



Reija Helenius

Statistics in my life

This ISLP Newsletter will tell, amongst other things, great life stories that interlace with statistics. John Haraway, Teresita Terán and David Stern open the doors to their interesting lives. These articles are equally complemented by an article from the 'mathematics teacher of the year' in Finland- Kalle Vähä-Heikkilä tells how enthusiasm for statistics shows in a teacher's work and how it is conveyed to young students. These stories could and can, for their part, work as marketing speeches for the field of statistics and its opportunities.

Complementing this, statistical competitions have, for their part, the goal of also generating enthusiasm for statistics among young people. Peter Howley – the winner of ISLP's Best Cooperative Project award from 2017 – provides a model example of someone inspiring young students in Australia. In the last poster competition over 12,000 young students felt that important first spark of enthusiasm for statistics.

Also presented in the Newsletter are the ISLP Advisory Board, the ISLP Executive and the new President of IASE, Gail Burrill. These presentations tell the 'story of statistics in my life'. The newly appointed ISLP Executive from Argentina is Adriana D'Amelio who works as a conduit to the Spanish speaking world. Bienvenida al comité ejecutivo de ISLP Adriana!

It's time to thank all of our ISLP countries for your continued support and commitment. Our country



coordinator group is strong, over 170 members from 91 countries. We have also a new partner, JMP from SAS, which is the main sponsor of the 2018–2019 international poster competition.

From my part and on behalf of ISLP Executive, I wish you a peaceful New Year and vigour and energy for 2018. Let's welcome the New Year with the power of statistics. ■

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John Harraway

Contributions to 52 years teaching statistics

The Early Years (1966 to 1978)

I was appointed to a lectureship in the Department of Mathematics at the University of Otago in 1966. I taught courses in Mathematics and Statistics including the first year service class in Statistics with 500 students. In 1973 I was approached to join a group of four scientists to review the teaching of Science and Mathematics at Khon Kaen University, North East Thailand, at the request of the New Zealand Ministry of Foreign Affairs. The World Bank was resourcing the establishment of a Medical school, a Dental School and a Hospital at Khon Kaen which the Thai Government wanted to develop as the cultural and administrative centre of North East Thailand. The project was to develop the Sciences at the University to support this programme. Our group, a chemist, a physicist, a microbiologist and I, were asked to recommend New Zealand Foreign Aid to support the development of a university science programme relevant to the society of North East Thailand.

In one of the most interesting periods of my life we were shown round North East Thailand, taken to schools, irrigation schemes, industrial projects, student aid projects in remote villages, and the internationally renowned archaeological excavations at Ban Chiang. Two of us were asked to visit nearby Laos. This was an experience because a week before we were due to cross the Mekong at Nong Kai in a motorised canoe the Communist Pathet Lao troops occupied Vientiane. But the New Zealand Embassy advised we could still go. We went through three check points with armed communist soldiers inspecting our papers but we felt safe with our Lao hosts.

Recommendations for the Mathematics Department at Khon Kaen were controversial for a Department which had no statisticians. There was a large Agriculture College at Khon Kaen, an Education College for training local teachers, an Engineering College and Medical/Dental Colleges about to open. We proposed that the Department should develop their teaching in statistics which was not a popular recommendation.

After Khon Kaen I spent a sabbatical in the Department of Applied Statistics at Reading University. Reading provided statistics training in developing countries. Roger Stern who was at Reading but in Nigeria at the time of my visit to Reading I met recently in Morocco at the World Statistics Congress along with his statistician son David who has been working in Kenya and who had helpful advice on how we should introduce our Apps for Official Statistics training in African countries by locating them on mobiles rather than on desk tops which few people own. David is also on the Advisory Board of the International Statistical Literacy Project which I have been chairing.

The Middle Years (1978 to 2000)

After returning to Otago the following years were spent teaching a variety of statistics courses including service first year classes of 1000 students from the biological and social sciences and business. I also taught advanced courses on modelling and multivariate statistics. With colleagues I developed in 1997 a new course, Introduction to Biostatistics, which was compulsory for all Health Sciences first year students. This course with another 1000 students had an emphasis on epidemi-

ology and critical appraisal of health research publications. During this period I also wrote three textbooks, one including many ideas of Professor Geoff Jowett, a leader of statistics education in schools in New Zealand who was responsible for my initial appointment at Otago. I was for four years Chief Examiner in Statistics for the New Zealand Qualifications Authority. I was Treasurer for the International Conference on Teaching Statistics in Dunedin in 1990.

The Later Years (2000 to 2017): Education Research

Association with the IASE began in 2000 at a Round Table Conference in Tokyo on Training Researchers in the Use of Statistics. Statistical methodology in 2927 recent publications in 16 high impact journals in disciplines that sent us students for our service teaching were analysed to check relevance of our statistics curriculum. I followed up with a study in 2004 surveying PhD graduates from all New Zealand Universities two years after completing their degrees to establish the statistical methods they were using in employment to see if we were teaching the essential topics at university. There were 913 respondents after follow-up. This led to workshops on generalised linear modelling and multivariate statistics which I taught with positive feedback. This told me that students enjoyed seeing local real data which they found motivational.

I joined the management structure of IASE in 2005. I have organised ICOTS Conferences in Brazil (2006),

Slovenia (2010) and Flagstaff, Arizona (2014). I have attended all ISI Conferences since 2001, the most recent being in Marrakech, Morocco, plus associated Satellite conferences in education, the most notable being in Macau. I have presented at IAOS conferences in Ukraine and Vietnam. I was President of IASE 2011 to 2013 and chaired the Advisory Board of the ISLP for 4 years.

The Later Years (2000 to 2017): Research Collaborations

Collaborative research has given me satisfaction after never to be forgotten experiences in Thailand. All studies have produced local data which students like when used in class and on assignments.

(i) Analyses of dolphin behaviour and habitat selection of wild animals (2000 to 2017)

I have helped three marine scientists working with dolphins. The first project discovered that after 50 minutes interacting with tour boats dolphins move away from a boat. The results have been published in a well cited paper and have been used by the New Zealand Department of Conservation to limit the time a tour boat can be following dolphins. A second student collected data over two years on the habitats of the coastal dwelling Hector dolphins. This work involving the habitat selection of a wild animal developed a model from data generated around the South Island of New Zealand. I



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have used the data from both studies in lectures and on assignments. From 2014 to 2016 I supervised a student who carried out research on the Spinner dolphins in three resting bays along the Red Sea coast of Egypt investigating the impact of tourism disturbance on dolphin rest periods.

(ii) A Nutrition Study (2006)

New Zealand infants have low iron levels, a bad health problem. This could be related to the use of cows' milk rather than breast feeding of babies. Data from 323 households with children under 24 months of age was collected. Iron level was the response measure with food intake variables and other measures such as education and socioeconomic status predictors, as well as the presence of an infection in a child, a confounder for iron level, which needed to be controlled. A video describing the fitted model is at <http://www.stats.otago.ac.nz/videos/statistics/Iron>.

(iii) Alcohol Consumption during Pregnancy and related issues (2007 to 2017)

I have worked with a researcher in health analysing data on profiles of New Zealand women who consume alcohol when pregnant. Predictors including Ethnicity, education level, socioeconomic status, smoking status and others were recorded for 1100 women in the study. Six research papers have been published in international journals. This work is continuing with research into the attitudes of New Zealand ethnic groups to different methods of contraception.

(iv) Attitudes held by university students to sustainability: HEDC research group (2010 – 2017)

This is a longitudinal study in collaboration with our Higher Education development Centre. Data were collected from 500 students in the first year statistics service class in 2010. The instrument used to collect the student opinions on issues surrounding sustainability was the social sciences Revised New Ecological Paradigm Scale (NEP) survey of Riley Dunlap with 15 Likert questions. The cohort has been followed for four years to see if student attitudes to sustainability change during their study at university. Students had a unique password ensuring confidentiality. Factors were identified from the 15 variables and tested to confirm underlying attitude traits prior to analysis of the longitudinal data to be compiled over the next three years. Our four factor model had lower AIC values than all three factor and five factor models investigated as well as a four factor model using other combinations of the original 15 variables. I use the data from this study in the Multivariate Statistics paper when teaching the ideas of Confirmatory Factor Analysis. Multinomial logistic regressions have also been used when examining the different subject groupings of the students.

(v) Trace element analysis and Forensic Science (2011 – 2015)

I analysed mass spectrometer data on ginseng samples from 50 farms in each of China, Canada and Wisconsin for a Chemist. The ginseng was being sold in competition with locally grown Wisconsin ginseng. The origin of new samples had to be determined. There were 40 trace element values obtained from each ginseng sample used to build profiles of samples from the three countries. Discriminant function analysis found probabilities for samples from the three countries using 13 of the trace element variables. This data is motivational in class for principal component analysis and Fisher discrimination. I was invited to present the results in China at the World Congress of SQ Foods in 2012. Further analyses have been published in Forensic Science International in 2015.

In a similar analysis I have investigated the location origin of oysters in New Zealand. One of my 19 videos, <http://www.stats.otago.ac.nz/videos/statistics/Oysters>, describes this analysis of the oyster profiles. These case study videos have had 67272 unique off campus hits since April 2011.

(vi) Additional Motivational videos with data for coursework:

Two further studies are described. The first involves data from a survey to assess support or lack of support among ratepayers to the building of a covered stadium in Dunedin, an expensive project using ratepayer funds. The



By mhx from London, United Kingdom (Aoraki over Lake Pukaki) [CC BY-SA 2.0 (<https://creativecommons.org/licenses/by-sa/2.0>)], via Wikimedia Commons

survey, distributed to 5000 residents with responses received from 2248 residents, features in the video <http://www.stats.otago.ac.nz/videos/statistics/Stadium>. The outcome variable had three categories, support for the stadium, opposition to the stadium or neutral. The predictors for a multinomial logistic regression are age group, employment status, education level, home ownership status, income level and sex. The significant predictors indicated most support came from men on higher incomes. This is an excellent case study to use in lectures.

The second investigates attitudes of overseas visitors to New Zealand to 35 activities for tourists. About 1200 respondents from each of Australia, Japan and Germany were interviewed, some before visiting New Zealand, some when leaving the country at airports and a third group at both locations. The data can be viewed in the video <http://www.stats.otago.ac.nz/videos/statistics/Tourists>. The data set lends itself to factor analysis and other multivariate methods applied to 3500 cases with 130 variables related to demographic profiles, mode of travel, type of accommodation, age and sex. Students write a 20 page report for New Zealand tourism organisations.

The Future

I have formally retired but I shall be teaching a course on multivariate statistics in 2018. I intend to go to ICOTS in Kyoto and present a paper with Sharleen Forbes on apps for training in Official Statistics. I am still collaborating with the researcher in our Department of Preventive and Social Medicine exploring the association between methods of contraception and Ethnicity in New Zealand. I also intend to develop two more videos, one telling the story of honey and the ef-

fect of the Varoa bee mite and the other on the butter/margarine controversy, both providing data for analysis.

The following comments from a student in my advanced regression course would encourage anyone to continue teaching until the day they die. But it also highlights the importance for many students of motivational local and relevant real data:

"I am Billy Rosencrans, one of your students. As you know I am studying in Dunedin this semester before heading back to the United States. I wanted to let you know that your lectures have truly inspired me and made me love math even more. I have always enjoyed the subject but I have not had previous Professors that can explain and engage as well as you can. I truly think you have a gift and your lectures have made me want to do something in the math field after university. I am in third year at a liberal arts college in upstate New York. I major in math (since our school being small with 1800 students does not have a focus on applied math or even statistics). My favourite class has been differential equations. The class had a large focus on real world problems which was my first real exposure to modelling. When I return in August for my last year (since we do four years of undergraduate) I am taking a seminar in math modelling which may overlap with your regression modelling." ■

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From kindergarten
to elderly people.

A macro view of the teaching of statistics



Teresita Terán

The purpose of this paper is to show how we can teach Statistics at all levels of life. Applying the qualitative method of participative observation I will present the outcomes obtained in many years of teaching. When the education law was implemented, statistics was incorporated into the math programs, but the teachers, as in their curriculum did not have statistics, had no knowledge about it; they need training and that was a great challenge. So, professors of statistics from the university were called to capacitate teachers. I was one of them. I taught statistics to kindergarten teachers and the results were amazing, then to teachers of initial and secondary level. I will present some papers done by the students since the practice was the feed-back with the students in the classrooms. As a university professor I am in charge of Biostatistics at the Faculty of Veterinary Sciences of the National University of Rosario. I also teach on postgraduate courses of Statistics and to elderly people as extension function. This macro vision of teaching statistics and the results show how the teaching of statistics has no age limits.

Once I graduated as Statistician I started teaching in the secondary level Mathematics. Statistics were not included in the curriculum. Between the years 1985 to 1988 the Pedagogical Congress was developed where teachers of all the levels discussed on the incorporation of Statistics in Math Programs. I began also to teach Statistics at the Faculty of Veterinary Science.



Weather chart filled by 3-5 years old children

When the education law was implemented in 1993, statistics was incorporated into the math programs, but the teachers, as in their curriculum did not have statistics, had no knowledge about it; they need training and that was a great challenge. So, professors of statistics from the university were called to capacitate teachers. I was one of them. I taught statistics to kindergarten teachers and the results were amazing, then to teachers of initial and secondary level. I will present some papers done by the students since the practice was the feed-back with the students in the classrooms

Experience with teachers of initial level (3–5 years old)

When I started to teach teachers at this level I was disoriented as to what to teach and how, but in the first class when explaining the definition of statistics and its scope, there were the same teachers who guided me in the applications that they could implement in their classes. So each class I taught them and they worked in their classrooms what they learned. There were forms of collecting information through drawings and sticks, such as at the beginning of the day the teacher drew figures of a baby and a girl and wrote down how many were missing or at the end of the month looked at their notebooks and counted sunny days, cloudy days, rainy days and even made after a visit to a farm a double entry table.

This table made with feathers, and hairs and sticks in the case of the feet was used by the children who drew in each box the animals that fulfilled with the indicated characteristics. It was an experience that allowed me to understand how statistics with different ways of teaching can be incorporated from the first levels of teaching and this fact is the starting point to be teaching in an increasingly complex way the basic concepts.

Experience with teachers of elementary school (6-12 years old)

In elementary school, the statistics classes were simpler, each topic developed was worked in the classroom and as the students between 6 and 12 years old were motivated to gather information, doing surveys, calculating easy descriptive measures. The teachers learned the basic notions with great enthusiasm since those students who had difficulties in mathematics found in statistics a way of meeting and motivation.

At this level the students carried out surveys for example, on the need to incorporate the milk cup for the entire primary level, collected information, tabulated, made tables and graphs and presented a report that the teacher raised to the authorities and after several formalities the cup of milk in that school spread to the whole level. This fact represented a valuation towards the Statistics that was commented in the classes with the other teachers and motivated them to apply the subjects taught in their classes, and to carry out another surveys at their schools.

Experience with teachers of secondary level (13-17 years old)

When I started working with Mathematics teachers at the secondary level, I noted with concern that they had no interest in learning Statistics since in their curricula they did not have Statistics and many of them forced to do the courses considered that the change in the curriculum removed Mathematics contents.

The teachers with many years working at schools attended the classes without interest in the content, the youngest came to really learn.

When I developed the project method changed the situation, all the teachers changed their attitude and began to apply this method in their classes.

They presented projects on water pollution, on the use of public libraries, the need to incorporate folkloric dances in schools, on recreational violence, bulimia, and drugs. They began to have a different way of communication with their students, and they said Statistics was the change!.

The students became participants of their own learning and when I went to observe classes a student said:



Charts for 6-12 years old children.

"The experience in math classes applying statistics through the project is what I will never forget, what I learned was great".

Experience at the university

Since 2000 to strengthen the teaching of Statistics in the middle school, the University through agreements with the Ministry of Education implemented Postgraduates courses. The National University of Rosario incorporated a special course of Specialization on Math and Statistics at the Faculty of Economic Science and Statistics in Rosario. I was invited to dictate Didactics of Statistics. There was no program, so I had to prepare one, and I organized it guided by the works of Dr. Batanero and Dr. Godino. So, I began my classes with all the theories about didactics of Mathematics and then I explain the role of variability one of the most principles of Statistics.

Based on Batanero's works I introduced the project method in the Math classes. Working the project method with the student-teachers who were professors of Math's and putting it into practice made the didactic classes enjoyable.

I presented the theory and then the professors use these contents in their own classes. The next working



Various pie charts made by 13-17 years old children.

day they came to explain the experience in teaching what they learned to their students.

So, the next step was a workshop where professors explain what they did in their classroom work and then a discussion between all the professors was generated to arrive to a common point between all the experiences presented.

This experience was enriching because professors explain that the students were motivated and presented to their teachers subjects that really interested them, so they presented Projects about bulimia, lack of motivation in math classes, assistance in public libraries, incorporation of a breakfast in schools, Use of computers in the classroom, group meetings organized at recess, creation of student centers, among others. The works were similar to those presented in the updating course for teachers of Mathematics.

The National University of Rosario together with the Faculty of Humans and Arts signed in 1998 an agreement of pedagogical assistance to incorporate the career of Professor in Statistics, for this matter they took into account the subjects of the Degree in Statistics and they were due to attend the corresponding pedagogical subjects.

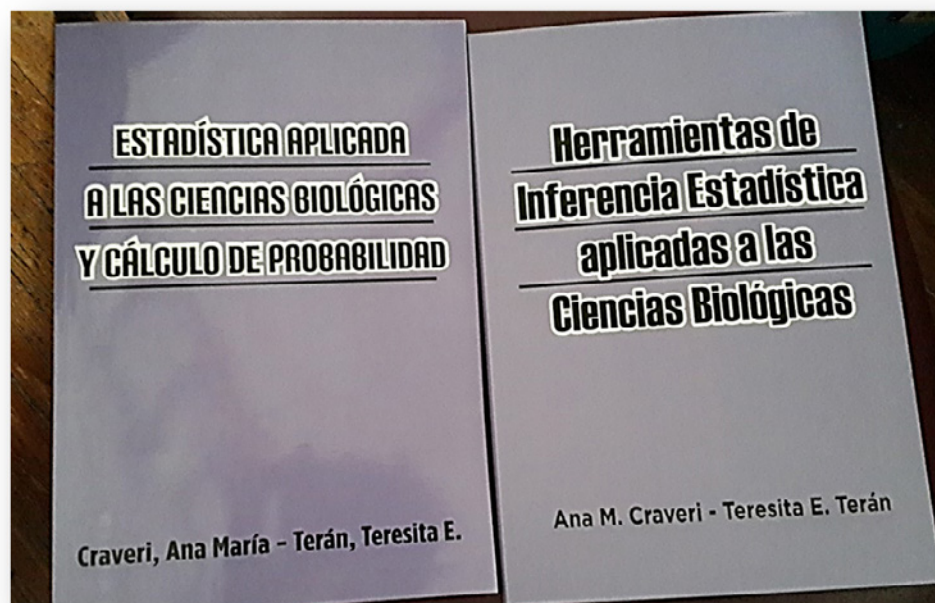
I was a student of the first promotion and then I was appointed to dictate Curriculum and Didactics and Residency in Statistics.

In these years I have analyzed the teaching methods and incorporated the need to teach the use of statistical software and its interpretations so that professors of Statistics are able to provide students of all careers with the use of statistics in their instrumental character so they will be able to solve problematic situations of each professional area where they work.

In these courses students study the epistemology of Statistics, its history, how it is incorporated into curriculum design, how it is planned and how it is taught.

In addition, classes are observed at both the middle and upper levels where the statisticians must present methodological strategies to be evaluated in their own teaching practices not only from the contents but also from the pedagogical way to teach.

Residence in the middle level is often difficult for the statisticians because as the adolescents know that the teacher who teaches them is just passing through the



Books written by Teresita.

classroom and will not evaluate them, they are predisposed not pay attention because they have no commitment of learning, but it is the communication between the teacher in charge of the course and the students that allows to be able to realize these practices in classroom.

In the upper level the situation is different since the statistician teacher will give certain subjects which will not be repeated by the managers of the course. This fact benefits our statisticians as they can develop the topics in a friendly and respectful climate.

At the end of the pedagogical subjects that include history of education, psychology, among others the statistician is graduated as Professor in Statistics, which gives him a score to enter secondary and university teaching.

Developing teaching

From my beginning in university life I have developed the teaching in the Faculty of Veterinary Sciences, as I have explained at the beginning.

I started just when I graduated as a Biostatistics teacher when a new Faculty of Veterinary Sciences was opened depending of the National University of Rosario, I prepared the program, organized the activities and in this place I have being working for more than 40 years.

I was appointed in all teaching stages that are generated in the teaching career; I have given the respective competitions until becoming the maximum title at the University of Titular Professor of Biostatistics.

During these 40 years of university teaching in Biostatistics I have compiled data from different professorships,

analyzed research projects, carried out the statistical part of the work of many colleagues. The fact of provider of all this information of empirical experiences and works allowed to my colleague and me to write a book on Statistics Descriptive and another on Inferential Statistics.

These books allow students to have all the pedagogical resources for the course to achieve meaningful learning because in them there are all the necessary material for the course.

These books consist of an introduction in each chapter with a problematic situation motivating on the subject, then the corresponding theory together with applications in the field of Veterinary Medicine, also explain how to approach the problems using the statistical software available at the Faculty and a proposed exercise based on problems and papers to analyze and solve.

Working in this way allows students in class to listen, understand and ask, as the books provide the necessary theoretical contents that can be deepened with the bibliography proposed by the chair.

In order for students to participate in their own learning and be aware of this process, the exercises set out in the book are incorporated in the Campus of the Faculty, and dynamic self-assessments are proposed where, when solving them, they know their progress or regression in the comprehension of the themes of the course.

The use of statistical software is a tool that allows them to be intelligent users of statistics, emphasizing interpretations in context.

Evolution of teaching statistics

During all my life as teacher, the way of teaching statistics has evolved and currently the goal of teaching is that, faced with a problematic situation, students can understand it, position themselves in the subject, be able to use the computer through some of the proposed software, achieve the correct output and interpret the conclusions in terms of the context of the problem.

At the moment this methodology has motivated students who, in general, show reluctance towards Statistics and our challenge has been, is and will be to show the importance of the Statistics in the instrumental role in his career.

Current courses

For several years I have taught in the "Master's Degree in Politic and Food Safety Management" "the subject "Thesis Workshop" where the importance of Statistics in the research presented by students is very important. Quantitative Methods are included in this Workshop and the most used Qualitative methods used when conducting surveys, interviews, participant and non-participant observations, with their internal and external validity through Statistical analysis.

At this stage the students are aware of the need to apply Statistical techniques and the contents depend on their proposals. The Workshops are enriching since in them each student presents his problem and his proposal to apply the Statistical techniques already known in his degree careers. The Statistical topics that are needed are deepened and at the end of the course in an integrating Workshop each student presents the Statistical methods used and how they contribute to their thesis work.

In addition I am in charge of a course of Postgraduate that gives score for different doctorates, in this course I dictate the module "Descriptive Statistics and Basic Probability" for those students who in their degree careers do not have Statistics, or have had it in the beginning of the careers and had not grasped the basic knowledge necessary to apply in their respective projects in their doctorates. In this course the students are aware of the need to apply statistical knowledge in their respective theses, so they are motivated to learn to achieve the goal of graduating.

Experiences with elderly adults

As a community work at the Faculty, one of the most rewarding moments of my career has been the extension courses on Statistical Literacy for elderly adults.

Teach to interpret the results of a survey, see if the information is statistically sustainable, as a sample can be malicious, as interpreted averages. The elderly adult's

workshops allowed them to feel useful; they can analyze simple information, and strengthen their self-esteem.

The final workshop was one of the most sensational moments of my career, to feel the affection received by trying to incorporate Statistical reasoning into them, even if it was elementary was a return that I never imagined.

Conclusion

It is amazing to observe how the little ones can assimilate the basic concepts and the notion of variability and from the perspective of the elderly people, how statistics gives them possibilities of overcoming and of self-esteem that allows them to reflect and obtain critical spirit many times forgotten.

The importance of this work reflects the need of Statistics in everyday life and the significative role of the statisticians who must strengthen these concepts in the changing society in which we live.

This road traveled from the most different levels and spaces has strengthened my great challenge of teaching statistics from kindergarten to elderly people. ■

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Roger Stern and David Stern

A story of a British mathematician in Africa

At first glance, as a British pure mathematician, David Stern may seem to be an unlikely champion for improved statistics education in Africa but first impressions can be misleading. He is unconventional in many ways and his varied background has enabled him to respond to local needs more than his own agenda.

His passion for Africa stems from his childhood, where he spent all of his secondary schooling in a French school in Niger. He is a digital native growing up in a household with computers around from age five, even working as a professional programmer before starting university. His University education was in mathematics, mainly in the UK but with an additional degree in Germany. His love was for the pure and abstract, though he had a broad interest in all of the mathematical sciences.

After his PhD in algebraic geometry, David then accepted a 6 month contract, in 2008, as a local lecturer, in Maseno University, one of Kenya's younger universities at the time, chosen partly because of its existing strength in Mathematics and partly because it was open to change in the way teaching was undertaken. It had recently taken the bold and novel step of insisting that all its undergraduate students (whatever their subject) were taught IT. And the time devoted to this strand was substantial.

Just after he joined he had a lunch with the Head of the Maths and Stats Department, who announced: 'It is a shame but we will have to send our applied statistics MSc students home because we don't have enough lecturers to teach them'. David responded: 'Would it help if I taught them a course?'. This was how he got involved in statistics education and it played a big role in his six months in Kenya becoming six years."

In the following years, innovation in the teaching of statistics was much of his work, starting with the MSc programme. This was a degree in Applied Statistics, but the students had no prior knowledge of any statistics package and none of the existing courses changed that. Hence the introduction of statistics software seemed an essential addition which started David on the path of innovation. The next steps followed simply from discussions with contacts about some of the more applied teaching that was happening elsewhere. This led to a number of other simple 'innovations', including introducing a series of statistical games and hosting a visiting lecturer.

David's innovation was really how these changes were integrated into the local institution. Wherever possible he involved junior lecturers with the changes he was bringing into the teaching, James Kaleli Musyoka was the keenest to embrace these innovations. This led to broader opportunities to become involved in curriculum development and while David's changes were at postgraduate level, he also supervised James and others to implement parallel changes in teaching statistics at the undergraduate level.

The most significant achievement at the undergraduate level, was the changes to the curriculum for the IT courses for all the Mathematical Science students in the University. The new courses in computing provided a range of opportunities for students to learn to work with data. This included using a spreadsheet for simple data analysis, using statistics packages, encouraging good statistical practices and elements of programming. Some of the most useful skills for graduates can be as simple as using pivot tables in Excel. These are often not taught but many potential employers across the continent expect statistics graduates to have them.

Through this process of curriculum change intertwined with improvements in the delivery David coined the phrase “Incremental Modernisation” to describe the approach taken in Maseno University.

Many of these initiatives are straightforward but this is an area where there remains so much to be done. In a recent informal survey of around 50 AIMS MSc students, top mathematical science students from 16 different African countries, few graduates, even with a statistics degree, have any real experience of dealing with data. There is a lot of talk about Africa entering into digital economies, but a substantive issue is the lack of Data skills even amongst statistics graduates.

The access to relevant data and textbooks for the African context is a problem, one which David is working to address. However there have been good free resources available for years. In particular many of David’s students and colleagues have been introduced to CAST, which had added many examples of data from Africa in 2005. This interactive textbook includes good exercises and even Moodle compatible tests. CAST is free to use, distribute and even to edit. Even so the uptake remains low.

The low uptake is easily understood in these environments because staff have very heavy loads and hence don’t have time to adapt teaching resources or even to adapt teaching to existing resources. “Making it easy” has become a catch phrase amongst David and his colleagues to remember that good ideas are not enough.

Across Africa many postgraduate degrees are taken part-time, with most students employed and many are school teachers. Most teachers take the degree to help them escape, but some are dedicated to teaching and would like to use their new skills to teach better. Zach Mbasu was one such dedicated teacher who took the initiative to engage David in initiatives with Schools. This was also a key driver in the initiative to establish a Kenyan NGO called AMI (African Maths Initiative). This developed out of a yearly “Maths Camp” given in Kenya since 2010 for school children and their teachers. It has expanded, to include maths clubs, and maths camps are now also given in Ethiopia (Bahir Dar), Ghana (near Cape Coast), Tanzania (Bagamoyo) and in the UK (London). This initiative has led to the establishment of a UK-based charity called SAMI (Supporting African Maths Initiatives), which has been supporting the expansion.

The way James and Zach used the postgraduate initiatives to impact undergraduate and school students led to a realisation that there are opportunities in Africa for research on improving teaching of statistics to be undertaken across “all academic levels”.

In 2013, Francis Torgbor, a Ghanaian student from AIMS contacted David, asking if he could supervise his MSc project. He was looking for a more applied project than those that had been offered and had come across some of the

David’s previous work. Accepting indirectly led David to finally leave Kenya. This was impeccable timing as Giovanna, his wife to be, had just managed to secure a post teaching development economics there. He joined AIMS (African Institute for Mathematical Sciences), an initiative that has spearheaded an innovative MSc programme in Mathematical Sciences across Africa, and was then based in Ghana for a year. With students and centres across the continent AIMS provided a Pan-African perspective to David’s experiences. Perhaps most importantly this experience challenged him to think beyond a single institution or even country to the bigger problem.

Given the differences between African countries, reflecting on the bigger problem led David to a new conceptual approach, namely “Viral Scaling”. This brought together a lot of his previous learnings into a natural framework through which future efforts could evolve.

In 2014 he joined the Statistical Services Centre (SSC) at Reading University where he remains until December 2017. A large piece of work for SSC is offering Research Methods support for agricultural researchers in a wide range of African countries; in particular this has involved a number of trips back to Niger where he grew up. It also involved him in more conceptual discussions about development and development evaluation.

In particular the concept of principles in development resonated extremely well. The phrases, “Incremental Modernisation”, “Making it Easy”, “Across Academic Levels” and “Viral Scaling” were now more than just phrases; they were principles which can be discussed, communicated and critiqued.

His SSC work has also given him further insights into interactions between development and research and the substantive need for statistical literacy at many different levels. He now believes that research and development are being held back by statistical misunderstandings.

The realisation that African statistical literacy is a substantive development problem is part of the motivation behind the African Data Initiative (ADI), a principled collaboration which aims to make a contribution to statistics in Africa and beyond. This is a first attempt to use the principles David has been developing to guide African statistical education. Supporting ADI to take shape and get started is eating up any available time at the moment. This is much to the disapproval of his one year old daughter Anna, but it is starting to take shape—watch this space! ■

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**Gail Burrill,
the new President
of IASE 2018–2019**

I am currently an Academic Specialist in the Program for Mathematics Education at Michigan State University. I was a secondary teacher and department chair in suburban Milwaukee, Wisconsin for over 28 years, served as the President of the National Council of Teachers of Mathematics, and as Director of the Mathematical Sciences Education Board before coming to MSU. I received the Presidential Award for Excellence in Teaching Mathematics, have directed the Teachers Program component of the Park City Mathematics Institute for 16 years, and am a T3 National Instructor. I taught high school statistics at the beginning of my career and have continued my interest in teaching and learning statistics. As a result, I have developed many curriculum units focused on teaching different aspects of statistics, have written many papers on teaching and learning of statistics, and my research at the moment is focused on the use of interactive dynamic technology to help students build robust concept images of key statistical ideas.

Promoting statistical literacy has always been central in my work, with my high school course focused on building statistical reasoning and sense making for all students, not just those in the upper level courses. In today's world, statistical literacy is even more important as nearly every aspect of our lives is awash with data, and the knowledge and ability to make rational data driven decisions is central to being a productive member of society.

My goals as President of IASE are to continue to promote statistical literacy as a key component of statistical education, to encourage research that builds on what we have learned about how people come to understand statistics to enable us to move forward as a field, and to grow the membership base of IASE so that more of us from all parts of the world can be working together to make a quality statistical education a reality for all students at both the school and tertiary levels. ■

Gail Burrill
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**Another country
coordinator
for Canada**

My name is Asal Aslemand. I am currently a sessional instructor in the department of Computer and Mathematical Sciences at the University of Toronto Scarborough. I recently obtained my PhD from Ontario Institutes for Studies in Education with the focus on Statistics Education. I received my Masters of Science in Statistics from University of Toronto in 2014.

I enjoy working on statistical problems in the field of education, psychology, and social sciences. I have an enormous passion for teaching statistics, particularly teaching statistics to adult students who need to take an introductory statistics course for fulfilling their degree requirement. I strive for making the learning experience of my students more meaningful in their introductory statistics course. I focus on developing my students' statistical literacy, because I believe that being statistically literate is a powerful skill to have in order to be able to read, interpret and take critical stance toward statistical information that we encounter on a daily basis.

My research focuses on examining the relationships between students' attitudes toward statistics, their past mathematics achievement, their statistics achievement, and their willingness to use statistics after leaving their introductory statistics course. In that regard, I examine the literature in statistics education on effective teaching strategies, that can keep students interested in learning statistics, and will enable them to realize the worth, relevance, and usability of the subject of statistics in their personal and professional lives.

I am delighted to be joining the ISLP team and work alongside Jeremy Balka as Canada coordinators in order to promote statistical literacy across the country. I am also looking forward to working with other country coordinators, and learning from them about the ways in which the subject of statistics has been promoted in their country to all their citizens. ■

I wish you all the best in 2018.

Sincerely,
Asal Aslemand
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Developing the value of official statistics

Elaine O'Mahoney, Eoin MacCuirc and Anu Peltola

1. Statistical literacy in a post truth society

The provision of reliable and high quality data and information by the producers of official statistics around the world is increasingly important to our economies and societies. But recently the status of official statistics has been challenged by other data sources, big data, open data and even opinions that seem to be replacing facts in a *post truth* society.

Under these conditions, there is a worry about people's ability to use numbers. Statistical offices need to step up and improve statistical literacy in societies. Several national statistical offices have partnered with secondary schools to increase statistical awareness and literacy amongst the pupils. User surveys, carried out by many statistical offices, show that users who are experienced in using statistics appreciate them most highly. It is of strategic importance for national statistical offices to work for better statistical literacy and provide sufficient education on the use of statistics.

Statisticians are also working together with universities to extend their capabilities and improve their data-gathering practices. At the same time, statistical data sets provide a rich source for researchers to improve their research capacity. An example of joint investment in capability is the European Master in Official Statistics, a network of Masters programmes that provides post-graduate education in the area of official statistics.

Additionally, many national statistical offices offer traineeships to students and carry out training on survey techniques and statistical methodologies, again adding to the overall endowment of research capability.

2. Enhancing statistics to empower people and support decision makers

In April 2014, the Heads of statistical offices from over 60 countries discussed the need to improve statistical literacy, support users of data and enhance the value of statistics to the users. The Conference of European Statisticians' seminar on *What is the value of official statistics* and how do we communicate that value? concluded that official statistics need to be promoted as a global asset.

In consequence, the Chief Statisticians established a UNECE Task Force¹ on the Value of Official Statistics to develop ways of enhancing, communicating and measuring the value of statistics. The resulting *UNECE Recommendations on promoting, measuring and communicating the value of official statistics*² were endorsed by the Conference of European Statisticians in June 2017.

The Chief Statisticians noted the need to work together for stronger official statistics, and that:

1. In the *post truth* era, more than ever before, statisticians need to increase the awareness of the high quality of official statistics and the unique value they offer;
2. Young people, pupils and students can act as multipliers of the value of statistics;
3. It is important to educate users through regular education systems, ranging from statistical courses to university programmes on official statistics;
4. The branding of official statistics and trust in official statistics go hand in hand with the value of official statistics. Statistical offices should build their communication strategies to enhance the value of official statistics, as highlighted in the *Recommendations*;
5. Statisticians should measure the value of their work. Concrete monetary measures have already proven effective in convincing decision makers that official statistics are worth their investment;
6. Statisticians should learn from each other about innovative practices to increase statistical literacy and support the use of statistics;
7. It will be important to increase knowledge of how statistics inform policy and business decisions. This understanding can be critical especially for engaging with respondents.

1 The full report is available here: www.unece.org/statistics/stats-tos/task-force-on-the-value-of-official-statistics.html

2 The full report is available here: www.unece.org/statistics/stats-tos/task-force-on-the-value-of-official-statistics.html

3. Can we reach informational Zen?

Having agreed on the need, statisticians are now looking at how to strengthen the future value of official statistics. At the 2017 ISI conference, a session on *Data users in focus—Statistics in use* noted that official statistics are essential for the functioning of democratic societies and are of little value unless they are developed with users in mind. The challenge is not only to provide a product or service with value, but also to demonstrate that it adds a growing, unique value to users.

In October 2017, the OECD conference on the *Role of official statistics in an evolving communication society*, discussed the abundance of data and how it is making people tired even to the extent that they are unwilling to use data. The conference mentioned the idea of “informational Zen” to encourage people to focus on the relevant information and accept that they cannot know everything. The key to reaching information Zen is learning how to assess data to quickly identify what data are reliable, relevant and useful. It is a new way of thinking about information that statistical offices can help societies to achieve.

Statistical offices have a special role in teaching people how to read statistics and infographics, find and assess data sources and transfer figures into meaningful information. Statistical offices are not there just to produce and release numbers. The UNECE *Recommendations on promoting, measuring and communicating the value of official statistics* make eight suggestions for strategic development of the value of official statistics:

1. **Exploit the comparative advantage of official statistics** – which is based on professional independence, scientific methods, rigorous quality criteria, including relevance and strict application of the Fundamental Principles of Official Statistics.
2. **Put customers truly at the centre** – producing statistics that meet users’ needs requires understanding users and non-users and helping them to use statistics.
3. **Design statistics for everyday life** – to keep users engaged with appealing products and services that are available quickly, easy to use and come with a storyline.
4. **Innovate to remain valuable** – be more agile for new solutions to unleash the potential of statistics to improve lives.
5. **Go forward with strategic partners**—seek out new partnerships with the academia, students and the private sector to tap unexploited potential of new technologies and design, new products and better communication.
6. **Build the official statistics brand and gain visibility** – develop communications skills and engagement with users to build trust.



7. **Measure outcomes to achieve greater impact** – The judge on the value of official statistics is whether they lead to better outcomes for our societies.
8. **Share and learn to keep abreast of best practices** – Share successes and failures in the new [wiki on best practices](#) with over 200 cases on ways to enhance the value of statistics.

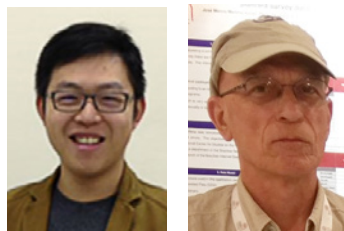
While the UNECE Task Force has finalized its work, what happens next in national statistical offices makes the difference—offices are now starting to implement the Recommendations. Several offices have started to measure the value of official statistics. In the long term, trust in official statistics and the use of statistics can only improve by investing in education and statistical literacy. ■

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Shu Wei Chou-Chen
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Teaching basic statistics to blind students

Understanding statistics has become extremely important not only for researchers but also for the general public in order to understand publications that include statistical analysis. Having in mind promoting statistical literacy, teaching statistics to students not pursuing a career in statistics is a great challenge for any teacher. However, it is a much greater challenge when some of those students have visual impairment.

This challenge was undertaken by the first author while teaching two statistics courses to Henry Martínez-Hernández, a totally blind student doing a biology major at the University of Costa Rica (UCR), in the second semester of 2014 and the first semester of 2015. We describe this experience and give some recommendations based on what we learned after evaluating the results.

In 1995, the UCR established policies with the objective of promoting the participation of disabled persons in activities such as teaching, research and social action, and in addition, projecting this principle of involving disabled persons to the national community.

To implement these policies involving disabled students, the UCR created the Center of Aid and Services to Students with Disabilities (*Centro de Asesoría y Servicios a Estudiantes con Discapacidad, CASED*). CASED is the operative unit responsible for providing the necessary aid instruments to guarantee the access and equality of opportunities to the student population with disabilities, and for implementing projects, aid services, information and training directed to the university community. All these services are offered by an interdisciplinary team in coordination with other institutional units.

The introductory statistics courses in the biology major

There are two statistics courses: Statistics for Biologists I and II. The first course has Calculus I as a requisite.

Formal teaching in both courses covers sixteen weeks. Each week has three hours of theoretical contents and two hours of laboratory session for practical applications with R and Rstudio.

The first course covers descriptive and inferential statistical techniques and it aims to develop critical and statistical reasoning for solving biological problems. The second one provides advanced statistical tools, such as experimental designs, regression analysis and multivariate analysis, to aid students with their research projects in the biological field.

The evaluation of students in the two courses are slightly different, but both courses include theoretical exams (concepts and calculations), practical exams in the computing laboratory using R, quizzes, homework (solving problems by hand and with R), and a research work involving sampling, data analysis, and a final report. The second course, unlike the first one, requires calculations carried out with R only due to the complexity of model estimation.

Teaching strategies and aids offered to the student

Since learning statistics is heavily based on visual and logical abilities, much of the content requires the use of graphs (histograms, box plots, probability distributions, scatter diagrams, regression line, principal components, etc.), especially when faculty relies on visually-based teaching material. This leads to some teaching disadvantages for visually impaired students.

In order to overcome these disadvantages, graphs were made by a Braille printer. They were very useful for understanding concepts like histograms, probability distribution and several others. For instance, by touching the points in a scatter graph, the student could differentiate positive from negative correlations, strong from weak correlations, and ‘feel’ the regression line (Graph 1). In less formal situations, with the cooperation of non-visual impaired students and of an assistant student, graphs were drawn in foam paper to produce tactile displays.

One week before each theoretical class, the student received a copy of the teacher’s class presentation and other documents, in digital form, together with graphics in Braille made by CASED. With the help of an assistant, mathematical and statistical formulas were converted to oral form to allow the student to use JAWS (Job Access With Speech)—a screen reader which cannot read mathematical notation—and to help him study the material without any assistance. The teacher also helped by explaining verbally each one of the mathematical expressions written on the blackboard. This helped him take notes and understand statistical formulas easily.

The theoretical exams were provided to the student as a Word file. Using JAWS, he was able to solve the exams

by himself, requiring only half an hour of extra time. Any graph included in a problem was provided in Braille code.

The performance of the student in the written theoretical exams was very satisfactory. According to him, he had no problems in understanding the theoretical classes. Group work and research work were particularly beneficial to him by enhancing interaction with other students and reinforcing the comprehension of fundamental statistical concepts and methods.

For the laboratory exams, JAWS screen reader can convert text in audio for common programs like Microsoft Word, Excel and PDF documents. However, JAWS cannot read R codes and outputs, and this caused some problems with laboratory work involving R.

Some of the difficulties dealing with R affected the overall performance of the student in the practical exams. In the first course, he was in the upper 10% of the class, while in the second course he was in the upper 30% of the class.

An evaluation by the student of the teaching strategy



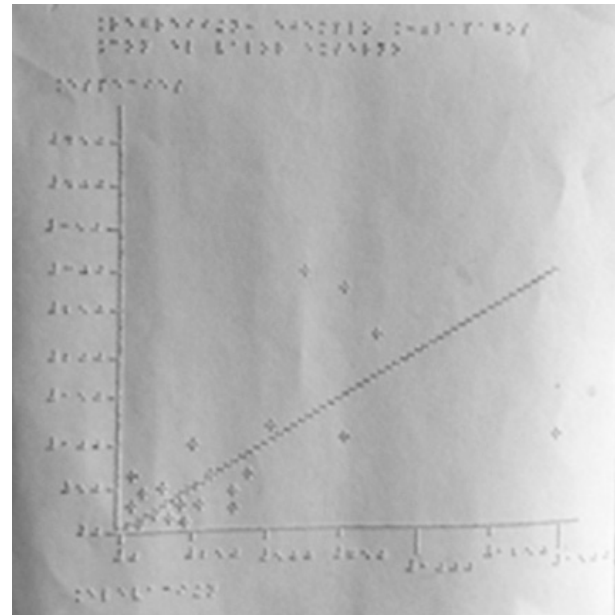
Concerning the courses related to mathematics like calculus and statistics, the opinion of Henry was that they meant more than an academic requisite, they also became a personal challenge. The challenge was not only cognitive, but also with ways of adapting

to the use of teaching materials, converting contents to other languages, and using new teaching aids different to the blackboard and the video beam projector. He emphasized that the cooperation of teacher and other students was primordial for obtaining positive results.

The student also stressed the constant effort and compromise demanded from him, and the benefits he received from the personal attention offered by his instructor in solving problems, and from the class experience of listening to general explanations given to all students concerning the conventional approach for solving problems and applying it to his particular needs. He concludes that: "The experience was valuable and successful because it was participative; it was not based on recipes on how to do things; all parts involved offered their best disposition, and also because creativity and wit to face situations were part of the strategy." (Martínez Hernández, Henry, personal communication).

Recommendations and conclusions

There is a lack of appropriate software to aid totally blind students in the quantitative field. A computer program



Graph 1. Scatter graph and regression line in braille characters.

such as JAWS provides them the possibility of reading textbooks and documents by themselves, but it does not include mathematical notation. Most of the statistical software programs are not designed for blind people. It is necessary to create statistical software that allow interaction with screen readers such as JAWS, to help blind students to perform statistical analysis by themselves.

It is very important to establish an effective communication between the teacher and blind students, especially when the former has not received any training in teaching visually impaired students. Concerning exams, multiple-choice items may be a better option or oral examinations. Specifically, oral tests focused on interpretations of basic statistical concepts and results may be more useful for blind students.

Acknowledgements

The authors acknowledge the great cooperation provided by Henry Martínez Hernández, who not only offered valuable recollections of his experience while attending courses, but also his personal written evaluation of the teaching strategy applied to him. ■

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Afshin Ashofteh



The challenges of improving statistical literacy in Iran

Statistics is a language, comprising data and information, very similar to music. Statisticians like musicians or composers, speak their musical language of data fluently—importantly, in creating their masterpieces, they understand the right time for silence!

A statistician or a data scientist should be creative enough to compose good music—music that people will intuitively love and understand. Statisticians should know how to employ different statistical tools, concepts and software like a musician playing different instruments. To do this, statisticians must understand not only statistics, but also IT, data literacy, business and idea synthesis. So, a data scientist should have multi potential super powers!

Let me ask something important: “Why do we, statisticians and data scientists, still want to go to work in our offices in this day and age when we can actually work from anywhere using technological devices?” I think it is because we want to play our statistical instruments in an orchestra!

To do this, we must learn how to broadcast statistics and metadata simultaneously and in harmony. We should communicate and participate in giant collective

experiences together and play our different instruments, not in a predefined way but in a harmonious floating platform. A functioning orchestra should pull us to into data pools and then create valuable information before disseminating to everyone.

Then we can do magic. Turn data to something of high value. Data scientists have mastered the art of doing ‘more’ with ‘less’. Now we must learn to:

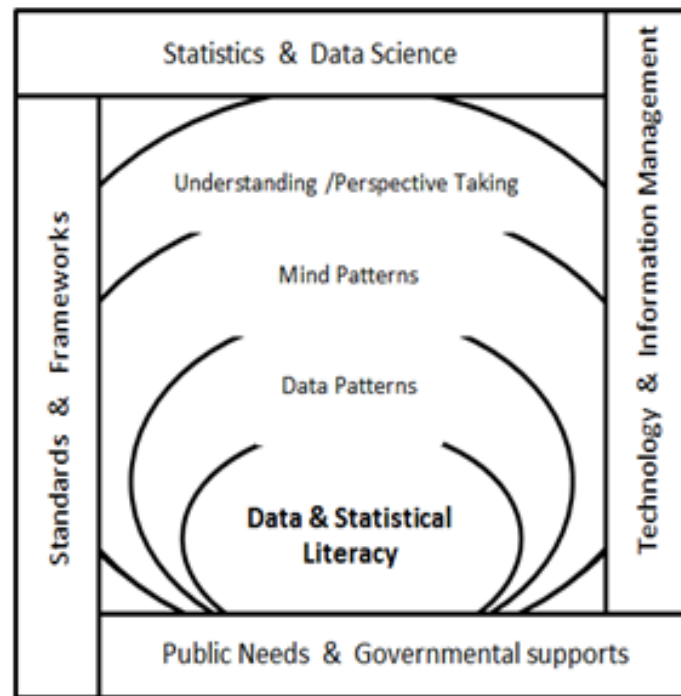
- Keep statistics simple and easily understood, like music;
- Avoid fragmenting statistics into separate small pieces, but rather presenting them as a coherent set, so they can play together like an orchestra;
- Improve statistical literacy so it become a common language in public.

The result would be ‘better understanding’, ‘perspective’ and a ‘better life’. Understanding the world and different perspectives have always been central to the progress and development of mankind. Improving the world’s understanding and empowering the development of different perspectives in order to understand how to relate to others, to perceive thoughts, feelings, and emotions actually requires a universal language to find, design and read mind patterns.

This common language should be based on two fundamental components. Firstly, a grammatical framework based on uncertain rules of mathematics to guarantee the achievement of a maximum level of coordination with the real world, and secondly, data to act as the language’s universal alphabet which is recognized as the evidence of the real world. This language, known as “Statistical Literacy”, would be a universal language, allowing us to discuss patterns extracted from data, facilitating understanding and challenging perspectives.

In this article, I as the ISLP coordinator, will describe how this language has been developing so far in Iran.

As noted already, ‘statistical literacy, would be considered as a universal language which extracted patterns from data, in order to improve understanding and challenge perspectives. Let’s consider the shape of the relationship between improved understanding and statistical literacy as a tornado whose narrow end or base touches statistical literacy i.e. statistical literacy is the input and the result or output is improved understanding. This tornado system is confined in the space built by four elements: technology and Information Management; statistics and data science; international as well as the local standards and frameworks; and public needs and governmental supports. If the size of these elements were increased somehow by developments or improvements, then the possibility of improvements in statistical literacy could be considerable.



Comprehensive plan for statistical literacy in Iran

The following activities were compiled as a comprehensive plan to improve statistical literacy in Iran during 2008. Accessibility to all of these facilities was free of charge and the benefits from workshops and optional payments for books were donated to charities, especially to Mahak (Society to Support Children Suffering from Cancer in Iran).

1. Designing a Persian website about Statistical Literacy;
2. Starting an online statistical literacy journal;
3. Preparing and organizing of eleven presentations and statistical literacy workshops;
4. Publishing two books in Persian. The first, a story book, published in 2010 was full of statistical literacy concepts in very simple language. This book was published in celebration of World Statistics Day. The second book, a more scientific book dealing with statistical literacy was published in 2015 and the latest book. It was selected by Iran's Ministry of Education to be used as a reference for Mathematics and Statistics book in high schools;
5. Organizing an ISLP poster competition for Iranian students in 2011;
6. Starting some studies on statistical literacy in monetary and financial systems, preparing a book in the field of statistical management of financial systems specialized for banking and also developing the concepts of big data mining in statistical banking systems;
7. Undertaking the following activities in cooperation with Iranian Statistical Society:

- Writing articles for the Iranian Statistical Society newsletter from 2013;
- Convincing the Iranian Statistics Society to accept statistical literacy as one of the main sessions of Iranian statistical conference which takes place every two years in Iran with around 1000 participants;
- Linking the Persian statistical literacy website to the main page of Iranian Statistical Society website;
- Reviewing two books on statistical literacy for the editorial committee of Iranian Statistical Society.

A complete report is available online as a post at:

<https://www.linkedin.com/in/statas>

Acknowledgment

The completion of this task as a coordinator of ISLP would not have been possible without the participation and assistance of so many people whose names cannot all be enumerated. The contributions of all ISLP related individuals, Iranian Statistics Society, Isfahan House of Statistics (especially Dr. Nasrolah Iranpanah and Dr. Ali Rejali), the Universities and statistical authorities of Iran are sincerely appreciated and gratefully acknowledged. ■

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Making societies data literate by working with journalists and online news media

Pim Bellinga

We're facing a big challenge: most people in our societies do not have adequate skills to interpret quantitative information. Current initiatives to increase data literacy target students in traditional education. This is a good and necessary step. But it is not enough. We must also focus our attention on the big group who are no longer in traditional education anymore. To reach this majority of citizens, I argue we need to turn our attention to online media and form collaborations with journalists. Here's why:

Viral misconceptions

For a few years now, infographics—informative visuals, often containing quantitative information—are shared by everyone. In newspapers, on blogs and on social media, such as Facebook. This should be a joyous thing. People are supporting their arguments with data! Data are becoming accessible to everyone with an internet connection, not only the experts anymore. What a wonderful trend.

However, making data accessible and shareable is not enough. In fact, it has amplified an already existing problem: the widespread misinterpretation of data. Allow me to illustrate this point: on the internet, a lot of infographics are shared like the one shown in Figure 1. It paints a grim situation: over the years, the number of vaccines has increased. In those years, autism rate has increased as well. The conclusion most readers draw from this: “vaccines are causing autism. The data show it.”

Over the years, this interpretation has spread like wildfire. Especially in the USA, where, for example, in parts of Minnesota, the vaccination rate has dropped from 92% in 2004, to below 42%, way below the critical level, leading to the largest outbreak of measles in years. [\[Source\]](#)



Infographic showing numbers used to support the claim that vaccines cause autism. [\[Source\]](#).

As you know: correlation does not imply causation. Whether vaccines cause autism cannot be concluded from this graph. For that, we need to turn to the gold scientific standard: Randomised Control Trials (RCTs). Over the past decade, this relationship has been studied using RCTs. So far, no evidence of a causal relation has been found. [\[Source\]](#)

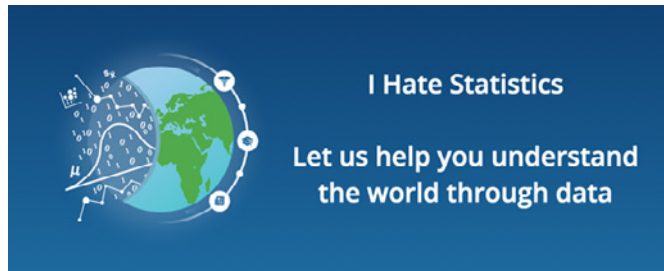
The problem: most people are not aware of this distinction between correlation and causation. They see an increase in vaccines and autism and conclude that vaccines must cause autism.

Meaningful data requires interpretation

In order for people to make the right choices, for their own lives or the lives of their children, they need to have the necessary skills to interpret the data. Meaningful data requires interpretation.

I believe that, just as we expect all citizens to be literate enough to be able to read a menu, we must also expect all citizens to be numerate and data literate enough to ask critical questions about the data that are presented to them.

General numeracy/data literacy. This is a topic I am very passionate about. Why? I am one of the founders of a social enterprise called ‘[I Hate Statistics](https://www.ihatestatistics.com)’. We’re based in Amsterdam, in the Netherlands. Our mission: to make data and statistics approachable and understandable for everyone. In particular, for those who now think that they hate statistics.



www.ihatestatistics.com, helping people understand quantitative information.

We support schools and universities in blending their statistics education with other subjects. We have created an online platform where students can practice and receive direct feedback. Teachers can tailor it to match their course and adapt all our materials.

In addition, we provide learning materials for students, such as simulations and stories, to help them better understand what they are doing conceptually.

Over past years, we have supported hundreds of courses and thousands of students:

“I think your website is one of the best sites I’ve ever used to better understand a course.”

“I find it to be very useful! If I find any chapters particularly confusing, I can better understand them through these exercises.”

It’s great to hear students are happy working online and we’re committed to keep supporting traditional education. Yet one day, a simple insight struck me:

Most people in our societies are not in traditional education anymore.

How to create data literate societies?

So the real question is: how do we help people—who often are no longer in traditional education anymore—become aware of the dangers of misinterpreting data and how can we help them learn the necessary skills?

We see as the answer to this question: close collaboration with journalists and the media. The media have access to a huge public, they write engaging stories and in their stories they could educate the public step by step.

But how to approach this? This was the question we asked ourselves when we [weighed in on this problem at the United Nations World Data Forum](#).

In order to appeal to the general public, we have identified five criteria, to which a solution must adhere:

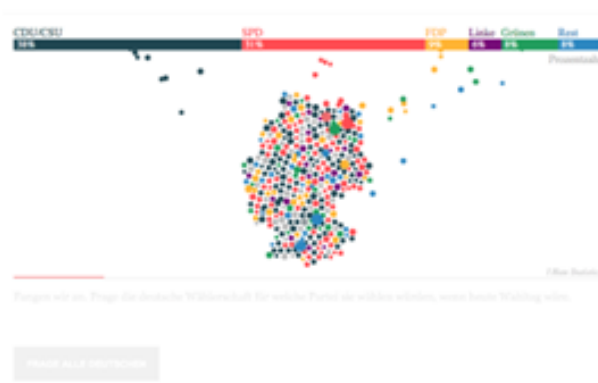
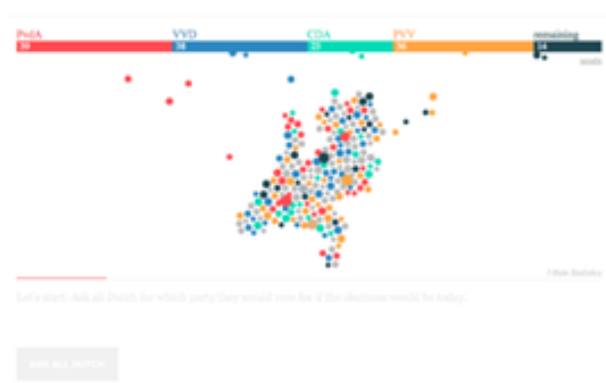
1. **Short**—because people have short attention spans online;
2. **Visual**—because people do not read text carefully when casually browsing;
3. **Interactive**—because people have different speeds at which they can comprehend new material;
4. **Relevant**—because the target group will only be interested in the possibilities and solution that statistics offers, instead of learning about abstract statistics;
5. **Discoverable**—because the target group will not be actively searching for material on statistics and do not have teachers suggesting material.



I Hate Statistics co-founders Pim Bellinga (left) and Thijs Gillebaart (right).

www.snapstat.org

Interactive explainers to help readers and journalists
Increase their numeracy and data literacy



Our solution: interactive explainers in online news media

The solution we came up, a project we dubbed [SnapStat](#), with that covers all of these five criteria: interactive explainers. [See what we mean by that through our first example here](#). It is about sampling variation in election polls and can be embedded in online news articles.

This explainer has been covered in news media (including the national news) in the Netherlands, and has been localised to the UK, Germany, Kenya and the Czech Republic.

We wrote a full paper about these explainers, which we presented at the IASE conference in Marrakech. [Read a preview of our paper here](#).

The first results have been very promising. In total, over 20.000 readers have seen the explainer, and more than 65% have finished the whole explainer. That is thousands of readers who have learned about sampling variation! We have barely scratched the surface of what is possible here.

Work with journalists to increase general data literacy

In this letter, I have made the claim that most people do not master the necessary skills to interpret data correctly. I have made an appeal that journalists and the media are the key to solving this problem, because they have access to the general public.

I have shown one example of how we are working with journalists to increase the numeracy and data literacy of the general public: interactive explainers.

I hope that more people from our statistics community will join this mission so that in a few years, you will never hear anybody in our society say: I Hate Statistics! ;-) ■

Warm regards from Amsterdam,
Pim
I hate statistics co-founder

More info:
www.snapstat.org
www.ihatestatistics.com
[IASE paper preview](#)

What can be hidden inside a collection of numbers? Where are the numbers from? Is it possible to predict something using them? What do you want to say with them? A collection of numbers on their own may not tell us much, but making graphs from them may tell us something about a studied phenomenon. Analysing statistics helps us to understand numbers. This is the message I have tried to get to young people in different subjects.

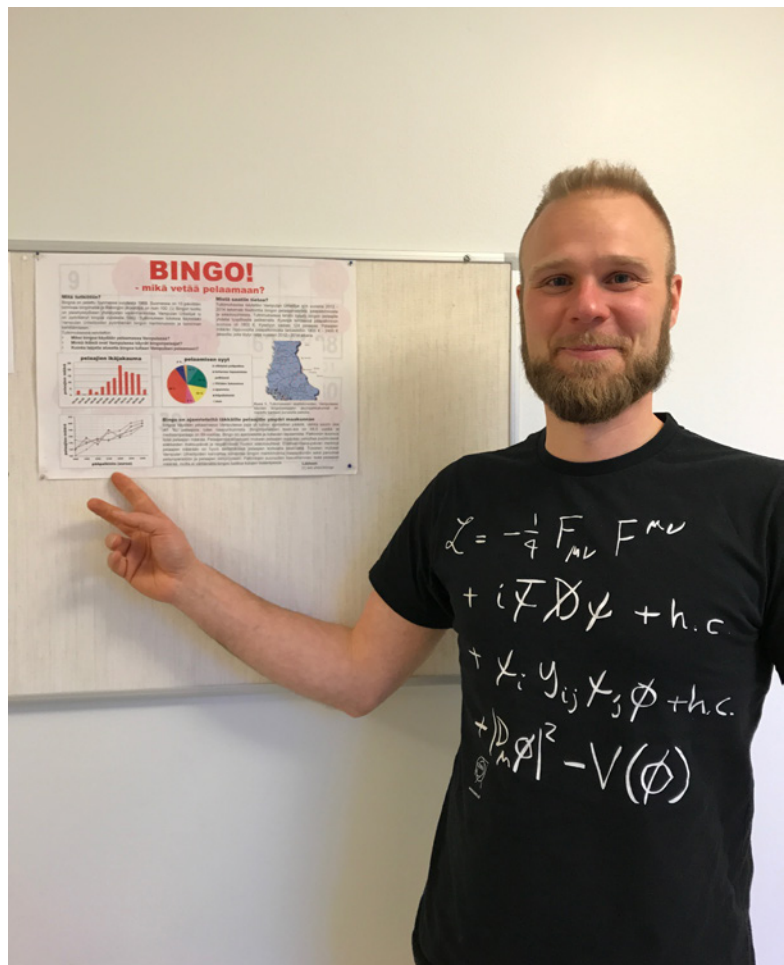
We weight matter in nine different volumes and measure the mass of each volume. The results are displayed in Vm-coordinates along with a graph. We drop a basketball from high floor and video the drop. The video is watched frame-by-frame and the ball's position is examined as a function of time. These are two typical measurements that are done in the first compulsory course of physics in high school. A physics teacher uses graphs and statistics daily when teaching and imparting information. A physics course illustrates the many ways generate, use and interpret statistics and charts—probably even more than a course on 'Statistics and probability' in mathematics.

Statistics are used in every subject in high school. Usually statistical charts are sector, bar and line charts, which are used to read values in order to try and understand the direction of change. The interpretation is, from a maths teacher's perspective, viewed as shallow. They might even challenge whether this really qualifies as interpretation of statistics at all. The focus should be directed more towards analysing statistics and assessing their reliability. Of course it is worthwhile remembering, that a student must be able to make graphs and diagrams so that he/she is able understand statistics, even if only at a basic level.

Statistics in studies

In the new curriculum for short course mathematics, statistics has been given more space. In the old curriculum the focus was on diagrams and basic statistics. In the new curriculum the inclusion of correlation and regression allows for more in-depth interpretation. This is a very useful development, as students will need to understand dependencies between variables and have the means to describe a study quantitatively when undertaking studies in higher education. Today statistical centre and dispersion are comprehensively taught and analyses are made using computers.

The changes outlined for mathematics are in their infancy. Having completed a 'Statistics and probability' course, students should be equipped to make statistics and use different models. But understanding relative change seems to be very hard for most students. I have tried to use different vertical axes to illustrate how important it is to detect and understand rela-



The 'bingo' poster, from Lauttakylä high school, hangs on the classroom door as an example for other students. The poster is displayed by physics and mathematics teacher Kalle Vähä-Heikkilä.

Kalle Vähä-Heikkilä

Statistics from many points of view

tive change. During the course students examine the relative change in many different contexts. Perhaps the poor understanding of the relative change comes from a poor understanding of how to calculate percentages? We see in financial mathematics, where lots of percentages are calculated, students pay more attention to relative changes. So perhaps financial mathematics courses should include statistics and vis-versa?

The interest in studying statistics is also affected by the probability element of the 'Statistics and probability' course. Most students find probability very difficult or even impossible. In exams, students score better in the general statistics section than in the probability section. Unfortunately the grade is determined by the average of the two sections. The probability section leaves a bad taste. So much so that, after taking the course most students don't ever want to go near the subject again, even with a long stick. I have tried to keep these two sections separate, so that the statistics part would stand out, and students might have a slightly more positive image of studying statistics.

Statistics as the prophets of the century

In teacher's work you often notice that students associate producing statistics with bar charts and fraction lines. Students perceive statistics only as categorising things. When teaching both mathematics and physics I have tried to bring out the many-sided usage of statistics in different areas of society. I have described statistics as the prophet of the century. The students should be aware of the continuous generation of data, and statistics derived, from smart phones, internet search patterns and bonus cards.

When speaking about saving the data of smart phone usage and using it to control the behaviour of people to students, their interest in statistics grows. Statistics and research should be made concrete for students. At the same time they should be informed of the education and work opportunities that need statistics and statisticians.

Bingo!

My students participated in Finland's statistical poster competition in 2015 and won Finland's high school level. At first a few students were very excited about the competition, but eventually only two second year boys made a poster. They both were involved in a local sports club and after we had thought about the subject together, they started studying the Bingo activities organised by their club.

The competition was very educational for the participating students in the sense of how to conduct a study. They needed to think about research questions and

collecting data – what kind of data and how it could be collected for the study and how much data would be needed? The biggest motivator was their own village's sports club and the idea that the research undertaken for the poster could possibly help in informing the club's Bingo activities.

The teacher's role in the poster study was to guide the students in investigating the research question and the related survey. I provided revision sessions on statistics for anyone interested in the competition. Students found this useful. The students making the poster were able to use different diagrams surprisingly well. They also used a geographical map to depict the phenomenon.

Both students participating in poster competition were also studying physics. The linear regression and correlation coefficients used in physics may have been helpful, as they modelled the Bingo's income's dependence on the size of the prizes and found a mathematical dependence between them. The sports club also benefited from the poster, using it to market and develop the income from bingo.

All in all, the poster competition was a very positive experience. I have used the methods learned during this time again—in the 'Statistics and probability' course.

Statistics as a theme

Statistics should be an excellent fit with the new primary and secondary school curriculum or as a theme course in high schools. Statistics are related to every subject and especially to everyday life. With statistics it's easy to integrate mathematics into interpreting other subjects. On the other hand, by making statistical posters you can use the studies in arts, media and foreign languages. Finally, making statistics can be connected to student guidance by making a visit to a company using and analysing statistics. ■

Kalle Vähä-Heikkilä

The teacher in mathematical subjects in Finland 2018
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“Merakyatkan statistik”

(Popularising statistics amongst citizens)

Mohd Uzir Mahidin

Statistics Literacy is essential for enhancing a country's economic strength and creating opportunities for people to develop skills that will help them to make better decisions, addressing change and making plans that enrich an individual's life and help them to face today's globalised world.

In 2014, the Government of Malaysia introduced the concept of humanizing the public service, in line with the Malaysian concept of “*People First, Performance Now*” to create a people-oriented civil service. In line with this recommendation, as a producer of national statistics of integrity and reliability, the Department of Statistics, Malaysia (DOSM) has introduced the “Merakyatkan Statistik” approach (popularising statistics amongst citizens)

aimed at intensifying awareness, correct interpretation and understanding in order to promote statistics as an attractive and beneficial tool for evidence-based decision making. A better understanding of statistics, from the individual perspective, will help people to fully participate in today's knowledge-based economy and contribute to community well-being.

In line with this initiative, DOSM organised a holistic strategic initiative that provides a platform for the transformation of statistical literacy among the public, including students at school and university. The engagement sessions with the community is an important programme practiced by DOSM, since 2011, to create awareness among Malaysians.



ASEAN Stats Run.



Mini Carnival Students.

At state level, DOSM's state offices successfully organised the engagement sessions with the community on an annual basis, targeting stakeholders, government and private agencies, researchers, media, business communities, academicians, students as well as the general public. This helped to highlight the significance of statistics for the community and also for the nation, and more particularly the function and role of DOSM in producing the real-time statistics for monitoring national economic performance and social development. As of September 2017, a total of 317 engagement sessions were successfully implemented across the nation.

National Statistics Day

In 2017, the Government of Malaysia officially declared 20th October as National Statistics Day (MyStats Day). The first MyStats Day was celebrated nationwide with the theme "*Merakytakan Statistik*" and interacted directly with the people by organising various activities with initiatives to create awareness on the statistical significance among Malaysians. Among the programmes organised in 2017 are the ASEAN Stats Run, Dialogue Session, and Mini Statistics Carnival.

A total of 4,200 citizens from all age group participated in the ASEAN Stats Run, consists of 13 categories which

was held on 20 October 2017 in Putrajaya, Malaysia. Meanwhile, the National Transformation 2050 (TN50) Dialogue: Empowering Statistics towards TN50 was held on 20 October 2017 involved about 500 people from government agencies and university students. The session was moderated by the Chief Statistician of Malaysia. The dialogue emphasised the importance of partnerships and sharing information among the ministries/agencies to ensure the coordination of national policy towards the national development in 2050, in particular, to strengthen the field of statistics; as well as to promote the sharing and aspirations of the younger generation towards the country's statistical capacities in the future.

In addition, mini statistics carnivals were conducted for 4 days between 23 and 26 October 2017 at the Malaysian Statistical Training Institute with a focus on the general public and students. A total of 600 people have participated in this carnival which emphasized education and fitness programmes such as Statistics Talk by the chief statistician, an innovation exhibition, a statistics clinic, a Robotics Exhibition, innovation talks, a statistical treasure hunt and a FunFit DOSM and so on. Similarly, throughout October to celebrate MyStats Day, DOSM's state offices also hosted programmes at the state level, namely statistical poster drawing competitions and statistics exhibitions schools and Universities, statistics talks on the state



Exhibition at School.

radio stations and visiting villages to promote statistics in rural areas. Overall, the Department has received an overwhelmingly positive response from the public to the MyStats Day celebrations in 2017.

Collaboration with other institutions

In order to promote the use of statistics and create opportunities for new scientific findings in statistical research as well as contribute to the country's transformation programmes, DOSM has signed a Memorandum of Understanding (MoU) with the higher learning Institutions. By October 2017, 23 MoUs had been signed. These provide an ideal opportunity for students to generate new relevant knowledge through academic research activities meanwhile, for DOSM, they will encourage the sharing of accurate methodology to assist with the production and interpretation of official statistics and research findings. They should also help to develop skills especially in journalistic and technical writing which are acknowledged at the domestic and international standard.

With the same objective, and with smart collaboration between DOSM, the Central Bank of Malaysia and the Malaysia Institute of Statistics, the Malaysia Statis-

tics Conference was hosted annually since 2012. The conference provides great opportunity for compilers to share their statistical methods, management, and dissemination; while for users, such as policymakers, researchers and academics it is a platform to discuss the transition of complex data into meaningful and useful information. A better understanding of the processes and challenges of compilers and users, with respect to data collection and usage, will facilitate greater collaboration and stronger commitment to improve the respective processes, tap opportunities for improvement, and address relevant issues. In view of this, efficient information management and accurate data analysis will help us to keep track of our performance and effectiveness as we move forward.

Promoting statistics and data

To promote friendly and professional statistical services for the purpose of formulating or implementing government policies and private sector initiatives, DOSM has made 26 courtesy visits to government and private agencies. The objectives of these visits are to foster closer cooperation as well as promoting data sharing and enhancing the use of administrative data.



Launching Visual Communication.

To facilitate economic analyses, so that researchers and media clearly understand the DOSM's published statistics, DOSM has organised quarterly briefing sessions, particularly with regard to economic statistics. As of October 2017, a total of 2 briefing sessions had been successfully organised explaining the current economic indicators, such as, Gross Domestic Product, Gross Domestic Product by State, 2010-2016; Gross Domestic Product of Small and Medium Enterprises (SME GDP) 2016; Travel Satellite Account 2015; International Service Trade Statistics 2016; Consumer Price Index; Balance of Payments; Foreign Trade; and Use energy.

Younger generation and social media

To attract the interest of the younger generation, DOSM has diversified the mode of data dissemination and visual communication. DOSM successfully launched 'People Centric Statistics through Visual Communication' by introducing three innovative products, namely: the mobile application MyLocalStats to publish districts statistics; mobile application BizCode@Stats to publish Business Code; and a Consumer Price Index (CPI) Capsule to understand CPI through visual communication.

In addition, to advocate for and foster the use of statistics in decision making by government and individuals, social media are also seen as a main target. Media can act as a medium for the promotional tools designed to publicise statistical data. In the long term, the initiatives should include all parties from citizen to decision-makers. Therefore, DOSM leveraged on social media such as Facebook, Twitter, Newspaper and Radio Station to broaden the communication of statistics to the wider community. The statistical info-graphics have grabbed the attention of the media, academics and general users.

DOSM strongly agrees that statistical literacy is of paramount importance to make statistics more understandable and help people to make evidence-based decisions as well as for the government in socio-economic planning and policy formulation. ■

YBhg. Dato' Sri Dr. Mohd Uzir Mahidin
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uzir@stats.gov.my



Some ACT teachers and participants.

International and Australian perspectives on statistics and outreach activity

Peter Howley

International industry and economic forum reports espouse critical thinking, problem solving, analytic capabilities, curiosity and imagination as critical ‘survival skills’ in the workplace of the future. In Australia, the national and state education curricula identify key general capabilities which align with such skills, and the primary and secondary school systems are embracing a culture-shift from siloed learning approaches, and an increased focus on quantitative skills and literacy, civics and citizenship, and diversity.

The practice of statistics requires and nurtures these skills through its interdisciplinary, collaborative, investigative, creative, problem-solving, evidence-based, com-

munication-oriented nature. However, a prime stimulus of student engagement and promoting independent learning often lost in the teaching of statistics is context. Practicing statisticians have a context, and a problem to solve, and have chosen their environment rather than having it thrust upon them. Allowing students to take the lead, determine the context and self-diagnose are powerful motivators. Developing interest in statistics within interesting and self-motivated problems must be done early in a student’s experience, to instil that statistics is an enabler, not a curse. Such interactions with statistics must infuse a recognition of how the field is not only valuable but, significantly, accessible to students; that it is an appealing and achievable pursuit.

Such an approach to developing awareness of the practice of statistics, engaging students through contextualised practice in areas of their choosing, and engendering those key community and workforce skills is exactly what the National School’s Poster Competition in Australia is primed to support. The national initiative in Australia has involved collaboration between University academics, national societies (Statistical Society of Australia and Commonwealth Scientific and Industrial Research Organisation (CSIRO)), industry professionals, schools, media experts and sponsors (SAS, Teacher’s Mutual Bank, RDA Hunters’ ME Program), with additional support from the Australian Government’s Department of Education and Training.

As part of its systems focus and development of both teachers and students to become aware of the practice of statistics and increase their expertise in statistics, supporting networks and resources have been developed. These include:



Winners and Teacher with me.

— Thirteen 4-minute videos of industry and career experts outlining their experiences and exemplifying the importance and application of statistics in practice – presenters include representatives from QANTAS, NASA, Hunter Valley Coal Chain, NSW Health, and many more – see <https://www.ssaipostercomp.info/resources.html>.

— Twelve animated 4-minute videos introducing statistical concepts along with supporting resources – see <http://statstuneup.com.au/>.

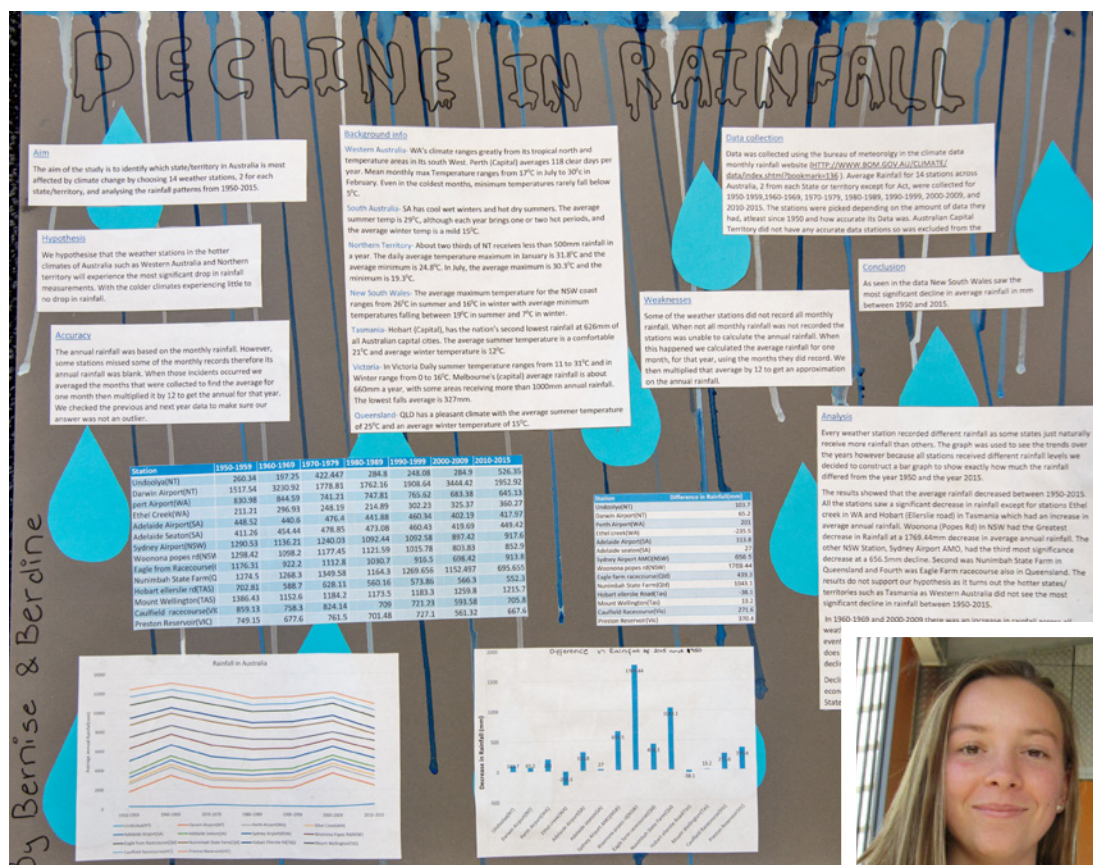
I am largely driven by the ideology of community and everyone supporting one another, providing platforms for people to enjoy a sense of contribution, fulfilment and feel inspired to reach greater heights. Based on the premise of we all need one another, and the underlying school-to-career supply chain model, a key element of the initiative (and its success) is to not treat schools at arm's length, but rather to develop strong connections with schools. This needs the collaborative efforts of academics, national societies, professionals, sponsors, schools, and teachers. Even the entrants themselves are part of a cooperative framework. Annual poster display and awards ceremonies (See Figures 1-3) as well as a mentoring model connecting industry, primary, secondary and tertiary educators and facilitating the delivery of the initiative in schools, exemplify aspects invaluable to the project's success.



People at poster display.

I feel honoured to have been awarded the ISI's 2017 Best Cooperative Project Award, it was greatly appreciated. I am equally pleased to have been invited to join and contribute to the ISLP advisory board. ■

Peter Howley
Professor
The University of Newcastle
peter.howley@newcastle.edu.au



Next ISLP Poster Competition is starting

Jukka Sireni

The 6th International Statistical Literacy Competition will start in January 2018. The competition was held for the first time in 2008-2009. Since then it has grown steadily. The 2016-2017 competition had more than 12,000 students from 23 countries participating. The winners of the latest competition came from South Korea and Australia.

The ISLP poster competition asks students to make a statistical poster—to conduct a small statistical study on any field of their own choosing. Students start with an interesting research question or a hypothesis. After that they must collect or find data, which will be analysed statistically to reach the answer to the research question. Thereafter they can present their conclusions. All of this should be presented in a clear and attractive poster with appropriate text and statistical charts or tables.

A poster has a rather limited space. A poster should 'stand alone' and make sense without any additional

explanation. So students must plan the contents carefully. The research question should be such that it can be presented and answered within the confined space of a poster. What information to present and how needs to be carefully thought through. The main results should be clear and easy to find. Every piece of text, figure or table should contribute something to the presentation.

Even though learning to use and present statistics is important, it is not the only aim of the competition. Students will also learn to work together in teams. They will also develop their written, oral communication and graphical skills. Most importantly, competing and collaborating with friends is always fun.

The competition has three categories: students born in 2002 or younger, students born in 1999 or younger and undergraduate university students with no age limit. Students from all fields, not just statistics, are encouraged to participate, as statistics are needed everywhere.



Older age division winners, Bernise Roelofse, Berdine Roelofse, Baldvis Secondary College, Australia: 'Decline in Rainfall'

How to Make History More Interesting

Motivation for research

While reading history books for young students, we saw that many reviewers commented, "Although history can be a boring subject, this book teaches history in a fun way." Also, many of our friends complained about having to learn about boring history. After hearing this, we wanted to find out how students could get more interested in learning history by surveying the students in our elementary school. Along with this student survey, we also conducted a survey for teachers to find out the difference between the opinions of the lecturers and learners.

Preliminary research

Recently, after the Ministry of Education issued controversial state-authored history textbooks, a Korean newspaper found that 95.4% of parents surveyed thought that learning history is important for students. In addition, an English education institute, Yous English School, conducted a survey of 569 elementary and middle school parents nationwide, focusing on the favored method of studying history. It showed 39.3% of parents preferred going on field trips to museums, followed by reading educational comics and magazines (23.8%) and listening to online lectures (20.4%). However, despite the parents' opinion, many students consider history to be boring and unnecessary. We decided to look into the students' opinion toward learning history.



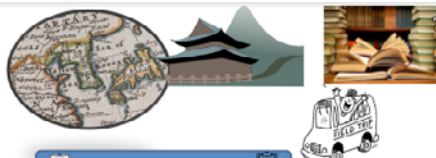
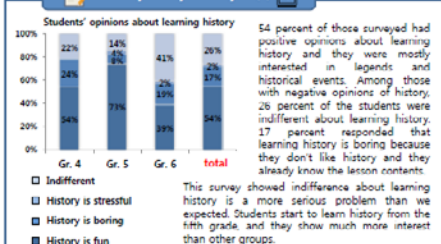
Primary research goal & Method

► Primary research goal: Find what students think about studying history, and what they think is the best way to study history

► Research subject: 167 students in 4th, 5th, and 6th grades at Seoul *** Elementary School

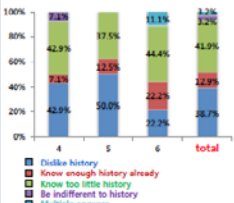
► Research method: Survey

Primary survey & Analysis (I)



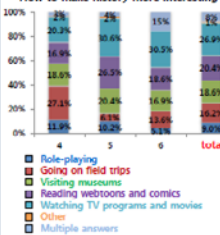
Primary survey & Analysis (2)

Why students feel negatively about history



5th grade students are very unfamiliar with history so they answered they feel bored and pressured. They realized that they don't have much knowledge about history when they started taking history class. The most interesting part of this survey was of the 6th graders, 44.4 percent replied they are not interested in history at all. This may be because they learn history mostly based on textbooks and teachers' lectures and don't have enough firsthand opportunities to participate in class.

How to make history more interesting

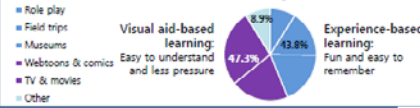


For the question how to make history more interesting, watching TV programs and movies turned out to be the most popular (26.9 percent), followed by reading webtoons and comic books. This was because TV programs and movies are interesting and easy to understand for students. This enabled them to remember the story or events well long term.

The 4th grade favored activities which can be experienced firsthand, like field trips, watching TV programs and movies, followed by visiting museums. Compared to the older group, the lower grade's group were positive about experience-based learning.

The 5th and 6th grades preferred visiting museums over field trips, and the percentage of 5th and 6th grade students who chose webtoons and comic books was greater than 4th graders. There was no difference between genders.

Reasons for choosing each method



Secondary research goal & Method

► Secondary research goal: Find teachers' opinion about learning history

► Research subject: 20 teachers in Seoul *** Elementary School

► Research method: Survey

Secondary research & Analysis

Teachers' opinion on how students can learn history in a more interesting way



The teachers replied field trips (43 percent) as the most interesting way to learn history for students. Students can actually feel, see, explore and experience history to learn it more easily. In addition, teachers also preferred using role-play because students could have firsthand experience.

Most effective way that teachers used to study history



When studying history as students, teachers read books (50 percent), followed by summarizing with notes (40 percent), but the surveyed students wanted to learn through actual experience.

Is watching TV or movies an effective way to learn history?



Teachers agreed with students that TV and movies can be an effective way to learn even though teachers chose reading books as the most effective way they learned history as students.

Does each grade need different learning methods?



Lastly, teachers agreed on setting a different learning method by grade.

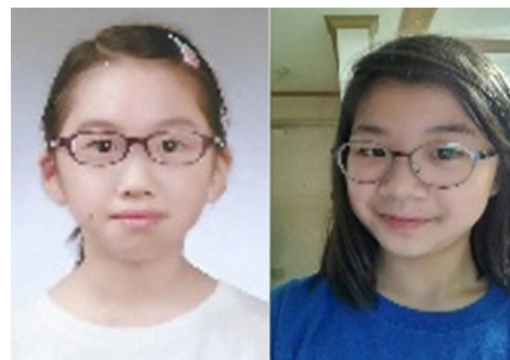
Conclusions & Suggestions

- In conclusion, hands-on experience and field learning should be accompanied by a differentiated curriculum by grade.
- Generally, students preferred watching TV programs or movies. Historical dramas and movies are easily understood. However, students should be careful using this as a main learning content, and it needs teachers' comments and explanation.
- Also, the curriculum for the 4th grades should include more frequent field trips as the survey results showed. In addition, 5th and 6th graders need a lot more opportunities to participate in class. With watching TV programs, movies, dramas, or webtoons, an in-class discussion should follow.
- Because teachers pointed out reading books was most efficient for them, students should organize the information with books after watching TV programs and movies.
- Setting a variety of different learning methods is important and makes more opportunities for the students to participate for themselves. This can lead students to pay more attention while learning.
- The creation and distribution of educational history programs should be done by the Ministry of Education and teachers systematically.
- At the same time, visual aids should be used more often in the upper grades for their visual curiosity and attention.
- When using visual aids, teachers should fully discuss the fictional parts and the contents to help students understand the right information.

Personal opinion & Future research plan

- Personally we expect more educational applications or programs equipped with

Younger age division winners: Jo Yuna, Lee Yena, Seoul Dongho Elementary School, South Korea: 'How to Make History More Interesting?'



Competition starts	8 January 2018
Posters submission deadline	Country dependent
National winners announced	latest at 30 March 2019
International winners announced	18 - 23 August 2019

The competition begins at school. Posters are compiled in teams of 2-5 students and here the best posters are selected. These school winners are then sent to the country coordinators of the national competition. The way the competition, especially the university category, is arranged may vary in different countries, so ask your country coordinator for more information.

In each country a national jury decides the winners, and who will progress to the international competition. An international expert statistical jury will decide the winning posters, which will be announced at the World

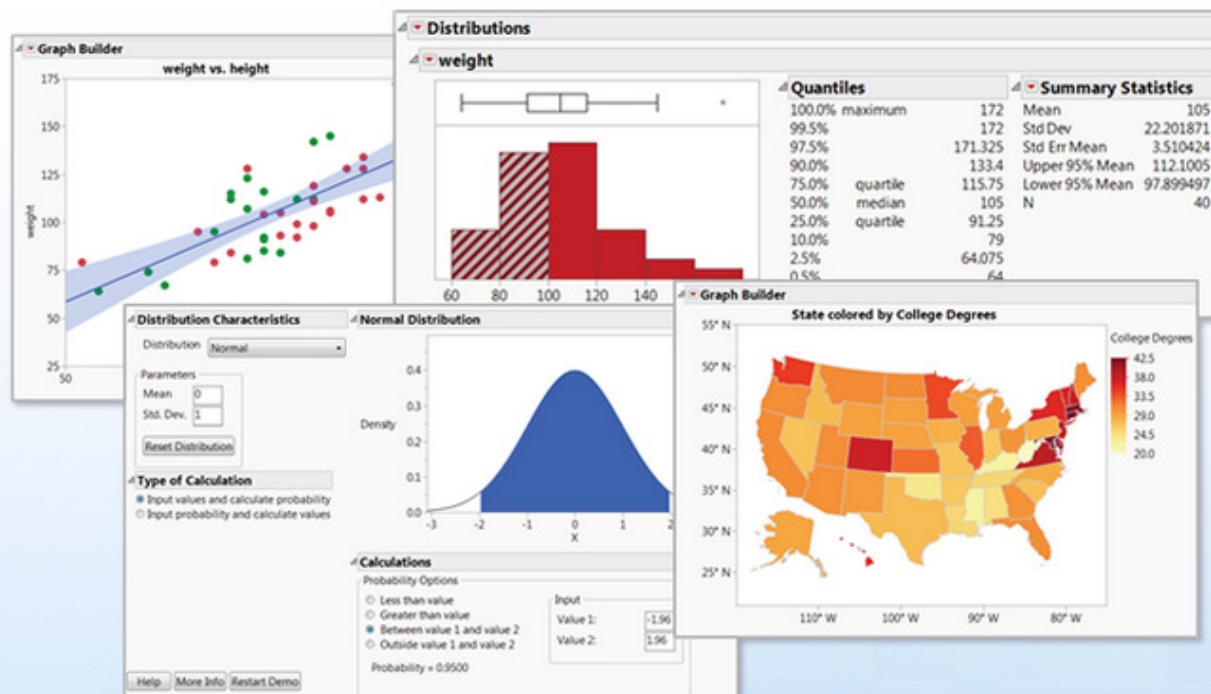
Statistics Congress in Malaysia. The international competition has money and good prizes.

JMP from SAS has offered JMP Student Edition to all participating students, teachers and country coordinators for two years. JMP is a powerful data analysis software, which can be used when constructing a poster. However, it is not a requirement to use this software or to get prizes in the competition.

So why not arrange a competition in your school? It doesn't matter if you are a teacher, or a student who wants to participate. Working on a poster is a fun way to learn statistics. Also, remember to spread the word so that the growth of the competition continues. ■

Jukka Sireni
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 Statistics Finland
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JMP® Student Edition



Use JMP for creating a poster – SAS sponsors the ISLP competition



Volker Kraft.

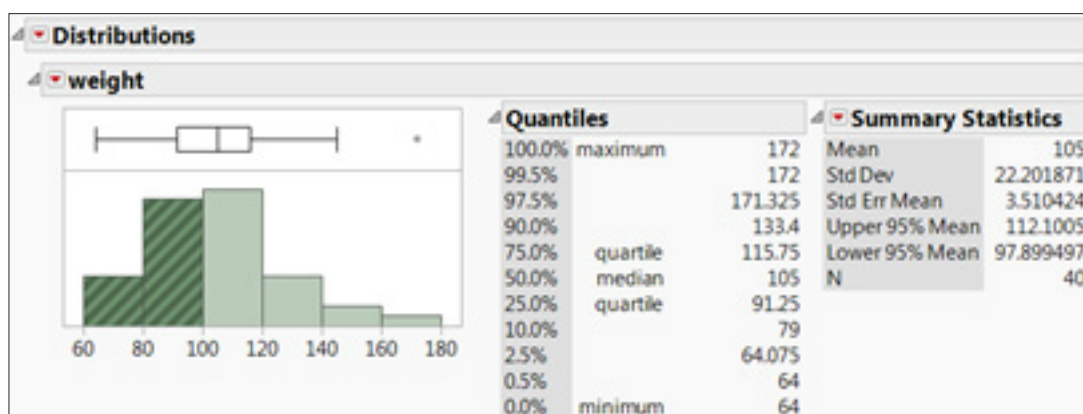
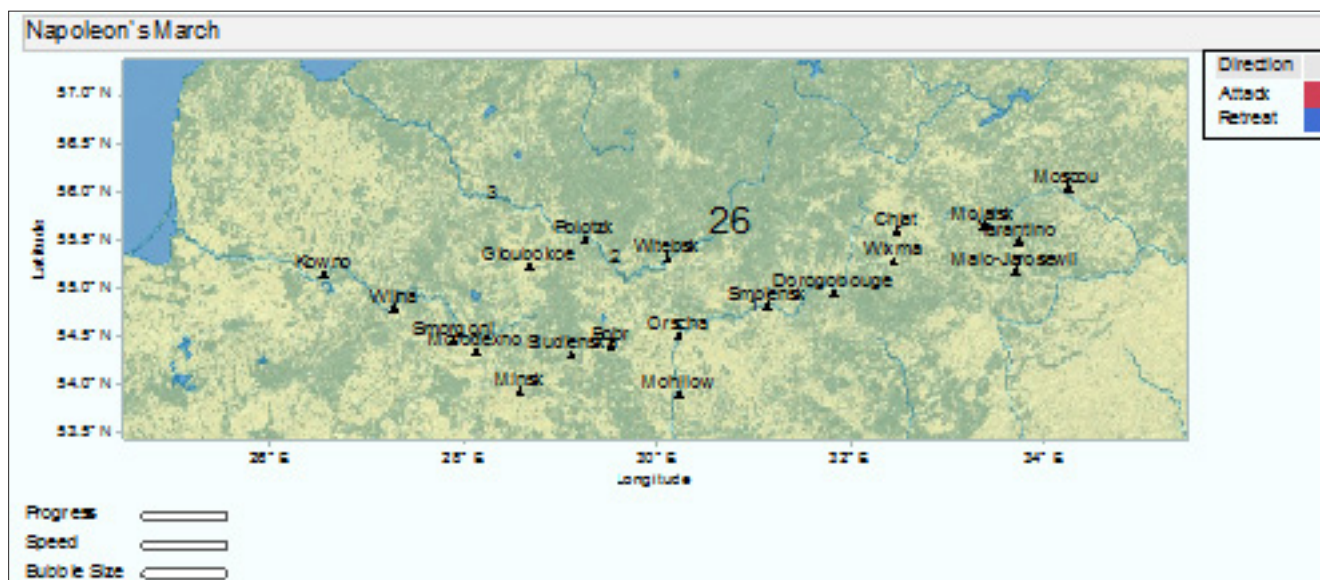


Curt Hinrichs.

Volker Kraft and Curt Hinrichs

Developing an effective ISLP poster has just become a little easier and perhaps, a little more intuitive. The JMP division of SAS Institute is pleased to make JMP Student Edition available to all qualified students, as well as to faculty, school and country representatives who participate in or organize the competition. [JMP Student Edition](#) is a streamlined version of JMP statistical software for teaching, learning and telling the stories behind your data.

Good posters begin with an interesting and meaningful question followed by the data that facilitates answers to that question. JMP Student Edition software offers a point-and-click, drag-and-drop interface that enables the user to focus on analyzing their data and the questions at hand rather than on translating them into techniques and coding. The interface is also visual and interactive allowing the user to easily explore their data and create compelling visualizations of them.



JMP Student Edition contains most of JMP's core platforms including univariate and bivariate methods, multiple and logistic regression, regression and classification trees, time series, DOE, quality, survival analysis, graphing and map building (click [here](#) for a comparison of JMP and JMP Student Edition). All results can be exported as publication-quality graphics.



JMP Student Edition can be downloaded onto a Windows or Mac computer with an authorization code that will be provided to eligible participants by the ISLP organizers. The software will operate for 24 months. Resources to learn how to use JMP Student Edition and to create needed analysis and graphics are available at www.jmp.com/teach. The Learning Library provides almost 100 One-Page Guides which get students started within minutes. A video describing how compelling JMP outputs can be exported into a Poster will be available in early 2018. ■

Curt Hinrichs, Senior Manager, JMP Academic Programs, SAS Institute, curt.hinrichs@jmp.com.

Volker Kraft, JMP Academic Ambassador, SAS Institute, volker.kraft@jmp.com.



The first European Statistics Competition

María Jesús Vinuesa Angulo

The European Statistics Competition (ESC) is a new contest organised by Eurostat and 12 volunteering NSIs (Portugal, Italy, France, Norway, Slovenia, Finland, Bulgaria, Greece, Croatia, Cyprus, Poland and Spain). It aims to promote statistical literacy, curiosity and interest in official statistics among students and teachers. This challenge is launched under the DIGICOM (Digital and Innovative products in communication), which is one of the eight projects of the ESS Vision 2020.

The competition is structured in two parts, the national competition followed by the European final. The finalists of the national part of each country can take part in the European final. The language of the national competition is the national language while the European phase will be in English.

The competition kick-off was on European Statistics Day on 20 October 2017. The national competition is taking place during the school year 2017/2018 with the European final in May 2018.

The competition targets two categories of participants, 14-16 years old and 16-18 years old. Their ages may vary slightly from country to country depending on the national educational system. Participation is free of charge. Students should work in teams of a maximum of 3 with a tutor (a teacher who coordinates them).

National competitions can have some differences between them due to the fact that there are some tradition in this kind of contest. In many countries they follow the structure and content inspired by the experience of INE Spain. In these cases, the national competition consists of two online assignments.

The first assignment consists of three tests with ten closed questions in each one. Participants need to answer questions on basic knowledge on Statistics, the use of official statistical data sources (search and interpretation of information from Eurostat and national websites about official statistics) and the understanding of the publication “The life of women and men in Europe — A statistical portrait — 2017 edition.”

In the second assignment, the teams will have to prepare an output from the exploitation of a dataset in Excel which will be facilitated by the organisation.

A maximum of 3 winning teams per country and category will take part in the European final, which consists of making a video in which they will try to answer the question: “Why are official statistics important in our society?”.

The winners (students and teachers) will receive among other prizes, a laptop and the possibility to travel to Krakow (Poland), to the Conference of Quality in Official Statistics (Q2018), where on the award ceremony they will receive the prizes.

If you want to find out more about the ESC, please go to <https://www.eso2018.eu/> and follow the links to the participating countries.

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Key success factors for statistical literacy poster competitions

Statistical literacy is complex and multifaceted. In every country, education and numeracy are a function of a multitude of factors including culture, history, and societal norms. Nevertheless, since the launch of the International Statistical Poster Competition (ISLP) in 1994, a number of patterns have emerged to suggest there are some common or universal success factors in running statistical literacy competitions involving schools, universities, statistical offices, and many other institutions.

Earlier this year we published a paper entitled 'Key success factors for statistical literacy poster competitions' in the *Statistics Education Research Journal*¹ in which we explored some of those factors. We examined issues, such as, institutional cooperation; celebrating participation and success;

improvement of statistical literacy in the local schools; support for teachers; the involvement of national statistics institutes; and use of technology. These factors were identified from our own experience running the ISLP competition and from articles submitted to the ISLP newsletters. Given the complexity of statistical literacy, the list of factors we selected is not exhaustive. Nor do they provide a blueprint or formula for success. Nevertheless, they provide an overview of common strategies adopted by many countries participating in the competition around the world.

Our hope is that the paper will provide a useful guide for countries considering involvement in the poster competition or simply contemplating how to improve statistical literacy. ■

Reija Helenius, Pedro Campos and Steve MacFeely

¹ *Statistics Education Research Journal*, Vol. 16, No.1, pp.202-216

Members of ISLP Advisory Board

James Nicholson

James taught Mathematics and Statistics in secondary schools in the UK for 25 years, and has since worked with a group at Durham University on developing data visualisations of multivariate data to support conceptual understanding of big statistical ideas. In a world in which evidence-informed decision making is advocated by many, but there is also an alarming rise in 'fake news' giving rise to talk of us living in a 'post-truth' world, James believes that statistical literacy is perhaps more important than it has ever been.

James is currently involved in an Erasmus funded collaborative project involving 6 universities from 5 countries, called ProCivicStat, which aims to promote civic engagement and understanding among young adults about key societal phenomena. Mapping out key dimensions of statistical literacy is an essential element of this work.

James is a Fellow of both the Royal Statistical Society and the Institute of Mathematics and its Applications. He has been a Vice-President of IASE and is currently Chair of the Advisory Board of the International Statistical Literacy



Project. He holds a MA in Mathematics from Cambridge University and an MSc in Applied Statistics with Statistical Education from Sheffield Hallam University. ■

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John Harraway

Associate Professor in the Department of Mathematics and Statistics at the University of Otago, New Zealand. After graduating at Otago in 1965 he started teaching mathematics before moving to statistics in 1970 with responsibility for a service course of 1000 students. Soon after, he was

asked to help Khon Kaen University, North East Thailand, with development of mathematics and statistics teaching as part of an aid project. A sabbatical year followed in the Department of Applied Statistics at Reading University. Back at Otago in 1977, he taught several statistics courses, wrote three textbooks and was Chief Examiner in Statistics for the New Zealand Qualifications Authority. He became involved with IASE in 2000 at the Round Table in Tokyo after which he served on a number of Statistics Education Committees. These included Scientific Secre-

tary for ICOTS in Brazil in 2006, Chair of ICOTS in Slovenia in 2010 and President of IASE 2011 to 2013 when he joined the ISLP Advisory Board serving as Chair for four years. He taught large first year classes in the biological and health sciences, the social sciences and business as well as advanced courses in modelling and multivariate statistics. Consultancies with Colleagues led to publication on dolphin behaviour, profiles of women consuming alcohol when pregnant, analysis of trace element data for food authentication and longitudinal analyses of student attitude change to sustainability during their time at University. The data from such local consultancies provided excellent motivational case studies for students. John believes statistical literacy is increasingly important with the new areas of data science and machine learning requiring a clear appreciation of statistical concepts. Statistical literacy in society is also important and the interactive apps for training in Official Statistics available on the ISLP website and accessible on phones are serving an important role. John will still be teaching at Otago in 2018. ■

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David Stern

David Stern is a British Mathematical Scientist with a passion for Africa. He grew up in Niger, Francophone West Africa, where he spent the whole of his secondary school finishing with a French Baccalaureate. After school he took a Gap year to work in London as a programmer.

David studied Maths at Warwick, including an Erasmus year in Augsburg, graduating with First-Class honours and a German "Diplom". His passion for education started in Warwick where he got the opportunity to supervise first year students and coach Volleyball. During his PhD in Algebraic Geometry he moved with Tom Bridgeland, his supervisor, from Edinburgh to Sheffield.

Having spent over a decade based in Europe David looked for opportunities to rekindle his passion for Africa and accepted a position to lecture in Maseno University, Kenya, for 6 months which turned into 6

years. This was a productive time professionally as he broadened into statistics education, took on climate related projects, got involved in school education, developed new degree programs, was promoted to Senior Lecturer, took on the role of chair of the post-graduate committee for the school of Mathematics, Statistics and Actuarial Science, and was a founding Coordinator, for content development, for Maseno's eCampus. It was also a good time for him personally as he immersed himself in a different culture, got involved in giving Maths Camps, creating the Kenyan NGO AMI (African Maths Initiatives), the UK Charity SAMI (Supporting African Maths Initiatives) and most importantly met his wife to be Giovanna.

David worked for AIMS (African Institute of Mathematical Sciences) as Director of Project Development based in Ghana before moving back to the UK to take a role of Mathematical Scientist at the Statistical Services Centre, University of Reading, to support their African work. David Has also served two terms as vice-president of IASE (International Association of Statistical Education).

His passion for Africa and Statistics education owes a lot to his Father a Statistician who first worked in Africa in the 70s. Recently they have been working together to support the African Data Initiative (ADI), a project which aims to transform the teaching and learning of statistics across the continent, partly through making R more accessible. This is tied in with David's new big adventure for 2018 where he is planning to launch a social enterprise to support ADI and related projects. ■

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Mohd Uzir Mahidin

YBhg. Dato' Sri Dr. Mohd Uzir Mahidin is currently the Chief Statistician of Department of Statistics Malaysia (DOSM), effective 14 February 2017.

He has served the Department for the past 27 years since his first posting as a Statistician in 1990. He is also a member of various expert groups globally as well as international associations such as the UNWTO Tourism Statistics, Expert Group on Civil Registration and Vital Statistics (ESCAP), ASEAN Secretariat on SNA Statistics, ISI-South East Asia Network and Regional Programme on Economic Statistics. Recently, he had become a

member of High-Level Group for Partnership, Coordination and Capacity-Building for Monitoring Sustainable Development Goals (SDG) and the ASEAN Community Statistical System (ACSS) as well as Executive Committee (EXCO) members of International Association for Official Statistics (IAOS), 2017 – 2019. At the National Level, he is the Exco member of Institute Statistics Malaysia (ISM) and the Chairman of the National Organising Committee of ISI World Statistics Congress 2019 whereby Malaysia will be the host. ■

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Peter Howley

Dr Peter Howley, The University of Newcastle, is Chair of the Statistical Society of Australia's Statistical Education Section. Peter was awarded a 2015 Office for Learning and Teaching (OLT) Citation for Outstanding Contributions to Student Learning, and the ISLP's 2017 Best Cooperative Project Award.

Peter's work is cross-disciplinary and practically-oriented, with a passion for systems thinking and improvement, and the connection of students, teachers and the community with Statistics and STEM.

He is currently leading a Commonwealth Department of Education and Training-funded national initiative combining Sustainability and Statistics, to assist low SES, remotely-located and culturally diverse students and their teachers overcome barriers associated with learning statistics – see <http://www.tomfarrellinstitute.org/sustainability-meets-statistics-and-stem.html>. The initiative combines the National Poster Competition with Electric Vehicle creation and a more general Environmental Sustainability focus, and resulted in receiving the 2017 Faculty of Science Collaboration Excellence Award.

Peter undertakes collaborative research with the Health Services Research Group (Australia), Taipei Medical University (Taiwan) and Australian Council on Healthcare Standards on methods for improving clinical indicator reporting systems and monitoring and improving health care systems and performance,

as well as with the Hunter Medical Research Institute designing and analysing clinical trials surrounding the improvement in blood glucose level variation in those with Type 1 diabetes. He also conducts collaborative research with Schools of Education and is a member of the Priority Research Centre CARMA (Computer-Assisted Research Mathematics and its Applications).

His enthusiasm for collaboration and STEM has resulted in both the inclusion of the National Poster Competition within a Stage 5 School's iSTEM program; and his partnering with industry and engineering to develop a Graduate Certificate in Integrated STEMM*, commencing online in 2018, based upon the following four courses – the STEC6104 course is akin to the poster competition:

1. STAT6100: Systems Thinking for an Integrated Workforce (the Science of Systems and Integrated Management)
2. STEC6102: STEMM in the Digital Age–Emerging Technologies (Digital Technologies)
3. STEC6103: STEMM by Design – Innovation and Entrepreneurship (Engineering for concept and prototype design and delivery)
4. STEC6104: Evidence-based STEMM Investigations (Statistics.... Mathematics)

* the second M in STEMM is for Medicine; Medicine and Health featuring throughout the four courses as context, as well as extension Master courses within optional Medicine and Health optional stream of Master program.

Peter will be guest editor (along with Ayse Bilgin and Reija Helenius) of SERJ special issue "Building future generations of statisticians". ■

See <https://www.newcastle.edu.au/profile/peter-howley> and follow on twitter: @peterhowley0
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ISLP Executive Team



Reija Helenius

Reija has worked as the ISLP Director since 2010. Reija is responsible for the ISLP Executive Team, which consists of her, Pedro Campos, Adriana D'Amelio and Steve MacFeely. Reija is also a member of the ISLP Advisory Board. Her day job is as the head of development in communication and information services in Statistics Finland. Reija's duties include collaborating with schools, product and service projects, supporting the head of the unit and

international duties. Earlier Reija has worked, amongst other things, as an information specialist and as a head of training. She is an elected member of ISI and also a member of IAOS and IASE. In Finland, Reija works as the vice chairperson of Tietojohdaminen ry and also belongs to the Finnish Statistical Society. She is a member of the Statistical Literacy part of Eurostat's Digicom-project and also the representative of Finland in the European Statistical Training program.

Promoting the use of statistics and reliable information is near Reija's heart, especially amongst citizens, youth and information suppliers. She believes in power of collaboration and international networking. ■

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Steve MacFeely

Steve is the Head of Statistics & Information at the United Nation Conference for Trade and Development in Geneva and Adjunct Professor at the Centre for Policy Studies in University College Cork, Ireland. Before working at UNCTAD, Steve was the Assistant Director-General at the Central Statistics Office (CSO) in Ireland and was a member of the Oversight Board of the new Irish Government Economic and Evaluation Service. He established the "Professional Diploma in Official Statistics & Policy Evaluation" at the Institute of Public Administration in Ireland and played a central role in launching the ISLP competition in Ireland. He has published more than twenty papers in peer reviewed journals covering a range of topics including family business, cross-border shopping, productivity, tourism, input-output, regional policy, data infrastructure, capacity development and sustainable development goals. ■

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Pedro Campos

Pedro comes from Portugal where he is working as an Assistant Professor at the University of Porto teaching statistics and information systems. He is also working in the Department of Methodology and Information Systems in Statistics Portugal. He is a member of the Research Unit LIAAD-INESC (Laboratory of Artificial Intelligence and Decision Support). Pedro was one of the pioneers in organising an ISLP statistical literacy competition for the first time in Portugal in 2006. ■

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Adriana D'Amelio

Adriana D'Amelio is from Mendoza, Argentina. She is a Magister in Pedagogy of the Sciences, specializing in University lectures, and Head Professor in "Universidad Nacional de Cuyo", in Argentina. Inspired by the book "Government Statistical Offices and Statistical Literacy 2008", edited by Juana Sánchez, Adriana started working in statistical literacy. She became coordinator of the first web page about Statistic Literacy in Argentina (2009) "AEM" (Statistic Literacy in Mendoza). Subsequently she has authored the first Booklet of Statistic Literacy in Mendoza which was given to more than 40.000 students during the 2010 Census. She has participated as a jury member in the ISLP Best Cooperative Project 2011 and the Poster Competitions 2011 and 2017.

As a member of the Board of Directors of Argentina Statistic Association (2013) Adriana was the organizer of the "First Workshop of Statistical Education Marta Aliaga". In her role on the Advisory Board to the ISLP, she has always been concerned about Statistic Literacy in Latin America and in Caribbean. For example, she has helped detect some problems in the assessments of national statistical literacy by international organizations (PISA). This was important as many Latin American countries obtained scores that placed them among the lowest in the international rankings.

At various international conferences it has been discussed and agreed that a major contributing factor to students' not understanding statistics is because many teachers do not teach it. Although statistics are included in primary school curricula, however it is always noticed that such contents are not taught by teachers, either because of ignorance or because they do not consider statistics relevant. It is the teacher who must develop the appropriate cognitive, social and pragmatic skills. This will enable action in situations according to the criteria appropriate to the cognitive-cultural platform of the peo-

ple. According to Vygotsky (1998), "It is the teacher who will guide the learning for a relevant learning, continuous throughout the time of your life." This knowledge is aimed to transcend the boundaries of school life.

What can we expect from a citizen regarding reading and interpreting, data, tables and statistical charts? Adriana agrees with Reija Helenius, Director of the ISLP, that the poster competition provides "a possibility for young citizens to participate and promote statistical literacy from schools as it involves the participation of different actors and engages teachers to accompany their pupils in this task." We see that on the one hand there is a diagnosis, on the other the detection of the problem and on the other one a solution. Nevertheless, to be literate we must promote training of teachers so that the process of teaching-learning is carried out from the roots, including all citizens of different ages and social conditions without discriminating against anyone.

Statistical literacy is a fundamental right essential for human and social development. To achieve this will require joint action, interaction and management from many different organizations. Because literacy varies and depends on the environment and the context of each society or community at a particular time Latin America will be one of the regions most in need.

That is why my challenge from the ISLP will be to encourage and promote statistical literacy in Latin America and the Caribbean. This will include participation in poster competitions and also to develop 'mother tongue' pedagogical materials. This will require joint interaction and mutual solidarity across all responsible actors. ■

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ICOTS-10 in Kyoto

*Local Organizing Committee of
ICOTS-10*



The next ICOTS (International Conference On Teaching Statistics), ICOTS-10 will be held in Kyoto. ICOTS is held every four years. Its main purpose is to give statistic educators and professionals around the world the opportunity to exchange information, ideas and experiences, to present recent innovation and research in the field of statistic education, and to expand their range of collaborators.

Main theme of the ICOTS-10 is “Looking back, looking forward”. We are at a critical time in statistics education where the world of data is changing rapidly. We need to be looking ahead to how as a field we will evolve and engage with the future. At the same time, we are celebrating our tenth ICOTS and this marks a time for us to look back on the past 40 years when in 1978, ISI’s Education Committee Task Force was established to plan for the first ICOTS.

It’s clear that statistics education has matured as a field. Data have become part of everyday life, vital for professions and part of our very fabric as a society. Data are used everywhere to document, evaluate, plan and persuade. The very nature of what we call “data” is not what it was 10 years ago – or even last year. Data science is emerging as a new field. And yet it is not clear if we are moving together or apart. Evidence exists that it is both. Both areas focus on variability, uncertainty and context but may approach the analysis and collection of data quite differently. In ICOTS-10, we can have good opportunities to look back histories and look forward new statistical education in Kyoto, which is a historical city in Japan.

Kyoto is one the most famous city in Japan. Kyoto is an ancient city with a 1200 year history. It was established as Japan’s capital under the name “Heian-kyo” in the year 794. Although many transformations have taken

place over the years, Kyoto has always adopted the most advanced standards of the times. It has greatly contributed to the nation’s industrial, economic and cultural development and strength. The dauntless and leading spirit of Kyoto’s past as a capital city, is still felt here today.

Kyoto also preserves the beloved properties of its culture as testimonials of time. This is shown in the ancient temples and shrines built in styles unique to Kyoto, as well as private houses. Moreover, many festivals, ceremonies and traditional industries reveal the will of this city to transmit and develop its 1200 year culture. ICOTS-10 will be in July. One of three big festival in Kyoto is “Gion Matsuri (festival)”, which is one month length festival in July. During and after the ICOTS-10, you can enjoy some parts of the festival in Kyoto.

ICOTS-10 is the second ICOTS in Asia and the first ICOTS in Japan. LOC hope participants can have good opportunities not only to exchange researches and information on statistical education, but also to enjoy old and new Japanese cultures in Kyoto.

Information on ICOTS-10 can be obtained from the web site <<http://icots.info/10/>>. Please visit ICOTS-10 web site.

We are looking forward to seeing you in Kyoto.



ICOTS-10

Date: 8–13 July, 2018

Venue: Kyoto TERRSA,
Kyoto, JAPAN

Web: <http://icots.info/10/>