would travel to Saint George's in early December to deliver the inaugural workshop for this project.

Mr. Halim Brizan, Director of Statistics with Grenada's Ministry of Finance, welcomed participants to the 1st Caribbean & Central American Workshop on Statistical Literacy for High School Students on the morning of December 3. Twenty-five colleagues (primarily high school teachers along with a few college instructors and officials from the National Statistics Office and the Ministry of Education of Grenada) participated throughout the three-day workshop. They were extremely enthusiastic and highly engaged, and the anonymous reviews they completed at the conclusion of the workshop indicated that they were exceedingly satisfied with this experience.

The workshop was also well received by our hosts and it attracted a great deal of attention across Grenada. Officials from the National Statistics Office and the Ministry of Education of Grenada were tremendously pleased with the workshop, and the workshop was reported on nationally by the Grenada Broadcast Network (https://www.facebook.com/watch/?v=2736786999675140). In addition, Ambassador Didier Chassot, Head of Mission of Switzerland to Venezuela and several other diplomatic missions of Switzerland in the Caribbean, also praised the workshop.

After the workshop in Grenada, we initiated efforts to roll out similar workshops across the Caribbean and Central America over the following few years. Unfortunately, these efforts have been slowed by the worldwide COVID-19 pandemic. Once these efforts again begin moving forward, organization of the participants into workgroups that will develop chapters for the Handbook on Statistical Methodology oriented to the region can commence, and the recurring Caribbean and Central American conferences on teaching statistics effectively can be organized. As these efforts proceed, this program can be extended to developing regions outside the Caribbean and Central America and can be replicated for operations research. This was a terrific first step in what we hope will be a very productive and rewarding endeavor.

If you are interested in serving as a host and bringing a similar workshop to your country, please contact me at jcochran@cba.ua.edu. The COVID-19 pandemic may be slowing our progress, but we want to be optimistic and prepare for the time in the (hopefully near) future when we can resume assisting the efforts of our colleagues in developing nations to build and enhance their country's statistics and operations research capacity.

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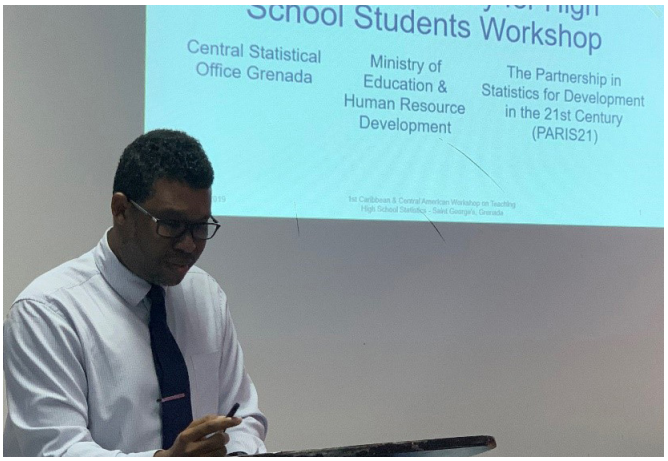

Fig 1: Mr. Halim Brizan, Director of Statistics with Grenada's Ministry of Finance, Welcomes the 1st Caribbean & Central American Workshop on Statistical Literacy for High School Students Participants

Fig: 2 Dr. Nathan Tintle Discusses a Concept in Experimental Design

Fig 3: Dr. Beth Chance Discusses Statistical Inference

Fig 4: Attendees of the 1st Caribbean & Central American Workshop on Teaching Introductory Statistics

XLVIII Coloquio Argentino de Estadística y la VI Jornada de Educación Estadística “Martha Aliaga”

La Sociedad Argentina de Estadística y la Universidad Nacional de Córdoba organizaron el XLVIII Coloquio Argentino de Estadística y las VI Jornadas de Educación Estadística, “Martha Aliaga” que se llevó a cabo el 27 de octubre de 2020, de forma virtual.

El objetivo de la Jornada fue contribuir al desarrollo de estrategias para la formación de docentes de educación primaria, secundaria y terciaria que utilicen contenidos de estadística y probabilidad en la práctica áulica, mediante el desarrollo de talleres. La Jornada está dirigida a docentes de escuelas primarias, secundaria y terciaria de las provincias convocantes.

Conferencia Inaugural

“Desarrollo colaborativo de maestros de nivel medio y primario para la Alfabetización Estadística”. A cargo de la Dra. Mauren Porciúncula. Universidade Federal do Rio Grande – FURG. Brasil.

Ganadora del Premio al mejor Proyecto de Cooperación Internacional 2019. Otorgado por el ISLP (International Statistic Literacy Proyect) del IASE. Kualalumpur agosto 2019.

Talleres

Cada taller tendrá dos encuentros, uno por la mañana y otro por la tarde, con instancia de evaluación y certificación.

Taller 1: ¡Adivina adivinador, con las distribuciones mucho mejor! Docentes: Dra. Ana María Sfer, Mgter. Lorena Naidicz y Lic. Andrea Mazzucco. Se generarán distribuciones con programas de uso libre observando la forma y ubicación al variar los parámetros de la misma. Se presentarán medidas de posición y de variabilidad enseñando su cálculo e interpretación; e indicando el uso adecuado de cada uno en diversas situaciones.

Taller 2: Jugando con las Estadísticas. Gameducacion y gameful learning. Docentes: Dr. Blas Haro Barbás, Lic. Matteo Tarquini y Prof. María Belén Parra. Teoría y aplicaciones prácticas de elementos y actividades lúdicas en espacios didácticos. Introducción al cálculo de probabilidades: evento aleatorio, espacio muestral, evento imposible, cálculo combinatorio.

Taller 3: Propuestas áulicas para enseñar estadística descriptiva con Geogebra. Docentes: Prof. Daniel Draghi y Mg. Dora Maglione. Introducción a los recursos de Geogebra para el análisis descriptivo de datos: medidas de tendencia central, de dispersión y gráficos. Interpretación de gráficos. Aplicación de estos recursos a actividades áulicas para la resolución de problemas.

En el XLVIII Congreso Argentino de Estadística

Hubieron conferencias y presentaciones en diferentes temáticas además la participación de las Estadísticas Oficiales con la exposición del Director de Estadística del INDEC Lic. Marcos Lavagna.

BOLIVIA

Activities Related to World Statistics Day, 20th of October, 2020

Universidad Mayor de San Andrés

The third World Statistics Day was celebrated worldwide on 20 October 2020 with the theme "Connecting the world with data we can trust." The celebration of World Statistics Day is a global collaborative endeavour, organized under the guidance of the United Nations Statistical Commission. World Statistics Day is celebrated every 5 years. This was the third time celebrating the event.

En el día Internacional de la Estadística la Universidad Boliviana "San Andrés" . Con motivo de celebrar la III sesión del Día Mundial de la Estadística, la Dirección de Carrera y el Centro de Estudiantes de Estadística invitó a docentes, administrativos y estudiantes a participar de las charlas de dos invitados:

- M.Sc. Rubén Belmonte Coloma, Matemático Estadístico, ex profesor de la Carrera de Estadística de la UMSA. Nos expondrá el tema: Perfil del Profesional Estadístico.
- Mg. Adriana Graciela D'Amelio, Subdirectora Ejecutiva del Programa de Alfabetización Estadística Internacional ISLP dependiente del IASE (International Association for Statistical Education) y Miembro de la Comisión Directiva de la Sociedad Argentina de Estadística. Nos expondrá el tema: Alfabetización Estadística Internacional.

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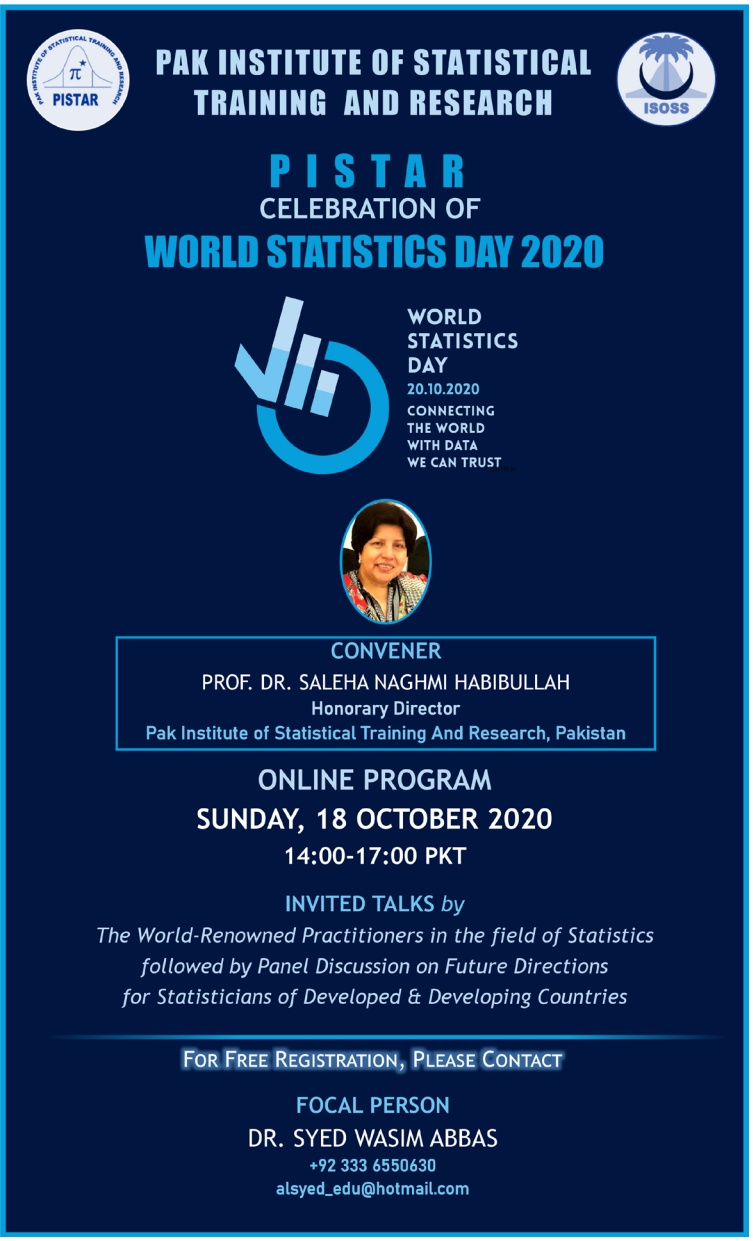
Executive team in 2018–2019
ISLP Advisory Board
Coordinadores de paises
Finlandia
Argentina

PAKISTAN

ISLP Country Coordinator, Professor of Statistics & Research Director Saleha Naghmi Habibullah, organized the PISTAR Celebration of World Statistics Day 2020 on the 18th of October with a number of speakers from the field of statistics around the globe. the event can still be viewed at www.isoss.net.



NSO Mongolia

Khuslen Zorigt*

With the outbreak of Covid-19 pandemic worldwide the Mongolian government has implemented containment measures since the beginning of the year.

The pandemic has created a severe crisis in the global economy. This crisis has not left Mongolias economy untouched. The National Statistics Office of Mongolia conducted an online survey "Impact of Covid-19 Prevention and Quarantine Measures on Business Activities" and has also completed economic reviews "Coronavirus and the economy" and "Covid-19 Pandemic impact to tourism sector" with the purpose of assessing the effect on enterprises and the broad socio-economic situation as well as on specific economic sectors.

The economic crisis has affected households and small and medium sized enterprises the most. From April 1 to May 20 of this year, the National Statistics Office of Mongolia (NSO) has conducted an online survey to find out how Covid-19 outbreak prevention and quarantine campaigns have affected the activities of enterprises, households and people's lives and what changes are taking place. A total of 2,402 companies were covered in the survey on the "Impact of Covid-19 Preventive Measures on Business Activities". Of the 2,402 businesses surveyed, 1,113 (46.3%) reported they were operating normally and 1,289 (53.7%) said they were not.

The Mongolian economy reviews during the containment measures "Coronavirus and the Economy" are based on the monthly statistical bulletin 'Socio-Economic Situation of Mongolia' released by National Statistics Office of Mongolia. Overall, the Mongolian economy and social situation has been negatively affected by the outbreak of coronavirus. COVID-19 and the slowdown of the Chinese economy have led to decline in global demand for mineral products resulting in declines in Mongolia's exports of coal, copper concentrate, iron ore, zinc concentrate and oil. As a consequence, exports have declined with negative impacts for manufacturing industries, and a decrease in incomes for the retail trade sector. In turn this is causing an increase in arrears or overdue loans in the banking system.

The research paper "Covid-19 Pandemic impact to tourism sector" reviewed one of the most affected economic sectors- the tourism sector. In the recent years, Mongolia's tourism sector growth was 18.2 percent accounting for 0.2 percent of GDP. For a country like Mongolia where domestic tourism is not developed, closing international borders froze this sector and also deeply affected related tourism industries which supply of the industry, such as civil aviation, crafts, entertainment, hotel and catering industry, food, alcohol and beverages. As a consequence of the closed borders and limited tourist inflows, the national carrier of Mongolia has suffered severe financial losses. In the first half of 2020, national air transport revenues fell by 66% to MNT 70.7 billion, compared with the same period in the previous year.

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NIGERIA

COVID-19 Pandemic Solution Model

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Ajayi A. O.
Ogunsola I. A.

Introduction

COVID-19 is an infectious disease caused by a newly discovered corona virus identified in Wuhan, China, in December 2019. It became a Public Health emergency of International concern on 30th January, 2020 and was declared a pandemic by the WHO on 11th March, 2020. First identified in Lagos, Nigeria on February 27, 2020, the second case was found in Ewekoro, Ogun State, Nigeria.

Justification for the new model

The reproduction rate (R), a way of measuring a disease's ability to spread, represents the average number of people infected by a single person. If R is greater than 1, the number of cases increases exponentially; less than 1 and the number of cases is expected to decline. The existing method to identify a covid-19 carrier is contact tracing followed by sample collection and laboratory tests. However, many existing models focus on forecast values of confirmed, discharged and death COVID-19 cases. Hence, another model is required to estimate the total number of hidden COVID-19 carriers; this involves determining the required sample size for COVID-19 tests to capture all the carriers in the population and provide better statistics to inform approaches for handling COVID-19 and reducing its spread, mortality and Government expenditure.

Methodology

Let α control the expected number of COVID-19 carriers in a region,β controls the conditional expected number of regions with COVID-19 carriers, λ is fixed arbitrarily as the expected number of confirmed COVID-19 cases in each region. Also N_1,N_2,…,$N_{M\text{-}X\text{-}P}$ are the number of COVID-19 carriers in each network.

We need to estimate the total number (N) of COVID-19 carriers in Nigeria (R).

Then,

$$N = \sum_{i=1}^{M-X+P} N_i = \sum_{i:N_i>0}^{P} N_i$$

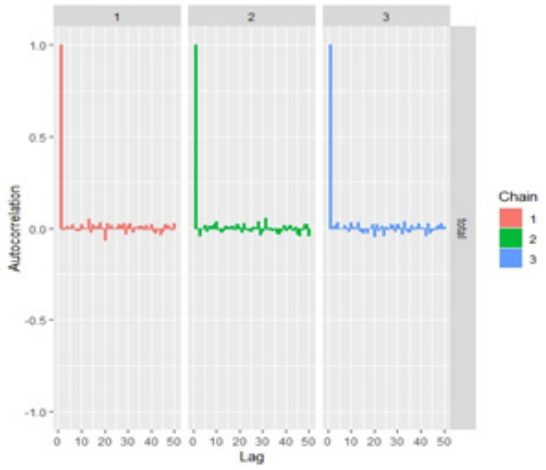
We constructed a Bayesian model for the number of networks in R by specifying the joint distribution of X, P, Y and N. Adaptive Cluster Sampling mechanisms, which leads to an adaptive sample s = i_1 ,i_2,… i_m} of m out of **M – X + P** networks. We fitted the Bayesian model using parameterization (Breckling et al. (1994)) and specified the joint distribution of X, P, Y and N for R. The structure of networks was modelled for with and without COVID-19 carriers (determined by X, P and Y) conditionally on the network structure and the number of COVID-19 carriers (N) networks of regions with COVID-19. We used a Markov Chain Monte-Carlo (MCMC) algorithm to estimate the unknown parameters α, β and λ in the model, observed quantities X_1 , P_1 , Y_1 and N_1 and we used the fitted model to obtain a predictive distribution for N. The predicto $\widehat{N} = 1_{P_0}^T N_0 + 1_{P_1}^T N_1$ber of COVID-19 carriers) is given as

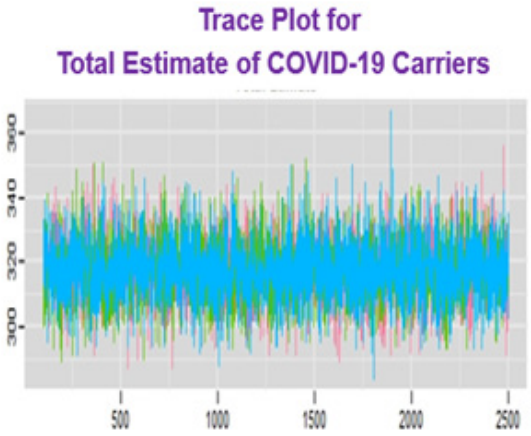
An R package was used to fit the model. Winbugs (Lunn et al. 2000) software was also used to implement the MCMC algorithm. MCMC Diagnostics were carried out to examine goodness of fit of the model using, trace plot, correlogram, Geweke diagnostic, Gelman, Rubin diagnostic and Raftery-Lewis diagnostic. The total number of hidden COVID-19 carriers in Nigeria was determined and the required sample size for COVID-19 test that will capture all the carriers in the population was also determined.

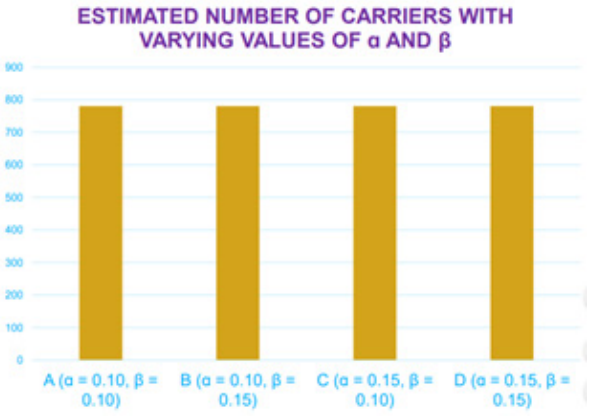
Diagnostic Check, Robustness of the model and its application

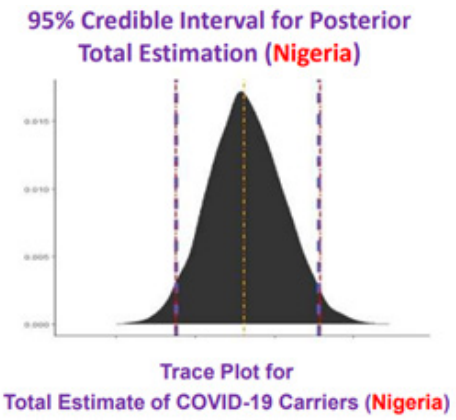
The chains' autocorrelation is quite similar for each lag. The chains mixed extremely fast, concentrating around the mode of the posterior distribution and stationary. As the parameter values of the fitted model change slightly, the estimated number of COVID-19 carriers remain unchanged. The fitted model is suitable to estimate total number of COVID-19 carriers in all States and FCT.

Taking samples of days and applying the model, it was observed that Nigeria Centre for Disease Control (NCDC) confirmed cases is lower than the estimated number of carriers. The number of samples to be tested to capture all carriers is greater than number tested daily by NCDC.









Recommendation

Sample testing from contact tracing yields less than the required numbers to be tested, therefore the Government should increase the targeted sample for NCDC to capture all the COVID-19 carriers within the population. Contact tracing and the models developed need to be integrated. Doctors can handle contact tracing while statisticians should implement the developed model to identify the carriers not captured by contact tracing. We recommend that statisticians are included in NCDC teams.

Conclusion

Tested samples from contact tracing are unable to capture all carriers. Hence, Adaptive Cluster Sampling is required to draw samples from the population in order to better estimate the total number of carriers in the population. We have developed a model for estimating total numbers of COVID-19 carriers in Nigeria. The model should be integrated with contact tracing to help identify COVID-19 carriers.

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Bridging the Statistical Divide: The Case of Australia and Saudi Arabia

Harman Preet Singh*

Educational institutions play a prominent role in the field of education, laying a foundation for students to survive, thrive, and excel in their future endeavors. In the current information age, the importance of inter-disciplinary knowledge has increased manifold, and students need to imbibe it. Understanding statistical tools and methods like survey, measurement and scaling techniques, methods of data collection and analysis, etc. lays a solid foundation for the career of students. The significance of statistical methods and techniques can be gauged from the fact that they find application in multiple disciplines and professions, like banking, entertainment, retail, hospitality, tourism, education, research, science, etc. Thus, students adept in statistical tools and methods are an ideal employee sought by employers.

Universities also play a prominent role in producing research output. University teachers and research scholars play an important role in writing and publishing research papers using statistical tools and software like SPSS, AMOS, STATA, SMART-PLS, R, MATLAB, SAS, etc. The application of statistical software can help glean knowledge from data, leading to interesting research findings, and allowing researchers to publish in high impact factor journals with high citations. This influences the world ranking of Universities. At the same time, leveraging statistical data and information helps to overcome crises in food, economy, and energy, and consequently play a role in the development of countries.

For quite some time, the world has focused on bridging the digital divide between developed and developing countries. However, bridging the statistical divide between the developed and developing countries has not received similar attention. In the present interconnected world, knowledge of statistical tools and techniques is useful for effectively handling the day-to-day affairs of citizens and effective discharge of workplace responsibilities. Therefore, reducing the statistical literacy gap between developed and developing countries is the need of the hour and would foster bridging the digital divide. The author presents the rationale and learnings of the statistical divide by choosing Australia and Saudi Arabia as developed and developing countries, respectively, and presents the facets of the statistical divide between them.

The Statistical Society of Australia (SSA) and the Australian chapter of the International Institute of Business Analysis (IIBA) play a crucial role in promoting statistical literacy in Australia. The SSA was established in 1962. It acts as an umbrella organization to support state statistical societies as well as hosts national conferences. It represents Australian as well as oversees statisticians in six states and territories of Australia. The Australian chapter of the IIBA is an Australian independent non-profit association for business analyst professionals. It acts as a community of professionals in Australia to build business analysis capabilities.

Saudi Arabia has a government body called the General Authority of Statistics, similar to the Australian Bureau of Statistics. However, Saudi Arabia does not have a society similar to SSA. There is a Saudi Arabia chapter of IIBA; however, it is not as active as compared to its Australian counterpart, which is evident as there is an abundance of business analysts in Australia, unlike Saudi Arabia. The need for the promotion of Statistics in Saudi Arabia can be gauged from the fact that the website of Allconferencealert shows eight statistics conferences planned in Australia between 1 September 2020 and 5 March 2021; however, none can be found in Saudi Arabia. The Australian academicians publish in top-tier peer-reviewed refereed and high citation journals more frequently compared with their Saudi counterparts, as indicated by the difference in the world rankings of their respective Universities. The Quacquarelli Symonds (QS) World University Rankings 2020 (previously known as Times Higher Education–QS World University Rankings) has 26 Australian Universities in the top 500 list, compared with only three for Saudi Arabia. The Australian school curriculum recognizes the ability to critically review and analyze graphs as a general capability, which is not the case in Saudi Arabia.

Saudi Arabia realizes the importance of statistics for the development of the economy and its workforce and aims to establish an effective statistical and information sector by 2030. The Saudi government aims to raise the importance of statistical awareness in society, disseminate statistical data effectively, and produce a qualified workforce. This can be made possible by developing a modern and efficient statistical and information sector served by a professional and credible workforce. To achieve this vision, Saudi Arabia should learn from more advanced countries like Australia and put its vision 2030 into action. Like Australia, Saudi schools and Universities should increase the importance of statistics in their curriculum and adapt it suitably to various levels. Also, Saudi Universities should encourage their academicians to improve the quantity and quality of their research output using financial and non-financial incentives and organize prestigious academic conferences related to statistics. Leveraging statistical tools and techniques is crucial to achieving these aims.

The author believes that utilizing the services of the International Statistical Literacy Project (ISLP) to promote statistical literacy among youth and adults would significantly accelerate the progress towards the vision of improving statistical literacy by 2030. The engagement of Saudi students and academicians in various ISLP activities can provide them with good international exposure as well as promote statistical awareness in society. Saudi schools and Universities should encourage participation in various ISLP activities so that they can play their part in fostering statistical awareness. The ISLP activities can help Saudi Universities to improve the academic level of students, raise their research output, and, consequently, world ranking. Also, they will serve the noble goal of promoting statistical literacy in society.

About the Author

Harman Preet Singh is the recipient of prestigious Fulbright Scholar-in-Residence, Erasmus Mundus Europe Asia, and UKIERI grants. In his illustrious career, he has served as a faculty/ research member at the University of Delhi, India; Fayetteville State University, U.S.A.; University of Warwick, U.K.; University of Warsaw, Poland; Debre Berhan University, Ethiopia, and the University of Ha'il, Saudi Arabia. He has authored two books, 33 research papers, 20 conference proceedings, nine edited book chapters, a case study, and presented 34 research papers in academic conferences worldwide along with a keynote address.

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UNITED STATES OF AMERICA

Significance's COVID-19 Efforts

James Cochran*

Covid-19, it is fair to say, became a much bigger story, much more quickly than we were expecting. At the outset there was hope that the outbreak could be contained, that cases would be limited in number and geographical spread, and Covid-19 would ultimately prove to be another warning – like SARS and MERS before it – that the world needed to wake up to the very real threat of a future pandemic.

But, as the days and weeks went by and the numbers of cases and affected countries kept growing, it became apparent that a global public health crisis was upon us. And the question we found ourselves asking was, what do we do about it?

Significance is a statistics magazine, one dedicated to introducing ideas about statistics and statistical thinking to a non-expert audience, so we knew we had something to contribute. Statistics were both telling the story of the pandemic – by recording the trajectory of the disease – and shaping the story as well – by informing the epidemiological models that decision-makers were using to try to safeguard public health, and helping the public understand the various related issues.

With statistics so deeply embedded in this crisis, we felt that *Significance* could and should offer statisticians and data scientists a platform to share their perspectives, analyses, and insights. So, we decided to do something we had not done before: we issued an open call for contributors, calling on statisticians and data scientists "to help us explain the statistics of Covid-19".

This was not an idea arrived at immediately or easily. We actually commissioned our first Covid-19 article in late January, on the day that the World Health Organization (WHO) issued its eighth coronavirus "situation report". There were only 4,593 confirmed cases globally – all but 56 of which were in China.

Steven E. Rigdon and Ronald D. Fricker, Jr., were the authors of an upcoming new book, *Monitoring the Health of Populations by Tracking Disease Outbreaks: Saving Humanity from the Next Plague*, so we invited them to write about "the role of statisticians/epidemiologists at this stage of a new outbreak: the sort of questions to be answered, data to be collected…" etc. They accepted and delivered a first draft a few days later.

The first version of their article concluded on a note of optimism: that maybe the coronavirus would be successfully contained and eradicated. But about 6 weeks later, as we were getting ready to send the article to print with our April issue, the conclusion was rewritten. "Unfortunately, containment of the virus no longer seems achievable", they said.

Fricker and Rigdon's article was sent to print in the same week that the WHO declared a pandemic. By the end of that week, Friday 13 March, the number of confirmed cases reported by the WHO was more than 132,000 – with 51,000 outside of China – spread across 122 countries in total. By 20 March, when the article was first published online, confirmed cases had increased to 243,000. By 1 April, roughly the date when our magazine would have started mailing, cases had more than tripled: 823,626 people were at that stage known to have been infected by the new coronavirus. The tally now stands at more than 30 million.

The huge increase in confirmed cases that we saw over the course of the commissioning, writing, editing, and publishing of Fricker and Rigdon's article was, frankly, terrifying. It also brought home the realisation that a print publication like ours, with long production lead times and only 6 issues per year, could not hope to keep pace with the pandemic. If we wanted to say something about Covid-19, to contribute to the conversation, then a different approach would be needed.

The idea for what would become our Covid-19 collection of articles started to take shape on 16 March 2020. Millions of people around the world were already in lockdown by that point, and UK citizens would find themselves in a similar situation just over a week later. At the time, it was hard to tear yourself away from the news or from social media streams. The temptation was to keep scrolling and scrolling, looking for some morsel of good news amongst the torrent of bad. There were also so many questions in need of answers. Some of the questions were being asked out loud. Others would silently dominate a person's thoughts: How dangerous is Covid-19? Will I catch it? Will I recover?

We knew we could not answer all the questions people might have. Indeed, much still remains unknown about Covid-19. However, the Significance editorial board quickly settled on a list of questions we thought statisticians could address, including: How do we model the spread of a virus? How do control measures change our models/predictions? What is the "case fatality rate", and does it give an incomplete picture of a disease?

It was decided that we would focus on addressing questions related to the processes of disease modelling, data collection, and reporting, rather than trying to explain what was happening at a particular point in time in terms of cases, hospitalisations, and deaths. Things were moving so quickly, and we had nowhere near the

resources of a major media outlet, so it seemed foolish to try to keep up with the work being done by newspapers, websites, radio, and TV.

However, one advantage we knew we had was our network of readers – many of whom are expert statisticians and data scientists, and were therefore working on various aspects of Covid-19. It seemed sensible to reach out to that network publicly by issuing an open call for contributors. We hoped that this would connect us with people who had not contributed to Significance before, and it did. We also knew that it would bring in fresh ideas for coverage: questions we had not thought to ask, and topics we had not even considered.

The call went out through our website, significance-magazine.com, on 25 March. Almost immediately, the responses came in. The editorial board quickly established a subgroup of members to review all Covid-19 submissions, not only to apply their usual "statistical sanity-check" to articles, but also to ensure consistency and continuity in approach. As much as possible, we wanted articles to link to and build on those previously published. The world's knowledge of Covid-19 was accumulating over time, and our collection of articles would mirror that growth and development. And we decided that articles would be published online first, with perhaps a selection of edited or updated versions appearing in print. Timeliness is everything in a fast-changing situation.

Our first batch of online articles was published on 9 April, addressing such questions as "What to make of the coronavirus mortality rate?", "How do epidemiologists know how many people will get Covid-19?" and "How many people are infected with Covid-19?" One article also addressed the need for more coronavirus tests, while another described a method for pooling test specimens as a way to deal with a shortage of tests.

Since then, we have published 32 articles in total. Testing for Covid-19 has been a frequent topic of conversation within articles. Some authors have looked at problems specific to certain countries: for example, Professor Sheila M. Bird, a member of the ***Significance*** editorial board and the Royal Statistical Society's Covid-19 Task Force, has written frequently about the ways in which the UK government could and should improve its reporting of Covid-19 test results. We also had UCL's Nathan Green explain the differences between tests for active and past infection, and how the sensitivity and specificity of tests determine the percentages of true and false positive and true and false negative results.

The reporting of Covid-19 deaths has also animated contributors: Kathryn Leeming wrote about the sometimes week-long delays in England between a person's death occurring and their death being reported, and how this reporting lag was creating a somewhat muddied picture of the progression of the pandemic. Tied to that, Oliver Stoner and Theo Economou discussed ways in which statistical modelling might correct for this reporting lag. Meanwhile, from Colombia, Professor B. Piedad Urdinola outlined the many reasons why mortality may be undercounted during the pandemic, while from the UK, Simon Briscoe compared and contrasted three different measures of the Covid-19 death toll.

Contributors have also taken to discussing the ways in which data about the pandemic has been, or could be, visualised – recognising the fact that visualisations of cases, hospitalisations and deaths are a regular feature of government briefings to the public, and that these visualisations may even help to sway politicians when deciding on policy responses.

Early on in the collection's existence, there was certainly more of a focus on exploring core concepts that would help readers make sense of the pandemic: exponential growth, for example, explains how and why Covid-19 "became a much bigger story, much more quickly than we were expecting", so we thought it useful to dedicate an article to this topic. But as spring moved into summer, attention shifted somewhat: contributors started to reflect more on what we had learned so far about the pandemic, whether from the peer-reviewed literature or from the weeks and months of data that we had amassed about patients and patient outcomes.

Now, as we transition from summer to autumn, and with winter on the horizon, contributors are again refocusing. Recent (and, so far, unpublished) submissions explore the various risks of "reopening" our societies and economies, and what it might take to manage Covid-19 in such a way as to keep things from spiralling out of control once again. Whether that is even possible, though, remains an open question. In the week this article was written, UK Prime Minister Boris Johnson warned that Britain had reached "a perilous turning point", with cases and hospitalisations once again on the rise, and government scientific advisors warning of a possible 50,000 cases per day by October unless transmission of the virus is brought into check.

There is a grim sense of déjà vu. In many ways, it feels like we have returned to that point in mid-March, when we found ourselves worrying and wondering what to do. The difference is, we have a plan of action now. The questions that dominate may have changed, but statisticians are still well-placed to answer many of them. If you would like to be part of this continuing conversation and help "explain the statistics of Covid-19", then please visit significancemagazine.com/covid19 to find out how to contribute. All articles are free to read.

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Encouraging a Critical Mindset on Social Statistics

Anushka Karkelakova*

On August 3rd, 6 Professors from USA inspired by the International Statistical Literacy Project of IASE presented a Topic Contributed Panel at JSM 2020- Joint Statistical Meeting. The session, "Encouraging a Critical Mindset on Social Statistics ", was intended to encourage consumers of statistical information to broaden their current statistical mindset and serve as a reminder that we do not live on an Island of One. In today's culture, it is easy for a person to succumb to confirmation bias and primarily ingest quantitative information, which conforms to their worldviews. Panelists discussed various methods to encourage consumers of statistical information to challenge their personal views and broaden their current knowledge base. Organizer for the session was Dr. Anushka Karkelanova, with Dr. Anna Smith serving as the Chair.

The first panelist was Dr. Melissa Pittard from the Bing Zhang Department of Statistics at the University of Kentucky. Her topic: "Do You Know These Benchmarks? Teaching Students to Become Statistically (and Socially) Literate". highlighted the importance of knowing statistical benchmarks. These benchmarks aid in statistical literacy, are useful when confronting other statistics, can help us identify error and misuses of statistics, particularly in the news, and can easily be applied to other countries, globally, or locally. She demonstrated the benchmarks in an interactive quiz format to all participants. She reminded everyone of the importance of teaching students how to intelligently consume statistics encountered in the media. She supplemented her talk with ways she has incorporated the use of benchmarks in her classes.

One way the benchmarks were incorporated in the classroom was by posting a weekly discussion board assignment with ten benchmarks. Each student had to post which benchmark was most interesting/surprising and comment on another student's post with a related statistic and the source attached. In her case most students were surprised by the percentage of people who die from heart disease, which many noted was preventable in many cases and cited some studies to that effect. Benchmarks such as these can be sprinkled throughout the course, made part of a project, a discussion board, or a survey assignment. Benchmarks can be part of any statistics course.

Dr Pittard also used the Gapminder quiz located at www.gapminder.org. She used it as a discussion prompt in one of her classes and also as an extra credit assignment. The goal is to help students become more statistically and socially literate.

The second panelist was Dr. Amanda Ellis from the Department of Biostatistics at University of KY. Her topic was: "Methods to Motivate Students to Connect Statistical Ideas with their Individual Interest through Classroom Discussion". Everyone who teaches statistics continually hears the question: Why Study Statistics? When learning that a statistics course is required to get a degree, most students immediately look for an alternative option or a loophole that will get them out of the course. Dr. Ellis' goal is to convince them that the information presented in all statistics courses she teaches will be of use to her students. She reaches her goal using class discussions.

Her first example was about regression and its application. Since this is one of the most widely used statistical tools, she asks her students to find an example of how regression is used in their field of study. In their response they should include information such as the field they are interested in, if they heard about regression before, when they searched for regression whether many results appeared, how regression is used in their field and to give one example.

With her second topic she wanted to show her students that "Data is Beautiful". She wanted to teach her

students that in her course they will learn about basic types of graphs and numerical summaries, but there are many more ways to summarize data. For this discussion, she asked them to visit a page from the website reddit.com. Reddit is an American social news aggregation, web content rating, and discussion website comprised of topic specific pages called subreddits. According the subreddit page dataisbeautiful, "...is place for visual representations of data: Graphs, charts, maps, etc. DataIsBeautiful is for visualizations that effectively convey information. Aesthetics are an important part of information visualization, but pretty pictures are not the aim of this subreddit." In their responses students should include answers to questions like "what type of data is the post about?"; "how is the data related to their academic or personal interest?"; "what the student find interesting about the graph"?; "how does the graph effectively convey information and include a link to the post?".

With her 3rd discussion topic Dr. Ellis teaches her students how to spot Bad Science. It is really of high importance to critically analyze the presentations of others. The students start with viewing an infographic by visiting: https://i1.wp.com/www.compoundchem.com/wp-content/uploads/2014/04/A-Rough-Guide-to-Spotting-Bad-Science-2015.png?ssl=1 Then, they choose one of the twelve items on the guide and find a real example. In their responses they should include the following: which of the items on the guide occurred, how the example they found illustrates the item from the guide, the potential or real consequences of the item from the guide in context of the example they found and include a link to their example.

Our third panelist was Dr. Emma Bojinova from the Department of Agricultural and Resource Economics at the University of Connecticut. Her presentation topic was: "Developing Critical Thinking and Analytical Skills via Data Analysis and Application of Course Content to Real-World Events". The aim of her talk was outlining how she helps students to distinguish fake news from real news. Students are bombarded every day with a lot of information from online sources, friends, parents, and social media. However, they seem to have difficulties evaluating the credibility of the information or just accept most of the news as real. In support of this conclusion she cited Stanford researchers who released a report in November 2016 from a study conducted across 12 states. They collected and analyzed 7,804 student responses. Their findings show that many high school students were not able to distinguish between real and fake news on Facebook and most college students didn't recognize potential bias in a tweet from an activist group. Researchers also concluded that many college students couldn't identify the reliability of an online source. Since our role is to teach students how to evaluate information posted online and develop their critical thinking and analytical skills to become reliable users of statistical information, Dr Bojinova suggested a list of great resources she uses in her classes to enhance the relationship between academic rigor and critical thinking skills.

In the course Population, Food, and the Environment (GenEd Course). Dr. Bojinova focuses on the relationship between population growth, use of resources, food production, and the environment. Students are expected to apply their knowledge of various micro- and macroeconomic concepts to analyze and compare countries, regions, or continents in terms of their economic development, population growth, income distribution, resource usage (e.g. fossil fuels, water, soil, forests), agricultural practices and other activities that affect the environment including climate change. In this class students are exposed to statistics from World Bank, Gapminder, Population Reference Bureau, the Environmental Protection Agency, the Intergovernmental Panel on Climate Change of UN, Gapminder, Our World in Data, etc. Students are expected to use their critical thinking and analytical skills.

Dr. Bojinova discussed how she uses Gapminder www.Gapminder.org in her classes. Another resource she discussed was the Population Reference Bureau- https://interactives.prb.org/. The Bureau provides data on population, life expectancy, birth rates, death rates, rate of natural increase, net migration rate, infant mortality rate, total fertility rate, GNI per capita, population density, etc. Using visual Data Sheets and Interactive maps and storytelling, students learn how to analyze data, what different statistics mean and how they are computed, how to read graphs, and how to make comparisons among countries or regions. This also expands their geographical knowledge and knowledge about various countries. Another great source is United Nations, Population Division website. https://population.un.org/wpp/Graphs/DemographicProfiles/Pyramid/947. It provides age population structure diagrams, which are an important tool for demographers. Students can observe trends over time. They can be used to make predictions about future population changes given current and past data.

One final source worth sharing is Our World in Data - https://ourworldindata.org/charts It has data about various indicators (e.g. age structure, agricultural production, business environment, CO2 and greenhouse emissions, food prices and expenditure, forest statistics, etc.). Students learn using interactive charts and interactive maps. All listed applications help her students develop their critical thinking and analytical skills, as well as learn about other countries and regions.

In her more advanced class, Intermediate Applied and Resource Economics, students work on a group project and analyze a good or several goods that are substitutes or compliments, a manufacturing company, or an industry (supply and demand, inputs, production, consumer preferences); collect data themselves via a survey or use existing data; compute statistics like elasticity of demand or supply, draw graphs. In her real-life assignments, students are given data from USDA and asked to compute summary statistics and analyze the data and discuss trends. Students are assigned 1 or 2 articles on a topic relevant to the course material and expected to analyze the situation by providing arguments and graphical analysis.

At the end of her presentation, Dr. Bojinova highlighted our role as educators to teach students how to recognize and use reliable online sources of information. She also pointed out that course rigor is important for helping students develop their critical thinking and analytical skills. We can achieve that via in-class discussions, homework assignments, group projects, role play activities or debates she stated.

Our last panelist was Dr. Milo Schield who is ASA Fellow, Consultant: University of New Mexico, President: National Numeracy Network and the US Director: International Statistical Literacy Project. His topic was Scanlan's Paradox. Dr. Schield's presentation started by explaining what Scanlan's Paradox is: Lowering 'bad' rates for two groups generally increases their disparity ratio. Agencies are being required to lower rates of bad things: suspensions, birth defects, poverty, etc. If blacks are more likely to encounter these bad results, reducing these bad rates tends to increase the black-white disparity ratio. When this happens, agencies are criticized for their negative results. People may be fired – unaware that the increase in the disparity ratio is predictable.

One great example that Dr Schield used to explain Scanlan's paradox was Racial Suspension Disparities in St. Paul Schools where Black students were expelled or suspended 6.2 times as often as white students. However, a third of all Minnesota school exclusions are for minor incidents: talking back, eye rolling or swearing. St. Paul staff "took racial equity training, the district narrowed the types of behaviors that were to result in suspension, and principals were instructed to keep kids in class when possible." They reported: Good news! The results! Suspensions down: blacks cut 37%; whites cut 44%. This is what actually happened- Scanlan's Paradox: because racial disparities increased, black-white ratio of suspensions went up from 6.2 to 7.6; Blacks almost 8 times were as likely to be suspended as whites.

In general, this is Scanlan's paradox and this is how it works: Making some things better makes other things worse. Dr Schield noted that as society eliminates bad things, we can expect 3 things to happen:

1. the more susceptible group is increasingly subject to the bad thing – relative to the less susceptible group.
2. the more susceptible group to have an increasing share of those experiencing the bad outcome.
3. the improvements in – and the differences between – the good things to become smaller.

In conclusion, Dr Schield suggested that Scanlan's paradox is socially (journalistically) significant and should be in statistical literacy (social statistics) courses.

The panel was organized in support of Statistical Literacy and its importance in our everyday life. Many research studies over the past several decades indicate that most students and adults cannot think statistically about important issues that affect their lives, even though their lives are increasingly governed by numbers. Without sufficient statistical knowledge, it is difficult for today's citizens to have an informed opinion and participate in social and political debates concerning the environment, health, education, and so on. Our society has entered an age of information where the "information explosion" is creating a critical need for statistically educated citizens— people who need to be statistically literate not only in their workplace but also in their everyday life. The main goal of the ISLP project is to advance statistical literacy and the usage of data among citizens. Therefore, it is "Data for the public good". Statistical literacy is a skill necessary for both working life and everyday life.

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Results of the 2020 ISI Officers' Elections

The 2020 ISI Officers' Elections were conducted from 8 September- 20 October. The results are presented below.

For the post of President-Elect (2021-2023)

Xuming He

For two Vice-President posts (2021-2025)

Oliver Chinganya
Kerrie Mengersen

For eight Council Member posts (2021-2025)

Linda Chaba
Jean-Michel Durr
Pietro Gennari
Reija Helenius
Manuel Mendoza
Alexandra Schmidt
David Stern
Caroline Uhler

The current Officers who will be continuing their service for a further period of two years (2021-2023) and thus serve together with those elected are:

President (2021-2023): Stephen Penneck (UK);

Vice-Presidents (2019-2023): Byeong Park (Rep. of Korea) and Gabriella Vukovich (Hungary);

Council Members (2019-2023): Victor Alfredo Bustos (Mexico), Albina Chuwa (Rep. of Tanzania), Andreas Georgiou (Greece/USA), Dominique Haughton (USA), Fionn Murtagh (UK), Aurel Schubert (Austria) and Elena Zarova (Russian Federation).

The formal approval of the election results by the ISI General Assembly will occur during the 2021 Virtual WSC from 11- 16 July 2021. We are grateful to all candidates for their enthusiasm and willingness to support the ISI. The newly elected team, under the leadership of the incoming President Stephen Penneck, will start its work after the completion of the Virtual WSC on 16 July 2021.

Course modules:

Statistical Thinking and Problem Solving

Learn how to map a process, define and scope your project, and determine the data you need to solve your problem.

Exploratory Data Analysis

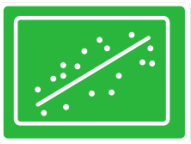
Learn how to describe data with graphics and use interactive visualizations to find and communicate the story in your data.

Quality Methods

Learn about tools to quantify, control and reduce variation in your product, service or process.

Decision Making With Data

Learn to draw inferences from data, construct statistical intervals, perform hypothesis tests, and understand the relationship between sample size and power.

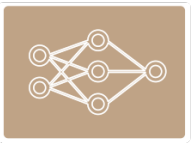


Correlation and Regression

Learn how to study the linear association between pairs of variables, and how to fit and interpret linear and logistic regression models.

Design of Experiments

Learn the language of design of experiments (DOE) and see how to design, conduct and analyze an experiment in JMP.



Predictive Modeling and Text Mining

Learn how to identify possible relationships, build predictive models and derive value from free-form text.

jmp.com/statisticalthinking

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International Statistical Poster Competition 2020 – 2021

The Poster Competition has started in February 2020. Lower, upper secondary, and bachelor-level university students around the world are invited to create statistical posters in teams. Great prizes included! For more information visit the ISLP website.

The Best Cooperative Project Award

The award in recognition of outstanding, innovative, and influential statistical literacy projects is on. Proposals should be sent to the ISLP Deputy Director, Steve MacFeely by the end of April 2021. The winning project will receive 1000 euros! For more information visit the ISLP website. To sign up, contact steve.macfeely@unctad.org

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