IDEMS

International

IDEMS International Annual Report

8 January 2018 – 31 January 2019

David Stern & Danny Parsons

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Overview

IDEMS International finished its first year in the black, having invested both time and money into projects valued as important. Our accounts show a turnover of over £143,000 with a surplus of £12,000 before tax. Full accounts are provided openly for transparency. A large portion of the surplus will be donated to the UK charity Supporting African Maths Initiatives (SAMI). As one of the initial motivations for founding IDEMS, we are delighted to already be able to make a significant donation to SAMI.

We had 11 contracts and 1 grant, with 7 clients. Our biggest client was Statistics for Sustainable Development (Stats4SD) with whom we collaborated with on 3 different projects, followed by the UK MET Office, 3 UK universities, a US Foundation and a UK charity. We focused on building a solid foundation of paid work, conscious of wanting to avoid IDEMS becoming reliant on donor funding or expanding in an unsustainable way.

We introduced a sensible salary structure from day one that is sustainable for current and future employees and finished the year with 2 full-time directors, 1 part-time employee, 1 volunteer on the management team and 4 sub-contracted individuals, 2 regularly and 2 for specific projects. This includes colleagues in the countries we work in and we have succeeded in involving local partners in projects, particularly in Kenya and in Ghana, where we are developing exciting young teams.

Our administrative, legal and accountancy choices made during the formation of IDEMS have provided a solid foundation and enabled us to be efficient with our time. Advice from Statistics for Sustainable Development (Stats4SD), informed many of these decisions and we wish to thank them for being extremely supportive and encouraging, particularly in our initial period.

This year's major activities are highlighted below grouped into five overlapping categories.

Consultancy contracts

The list of consultancy projects illustrates the variety of IDEMS' work, from supporting agricultural research to delivering training on satellite data. Consultancy contracts have provided a solid financial foundation while being valuable and interesting work in their own right. We are encouraged that we have achieved this through work coming to us from existing contacts, without yet needing to actively seek out opportunities.

Open-source products

IDEMS has contributed to the development of two open-source projects this year, R-Instat (statistics package) and Climsoft (climate database software). These contributions are intended to support global efforts, while also being closely linked with some of our consultancy work.

IDEMS community work

Community work allows us to support projects we are passionate about that may not have the required funding behind them. As well as supporting activities in Kenya, towards the end of the year IDEMS made a conscious decision to prioritise projects that have the potential to achieve impact at scale, starting with developing electronic assessment tools for mathematics education.

Conferences and workshops

Engaging with wider communities of experts is important for IDEMS and its staff. Conferences and workshops allow for sharing and learning experiences among peers and building connections and collaborations with new groups. This year IDEMS was represented at data science and science events in Rwanda.

IDEMS investment

We are keen to invest in the talented people we work with around the world. In supporting and developing partners in Kenya, Ghana and Argentina, we hope to strengthen IDEMS as an organisation, and build teams that can attract work locally.

Lessons learnt

The experience has not been without challenges and we have learnt many lessons during the year. One project was not delivered in the time frame promised, partly due other projects taking our main focus and our own underbudgeting. Fortunately we had an understanding client that agreed to a mutually acceptable final delivery date.

Our external communications have been neglected. We did not launch our website within the first year or create a sound communication strategy for how to present the company. The website is a priority for our second year and we are starting to learn how we want to present ourselves to the outside world.

Looking ahead

Our year finished with an exciting inception meeting for our agroecology hub project in Kenya. This project brings in Beth Medvecky to the IDEMS team in a leadership role. We are excited to have her on board and her vast experience in development will strengthen all our work in this area.

We are ready to invest more time next year to take some of the projects started in year one to a higher level, including electronic assessment for undergraduate courses and open electronic textbooks for schools. We will also look for funding and opportunities to support these and to begin to grow as an organisation aiming to start achieving impact at scale.

We are proud of what we have been able to achieve in our first year and can't wait start building on this in 2019.

Directors Perspectives

At the end of the first year of IDEMS International we are extremely pleased with both the current financial state and our initial efforts to support our community. Within the year we have established our potential as a small consultancy company as well as rejected this option as our long-term objective! Through the year our thinking has evolved to the extent that we have embraced prioritising "strategic investment" towards social impact over reserve building with ambitions of growth.

Entering the private sector, we did not initially embrace the entrepreneurial spirit. We were somewhat "reluctant entrepreneurs". From our background in academia and development, the step to form a community interest company took us out of our comfort zone, requiring us to learn a range of new skills. Starting a new enterprise also comes with a loss of stability, with potential for greater highs but lower lows. However, what's lost in stability is gained in flexibility, and IDEMS has given us opportunities to do things, such as bringing in new collaborators in flexible ways, that wouldn't have been possible in more traditional and rigid settings.

We were challenged early on to think about growth. This is where we started to recognise the need to think beyond consultancy and find new business models that could enable us to achieve the impact we want to see at scale. We grew to appreciate how entrepreneurial thinking could enable us to transform some of our social causes into social investments, increasing the potential scope and value to end users without compromising on our principles. We are not in a hurry to grow but recognise the need to achieve our goals and we are starting to put structures in place to enable growth to happen on our terms.

Activities

Consultancy contracts

Research Methods Support for Projects in The McKnight Foundation's CCRP – West Africa

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January 2018 – Present

Funded by: Stats4SD

Through our partner, Stats4SD, IDEMS is involved in offering research methods (statistics & data) support to projects funded by The McKnight Foundation's Collaborative Crop Research Program (CCRP). We lead on the support for the West African CCRP projects, a collection of agriculture research projects spread across Niger, Burkina Faso and Mali. The projects we support in West Africa are aiming to improve access to local, sustainable, nutritious food through collaborative research and knowledge-sharing with smallholder famers, research institutions and development organisations.

It is challenging and diverse work for our team. Our work involves supporting projects in the entire research process from design and collection through to analysis and communication. This is often through in country and regional workshops, data clinics, tailored training courses to stakeholders, inception and community of practice meetings and online remote support.

This year our major activities were attending the West African Community of Practice and CCRP leadership team meetings, running in-country data clinics, joining the monitoring tours of all the West African projects and facilitating a joint inception meeting for new and renewed projects in Burkina Faso.

This work is particularly stimulating for us because of the efforts CCRP is making to put Farmer Research Networks (FRNs) at the centre of the research programme. From a research methodology perspective this is really exciting as it is leading to science that tackles more complex multi-faceted problems. This requires a reinvention of research approaches which embrace large scale farmer experimentation with highly variable social and physical contexts. In many cases we are challenged to adapt and reinvent research methodologies that can be implemented at scale while staying true to core scientific principles. This often involves letting go of a lot of the traditional notions of 'rigor' and embracing the power of bigger data.

Workshops on use of gridded satellite data for climate services

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March 2018 – Present

Funded by: Stats4SD

With our partner, Stats4SD, IDEMS has supported the delivery of workshops organised by the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) on the use of gridded satellite data for climatic services. The workshops are attended by staff from national meteorological services as well as researchers and university lecturers.

Vast amounts of satellite data are now freely available online through EUMETSAT. This could have direct impact on the climate services that meteorological services and other organisations could provide. The data available includes estimates of radiation, sunshine hours, land surface temperature, vegetation cover and many more parameters.

Stats4SD and IDEMS support EUMETSAT in these workshops by introducing R-Instat to participants as a way of easily working with satellite data (NetCDF files) and ground station data (various formats) to facilitate comparisons of satellite and ground truth data, among other facilities. We also support participants in the use of R and in particular the CM SAF R Toolbox which is tailored for satellite data.

In 2018 IDEMS supported two such workshops (South Africa and Latvia), with two further workshops are already in place for 2019.

We are excited about this collaboration with Stats4SD and EUMETSAT particularly because of the potential role satellite data has to play in Africa where ground measurements are often sparse and of poor quality (many missing values). If estimates from satellites prove to be accurate enough in comparison with ground measurements, then suddenly a vast amount of data is available across the whole continent at high resolution for over 30 years. This could be used to provide better estimates of the climate in places which are far from a ground station or help to fill in gaps in ground station data to make records more complete as well as many other applications.

Data Management and Analysis support for Lesotho Meteorological Services

January 2018 – December 2018

Funded by: Stats4SD

With our partner, Stats4SD, under a project funded by The International Fund for Agricultural Development (IFAD), IDEMS is supporting the Lesotho Meteorological Services (LMS) to store, manage and analyse their historical climatic data. Through this work LMS will be able to easily produce climatic products (graphs & tables) for their country that are needed to be presented to farmers in workshops as part of the PICSA project.

Our work included visits to LMS, initially to support data cleaning efforts of their large historical data. Our role in particular was in setting up data correction processes and understanding the sources of data errors as well as creating processes with LMS to minimise these for future data collection. This then led to supporting LMS to import their data into the latest version of Climsoft, a climate database management system, to ensure that data is properly stored and managed. There were also capacity building components where the LMS data management team visited UK for training on using statistical software to clean, prepare and analyse their data to produce the graphs and tables needed to eventually be presented to farmers in workshops to help them understand climate risks.

This project was both stimulating and challenging because of the varied role we've played in the project. Through visits to LMS and interactions with their staff it was fascinating to understand how better data management process across all the data handling stages could lead to higher quality final data. This was challenging too as it required gaining an understanding of the workings of the data processes throughout LMS.

This project was also the first where we focused on temperature data, in comparison to our work in many other African countries where rainfall is most important climatic variable, so it was interesting to design new tailored products for temperature data. It has also been useful to interact with LMS as a user of Climsoft which has helped us better understand the needs from a climate database management system.

Development of Public Procurement analyses in R-Instat & delivery of workshops

October 2018 – Present

Funded by: University of Sussex

The R-Instat software developed and supported by IDEMS has a special menu for the analysis of public procurement data, which aims to make it easy to do specific analyses commonly used to understand corruption risks in the public procurement process. This was initially development through a project led by mathematicians in University of Oxford, partnering with IDEMS staff and social scientists (including at University of Sussex). Through the success of that project the Conflict and Social Development Issues Department of DFID UK are funding the continuation of this work led by the University of Sussex and in collaboration with IDEMS.

In this project IDEMS, with support from African Maths Initiative (AMI), are enhancing the facilities of the procurement menu in R-Instat to support further analysis of procurement data. We are also including open procurement data sets collected by University of Sussex from a variety of countries into R-Instat's data set library to allow access to anyone. This year a workshop took place at Makerere University, Uganda bringing together mathematics and statistics students, civil society groups, the government procurement agency and political science researchers to work together to gain hands on experience working with procurement data and understanding how it can be used to gain insights into the procurement process. Further development of R-Instat and workshops in other countries are planned for 2019.

The use of large scale public procurement datasets to analyse corruption risks is a very new innovation which could lead to huge improvements in the use of public money if the data can be made available, with a high enough quality, and crucially, if there are people with the skills to extract the important information from the data. We're excited about the potential for impact on development this could have, plus the added benefit that we have seen how these workshops provide a motivation for mathematical science students to see how their subject can be used to tackle current challenges facing their countries and that they are able to acquire the skills needed to do this.

Data-driven agriculture: implementation and case study

March 2018 – July 2018

Funded by: University of Oxford

The Federation Des Unions De Producteurs De Maradi (FUMA Gaskiya) is a federation of unions of farmers based in the Maradi region of Niger, West Africa. They are one of the first organisation supported by The McKnight Foundation's CCRP to implement the farmer research network (FRN) approach – engaging large number of farmers in research. The University of Oxford led a project supporting FUMA Gaskiya's innovative

use of data through digital technologies. IDEMS's experience working with agricultural research projects in Niger, and knowledge of the FRN approach led to our involvement in the project.

As part of this project, IDEMS and AMI supported the development of a tailored menu in R-Instat to make it easier for FUMA, and others, to analyse large agriculture research data. With FUMA Gaskiya, who has been collecting research data with their farmer since 2014, including a trial of 1,500 farmers in 2017 on low cost fertilisers, we have analysed this data to understand the effectiveness of these fertilisers, with the results soon to be published in research papers. The project concluded with workshops in two regions of Niger to share the findings from FUMA's work, the approach they have taken to implementing an FRN and importantly, how they have achieved this through their own digital data collection app. The workshops were attended by farmer representatives from FUMA, members of agricultural organisations across Niger and representatives from local government with the aim of spreading the idea of FRN as an approach to impact the agriculture and the lives of those who depend on it on a large scale. Mathematics and statistics students were also invited to special sessions to work with farmers and representatives, using R-Instat to analyse some of FUMA's large data sets.

As a relatively new approach, pioneered by CCRP, the FRN has potential to have great impact throughout the West African region and beyond. We're excited to be involved at these early stages in the cutting edge of understanding this new research methodology, learning what tools and methods are needed to support this, and ultimately how to achieve impact.

Understanding statistics teaching in higher education in Africa

April 2018 – Present

Funded by: Education Sub-Saharan Africa and IDEMS Community work

Education Sub Saharan Africa (ESSA) is a UK charity aiming to improve educational outcomes in sub-Saharan Africa from school level through to universities. IDEMS's extensive knowledge and experience of high education in Africa led to a project supported by ESSA to understand the teaching of statistics in higher education institutions across Africa.

With an initial focus on five countries: Kenya, Niger, Rwanda, Botswana and Ghana, IDEMS is conducting a mixture of general and in-depth studies in these countries to be able to present to an international audience the current needs, depth and complexity of issues around statistics education, as well as representing the rich diversity across countries.

This work continues into next year, and by May 2019 IDEMS will release one-page fact sheets on all five countries and in-depth reports on Kenya, Rwanda and Ghana after in depth study of all universities offering statistics degrees within the country.

We feel this project is important because once the findings are openly accessible, they will illustrate some of the diversity which exists across the continent and enable international partners to identify common issues which they could contribute to. This work will be used to inform IDEMS community work related to strengthening statistics in African higher education.

Exploring the PICSA approach with financial institutions in Kenya

September 2018 – Present

Funded by: University of Reading

Participatory Integrated Climate Services for Agriculture (PICSA) is a highly successful participatory extension approach, developed by researchers at the University of Reading. It has proven to be an exceptionally effective method of supporting farmer innovation in over 20 countries across the world. PICSA makes use of historical climate data, forecasts and farmers' knowledge of what works in their own context with participatory planning methods to help farmers make informed decisions about their agricultural practices. The climatic data component of PICSA relies on the ability of the local partners, often the national meteorological services, to analyse historical daily climatic data to provide the local climate information for their country. IDEMS provides support for local partners to work with climate data in a number of PICSA implementations, including in Lesotho as mentioned above.

The International Fund for Agricultural Development (IFAD) funded University of Reading for a project to investigate the potential of using PICSA with financial service providers (FSP). IDEMS, with in country partners, took the lead on a scoping study that interviewed six FSP already working with IFAD to investigate how climate risk could be better modelled for FSP and how their activities and interests could align with the PICSA approach.

We have planned a workshop for February 2019 where the FSPs will be trained in the PICSA approach based on the priorities identified during discussions with them.

We are excited by this important work because we believe in the PICSA approach and the way it uses climate data as a way of contributing to people making more informed decisions, in some cases changing opinions and mind sets and ultimately empowering farmers to tackle problems that are within their control. Extending PICSA to engage with FSP by working towards better understandings of risk using climate data and models has the potential for not only improving the work of FSP but also helping reduce farmers to better manage their risks.

Planning for a hub to bring together Agroecological Science, Practice and Movement

December 2018 – Present

Funded by: The McKnight Foundation's Collaborative Crop Research Program

The McKnight Foundation's Collaborative Crop Research Program (CCRP) funds collaborative research projects that aim to explore solutions for sustainable, local food systems. IDEMS's staff have been involved in the research methods support for CCRP's East and West African projects for several years, and this year also received a planning grant to establish an agroecology hub, based in Western Kenya.

Agroecology, put simply, is an ecological approach to agriculture, which centres on food production that makes the best use of nature's goods and services while not damaging these resources. Across the world, scientists, researchers, NGOs, CBOs, activists, farmers, consumers, universities and others are working in the agroecology space. However, there's often a disconnect between what is happening in the *science* and research into

agroecology, the *movement* of those promoting agroecology and the *practice* of what agroecological practices farmers are actually using. Therefore, the hub, formed with partners including Manor House Agricultural Centre (MHAC), AMI, Participatory Ecological Land Use Management (PELUM) Association – Kenya, has an overarching aim of bridging the gap between science, practice and movement in agroecology. It's initial activities will be to carry out research into the effectiveness of agroecological practices that are commonly practiced among small holder farmers in Kenya, and through a scoping study, understand the major challenges faced by small holder farmers in Western Kenya, and what systems, from NGOs and government, are in place to support these.

The project began with a highly successful inception meeting in January 2019, bringing together a diverse set of partners to conceptualise what the hub is and to plan out the research activities to take place over the following 8 months.

We are committed to this project, in particular in supporting the local partners to develop the necessary structures that could enable them to support the wider farming community across East Africa through the use of effective agroecological approaches. We also believe in the importance of bridging the gap between science, practice and movement, and feel this aligns with IDEMS's desire to work within and across broad areas. We believe in the importance of research for impact development and want to support research for development in this area.

Open-source products

Development of R-Instat

January 2018 – Present

Funded by: IDEMS community work

IDEMS is committed to supporting the open-source development of R-Instat, a front end to the popular statistics language R, conceived for and developed primarily in Africa. It was instigated by African Maths Initiative (AMI) as part of their collaborative African Data Initiative (ADI) project to support data playing a transformative role in African development and education.

IDEMS supports the development of R-Instat, both through contributions to the source code, often linked to other projects which use custom functionalities in R-Instat, as well as support and mentorship for the developers within AMI. We actively look for contracts which can raise funds to support the development team in AMI, and IDEMS has taken on a responsibility to source this continued funding stream.

With R-Instat now being used in a number of projects from climate and agriculture to public procurement and education, we are seeing the role it can play in enabling people to gain the skills needed to work with data. In the longer term, we're committed to supporting the ADI project in its aims to transform statistics education across Africa to be more relevant and data focused, and more broadly see data being used to support better decision making for development in Africa and elsewhere.

Development of CLIMSOFT

January 2018 – Present

Funded by: UK Met Office and IDEMS investment

IDEMS is supporting the development of Climsoft, an open-source Climate Data Management System. Like R-Instat, Climsoft is developed primarily in Africa, to serve an African audience, and in the case of Climsoft, it is for African National Meteorological Services.

The UK Met Office has been a long-term supporter of the Climsoft project and they contracted IDEMS to support the development of Climsoft. Our involvement is in part because of our experience developing R-Instat, another collaborative, open-source African product, and also because of the experience we have working with African Met partners.

Through the support of UK Met Office we have also mentored the developers at African Maths Initiative (AMI) and supported them to contribute to Climsoft, with a substantial part of the budget for Climsoft projects paying staff time at AMI. This is driven by our believe in developing talent in Africa and our commitment to ensuring that Climsoft remains primarily an African product.

The work on Climsoft this year has included enhancing the data entry system for data and metadata, developing a solid and secure structure for database connection and building links between Climsoft and R-Instat to enable climatic data to be managed and analysed across both software more easily.

In September, IDEMS and AMI jointly supported the delivery of a workshop in Kigali, Rwanda for staff at the Rwanda Met Service. The workshop included training on the use of both Climsoft and R-Instat, demonstrating their compatibility and complementary roles they play with climate data. In particular, staff were able to import station data into Climsoft for storage and then export to analyse with R-Instat's climatic features.

We are excited by the Climsoft work because we know how important it is for African Met services to have access to products which match their data management needs. We believe that Climsoft is positioned to provide a sustainable long-term solution that will enable African Met services to make better use of their historical data.

Development of climatic data quality control procedures in R-Instat

July 2018 – October 2018

Funded by: UK Met Office

IDEMS was funded by UK Met Office to develop quality control procedures for climatic data as part of R-Instat's tailored climatic facilities. Errors in climatic data can come from various sources including data entry (particularly as historical paper records are computerised) and faults or problems with measuring instruments. Therefore, good quality control procedures are essential to ensuring accurate information is obtained from the available data. National metrological services must ensure data collected from each of their stations across the country are as accurate as possible before being used for analysis and applications which lead to decision making.

R-Instat's tailored climatic facilities are designed to be easy to use for staff at national metrological services. This project extended R-Instat's climatic facilities to include easy to use quality control procedures for daily climatic data from multiple stations. A particular focus was on quality control of rainfall and temperature records, the most commonly collected and used in Africa. The procedures implemented align with and extend those which are recommended for daily climatic data. Visualisations can also form part of quality control and within this project we also implemented facilities to map stations within a country and display station metadata.

This project also included documenting the new facilities in guides and tutorials and we were excited to test these out in our work with Lesotho Metrological Service, who used the temperature quality control for the first time, and Meteo Rwanda, who were the first to use the mapping facilities. We are already seeing the impact of this project as in both these countries they have already been able to improve the quality of their data through use of R-Instat.

IDEMS community work

Support for African Maths Initiative (AMI)

January 2018 – Present

IDEMS has a strong connection with African Maths Initiative (AMI), a Kenyan NGO formed by mathematicians and mathematics educators working to create a stronger mathematical community and culture of mathematics across Africa in all academic levels. IDEMS collaborates with AMI on many of its consultancy contracts and open-source software development projects. IDEMS also plays a mentioning role to the junior staff within AMI. Both of these are important aspects of our commitment to build capacity within Africa. Alongside this ongoing support, IDEMS has supported AMI in a number of specific activities this year.

- In May 2018 IDEMS participated in a week long meeting between AMI and Manor House Agricultural Centre, Kitale, Kenya to discuss a collaboration between the two institutions involving joint activities. The meeting was highly successful with joint activities agreed, including the joint delivery of diploma courses in mathematical sciences, and a memorandum of understanding signed at the close of the meeting. IDEMS helped facilitate the discussions and discussed ways in which IDEMS could also support the collaboration.
- This year IDEMS has supported AMI in building their partnership with M-PESA Foundation Academy Collaboration, an innovative secondary school in Nairobi, Kenya. IDEMS attended meetings and workshops at the school.
- Swahili Pot Training on Maths Education in Mombasa, Kenya. IDEMS supported AMI to give a training for volunteers who were going out to work with kids in schools.
- In August 2018, IDEMS funded Zach Mbasu and Maxwell Fundi from AMI to attend the 5th AFRICME conference in Dar es Salaam, Tanzania. AFRICME is a forum for mathematics educators working across Africa to discuss developments, initiatives and research in mathematics education. At AFRICME, the AMI team delivered a workshop on the African Data Initiative, introducing the R-Instat software to teachers and educators at both school and university level. Keeping connections with the AFRICME community is important for both IDEMS and AMI and IDEMS was happy to support AMI to be represented at the conference this year, particularly as no one from IDEMS was able to attend.

Support for Supporting African Maths Initiatives (SAMI)

January 2018 – Present

Supporting African Maths Initiatives (SAMI) is a UK charity established by mathematics educators in UK to support initiatives in mathematics education across Africa, initially supporting the work of AMI. SAMI coordinates the international volunteer program that supports maths camps run across Africa. SAMI also fundraises to support AMI in offering internships within Kenya.

IDEMS also has a legal relationship with SAMI. SAMI is mentioned in IDEMS Articles of Association as a specified organisation which IDEMS is able to transfer assets (including money) within its requirements as a community interest company. IDEMS will make donations to SAMI in 2019 using profits made from our first financial year.

IDEMS has attended a number of SAMI events this year, offering advice and support where useful.

- This year IDEMS has been involved in discussions and planning for the maths camps that SAMI supports in a number of African countries. We're excited to see plans for the maths camps to expand in 2019 beyond Kenya, Ethiopia and Ghana to also include new countries of Togo and Cameroon. The maths camps are important events to bring together people who are passionate about mathematics education from within each host country and internationally, to provide an inspiring, enjoyable mathematics experience to high school students. We have seen how a maths camp can be a life changing experience for the students that attend, inspire students in mathematics and encourage teachers to embrace the fun and relevance of mathematics.
- IDEMS was also involved in the planning of the London Maths Camp, a SAMI event to inspire students in UK through extracurricular mathematics, as well as raising funds to support the maths camps in Africa.
- IDEMS attended SAMI's Theory of Change meetings in January 2018, helping to facilitate the meeting and contributing to the documents that came out of the meeting which begin to document SAMI's long term vision and goals and how its activities contribute to this.
- IDEMS also attended SAMI's Annual General Meeting in September 2018.

Support for Maseno University, Kenya

August 2018 – Present

IDEMS has a close relationship with the School of Mathematics, Statistics and Actuarial Sciences at Maseno University, Kenya. During visits to the region discussions have been initiated on how IDEMS can support the school and possibilities to formalise the collaboration. In particular support is given to recent doctoral graduates in the form of technological tools and mentorship.

There are two major initiatives which characterise this collaboration, the electronic courses, described below, and work towards a new doctoral programme for the school.

Development of electronic assessment tools for mathematics courses at Maseno University

November 2018 – Present

IDEMS has a close relationship with the School of Mathematics, Statistics and Actuarial Sciences at Maseno University, Kenya. Michael Obiero, lecturer at Maseno University, initiated discussions with us his concern of how he could provide a high quality education to his undergraduate students when class sizes are typically 700 or more in the first year. We discussed an approach which makes use of automated, electronic assessment to provide high quality feedback to students through weekly online quizzes which help students assess and build their understanding of the content. Automated assessment was created using the open-source STACK system developed by Chris Sangwin at the University of Edinburg. Together with Michael Obiero we developed automated, electronic assessment for a first year mathematics course to be delivered in January 2019. The assessment questions were authored using STACK and embedded into a Moodle site for the course.

We are grateful to Chris Sangwin for his invitation to visit him, support in using the STACK system and to University of Edinburg for hosting the course on their server.

We look forward to seeing the implementation of this course in 2019 and the feedback from Michael Obiero and his students on this new approach to improving undergraduate teaching. We will continue to provide technical support and advice to Maseno University. In 2019 we hope to work with other lecturers at Maseno University, and other universities, to develop automated, electronic assessment for more undergraduate mathematics courses and support them to implement in their courses. IDEMS will set up its own dedicated server to offer hosting of courses to universities wishing to use this system.

All content developed will be made available under an open licence and free for anyone to use and adapt.

Teaching Statistical Problem Solving on AIMS Cameroon's Master's Program

November 2018

Also funded by: Royal Statistical Society

In November 2018 IDEMS and Stats4SD co-taught a statistical problem solving course to 47 MSc Mathematical Science students at AIMS Cameroon. The course, taught over a three-week period with five two-hour lecturer per week, exposed students to problems in statistics ranging from design, collection, manipulation and organisation of data through to analysis and reporting through games and simulated data and real data. Students also worked in groups to explore and report on a specific problem including climate for agriculture, procurement for corruption, a poverty survey and five other topics. The course was the first of a series of statistics courses that year as part of an RSS initiative to strengthen the statistical component of AIMS training.

The course was challenging and rewarding to teach, with a diverse set of students from 16 African countries, some with a full statistics degree and others with no previous statistics experience. However, the students' evaluations confirmed that the course was an "eye opener" with some students stating a new-found interest despite no previous background in statistics. For others, it was totally different to their past statistics courses and provided practical contexts for many concepts which they only know as a mathematical formulation. For many it seemed they gained an appreciation for what statistics is and how it is applies to real world problems, and they also gained interest in studying statistics further.

IDEMS maintains strong links to AIMS and is proud to support AIMS in delivering high quality mathematical science training in Africa.

Conferences and workshops

Quantum Leap Africa (QLA) Data to Quantum Workshop, Kigali, Rwanda

March 2018

https://quantumleapafrica.org/event/data-to-quantum/

The Directors of IDEMS were invited speakers at Quantum Leap Africa's workshop titled "Data to Quantum". QLA, based in Rwanda, was created by AIMS and seeks to catalyze top quality high impact research in data science, smart systems engineering and drive the future IT revolution through quantum information. This workshop focused on data science and brought together leading researchers, industry practitioners, and potential users of data science, big data analytics and quantum information.

17 speakers presented their ideas and work in data science and discussed how QLA could achieve impact in Africa through data science and how data science is a path to quantum information. IDEMS's presentations included our data work in agriculture, climate, and public procurement as well our initiatives in training and education in data skills.

It is hoped that IDEMS continues to be involved in this initiative and helps support QLA in enabling high quality impact research within Africa, a goal that closely aligns with the vision and work of IDEMS.

AIMS Next Einstein Forum (NEF) Global Gathering 2018, Kigali, Rwanda

March 2018

https://gg2018.nef.org/

Following the Data to Quantum Workshop, the Directors of IDEMS attended the NEF Global Gathering 2018 in Kigali, Rwanda. NEF Global Gatherings are exciting biennial global events where the world of science and technology meet on Africa soil to unveil breakthroughs in science, respond to existing challenges and look to the future. It is a large event, attended by over 1000 people, with talks by the President of Rwanda and President of Senegal, and leading academics and industry leaders, discussing the state and future of science and technology in Africa.

This was an excellent opportunity of IDEMS to meet and discuss with a wide range of actors thinking about the future of science and technology in Africa. The event allowed us to discuss our current work and ideas for future collaborations with new potential partners who we share common goals with. We see the NEF Global Gatherings are important forums to place science and technology in Africa on the global stage, and we are keen to continue our involvement at the next Global Gathering in Kenya in 2020.IDEMS Expansions.

IDEMS investment

Investigating IDEMS Kenya

November 2018 – Present

Our vision is to establish an IDEMS Kenya which attracts work within Kenya that enables it to employ talented staff, initially established former interns of AMI. AMI can provide excellent volunteer and internship opportunities for a limited period, but it is hard for AMI to secure sustainable long-term funding that enables long-term employment. We envisage IDEMS Kenya playing the role of creating sustainable opportunities through a similar business model to IDEMS International, as well as supporting AMI, establishing a mechanism that enable AMI to get sustainable funding and resources.

This year a small team in Kenya has been investigating the formal processes of establishing IDEMS Kenya including understanding the types of legal structures to ensure IDEMS Kenya has the same accountability and structure as IDEMS International. We are excited by the enthusiasm of some members to drive this venture forward and the potential it has to build a sustainable infrastructure which could provide employment and impact on development in Kenya.

Francis Torgbor in Ghana

December 2018 – Present

Francis has been an integral member of the PICSA team in Africa since his graduation from AIMS with a Masters in Mathematical Science. Alongside his work, he is also completing this PhD in climate statistics, closely related to his PICSA work. Problems with the grant funding that had been supporting Francis lead to IDEMS stepping in to support Francis and take him on as part of the IDEMS team, allowing him to continue his PhD alongside his other work. We are also interested in establishing IDEMS Ghana as a subsidiary of IDEMS International to expand our work in the country, led by Francis. With Francis we are investigating formally establishing IDEMS Ghana with a plan to have Francis becoming a full time member of IDEMS by next year as he looks to build up activities in Ghana that support development, education and the mathematical sciences in Ghana.

We are excited to have Francis on board because of his exceptional talent and commitment to development in Ghana. IDEMS has a vision to impact African development by making in demand skills locally available. Establishing IDEMS Ghana is part of that vision, with a long-term plan of IDEMS International supporting its African subsidiaries to grow up and impact locally. Eventually, these subsidiaries could be exporting services, therefore becoming part of the global economy.

Santiago Borio in Argentina

December 2018 – Present

We asked Santiago to join the IDEMS team because of his previous role working with SAMI in UK and with AMI in Kenya supporting a variety of education initiatives. He also has extensive mathematics teaching experience both in the UK and in Argentina.

Remotely from Argentina, Santiago has been supporting the development of electronic assessment tools for mathematics courses at Maseno University, Kenya. His experience of innovating in the classroom, including through the use of technology ensured we developed high quality, innovative assessment for mathematics courses at Maseno University.

Santiago strengthens the skill set of IDEMS through his experience in the education field and we hope to develop a long-term role in IDEMS in the future. His involvement also makes it possible to investigate opportunities for IDEMS in South America.