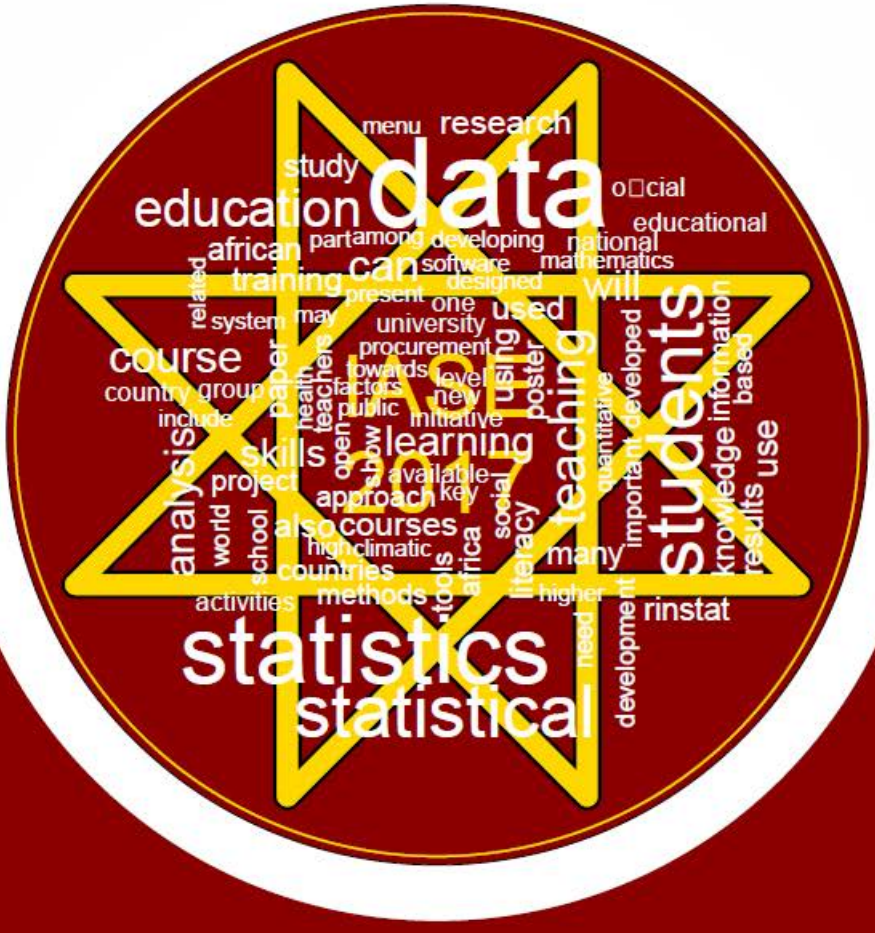
جامعة محمد الخامس بالرباط
Université Mohammed V de Rabat

Université Mohammed V
Faculté des Sciences
Rabat

IASE 2017 Satellite Conference

Teaching Statistics in a Data Rich World



July 11-14,2017

Rabat - Morocco

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IASE 2017 Satellite Conference

Teaching Statistics in a Data Rich World

PROGRAM and ABSTRACTS

Rabat, Morocco

http://iase-web.org/conference/satellite17/

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Published by: International Association for Statistical Education
Voorburg
The Netherlands
Edited by: Ayse Bilgin, Adam Molnar, Andrej Blejec
Printed by: GraphoPub, Rabat, Morocco
Produced using: generbook R package
Circulation: 120

Dear IASE 2017 participants,

Every two years, the IASE organizes satellite conferences that are regionally connected to the World Statistics Congresses (WSC) organized by ISI. WSC61 will take place in Marrakesh; the IASE decided to have the satellite conference in Rabat. I am grateful to the Faculty of Sciences at University Mohammed V in Rabat for hosting the conference. At this point I also thank to Ayse Bilgin (the IPC chair), Adam Molnar (the Proceedings editor), Abdelhak Zoglat (the LOC chair), and John Shanks (the webmaster) and their teams for hard and devoted work which made this conference possible.

From the program I see that the conference theme, *Teaching Statistics in Data Rich World*, addresses many aspects of contemporary dilemmas and challenges in statistics teaching. The abundance of data, information becoming more and more available in most parts of the world, is bringing new needs and requires new approaches to teaching not only experts in different fields but also the general non-expert population. Coping with data, processed or raw, is becoming extremely important for every citizen of the modern, data rich world. That is likely the reason that the majority of this conference's presentations could be classified under the topic "Creating socially responsible societies with statistics".

One of the goals of every IASE organized conference is to have some impact on statistics teaching and statistics literacy level in the region. I am happy to see that we have multiple sessions addressing statistics education in Africa – unfortunately less than expected from the Mediterranean part of the continent. The three keynote speakers are coming from the nodes of the African continent (and slightly beyond): South Africa, Iran, and Morocco. They will give us interesting perspectives on the education approaches in their countries. I hope that the presented possibilities will serve as models for raising awareness of the need for statistically educated and numerically literate citizens in other parts of the world.

Another goal of IASE conferences is meeting people that share a passion for spreading good teaching ideas and trying to overcome the fate of statistics teachers, as our friend Eric Sowey once said: "to teach unwanted to unwilling". Again this year, we are meeting many old and new friends, bringing new ideas and new enthusiasm.

We are just a year away from the IASE's major conference event, the ICOTS meeting. The jubilee 10th event will be held from July 8 to 13, 2018, in Kyoto, Japan, with another interesting theme, "Looking back, looking forward".

I wish us all an interesting, fruitful and enjoyable conference, and look forward to meeting you all again next year at ICOTS 10.

Andrej Blejec
IASE president, 2015 - 2017

PROGRAM

		Hall 1	Hall 2
Tuesday	8.00 – 9.00	Registration	
	9.00 – 12.00	Workshop B.... - CompLabs (with a break)	
	13.00 – 14.00	Registration	
	14.00 – 17.00	Workshops C, D, E - CompLabs (with a break)	
	16.00 – 17.00	Registration	
	17.00	Reception	
Wednesday	8.00 – 9.00	Registration	
	8.45 – 9.30	Opening of the Conference	
	9.30 – 10.30	Plenary lecture	
	10.30 – 10.50	Break	
	10.50 – 11.50	Session 1: Socially responsible societies I	
	11.50 – 12.10	Break	
	12.10 – 13.10	Session 2: Socially responsible societies II	
	13.10 – 14.40	Lunch	
	14.40 – 15.40	Session 3: Socially responsible societies III	Session 4: Statistics Education in Africa I
	15.40 – 16.20	Break	
	16.20 – 17.40	Session 5: Socially responsible societies IV	
Thursday	9.00 – 10.00	Plenary lecture	
	10.00 – 10.20	Break	
	10.20 – 11.40	Session 6: Employability skills for statistics graduates	
	11.40 – 12.00	Break	
	12.00 – 13.20	Session 7: Statistics for other disciplines I	Session 8: Socially responsible societies V
	13.20 – 14.30	Lunch	
	14.30 – 15.50	Session 9: Big data era	
	15.50 – 16.10	Break	
	16.10 – 18.00	Posters	
	17.00 – 18.00		Special session
	20.00	Conference dinner	
Friday	9.00 – 10.00	Plenary lecture	
	10.00 – 10.20	Break	
	10.20 – 11.40	Session 10: Socially responsible societies VI	
	11.40 – 12.00	Break	
	12.00 – 13.00	Session 11: Statistics Education in Africa II	
	13.00 – 13.30	Closing of the Conference	

8.00–9.00 **Registration**

9.00–12.00 **Workshop B.... - CompLabs (with a break)**
(Hall 1)

1. **Towards a Country-Level Federated Platform for Big Data and Statistics Education Based on Amazon Web Services, AWS Educate and RosettaHUB.**
Karim Chine and Latifa Bouabdillah

13.00–14.00 **Registration**

14.00–17.00 **Workshops C, D, E - CompLabs (with a break)**
(Hall 1)

1. **See Why Students Love JMP**
Volker Kraft
2. **Reconceptualising Statistical Literacy**
Jim Ridgway, James Nicholson and Mark Brown
3. **Using IPUMS Data to Address Sustainable Development Goals: Analysis of Real World Policy Challenges using Real World Data**
Kristen Jeffers

16.00–17.00 **Registration**

17.00 **Reception**

8.00–9.00 **Registration**

8.45–9.30 **Opening of the Conference**
(Hall 1) *Chair: Andrej Blejec*

9.30–10.30 **Plenary lecture**
(Hall 1) *Chair: Ayse Bilgin*

1. **Statistics Capacity Building in a Developing Country – Experiences, Opportunities and Challenges**
Delia North

10.30–10.50 **Break**

10.50–11.50 **Session 1: Socially responsible societies I**
(Hall 1) *Chair: David Stern*

1. **Primary School Students' Statistical Reasoning when Comparing Groups**
Daniel Frischemeier

2. **Design, Realization and Evaluation of a Statistics Course for Preservice Teachers for Primary School in Germany**
Susanne Podworny, Daniel Frischemeier and Rolf Biehler

3. **Engaging Students, Teachers and Industry Through Statistics Towards Greater Connection and Social Responsibility**
Peter Howley, Ayse Bilgin and Elena Prieto

11.50–12.10 **Break**

12.10–13.10 **Session 2: Socially responsible societies II**
(Hall 1) *Chair: Teresita Teran*

1. **The Power of Balancing in a Data-rich Material World: Teaching introductory Mathematics and Statistics to Biology Students**
Jorge Augusto Navarro-Alberto and Roberto Carlos Barrientos-Medina

2. **Perceived Usefulness of the Introductory Statistics Course as a Correlate of Student Engagement in Statistics**
Rossi Hassad

13.10–14.40 **Lunch**

14.40–15.40 **Session 3: Socially responsible societies III**
(Hall 1) *Chair: Rossi Hassad*

1. **Making Societies Data Literate at Large Scale by Using Online News Media**
   Pim Bellinga and Thijs Gillebaart

2. **Problem-Based Learning as a Pedagogical Approach for Preparing Statistics Graduates**
   Gerald Iacullo

3. **Teaching "Quantitative Methods of Analysis in Social Sciences" at University Level**
   Theodore Chadjipantelis, Marina Sotiroglou and Eirini Gkouramani

14.40–15.40 **Session 4: Statistics Education in Africa I**
(Hall 2) *Chair: Alexey Ponomarenko*

1. **Using Digital Tools to Engage Kenyan Development Studies Students with Data**

   Giovanna De Giusti

2. **Financial and Statistical Literacy for Retirement Housing Decisions in Australia**

   Timothy Kyng, Ling Li and Ayse Bilgin

3. **Facing the Challenges from Different Realities: eLearning Approaches for Africa and Europe**
   Bruno de Sousa and Gomes Dulce

15.40–16.20 **Break**

16.20–17.40 **Session 5: Socially responsible societies IV**
(Hall 1) *Chair: Michael Bulmer*

1. **Teaching Statistics at the Civil Service Academy of Pakistan: An Innovative Endeavour**
   Saleha Naghmi Habibullah

2. **Assessment of Teaching Practices on Mathematics for Students in Qatar**
   Ali Alzahrani, Elizabeth Stojanovski and Peter Howley

3. **We Learn Statistics and Mathematics Hardly**
   Mohammad Nekoufar

9.00–10.00 **Plenary lecture**
(Hall 1) *Chair: Andrej Blejec*

1. **What are the Mathematics Houses in Iran? And what they have done to Popularize Statistics**
Ali Rejali

10.00–10.20 **Break**

10.20–11.40 **Session 6: Employability skills for statistics graduates**
(Hall 1) *Chair: Pim Bellinga*

1. **How to Prepare Students for Work in the Pharmaceutical Industry**
Ziad Taib

2. **Using Internships to Engage Social Science Students in the Practice and Development of Data Skills**
Mark Brown and Jackie Carter

3. **Getting a Statistician Job You Want: Necessary Skills for Statistics Graduates**
Jay Mandrekar

4. **Embedding Data Manipulation into Statistics Education**
John Lunalo, Steven Ndug'u, David Stern, Danny Parsons, Roger Stern, James Musyoka and Cathy Garlick

11.40–12.00 **Break**

12.00–13.20 **Session 7: Statistics for other disciplines I**
(Hall 1) *Chair: James Musyoka*

1. **Describing Data Well in R-Instat**
Maxwell Fundi, David Stern, François Renaud, Lily Clements, Roger Stern and Alex Sananka

2. **Making Multilevel Data Ideas More Accessible**
Danny Parsons and David Stern

3. **Mobile e-Book for BITEC MOOC**
Taerim Lee

4. **The Pathways to Teaching Statistics in the Health Area**
Rodrigo Fioravanti Pereira and Ileana Greca Dufranc

12.00–13.20 **Session 8: Socially responsible societies V**
(Hall 2) *Chair: Susanne Podworny*

1. **Towards Statistically Literate Communication Professionals**
   Cláudia Silvestre and Ana Meireles

2. **ISLP Country Coordinators as Ambassadors of Statistical Literacy**
   Reija Helenius, Pedro Campos and Steve MacFeely

3. **Facilitating Statistical Literacy for Evidence-Based Nursing Practice: An Active-Learning Approach**
   Alex Bux

4. **Statistics Education in a Post-Truth Era**
   Jim Ridgway, James Nicholson and David Stern

13.20–14.30 **Lunch**

14.30–15.50 **Session 9: Big data era**
(Hall 1) *Chair: Zachariah Mbasu*

1. **Training Statistics Graduate Students in Ethics, Reproducible Research, and Other Best Practices**
   Jeffrey Dawson

2. **Tools for Visualising Data: A Review**
   Jim Ridgway, James Nicholson, Pedro Campos and Sónia Teixeira

3. **Reformatting Statistical Education in Russia: Changes in Classifications, Standards, and Programs**
   Alexey Ponomarenko

4. **Still Coming Down From the Mountains**
   Roger Stern, David Stern and Richard Coe

15.50–16.10 **Break**

16.10–18.00 **Posters**
(Hall 1) *Chair: Reija Helenius*

1. **Using Public Procurement Datasets for Teaching and Learning**
   David Stern, Danny Parsons and Roger Stern

2. **Using the Climatic Menu in R-Instat**
   David Stern, James Musyoka, Steve Kogo, Danny Parsons, Lily Clements, Shadrack Kibet and Roger Stern

3. **Key Features and Educational Uses of the Describe Menu in R-Instat**
   David Stern, Maxwell Fundi, Danny Parsons, Lily Clements, Steven Ndungu, Alex Sananka and Roger Stern

4. **Key Features and Educational Uses of the File Menu in R-Instat**
   David Stern, John Lunalo, Danny Parsons, Lily Clements and Roger Stern

5. **Statistical Literacy in Ukraine: Problems and Developments**
   Oleksandr Osaulenko, Volodymyr Panteleiev and Yakiv Karchev

6. **Impact Of Big Data On Development Of The Curriculums Of Training Statisticians In Ukrainian University**
   Ruslan Motoryn, Tetiana Motoryna and Kateryna Prykhodko

7. **An Analysis of Statistical Texts through the Meaning Elements of Godino**
   Teresita Teran, Diana Kohan and Augusto Nascimbene

8. **Teaching a Polling and Survey Seminar**
   Adam Molnar

9. **Towards the next ICOTS10 in Kyoto**
   Michiko Watanabe and Kazunori Yamaguchi

17.00–18.00 **Special session**
(Hall 2)

1. **IPUMS International: Teaching statistics with free online microdata from international censuses and surveysemo of IMPUS databases for teaching and research**
   Kristen Jeffers

20.00 **Conference dinner**

9.00–10.00 **Plenary lecture**
(Hall 1) *Chair: Abdelhak Zoglat*

1. **The Teaching of Statistics in Morocco**
   L'enseignement de la Statistique au Maroc
   Adil El Marhoum

10.00–10.20 **Break**

10.20–11.40 **Session 10: Socially responsible societies VI**
(Hall 1) *Chair: Pedro Campos*

1. **Analyzing Unstructured Data: Text Analytics in JMP**
   Volker Kraft
2. **Confronting Misconceptions: The Role of Dynamic Interactive Technology**
   Gail Burrill
3. **Presentation of Statistical Concepts with Dynamic Graphics and Simulations in R**
   Andrej Blejec
4. **From Kindergarten to Elderly People. A Macro View of the Teaching of Statistics**
   Teresita Teran

11.40–12.00 **Break**

12.00–13.00 **Session 11: Statistics Education in Africa II**
(Hall 1) *Chair: Bruno De Sousa*

1. **Open Educational Resources for Statistics Training**
   James Musyoka, Roger Stern and David Stern
2. **Seeding the African Data Initiative**
   David Stern
3. **Statistics in Maths Camps**
   Zachariah Mbasu, Thomas Mawora and David Stern

13.00–13.30 **Closing of the Conference**
(Hall 1) *Chair: Andrej Blejec*

ABSTRACTS

Workshop B.... - CompLabs (with a break)

Towards a Country-Level Federated Platform for Big Data and Statistics Education Based on Amazon Web Services, AWS Educate and RosettaHUB.

Karim Chine and Latifa Bouabdillah

RosettaHUB Ltd, United Kingdom
karim.chine@rosettahub.com, latifa@rosettahub.com

AWS is Amazon's public cloud, the world's largest cloud in terms of market share and technological advancement. Amazon's cloud is emerging as an indispensable tool for scientific research and as a key innovation platform for education. AWS democratizes access to a broad spectrum of technologies, especially big data-related ones. A new Amazon program: AWS Educate allows students and professors to receive $100 and$ 200 coupons to be used freely on AWS for educational activities. RosettaHUB, a "man-data interaction" platform aims at establishing a global scientific, social and collaborative meta-cloud. In particular, it enables the creation of virtual teaching and research environments based on real-time collaboration, reproducibility and application convergence of scientific computing and data analysis tools on any infrastructure, including AWS. It simplifies and democratizes the chain of production and publication of applications and services in the arena of data science and big data. In collaboration with Amazon, RosettaHUB has helped nearly 2,000 students and 500 teachers and researchers from 30 Tunisian higher education institutions to join the AWS Educate program. RosettaHUB has developed the necessary monitoring and control technologies to enable massive educational use of AWS and has also made available to the institutions its technological platform to easily transform AWS resources into state-of-the-art instruments for teaching and research.

In this workshop, we will introduce the initiative and give an overview of different statistics and big data-related courses it has enabled. The key platform capabilities will be presented including the virtual workbench, the federation consoles, the social framework, the statistics and big data eLearning apps designer and the statistics apps marketplace.

More information about the platform can be found at www.rosettahub.com

Workshops C, D, E - CompLabs (with a break)

See Why Students Love JMP

Volker Kraft

SAS Institute, Germany
Volker.Kraft@jmp.com

The unique learner experience during the exploration and analysis of Big Data in JMP will be demonstrated using a case study approach. We will explore and analyze a collection of examples including geographic, messy and unstructured data. See why students having access to interactive and visual tools cannot wait to "jmp" into their data, making JMP particularly suited for teaching the underlying concepts of real-world analytics in an engaging way.

All workshop content will be shared with the attendees who are welcome to follow the demos on their own computers. A free 30-day license of JMP 13 for Windows or Mac can be downloaded at www.jmp.com/try and should be pre-installed before the workshop.

Reconceptualising Statistical Literacy

Jim Ridgway[1], *James Nicholson*[1] *and Mark Brown*[2]

[1]Durham University, United Kingdom
[2]Manchester University, United Kingdom
jim.ridgway@durham.ac.uk, j.r.nicholson@durham.ac.uk, mark.brown@manchester.ac.uk

This Workshop investigates the dimensions of statistical literacy in the context of contemporary society. Participants will analyse tasks, and explore the extent to which current curricula and assessment systems reflect the statistical skills necessary to function in the modern world.

We start from a UNESCO definition of literacy. "Literacy is the ability to identify, understand, interpret, create, communicate and compute... Literacy involves a continuum of learning in enabling individuals to achieve their goals, to develop their knowledge and potential, and to participate fully in their community and wider society."

ProCivicStat is an ERASMUS+ funded project designed to engage high school and undergraduate students with evidence and statistical analysis relevant to the progress of society, via topics such as such as poverty, migration and inequality. We have developed a framework for describing statistical literacy that maps out the knowledge bases, skills, and other enabling processes that are needed to understand and engage with statistics about society. The framework comprises 3 dimensions, each with a number of elements, namely: Reflections and Stance (e.g. Meaning for Society and Policy; Critical Evaluation and Reflection); Knowledge (e.g. Models and Representations, Methodology and Enquiry processes); Enabling Processes (e.g. Quantitative Core; ICT and Search).

The framework is designed to facilitate the analysis of curricula and assessment systems. Do current assessment systems reflect what we view to be valuable, or does technical mastery dominate? Do current curricula reflect key skills, or are they unbalanced?
The Workshop will engage users in working with and classifying tasks from a range of sources, notably the 2016 GAISE Guidelines, and tasks based on stories and images found in the media.

Using IPUMS Data to Address Sustainable Development Goals: Analysis of Real World Policy Challenges using Real World Data

Kristen Jeffers

IPUMS, University of Minnesota, USA
kjeffers@umn.edu

IPUMS-International (census data) and IPUMS-DHS (Demographic & Health Surveys) are two of the data projects disseminated by ISRDI—the Institute for Social Research and Data Innovation at the University of Minnesota. A leading developer and disseminator of demographic data, IPUMS serves a broad audience of over 60,000 demographic and health researchers worldwide. IPUMS partners with national statistical offices and other organizations worldwide to provide integrated and harmonized microdata and metadata free of charge to educators and educators.

This hands-on session will introduce participants to the power and ease-of-use of IPUMS and IDHS for teaching statistics using free data contributed by partner countries and organizations. As an example of how the data can be used, presenters will demonstrate how to build indicators to measure progress toward the United Nations "2030 Agenda for Sustainable Development" (SDGs). The SDGs are comprised of 17 global goals and 169 targets. At least 10 goals and more than two dozen targets can be measured using data available in IPUMS-International and IPUMS-DHS.

Participants are asked to bring their own laptops. Following an introduction to the datasets and the SDGs, participants will do a series of exercises to showcase the interactive metadata available on the web, the customized microdata extract system, on-line tabulator, individual educator / researcher home page, and the classroom registration system.

Plenary lecture

Statistics Capacity Building in a Developing Country – Experiences, Opportunities and Challenges

Delia North

University of Natal, South Africa
Northd@ukzn.ac.za

Statistics Capacity Building has traditionally been associated with building capacity in Official Statistics, i.e. the capability to collect, analyze and disseminate high quality data in a timely manner and analysing the data for effective functioning of government, the economy and society. Statistical Capacity Building in the 21st century encompasses the capability to deliver relevant statistics training for the needs in ALL areas of official statistics, as well as public and private sectors, academia and research centres. This calls for education systems to deliver effective and updated statistics training across the spectrum, from basic data literacy to high level straining in the statistical sciences.

Challenges faced when building statistics capacity across the spectrum are well documented, however in developing countries, these challenges are similar, but often on a larger scale and more critical.

The author will give an overview of lessons learnt and experiences in statistics capacity building initiatives in a developing country, at all levels in South Africa (school to PhD), over a period of more than 25 years.

S1: Socially responsible societies I

Primary School Students' Statistical Reasoning when Comparing Groups

Daniel Frischemeier

University of Paderborn, Germany
dafr@math.upb.de

This paper reports on the examination of group comparison strategies of primary school students in Germany (grade 4, age: 9-10 years), who were taught about group comparisons in a two weeks statistics course. We will present the design, the realization of the course and first empirical results of the evaluation. For the evaluation we gave the students a group comparison task before they attended the classroom activities and we gave them the same task after they had attended the classroom activities two weeks later. We collected the written notes from all students, analyzed the data with qualitative content analysis methods and compared the students´ outcomes and strategies before and after the participation in the course. The results show that students show more elaborated group comparison strategies after attending the course.

Design, Realization and Evaluation of a Statistics Course for Preservice Teachers for Primary School in Germany

Susanne Podworny, Daniel Frischemeier and Rolf Biehler

Paderborn University, Germany
podworny@math.upb.de, dafr@math.upb.de, biehler@math.upb.de

We designed and developed a statistics course "Data & chance for primary school" that aims at developing content knowledge, pedagogical content knowledge, and also the technological knowledge of preservice teachers for primary schools. The course consists of weekly lectures where the content and the technological knowledge components are developed and of a weekly accompanying small-group seminar. The course is designed by the statistical reasoning learning environment principles and the use of so-called interface tasks that bridge content knowledge and pedagogical content knowledge play a fundamental role in the course. Three topics are taught: data analysis, combinatorics, and introduction into probability via stochastic simulations. First results of our evaluation on the base of online surveys before and after the whole course (n=189), the evaluation of written homework assignments of our participants and a written test administered after the course show that the statistical thinking of our preservice teachers improves over time and that they show more positive attitudes towards statistics after having attended the course.

Engaging Students, Teachers and Industry Through Statistics Towards Greater Connection and Social Responsibility

Peter Howley[1], *Ayse Bilgin*[2] *and Elena Prieto*[1]

[1]The University of Newcastle, Australia, Australia
[2]Macquarie University, Australia
peter.howley@newcastle.edu.au, ayse.bilgin@mq.edu.au, elena.prieto@newcastle.edu.au

Arresting statistical anxiety and connecting students with statistics is critical in the big data age and for future generations to be socially responsible citizens. This paper outlines a successful national project-based learning activity, which facilitates boundary encounters, engages students from varied backgrounds with varying areas of interest, and develops key communication, research and statistical skills aligned with national school curriculum outcomes. Allowing students to take the lead, determine the context and self-diagnose are powerful motivators. A mentoring model connecting industry, primary, secondary and tertiary educators has been invaluable to the project's success. Australian school teachers are saying "21st Century learning at its best", "motivates and engages students". Mentors are saying "I was inspired by their keenness", "provides students a unique opportunity". Students are saying "engaging, educational and enjoyable". Over 1000 students engaged with the competition in 2016.

S2: Socially responsible societies II

The Power of Balancing in a Data-rich Material World: Teaching introductory Mathematics and Statistics to Biology Students

Jorge Augusto Navarro-Alberto and Roberto Carlos Barrientos-Medina

University of Yucatan, México
jorge.navarro@correo.uady.mx, rcarlos@correo.uady.mx

The present study analyzed the satisfaction level of first-year biology students exposed to two sorts of learning activities while taking an introductory course of quantitative methods. Using a handbook of practices in a course of Quantitative Methods in Biology, first-year Biology students carried out different activities involving data collection, statistical analysis and construction of graphical models. At the end of the term, students were asked to contrast their learning activities with and without the use of virtual learning tools. Most students declared both approaches useful in their learning process but praised the production of their own data without the intervention of technology or virtual/computerized tools. The pattern of responses found in the survey, along with the wide array of situations a first-year biology student may well encounter in the future, suggest that learning experiences of biology majors should balance virtualization and empirical work "in the material world".

Perceived Usefulness of the Introductory Statistics Course as a Correlate of Student Engagement in Statistics

Rossi Hassad

Mercy College, New York, USA
Rhassad@mercy.edu

Some non-academic factors, particularly perceived usefulness, are salient determinants of student success, and engagement in a discipline. This study explored the association between college students' ratings of the usefulness of an introductory statistics course, their beliefs about where statistics will be most useful, and their intentions to take another statistics course. A cross-sectional study of 106 students was conducted. The mean rating for usefulness was 4.7 (out of 7), with no significant difference by gender and age. Sixty-four percent reported that they would consider taking another statistics course, and that subgroup rated the course as more useful ($p = .01$). Thirty-five percent reported that statistics would be most useful for graduate school, 32% research, 14% their job, and 19% were undecided. The "undecided" students rated statistics as less useful ($p = .001$). Instructors should emphasize practical examples of the use of data in real-world problem-solving and decision-making. Qualitative research methods could help to elucidate these findings.

S3: Socially responsible societies III

Making Societies Data Literate at Large Scale by Using Online News Media

Pim Bellinga and Thijs Gillebaart

I Hate Statistics, Netherlands
pim@ihatestatistics.com, thijs@ihatestatistics.com

In informed societies, citizens require the means to inform themselves, as well as adequate skills to interpret the information. In most countries, the data literacy/numeracy of citizens is under-developed. We propose to use (online) news media as one of the channels to increase the data literacy of citizens. This paper presents one example of an interactive explainer that explains sampling variation and the need for error margins in polls. This explainer has been published in several Dutch news media. In just a few days, thousands of readers completed the explainer and reactions have been enthusiastic and encouraging. Currently, it is still unknown how well the readers now comprehend the concepts and if such explainers can be created less labor intensively. Overall, we see interactive explainers in mass media as a promising direction forward to help societies become more data literate.

Problem-Based Learning as a Pedagogical Approach for Preparing Statistics Graduates

Gerald Iacullo

Berkeley College, USA
gji@berkeleycollege.edu

The purpose of this study was to explore selected reform-oriented practices centered on Problem-based Learning (PBL). The target group was developmental math instructors who provide formative level instruction that can be defining in developing quantitative reasoning. Data were collected using a 10-item scale developed from a set of criteria that focused on knowledge acquisition, critical thinking, active learning, multiple representations, skills development, and assessment. The majority of the PBL strategies were highly rated as either "usually" or "always" (ranging from 72% to 90%), however, some key strategies were lacking, particularly critical thinking, active learning, and multiple representations, which were rated as either "rarely" or "sometimes" (ranging from 39% to 63%). The results of this study provide insight into the use of PBL strategies designed to promote quantitative literacy among college students, and identifying instructor strengths and weaknesses that can be addressed in professional development programs.

Teaching "Quantitative Methods of Analysis in Social Sciences" at University Level

Theodore Chadjipantelis, Marina Sotiroglou and Eirini Gkouramani

Aristotle University of Thessaloniki, Greece
chadji@polsci.auth.gr, misotiro@polsci.auth.gr, egkouram@polsci.auth.gr

This paper deals with the organization and teaching methods of the compulsory course "Quantitative Methods of Analysis in the Social Sciences" in the department of Political Sciences (A.U.TH) to postgraduate students. Various interactive teaching methods can be put in practice in order to achieve the initial teaching purposes and outcomes which include understanding the meaning of the electoral and the party system, comprehension of quantitative methods and finally the implementation of the given methods. The course's aim is for the students to enhance data analysis capabilities and statistical reasoning applied to Social Sciences, by using a project and assigning team-based learning activities. Thus students, beyond conventional teaching methods, participate in an electoral survey, monitor elections and develop research abilities over official sources.

S4: Statistics Education in Africa I

Using Digital Tools to Engage Kenyan Development Studies Students with Data

Giovanna De Giusti

Maseno University, Kenya
giovanna.degiusti@gmail.com

This paper describes the use of innovative tools for teaching research methods to undergraduate students in Development Studies and Political Sciences in Kenya. These tools included open educational resources such as those available in Computer-Assisted Statistics Textbooks and Statistics Made Simple. Such resources, rooted in practical examples and real-life scenarios, enabled students understanding theoretical concepts through their application. Open Data Kit, an open-source suite of tools that enables the design of surveys, data collection through mobile devices and data submission to an online server, was used to provide the students with practical experience. These tools can be used to transform teaching and provide graduates with the practical skills required in the field of development. Moreover, they can be successfully deployed in resource-poor environments like Kenya, where relatively few students have access to laptops or computers and the internet connectivity is relatively low, but most have access to mobile devices.

Financial and Statistical Literacy for Retirement Housing Decisions in Australia

Timothy Kyng, Ling Li and Ayse Bilgin

Macquarie University Sydney, Australia
timothy.kyng@mq.edu.au, ling.li@mq.edu.au, ayse.bilgin@mq.edu.au

Many older people in Australia sell their family home to fund a long term residential arrangement with a "retirement village". The contracts are complex. Consumers usually lack the capacity to compare various retirement village contracts with each other or with other arrangements. We have designed a methodology for comparing such contracts via a comparison rent and other metrics. We are working towards developing a free online publicly available calculator and relevant educational material to facilitate informed decision making by consumers. Our proposed calculator will utilise publicly available data on mortality and disability to model survival of resident status. It will compute various metrics that measure the costs, benefits and risks of these contracts. These metrics vary with age, gender, and health characteristics. These freely (soon) available resources are intended to educate both consumers and their advisors / families in statistical, health and financial literacy when they need to make an important decision towards the end of their lives.

Facing the Challenges from Different Realities: eLearning Approaches for Africa and Europe

Bruno de Sousa[1] *and Gomes Dulce*[2]

[1]University of Coimbra, CINEICC, Portugal
[2]University of Evora, CIMA/UE, Portugal
bruno.desousa@fpce.uc.pt, dmog@uevora.pt

Given that the UN's Millennium Development Goals focus on primary education, Guy Pfefferman has observed how higher education was omitted within the African context. He also found that skills development for employment requires a radical change, advocating for eLearning as the only way to accomplish this in a meaningful and relevant way. In Africa we have the fastest growing population in the world with 40% under the age of 15, yet with one of the lowest higher education enrollments in the world, whereas in Europe we note an ageing corps of teachers, who despite being identified as having more experience, tend to suffer from technophobia. How to face the challenge of profiting from this experience and improve teaching practices when no more than 14% of the African population has access to internet? Simple ideas from a pilot study will be presented in order to overcome problems that may arise in less than perfect environments.

S5: Socially responsible societies IV

Teaching Statistics at the Civil Service Academy of Pakistan: An Innovative Endeavour

Saleha Naghmi Habibullah

Kinnaird College For Women, Lahore, Pakistan
salehahabibullah@gmail.com

In the developing world, there is a need to create awareness in civil servants regarding the importance of carrying out in-depth analyses of official data, in order to ensure policy-formulation aimed at improving the lives of the people. This paper reports on an attempt to achieve this at the first level of civil service, through an innovative approach in rendering a course entitled "Quantitative Tools for Decision-Making" to the probationary officers of the 43rd Common Training Program at the Civil Services Academy of Pakistan. The course was wholly based on data pertaining to the Multiple Indicator Cluster Survey (MICS 2011). Feedback from participants in the four-month-long course provides motivation for recommending the ongoing adoption of this approach at all levels of civil service. Similar strategies may prove to be worthwhile in many other developing countries of the world striving to create statistical awareness in civil servants.

Assessment of Teaching Practices on Mathematics for Students in Qatar

Ali Alzahrani, Elizabeth Stojanovski and Peter Howley

University of Newcastle, Australia, Australia
alirashashr.alzahrani@uon.edu.au,
elizabeth.stojanovski@newcastle.edu.au,
peter.howley@newcastu.edu.au

While understanding statistics is essential, teaching this content is challenging. There is an increased need to improve teaching practices to achieve positive outcomes in mathematics and statistics education. Improved mathematics teaching in schools is essential to motivate more students to undertake Science, Technology, Engineering and Mathematics (STEM)-related courses at University given the demand for STEM skills. Data on school students in Qatar was analysed to compare the effectiveness of different teaching methods on mathematics exam performance. Students performed better when cognitive-based approaches to teaching were used. Findings from this study can supplement existing teaching practices used in the teaching of mathematics in schools and can carry across to teaching undergraduate courses.

We Learn Statistics and Mathematics Hardly

Mohammad Nekoufar

Andimeshk Branch, Islamic Azad University, Andimeshk, Iran
mrnekoufar@gmail.com

In the first session of the school year, the researcher faced this question by a student: 'why can't we learn mathematics and statistics while we can succeed in other subject matters with little amount of effort?' Of course, facing such a question was not beyond expectation; many students in Iran and other countries may ask such a question. Skamp (1976), Serpinka (1998), and Freudental (1982) support this point. Based on his experience, the researcher considered Skamp's theoretical framework on schemata, and learning in structuralist viewpoint as suitable to account for this question. The student's role is regarded as vital. The research findings were put into practice in the class by the researcher, which yielded satisfactory results. The present study first gives a discussion on the students' meaningful theoretical infrastructure of the mathematical knowledge, then presents the research results.

Plenary lecture

What are the Mathematics Houses in Iran? And what they have done to Popularize Statistics

Ali Rejali

Isfahan University of Technology, Iran
a.rejali@yahoo.com

Since 1999, teams of Iranian high school teachers and university faculties have established what are called Mathematics Houses in Iran.
"Math House" is a community center that aims to provide a learning environment and opportunities for students and teachers at all levels for experiencing deeper understanding of mathematical concepts and developing creativity through working on real-life problems by team work and cooperation. In this talk we will introduce the houses and present some of their activities, then we will discuss the necessity of popularizing statistics among the public by promoting and enhancing statistics education among the teachers and students. The last part will be devoted to what we have done at mathematics houses for this enhancement, and why we established a statistics house in Isfahan.

S6: Employability skills for statistics graduates

How to Prepare Students for Work in the Pharmaceutical Industry

Ziad Taib

Astrazeneca RD and Chalmers Univeristy of Technology, Sweden
ziad.taib@astrazeneca.com

In this article, we consider the skills and competencies needed for a statistician to make a successful career in the pharmaceutical industry. We argue that there is gap between a theory-centered academia and a problem solving and data driven industry. As a result, companies face a constant shortage of statisticians with the right skills and capabilities. However, this problem is not specific to the pharmaceutical industry and eventually necessary reforms will be made to remedy this situation. In the meanwhile, there is a need to design courses that build on existing curricula. We discuss some recent experience of such courses.

Using Internships to Engage Social Science Students in the Practice and Development of Data Skills

Mark Brown and Jackie Carter

University of Manchester, United Kingdom
mark.brown@manchester.ac.uk, jackie.carter@manchester.ac.uk

There is growing recognition that good (quantitative) data skills are an essential part of a graduates skill set in an increasingly competitive jobs market. This is the context for the UK's 'Q-Step' programme, a strategic response to a widely reported shortage of these skills among social science graduates. This paper describes an initiative at the University of Manchester Q-Step Centre to pilot the use of internships as an integral part of quantitative training in the undergraduate curriculum, enabling students to apply and practice the skills they have learned in the classroom in a workplace setting. The internships involve students being placed on data led research projects with a diverse range of employers for eight weeks over the Summer. Now in the fourth year of the programme our evaluation is highlighting the potential of internships to help motivate and build confidence in the use of quantitative skills, with a number of interns going on to undertake data led dissertations and specialize further at postgraduate level.

Getting a Statistician Job You Want: Necessary Skills for Statistics Graduates

Jay Mandrekar

Mayo Clinic, USA
mandrekar.jay@mayo.edu

Many smart statistics graduates compete for the same job, but why does only one of them get selected? What separates him or her from the rest? Technical skill or soft skill or both? What does an employer look for in the candidate? Statisticians work as collaborators in various industries and academic institutions. In today's competitive world, focusing only on mastering new statistical techniques and software is not enough. A candidate needs to strengthen soft skills. These include networking, communication, collaborative attitude, showcasing teamwork, and leadership potential. These skills are not generally taught in graduate coursework and may take time to develop, but pay dividends when they come together. Graduate students should find a mentor who can guide them in achieving and mastering soft skills. Mentoring is a form of shared leadership which benefits both mentor and mentee, and is facilitated by many statistical associations. This paper will share insights from the author's experience as a lead statistician over 15 years, as well as from his responsibilities as the director of biostatistics core at a large academic healthcare institute with over 300 statisticians, data scientists, bioinformaticians and programmers. Examples will include one on one interactions, as well as a group setting with high school and university students.

Embedding Data Manipulation into Statistics Education

John Lunalo[1], *Steven Ndug'u*[1], *David Stern*[2], *Danny Parsons*[3], *Roger Stern*[2], *James Musyoka*[4] *and Cathy Garlick*[2]

[1]African Maths Initiative, Kenya
[2]University of Reading, United Kingdom
[3]University of Oxford, United Kingdom
[4]Maseno University, Kenya
johnlunalo95@gmail.com, stevenndungu4@gmail.com, d.a.stern@reading.ac.uk, danny@aims.ac.za, r.d.stern@reading.ac.uk, jkmusyoka@maseno.ac.ke, c.a.garlick@reading.ac.uk

University courses in statistics in many African countries are dominated by data analysis. This is just one component of the subject and students therefore lack knowledge on many important practical laboratory work components. Here we consider how data collection and data entry can be included in training courses. The next important stage of preparing the data, so it is ready for analysis is also considered. These stages, before data analysis, may use a combination of a spreadsheet, a statistics package and special software. Examples of each are considered.

S7: Statistics for other disciplines I

Describing Data Well in R-Instat

Maxwell Fundi[1], *David Stern*[2], *François Renaud*[3], *Lily Clements*[4], *Roger Stern*[2] *and Alex Sananka*[1]

[1]African Maths Initiative, Kenya
[2]University of Reading, United Kingdom
[3]University of Bath, Belgium
[4]Statistics for Sustainable Development, United Kingdom
maxwell@africanmathsinitiative.net, d.a.stern@reading.ac.uk, francois.j.renaud@gmail.com, lily@stats4sd.org, r.d.stern@reading.ac.uk, asananka@africanmathsinitiative.net

In 21st century, there is an increasing need to have skills to derive meaning from the growing data around us. In Africa, too much of statistical teaching is theoretical. This leaves students with a lack of data handling skills, and often unprepared to find meaning in data. The African Data Initiative (ADI) aims to change this. A first step has been to develop R-Instat, an open-source, free software based on the increasingly used statistics software R. This paper explains some of the decisions behind R-Instat's approach to encouraging descriptive analysis. It also proposes how this could support the teaching of good descriptive statistics.

Making Multilevel Data Ideas More Accessible

Danny Parsons[1] *and David Stern*[2]

[1]University of Oxford, United Kingdom
[2]University of Reading, United Kingdom
danny@aims.ac.za, d.a.stern@reading.ac.uk

Each year increasing amounts of data are being produced and there are growing trends towards data becoming more accessible, particularly online. Here we present a range of examples where data are conveniently arranged in multiple linked rectangles or data frames. They are often omitted from all but advanced statistics courses. However, they are common in practice, hence their omission leaves graduates poorly prepared for real world problems. The obvious example is a survey that is at multiple levels. Other examples include multiple time series with spatial data, where the spatial information is in a separate data frame; and data sets in a single rectangle (data frame) but where the analyses are on summary data. The statistical software, R-Instat, resulting from the African Data Initiative is designed to make it easy to handle such data.

Mobile e-Book for BITEC MOOC

Taerim Lee

Korea National Open University, Rep. of Korea
trlee@knou.ac.kr

This paper describes an implementation of mobile e-Book initiative in the Bioinformatics Training & Education Center (BITEC) MOOC project supported by the South Korean Ministry of Welfare and Public Health. This project was initiated by Dept. of Bioinformatics & Statistics KNOU and Dept. of Medical Informatics of SNU Medical College for training medical doctors. High penetration rates of mobile phone subscriptions and rapid growth of handheld users show that mobile devices are a viable alternative learning mode. The mobile e-Book initiative is aimed to encourage learning and interactions in distance learning communities, aiming to bridge transactional distances faced by learners and adopt mobility as the key tool in Bioinformatics courses delivery. The BITEC m-Learning initiative focuses on introducing Bioinformatics using easily accessible handheld and mobile devices, since the learners are very busy medical doctors in an ubiquitous learning environment. The m-Learning approach is considered as a learning alternative to support distance learners, mainly working doctors and medical researchers in Korea. This research paper discusses the implementation of the mobile e-Book approach which has better affordable, accessible and flexible educational media.

The Pathways to Teaching Statistics in the Health Area

Rodrigo Fioravanti Pereira[1] *and Ileana Greca Dufranc*[2]

[1]Franciscan University, Brazil
[2]University of Burgos, Spain
prof.rodrigopereira@gmail.com, imgreca@ubu.es

The teaching of statistics has been gaining prominence and affirming itself as an area of study, especially due to the need to qualify the training of professionals. In this paper, we aim to discuss the history of teaching statistics based on two existing reviews of the literature that were written in 1995 and 2007, respectively. Therefore, we conducted our own review, focusing on higher education in the health area. In regard to the studies that have been published since 2007, it is evident the increase in use of the Internet, the search for methods of teaching specific contents and the effort to promote literacy as well as the distribution of the statistical results. We believe that the use of methodologies based on learning theories, developed in environments of research studies on real data and supported by virtual and face-to-face technologies is in line with the evolution that the teaching of statistics demands so that it may improve the training of health professionals.

S8: Socially responsible societies V

Towards Statistically Literate Communication Professionals

Cláudia Silvestre and Ana Meireles

ESCS- Escola Superior de Comunicação Social, Portugal
csilvestre@escs.ipl.pt, ameireles@escs.ipl.pt

Communication professionals increasingly need to be able to read and critically comment on statistical data to communicate statistical information fittingly. Consequently, Statistics play an important role in the education of these professionals. Unfortunately, in Portugal most of the students who intend to become communication professionals do not feel at ease with numbers, mathematics or statistics. To engage our students and motivate them to learn, we have selected working groups themes related to their courses and used statistical information available in the real world. With this approach, we expect to get students more involved, make them familiar with using statistical information and let them increase their statistical skills. Therefore, everybody in the classroom, both students and teachers, are likely to become more motivated.

ISLP Country Coordinators as Ambassadors of Statistical Literacy

Reija Helenius[1], *Pedro Campos*[2] *and Steve MacFeely*[3]

[1]Statistics Finland, Finland
[2]LIAAD INESC TEC and FEP, Porto, Portugal
[3]Central Statistics Office, Ireland
reija.helenius@stat.fi, pedro.campos@ine.pt,
Steve.MacFeely@unctad.org

The ISLP (International Statistical Literacy Project) was established in 1994 by the ISI. The project operates under the IASE. In 2009, the project was strengthened by setting up a three-person executive team and a network of country coordinators for the project. At the moment, the ISLP has over 90 country coordinators on all continents. Their duty is to be promoters of statistical literacy in their countries. The aim of this presentation is to describe and analyse the activity of country coordinators and ways of advancing statistical literacy in each country. In 2016, the ISLP asked for reports from country coordinators on their activity and received almost 50 responses. Over one-half of the reports came from developing countries and a significant part from Africa. The paper presents a summary of the country coordinators' reports.

Facilitating Statistical Literacy for Evidence-Based Nursing Practice: An Active-Learning Approach

Alex Bux

Pace University, New York, United States
abux@pace.edu

A critical component of the nursing education curriculum is facilitating evidence-based practice, which is the judicious use of evidence toward effective patient care. Among the knowledge and skill sets required, is statistical literacy, which is generally perceived to be difficult, resulting in learning outcomes that are lacking. This paper presents a student-centered approach to teaching statistical literacy, in which students are engaged in individual and group critique and analysis of scientific research articles. Students are facilitated to make meaningful connections. In general, students are motivated and engaged, and by addressing the broader research context, the variables and their relationships become more meaningful, and hence there is greater conceptual grasp of statistics, which can result in transferrable knowledge and skills. This active-learning approach facilitates a meaning-making experience, which improves self-efficacy, and makes learning more interesting and meaningful, rather than mechanical and anxiety-driven. More active-learning strategies should be implemented and formally assessed.

Statistics Education in a Post-Truth Era

Jim Ridgway[1], *James Nicholson*[1] *and David Stern*[2]

[1]Durham University, United Kingdom
[2]Reading University, United Kingdom
jim.ridgway@durham.ac.uk, j.r.nicholson@durham.ac.uk, d.a.stern@reading.ac.uk

Post-truth refers to a climate where emotional reactions and personal beliefs are used more in shaping opinion and forming the basis for political action than is empirical evidence. Contempt for evidence is socially corrosive. It violates the core values of the statistical community, and poses an existential threat to the idea of evidence-informed decision making. The task of developing resistance to post-truth should be shared amongst everyone involved in statistics education. Here, we explore some possible responses as a community; we need to promote a non-partisan approach to promoting respect for high-quality evidence, and reasoning from evidence. We also need to look hard at our implicit acceptance of an 'evidence-informed' world view – when does the statistical and scientific community claim too much? After some scene setting (a brief introduction to the problem, and ideas on solutions from groups such as fact-checkers, social media platform providers, and journalists), we explore ways in which introductory statistics courses could be adapted to incorporate 'anti-post-truth' activities, then conclude with some ideas about how statistics educators can contribute to efforts from the broader community that depends on statistical literacy, and that is threatened by post-truth.

S9: Big data era

Training Statistics Graduate Students in Ethics, Reproducible Research, and Other Best Practices

Jeffrey Dawson

University of Iowa, USA
jeffrey-dawson@uiowa.edu

Graduate students in many fields are required to receive formal training in scholarly integrity. Some institutions offer general courses to address this need, but statistics students may benefit from training more specific to the discipline. We have developed a "Scholarly Integrity in Biostatistics" course, which addresses the competencies mandated by several U.S. funding agencies, while emphasizing the key roles that statisticians have in collaborative research. The course meets one hour per week, and its topics include student/mentor relationships, communication skills, gender bias, conflict resolution, authorship, human and animal subjects' issues, statistical review of manuscripts, plagiarism, copyright laws, conflicts of interest and commitment, reproducible research, and publication bias. Course credit and grades are based on attendance, class participation, short writing assignments, and a term project. The course has been offered four times, and has been received favorably by the students and by the administration.

Tools for Visualising Data: A Review

Jim Ridgway[1], *James Nicholson*[1], *Pedro Campos*[2] *and Sónia Teixeira*[3]

[1]Durham University, United Kingdom
[2]LIAAD INESC TEC and FEP, Porto, Portugal
[3]LIAAD INESC TEC, Porto,
jim.ridgway@durham.ac.uk, j.r.nicholson@durham.ac.uk, pcampos@fep.up.pt, sonia.c.teixeira@inesctec.pt

There has been an explosion in the range of tools available for presenting data, many of which are available to support statistics teaching. These include tools that allow users to 'drag and drop' data sets (e.g. RAW), tools designed to display particular data sets (e.g. eXplorer) and software libraries (e.g. D3.js). We report on a review of visualisation tools, where we have described the sorts of visualisations facilitated by each tool, along with features such as ease of use and cost. Data visualisations can give new insights into complex data sets, and can be used directly to reshape teaching. We map out teaching opportunities facilitated by different tool types. Understanding novel data visualisations has become an important element of statistical literacy, and so curricula should expose students to a wide variety of examples.

Reformatting Statistical Education in Russia: Changes in Classifications, Standards, and Programs

Alexey Ponomarenko

Higher School of Economics, Russian Association of Statisticians, Russia
ponomarenko26212@gmail.com

In the centrally planned economy the main function of official statistics was monitoring of plans' execution. Hence, official statisticians had to be experts in economics and bookkeeping like tax inspectors. Russian statistical education was oriented mostly to official needs and statistics was included in the same educational group as economics.Currently, professional requirements for statisticians have changed. Official statistics lost its control function and the old reporting system is being replaced by sample surveys that are less onerous for respondents and also less expensive. The statistical agency needs more professionals in survey methodology, as well as statistical managers and mathematicians. In 2015, the new professional standard "statistician" was accepted in Russia in line with ISCO 2008. It consists of set of competences for professionals in data collection, processing, analysis and methodology in any field of activity, including business, finance, science, medicine. In 2016, the educational classification of statistics was changed to the same group as mathematics. A new educational standard for statistics was also accepted, This paper describes part of the reconstructive process.

Still Coming Down From the Mountains

Roger Stern[1], *David Stern*[2] *and Richard Coe*[1]

[1]Statistics For Sustainable Development, England
[2]University of Reading, United Kingdom
r.d.stern@reading.ac.uk, d.a.stern@reading.ac.uk, r.coe@cgiar.org

Statistics has changed in many ways since the 1960s, when many African countries became independent. Among these changes are an increasing emphasis on data and a set of unifying principles that can simplify the teaching of statistical modelling. These changes have yet to impact training in statistics in many countries. Access to technology is needed if these changes are to be incorporated into statistics teaching, and this is now feasible in many African universities.

Posters

Using Public Procurement Datasets for Teaching and Learning

David Stern[1], *Danny Parsons*[2] *and Roger Stern*[3]

[1]University of Reading, United Kingdom
[2]Oxford University, United Kingdom
[3]Statistics for Sustainable Development, United Kingdom
d.a.stern@reading.ac.uk, danny@aims.ac.za, r.d.stern@reading.ac.uk

As part of the African Data Initiative, this poster focusses on the procurement menu of R-Instat, a tailored product of R-Instat designed specifically to analyse datasets on public procurement. The menu, initially tailored around an online-available dataset of World Bank funded public procurement tenders awarded across 171 countries, implements a new, objective methodology for measuring corruption risks. By specifying recognised procurement variables in their dataset, such as number of bidders, users can allow R-Instat to suggest appropriate analyses of their data. Experience using this data in a hands-on workshop for mathematical science MSc students in Tanzania demonstrated the educational value of this tool. The menu has also been used to teach Public Procurement Management Masters students in Italy about corruption risks methodology using European procurement datasets.There is a growing movement towards more data becoming open, with initiatives such as the Open Contracting Partnership. Open data has exciting consequences for training statisticians and public procurement students. However, being able to fully take advantage of the open data movement requires tools that enable users to easily carry out appropriate analyses. Trainings using R-Instat have shown this has the potential to fill this gap. Future development of the procurement menu to support more varied datasets could make it easier for trainers to incorporate more real-world data into courses.

Using the Climatic Menu in R-Instat

David Stern[1], *James Musyoka*[2], *Steve Kogo*[3], *Danny Parsons*[4], *Lily Clements*[5], *Shadrack Kibet*[3] *and Roger Stern*[5]

[1]University of Reading, United Kingdom
[2]Maseno University, Kenya
[3]African Maths Initiative, Kenya
[4]Supporting African Maths Initiatives, United Kingdom
[5]Statistics for Sustainable Development, United Kingdom
d.a.stern@reading.ac.uk, jkmusyoka@maseno.ac.ke, stevekogo@gmail.com, danny@aims.ac.za, lclements1004@outlook.com, shadrackkibet36@gmail.com, r.d.stern@reading.ac.uk

Every African country has a National Meteorological Service (NMS) which provides short-term forecasts, provides seasonal forecasts, and holds historical climactic data. Historical data are used in many applications, including PICSA (Participatory Integrated Climatic Services for Agriculture). The PICSA project uses historical climatic data to support farmers and intermediaries. Analyses of historical data currently use a statistics package called Instat; this is soon to be replaced by the facilities in the new climatic menu of R-Instat. This poster focusses on the climatic menu of R-Instat, which includes daily climatic data on rainfall, temperatures, and sunshine hours, plus satellite data since 1983.Statistics education across Africa is still usually taught theoretically. Climatic data provides a rich set of opportunities to enhance learning in ways that are interesting to students. The poster mentions some ways to process this data using the climatic menu in R-Instat. We consider "events" such as the start, end and length of the rainy season, together with spell lengths and extreme rainfalls during the season. We also consider wind speed and direction, which can be presented as circular graphs and be related to wind energy.

Key Features and Educational Uses of the Describe Menu in R-Instat

David Stern[1], *Maxwell Fundi*[2], *Danny Parsons*[3], *Lily Clements*[4], *Steven Ndungu*[2], *Alex Sananka*[2] *and Roger Stern*[4]

[1]University of Reading, United Kingdom
[2]African Maths Initiative, Kenya
[3]Supporting African Maths Initiatives, United Kingdom
[4]Statistics for Sustainable Development, United Kingdom
d.a.stern@reading.ac.uk, maxwell@africanmathsinitiative.net, danny@aims.ac.za, lclements1004@outlook.com, stevenndungu4@gmail.com, sananka43@gmail.com, r.d.stern@reading.ac.uk

This poster focusses on the describe menu of R-Instat; in particular, features relating to data exploration. The exploration of data is fundamentally important for anyone working with data, yet it receives relatively little importance in many statistics courses. The poster illustrates some key aspects of tables and graphs in R-Instat and how they can be used to quickly get an overview of data. It shows how descriptive analyses are made into an easy and natural process, both to teach and to learn. We illustrate a wide variety of graphs that use ggplot2 in R, how to produce tables that are eye-catching and useful, and the similarities between tables and graphs. We can have a table of graphs or graphs where some of the cells have a table. Particular attention will be drawn to the value of a true problem based approach, where students start with a problem and some data and are free to use any appropriate analytic methods. The key to this approach is to have data which is rich enough that a combination of approaches yields more insights than any single analysis. Analyzing data can be fun!

Key Features and Educational Uses of the File Menu in R-Instat

David Stern[1], *John Lunalo*[2], *Danny Parsons*[3], *Lily Clements*[4] *and Roger Stern*[4]

[1]University of Reading, United Kingdom
[2]African Maths Initiative, Kenya
[3]Supporting African Maths Initiatives, United Kingdom
[4]Statistics for Sustainable Development, United Kingdom
d.a.stern@reading.ac.uk, johnlunalo95@gmail.com, danny@aims.ac.za, lclements1004@outlook.com, r.d.stern@reading.ac.uk

As part of the African Data Initiative, this poster focusses on the file menu of R-Instat and in particular the features relating to datasets. Statistical education is brought to life through the use of interesting and relevant data to engage learners in their tasks. The poster illustrates some key aspects of the import facilities and presents the richness of the inbuilt data library. It mentions some of the key ways in which these file features can and have been used for teaching and learning to change this situation. Particular attention will be drawn to the value of a true problem based approach where the students start with a problem and some data and are free to use an appropriate methods for the analysis. The key to this approach is to have data which is rich enough that a combination of approaches yields more insights than any single analysis. Transforming statistics education with R-Instat and projects could be a first step towards an African Data Revolution.

Statistical Literacy in Ukraine: Problems and Developments

Oleksandr Osaulenko, Volodymyr Panteleiev and Yakiv Karchev

The National Academy of Statistics, Accounting and Audit, Ukraine
O.Osaulenko@nasoa.edu.ua, bernstein@nasoa.edu.ua, karchev@ua.fm

This poster summarizes the current state of affairs in the Ukrainian system of statistical education and prospects for its development. Ukrainian higher educational institutions teaching economics have trained statistics throughout the study period - both within a general mathematical curriculum (probability theory, mathematical statistics, econometrics, etc.) and as part of vocational training for various economic specialties. Thanks to such features, statistical education is an integral part of training financiers, accountants, auditors, managers, etc.

Ukraine has made significant achievements in training specialists in statistics. Lately, ties between higher education institutions and main employers (official statistics and business) have been strengthened, including students' internships in the offices of employers, lectures by leading specialists, and more modern curricula such as ESTP and EMOS.

The center for contemporary statistical education of Ukraine is the National Academy of Statistics, Accounting and Audit, whose main mission is the training of highly qualified personnel, primarily for the needs of official statistics, in accordance with international recommendations and educational standards in this field. To implement the program "Learning throughout life", the Academy has developed training programs for continuous statistical education (retraining and second higher education), popularization of the profession, and a statistical literacy manual for general education schools. The Government of Ukraine has also initiated the creation of a International Statistical Institute for the countries of Eastern Europe, the Caucasus and Central Asia, on the basis of the Academy, as another training center.

Impact Of Big Data On Development Of The Curriculums Of Training Statisticians In Ukrainian University

Ruslan Motoryn[1], *Tetiana Motoryna*[2] *and Kateryna Prykhodko*[2]

[1]Kyiv National University of Trade and Economics, Ukraine
[2]Taras Shevchenko National University of Kyiv, Ukraine
motoryn@i.ua, t.motoryna@i.ua, kateryna.prykhodko@gmail.com

In the Soviet era in Ukraine, theoretical subjects dominated in the education curriculum. Since independence, there have been profound changes in the higher education system of Ukraine. The system has adapted to the market model, with an increasing number of applied disciplines such as data mining, software engineering and data visualization. Courses should cover both theoretical knowledge and practical skills. Recently, one of the top requested areas at the information technology market is the processing of large data sets (Big data). Many leading universities of Ukraine, including Taras Shevchenko National University of Kyiv and Kyiv-Mohyla Academy, plan to establish courses of data mining, statistics, and data visualization. For now, however, universities do not have enough teachers. Therefore, under the scope of the Ukrainian Distance Education Project "Prometheus", in 2017 an online course on the Big Data will be launched. This paper will summarize the curriculum developed by the authors, in courses on Business Analytics, Software Engineering, Data Analysis, and Data Visualization.

An Analysis of Statistical Texts through the Meaning Elements of Godino

Teresita Teran[1], *Diana Kohan*[2] *and Augusto Nascimbene*[1]

[1]National University of Rosario, Argentina
[2]National University of Entre Rios, Argentina
teresitateran@hotmail.com, dikohan@ingenieria.uner.edu.ar, anascimbene@yahoo.com.ar

Through some research projects, studies have been carried out on the contents of essential university textbooks of Basic Statistics. Access to textbooks as "epistemological tutors of wise knowledge" is fundamental at the university level. At that level, instruction in statistics is primarily instrumental. An apriori analysis of the text allows us to identify and anticipate possible epistemological and didactic obstacles that present generalized difficulties and will generate frustrations and errors for some students. In this poster, we use the theoretical framework of Godino to present an analysis of text content that is incorporated into the integral study of the Institutional Meaning of Reference in the topic Confidence Intervals, in the Faculties of the National Universities in Argentina.

Teaching a Polling and Survey Seminar

Adam Molnar

Oklahoma State University, USA
adam.molnar@okstate.edu

Unlike countries where an honors degree requires additional work after a standard bachelors' degree, honors degrees in the United States require specialized coursework during the initial degree program. Colleges value honors programs because they attract higher-performing students and donor interest. One way colleges attract students to honors programs is through small seminar-style courses on interesting subjects. Seminar courses are unusual for statistics programs, because seminars are characterized by in-depth readings and verbal discussion, not lecture or laboratory. The author was asked to create a specialized honors seminar course for fall 2016. Since the USA was scheduled for major elections in November 2016, a course was designed to learn about polling, surveys, and political applications of polls. The course had three goals - analyze statistical information about the 2016 US presidential election; plan and conduct a poll of campus students; and introduce a few mathematical tools related to politics and polls. Although all three goals were accomplished, class preparation was not simple. Since the campaign had high levels of discord and nastiness, including newspaper critique of polling organizations, the course had to maintain strict neutrality to prevent statistics from turning into politics. This poster will present verbal and visual highlights of the course, including a summary of recommendations for others considering a similar seminar-based offering.

Towards the next ICOTS10 in Kyoto

Michiko Watanabe[1] *and Kazunori Yamaguchi*[2]

[1]Keio University, Japan
[2]Rikkyo University, Japan
watanabe_michiko@nifty.com, kyamagu@rikkyo.ac.jp

The International Conference On Teaching Statistics [ICOTS] is held every four years. Its main purpose is to give statistics educators and professionals around the world the opportunity to exchange information, ideas and experiences, by presenting recent innovation and research in statistics education. ICOTS also allows peopel to expand their range of collaborators.
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 since 1978, when the ISI's Education Committee Task Force was established to plan for the first ICOTS. This is indeed an exciting time.
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. Yet, it is not clear if statistics and data science are moving together or apart. Both areas focus on variability, uncertainty and context, but often approach the analysis and collection of data quite differently. In terms of education, what can the fields learn from each other? Where do we see ourselves going?

Special session

IPUMS International: Teaching statistics with free online microdata from international censuses and surveysemo of IMPUS databases for teaching and research

Kristen Jeffers

IPUMS, University of Minnesota, USA
kjeffers@umn.edu

IPUMS-International partners with national statistical offices and other organizations worldwide to provide integrated and harmonized census and survey microdata and metadata free of charge to researchers and educators. This presentation will provide conference participants with an introduction to the database and demonstrate how to access the free data for classroom use. Census data can be used to expose students to a wide range of social topics including migration, employment, educational attainment, family structure, fertility, housing characteristics, and more.

Plenary lecture

The Teaching of Statistics in Morocco
L'enseignement de la Statistique au Maroc

Adil El Marhoum

University Mohammed V Rabat, Faculty of Legal, Economic and Social Sciences Agdal, Morocco
adil.elmarhoum@gmail.com

Discussing higher education in Morocco, particularly about statistics, the talk reflects on the following points:

- Interest of statistics
- Place of statistics in education programs in Morocco
- Difficulties in teaching statistics
- Teachers of statistics and teaching methods
- Suggestions for further increasing the penetration of statistics into curricula

Various reforms of Moroccan education have consistently placed more emphasis on the teaching of statistics. This teaching is currently being introduced in most of the training streams, such as economics, management sciences and agronomic sciences.
Despite this positive development, there are a number of shortcomings in the teaching of statistics. There is an absence of statistical reasoning in students: the ability to analyze and interpret the results of calculations. Statistics courses are taught by teachers who have often been forced to teach it, usually mathematics teachers, who on the whole have a formal approach to statistics. The mathematician takes the place of the statistician, without considering more applied questions.
In order to encourage better statistical understanding, we suggest the presence of experienced statisticians in any university or scientific research institution, in association if necessary; training seminars (Study visits, refresher courses, thematic networking of statisticians, etc.) in countries with more statistics education capacity; local training for researchers; participation in regional seminars; creation of courses of study more oriented towards statistical processing and data processing; and drafting and dissemination of guides to good statistical practice in experimentation, sampling and publication of results.

Dans le cadre de l'enseignement supérieur au Maroc, notamment pour le domaine de la statistique, la communication apporte quelques réflexions sur les points suivants :

- Intéręt de la statistique.
- Place de la statistique dans les programmes d'enseignement au Maroc.
- Difficultés liées ŕ l'enseignement de la statistique.
- Les enseignants de statistique et méthodes d'enseignement.
- Suggestions pour augmenter davantage la pénétration de la statistique dans les programmes d'enseignement.

Les différentes réformes de l'enseignement marocain n'ont cessé d'accorder plus d'importance ŕ l'enseignement de la statistique. Cet enseignement est introduit actuellement dans la plupart des filičres de formation avec une pénétration plus importante dans les sciences économiques, les sciences de gestion et les sciences agronomiques.
Malgré cette évolution positive, l'enseignement de la statistique connaît un certain nombre d'insuffisances. En effet on peut constater une absence du raisonnement statistique chez les étudiants : capacité d'analyser et d'interpréter les résultats des calculs. La statistique est enseignée par des enseignants qui ont été souvent contraints de l'enseigner, généralement des enseignants de mathématiques qui dans l'ensemble ont une approche formelle de la statistique. Le mathématicien prend la place du statisticien, sans pour autant résoudre les questions plus appliquées.
Face ŕ ce constat, pour encourager une meilleure pénétration de la statistique, nous suggérons que dans toute institution universitaire ou de recherche scientifique la présence de statisticiens expérimentés doit ętre effective, si besoin en association. Mettre en valeur les enseignants de statistique par des séminaires de formation dans des pays avancés dans ce domaine. (Séjours d'études, de recyclages, établissement de réseaux thématique de statisticiens, etc.). Des formations locales pour les chercheurs ou la participation ŕ des séminaires régionaux, éventuellement ŕ distance. Créer des filičres d'enseignement spécifiques, davantage orientées vers le traitement statistique et informatique des données. La rédaction et la diffusion de guides des bonnes pratiques statistiques en matičre d'expérimentation, d'échantillonnage et de publication de résultats.

S10: Socially responsible societies VI

Analyzing Unstructured Data: Text Analytics in JMP

Volker Kraft

SAS Institute, Germany
Volker.Kraft@jmp.com

As much as 80% of all data is unstructured but still has exploitable information available. For example, unstructured text data could result from comment fields in surveys or incident reports. If you want to explore this unstructured text to better understand the information that it contains, Text Mining, based on a transformation of free text into numerical summaries, can pave the way for new findings. This example of the new text mining feature in JMP starts with a multi-step text preparation using techniques like stemming and tokenizing. This data curation is pivotal for the subsequent analysis phase, exploring data clusters and semantics. Finally, combining text mining results with other structured data takes familiar multivariate analysis and predictive modeling to a next level.

Confronting Misconceptions: The Role of Dynamic Interactive Technology

Gail Burrill

Michigan State University, USA
burrll@msu.edu

Interactive dynamic technology can help students build concept images of core statistical ideas and in the process surface common misconceptions about these ideas. Applet-like documents allow students to take meaningful statistical actions in diverse situations, immediately see the consequences, and reflect on those consequences in terms of specified learning outcomes. Results from using the materials with preservice elementary teachers will be reported.

Presentation of Statistical Concepts with Dynamic Graphics and Simulations in R

Andrej Blejec

National Institute of Biology, Slovenia
andrej.blejec@nib.si

Understanding statistical concepts is important for proper use of statistics. The idea of using simulations and dynamic graphics to foster understanding of statistical concepts is not new. In recent years, R became the lingua franca for statistical data analysis. While R graphical devices are not meant for display of animated graphics, my aim is to use base R graphics for display of animated graphical sequences. To enable dynamic graphics in R, I developed a package animatoR, which supports smooth transitions of graphical elements and simplifies preparation of animated displays. I will show some animations that can be useful for statistics teaching and present basic features of the animatoR package. The animatoR package is freely available at https://github.com/ablejec/animatoR.

From Kindergarten to Elderly People. A Macro View of the Teaching of Statistics

Teresita Teran

National University of Rosario, Argentina
teresitateran@hotmail.com

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 outcomes obtained in many years of teaching. When new education law was implemented, statistics was incorporated into math programs, but the teachers, as in their curriculum did not have statistics, had no knowledge about it; they needed training and that was a great challenge. So, professors of statistics from the university were called to train teachers. As one of then, I taught statistics to kindergarten teachers and the results were amazing, then to teachers of primary and secondary level. I will present some papers done by the students, since the practice included 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 postgraduate courses on Statistics, and extension courses to elderly people. This macro vision of teaching statistics and the results show how the teaching of statistics has no age limits.

S11: Statistics Education in Africa II

Open Educational Resources for Statistics Training

James Musyoka[1], *Roger Stern*[2] *and David Stern*[3]

[1]Maseno University, Kenya
[2]Statistics for Sustainable Development, United Kingdom
[3]University of Reading, United Kingdom
jkmusyoka@maseno.ac.ke, r.d.stern@stats4sd.org,
d.a.stern@reading.ac.uk

A series of papers at this conference have built on the African Data Initiative (ADI) which was started to improve statistical literacy and understanding. One immediate deliverables of this initiative has been new statistical software which is free, easy-to-use, open source and which encourages good statistical practice. Here we show how this software together with other open educational resources can be used to improve statistics teaching. This is demonstrated using an undergraduate course which was offered to about 300 students at Maseno University, Kenya. The resources include those from an e-learning course, called e-SMS (Statistics Made Simple) and an electronic statistics book called Computer Assisted Statistics Textbook (CAST). The course also made extensive use of Moodle to enable a "blended" approach to be undertaken.

Seeding the African Data Initiative

David Stern

University of Reading, United Kingdom
d.a.stern@reading.ac.uk

The African Data Initiative (ADI) is a highly collaborative project that aims to transform statistics education and how people use and understand data, both in Africa and beyond. The first major activity of ADI has been the development of R-Instat, a front-end to R, tailored to African needs and developed largely in Africa. This paper describes the background, initial activities and the principles of ADI. The principles provide structure to guide and communicate thinking behind ADI decision making, for both existing and future activities. The ADI collaboration exists primarily through a common desire to contribute towards Africa's data revolution alongside a collective principal based approach.

Statistics in Maths Camps

Zachariah Mbasu[1], *Thomas Mawora*[2] *and David Stern*[3]

[1]African Maths Initiative, Kenya
[2]Maseno University, Kenya
[3]University of Reading, United Kingdom
zmbasu@gmail.com, tmawora@maseno.ac.ke, d.a.stern@reading.ac.uk

It is generally agreed that statistics is an important discipline to be introduced at school level. However, only small components of the subject and a narrow scope are introduced at primary and secondary school level curriculum in Kenya. This paper discusses the emerging prominence of statistics sessions at Math Camps in Africa. It shows how maths camp student participants have developed the knowledge and skills to support further learning of important statistical concepts. This has involved hands on sessions where students interact with real data sets.

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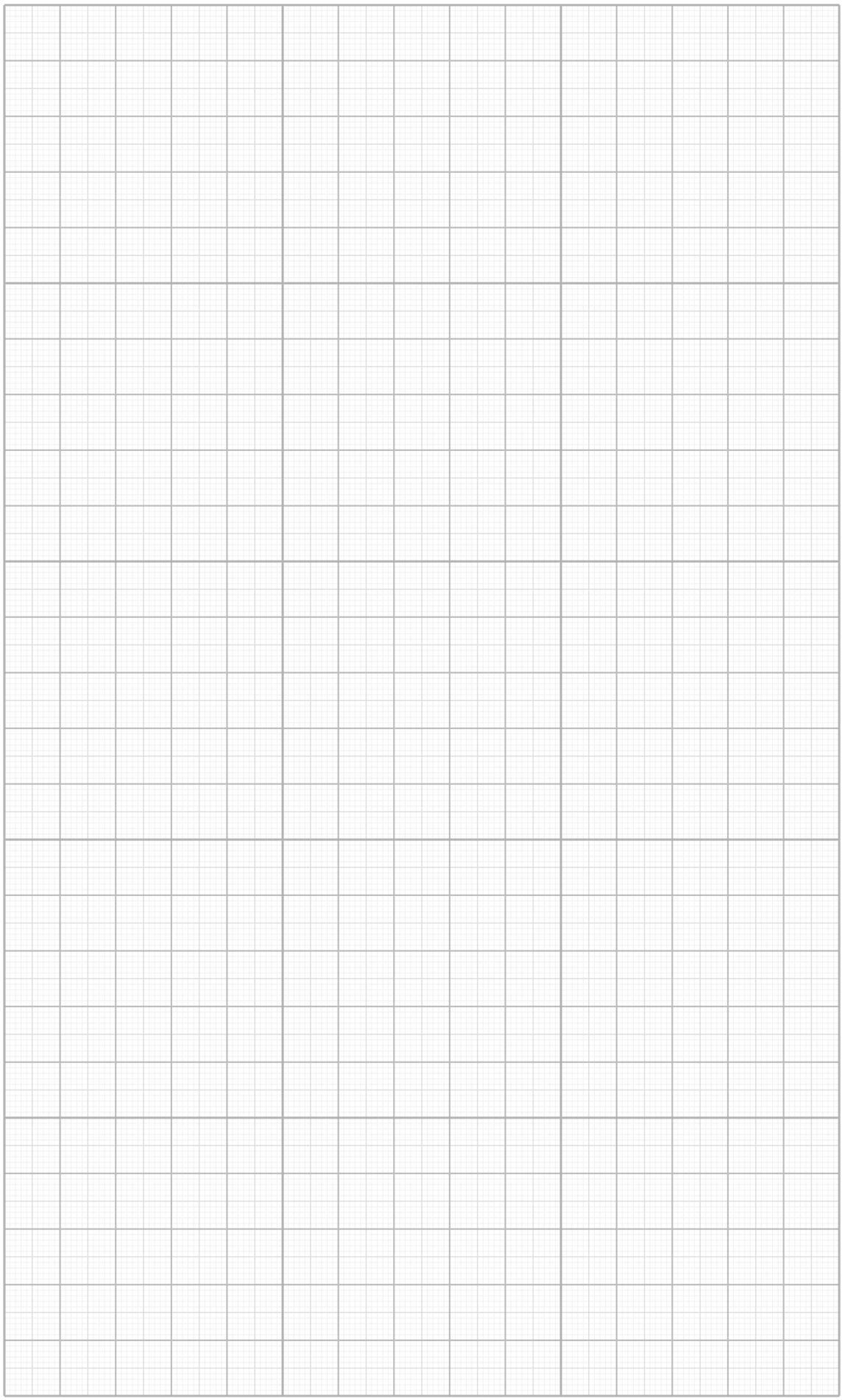

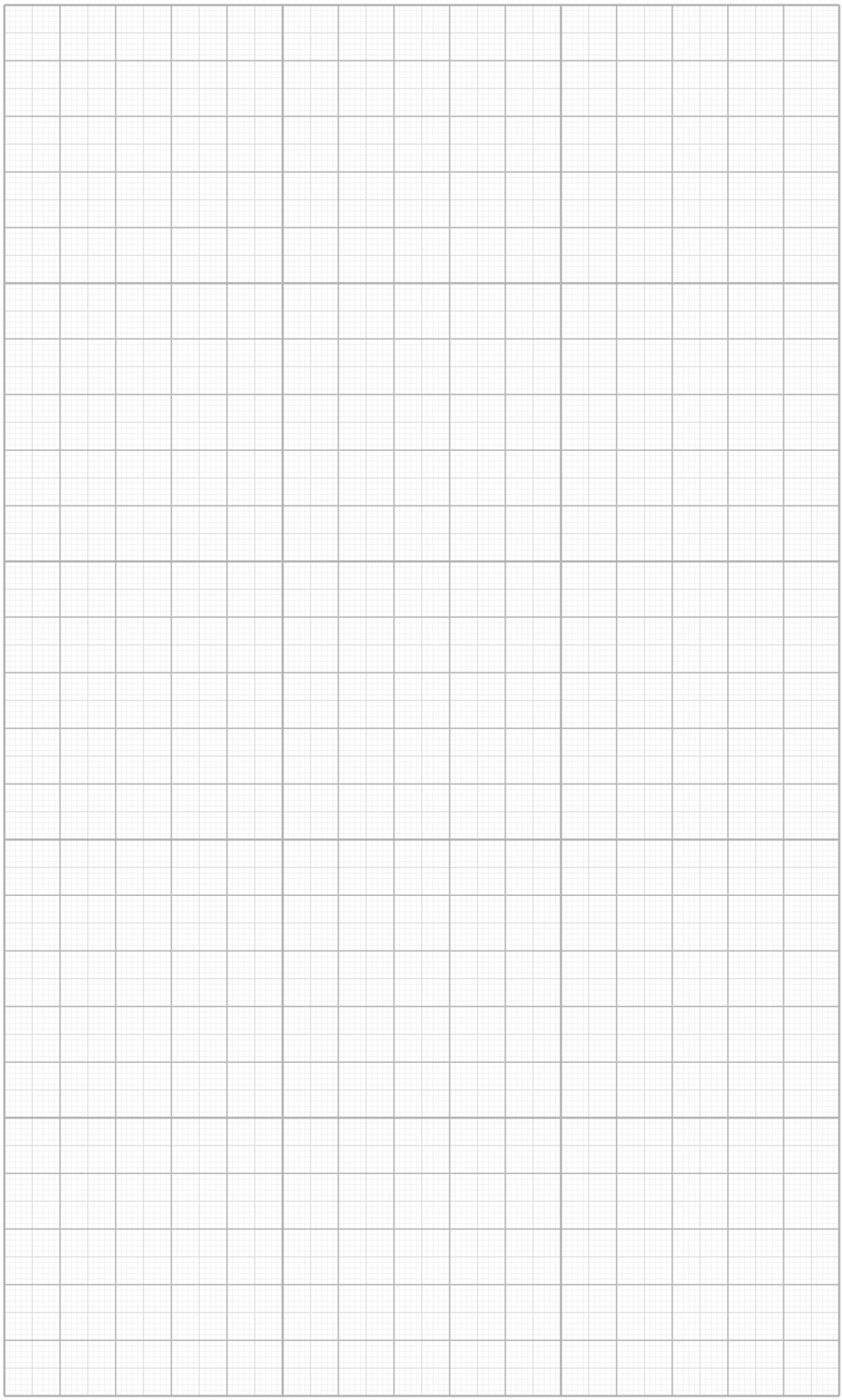

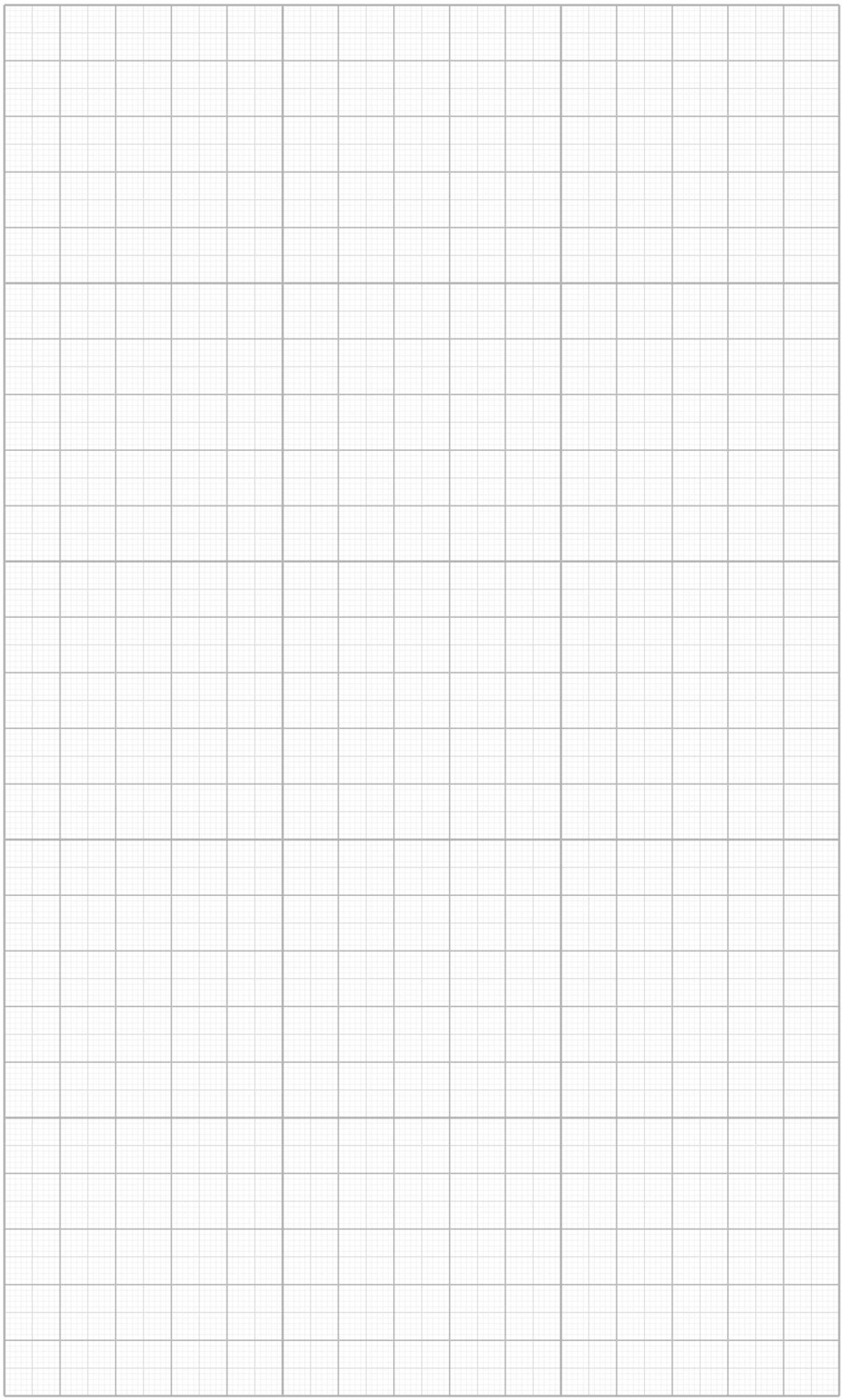

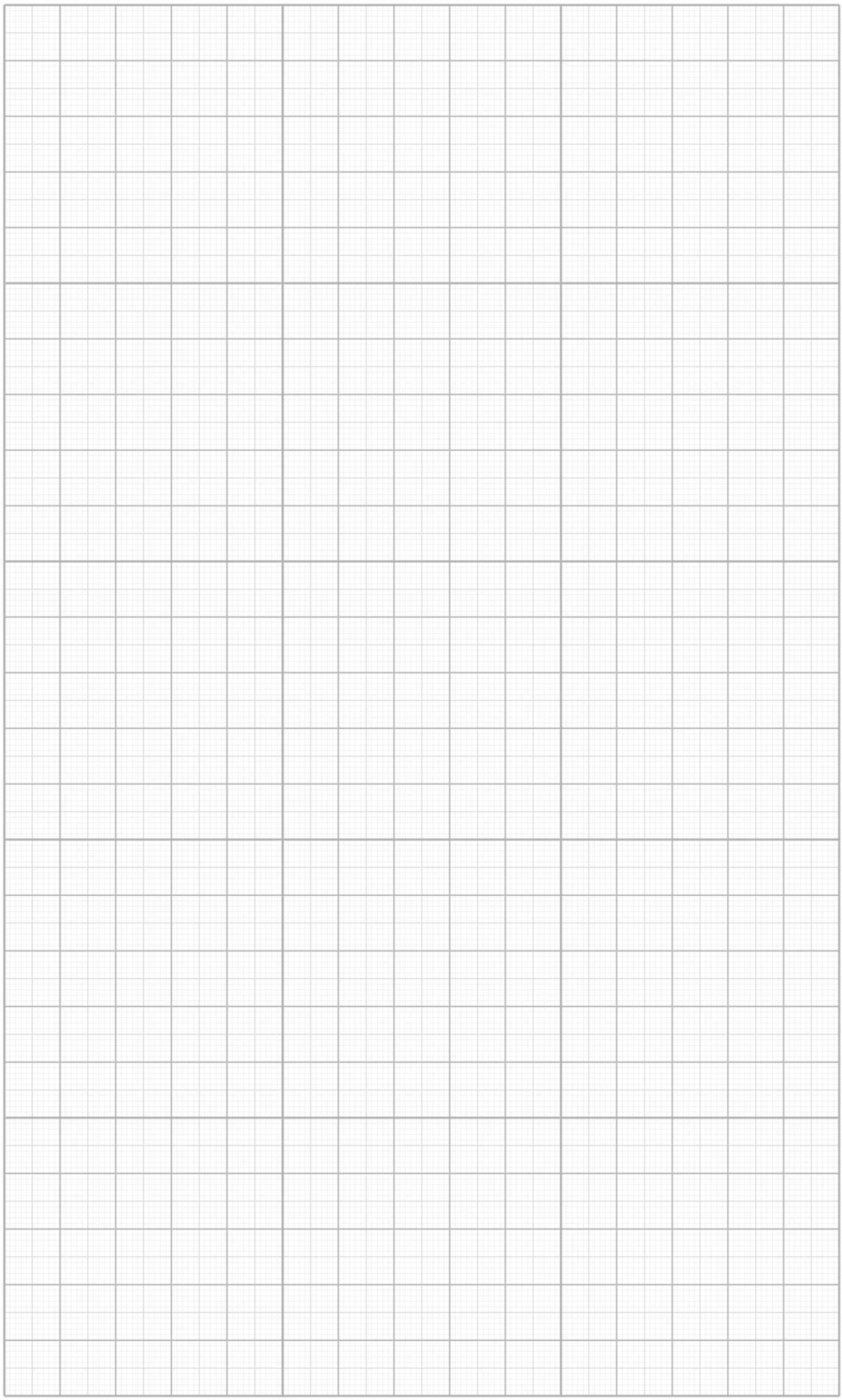

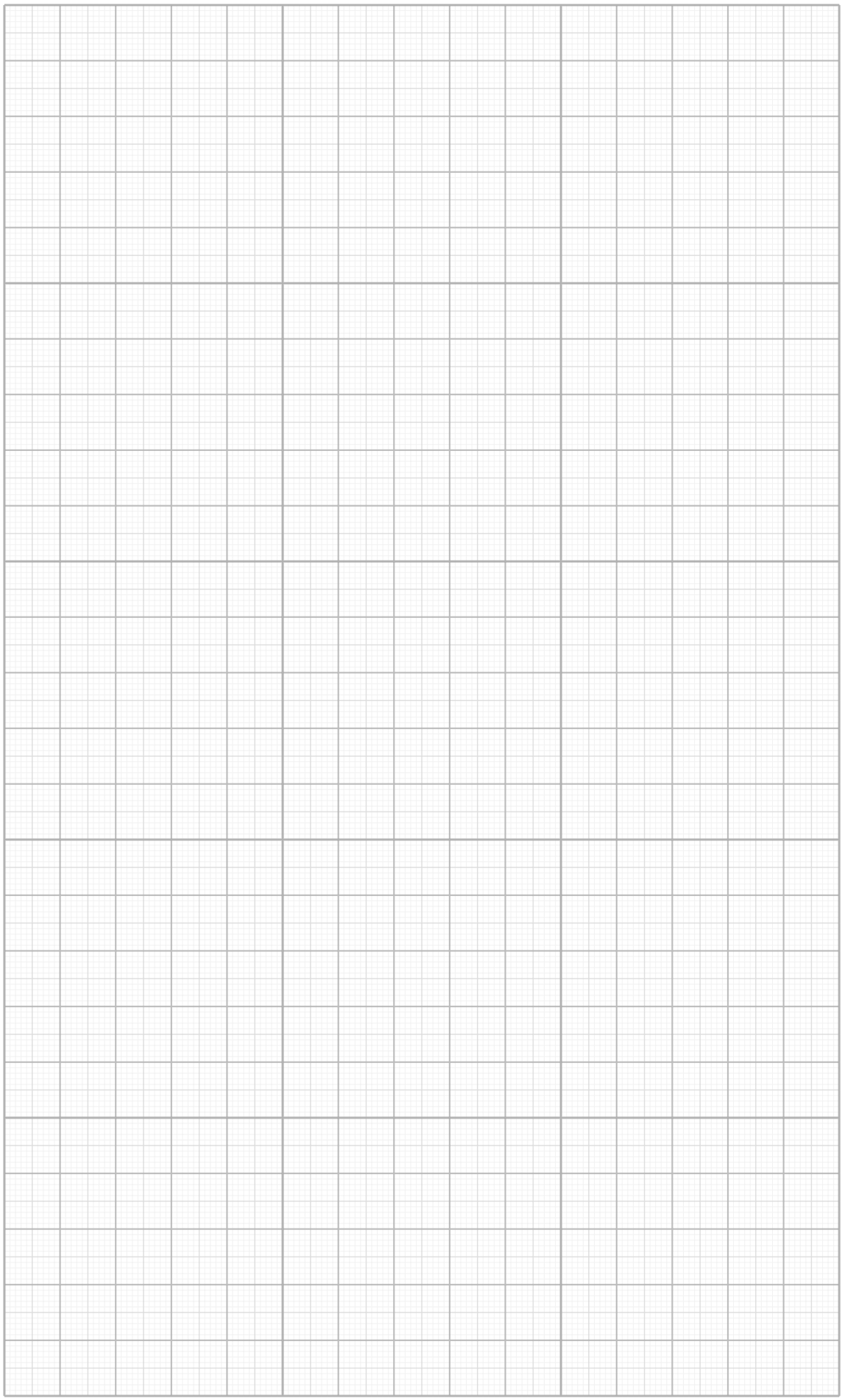

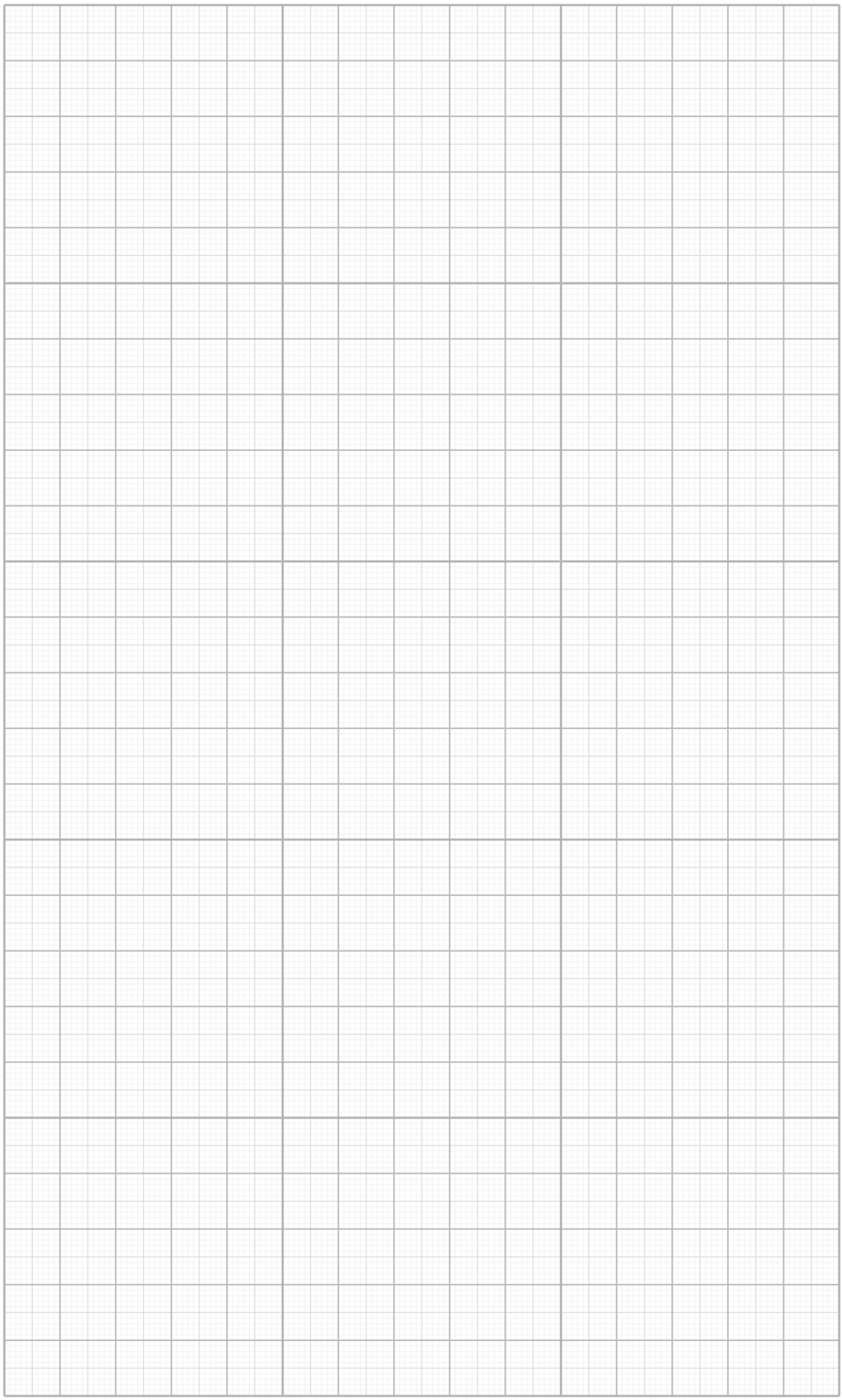

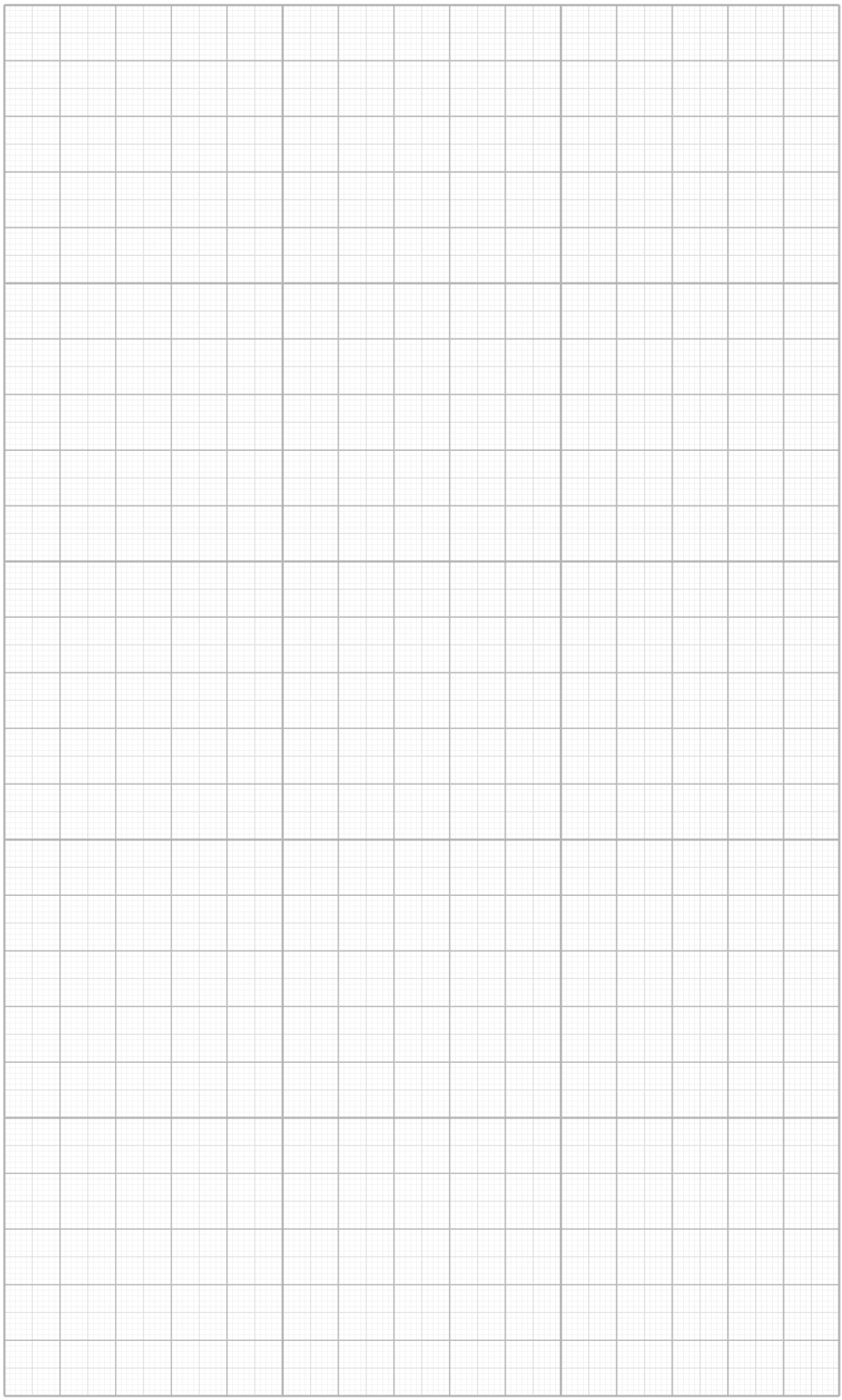

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IPUMS, University of Minnesota, USA

Universiteé Mohammed V de Rabat,
Institut Scientifique

IASE Satellite Conference, July 11-14 2017, Rabat, Morocco

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