

## Promoting Statistical Literacy in Abu Dhabi

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### **Abstract:**

Whilst the Middle East played an historic role in the development of mathematical principles, the recognition and importance of statistics in the region has been a more recent phenomenon. The founding of the Statistics Centre Abu Dhabi (SCAD) in 2008 and its Statistical Training Institute (STI) in 2011 has enabled Abu Dhabi to be at the forefront of professional statistics education, especially in the field of official statistics. This paper will explore how STI has promoted statistical literacy through a series of integrated programmes and initiatives.

STI delivers targeted training needs in the Emirate of Abu Dhabi and is developing its services to support demand for official statistics more widely. Its aim is to promote informed decision-making and evidence-based policy by improving the statistical skills and knowledge base across government and the wider community. To achieve this, STI organises fit-for-purpose, high-quality learning activities designed to strengthen the statistical capabilities and professional competencies of individuals and organisations involved in the production of official statistics.

Recent initiatives have included: the introduction of internationally certified "job family" courses to cover the disciplines of data management and data analysis; the organisation of the "Abu Dhabi Statistical Symposium", an international event for the whole community which focused on "Building Excellent Statistical Technologies" and included contributions from leading experts; a suite of statistical leadership courses for senior government officials interested in maximising statistical presentation, communication and impact; and international seminars on "The Data Revolution" and "Transparent Modelling" delivered by leading official statisticians and academics. Last year, the UK Royal Statistical Society gave permission for STI to become an authorised centre for its examinations; and an in-house modular training programme is underway to complement this syllabus. A Certified Fieldwork Licensing Programme has also been established.

Notwithstanding these successes, future challenges will be necessary and should include: broadening statistical literacy to include non-statisticians in government and the wider community; introducing award schemes for data managers, statistical analysts and other specialisms; ensuring accreditation by recognised international organisations and universities; and establishing a seamless statistical learning ladder to offer progression at all levels of statistical expertise.

*Key words: statistical literacy, capacity building, job families, statistical symposium, statistical leadership, award schemes, learning ladder.*

## **1. Abu Dhabi and statistics**

### **1.1 Abu Dhabi Emirate**

Abu Dhabi is the federal capital of the United Arab Emirates (UAE) and the largest of its seven emirates. Geographically, Abu Dhabi lies on the borders with the Kingdom of Saudi Arabia, the Sultanate of Oman, and the Arabian Gulf. Over the past 40 years, Abu Dhabi has experienced significant population growth and economic development. To manage the growth and prosperity of the Emirate, the Government of Abu Dhabi required an official agency that could provide statistics for decision-making and policy setting.

### **1.2 Statistics Centre Abu Dhabi**

The Statistics Centre Abu Dhabi (SCAD) was established in accordance with Law #7 of 2008. SCAD is responsible for the collection, classification, storage, analysis and dissemination of official statistics covering social, demographic, economic, environmental and cultural indicators. As a young statistical office, SCAD is in the fortunate position of being able to implement best practices from international bodies and leading National Statistical Organisations (NSOs). SCAD is aiming to be a world leader in innovative and efficient methods for data collection, analysis and dissemination.

### **1.3 Statistical Training Institute**

Established in May 2011, also in accordance with Law #7 of 2008, the Statistical Training Institute (STI) - which is managed by SCAD - delivers the training needs of the statistical community in the Emirate of Abu Dhabi and is developing its services to support growing demand for statistics training across the region. Its primary aim is to promote informed decision-making and evidence-based policy by improving the statistical skills and knowledge base across government. To achieve this, STI organises fit-for-purpose, high-quality training courses designed to strengthen the statistical capabilities and professional competencies of individuals and organisations involved in the production of official statistics. STI offers a wide range of statistical courses at varying levels of technical difficulty. Most courses are certified by internationally recognised academic institutions.

## **2. Statistical literacy**

### **2.1 Why do we need statistical literacy?**

English writer H.G. Wells once said, “statistical thinking will one day be as necessary for efficient citizenship as the ability to read and write”<sup>[1]</sup>. Nowadays, official statistics are collected on almost every aspect of human life. They capture vital information about our economies, our societies and our environment. They help inform the choices of our Governments, measure the state of our nations, the performance of our businesses, and provide us with essential knowledge to assess the health, education and wellbeing of our peoples. Often we take it for granted that those

statistics are accurate, timely, robust and accessible - but we pay little heed to whether there are enough statistically literate people to make best use of the information they contain. In fact, it is widely believed that: not enough people understand and appreciate the value of statistics and statistical thinking; statistical literacy is weak at all levels of global society; government decision makers, public citizens and the media all struggle with basic statistical concepts; and public trust in official statistics needs to rise.

## **2.2 What is statistical literacy?**

In the modern world, it is often the *issues* rather than the *statistics* that hit the headlines - but it is important to remember that it is the *statistics* themselves that inform the *issues*. Statistical literacy then, is the ability to understand, interpret and evaluate the statistics that inform these issues. Statistically literate people are able to use these skills to determine future actions, by presenting clear, convincing arguments, and developing evidence-based policies to guide decision-making.

## **2.3 Five ways to measure statistically literacy**

### **2.3.1 Being data aware, including....**

- Establishing whether or data are relevant and appropriate
- Understanding where data comes from
- Appreciating how data are collected
- Knowing whether or not data are fit for purpose

### **2.3.2 Ability to apply basic statistical concepts, including....**

- Representing statistics in tables, graphs and maps
- Differentiating between percentages, ratios and rates
- Using appropriate measures of location and dispersion
- Understanding the differences between censuses and surveys

### **2.3.3 Ability to apply complex statistical concepts, including....**

- Seasonally adjusting time series
- Calculating base and current weighted indices
- Undertaking correlation and regression analyses
- Stratifying samples using optimal allocation

### **2.3.4 Adept at analysing, interpreting and evaluating data, including....**

- Combining different data representations appropriately
- Describing and summarising data in a relevant way
- Extracting, understanding and explaining data effectively
- Grasping the overall nature and context of the data

### **2.3.5 Communicating and disseminating meaningful information, including....**

- Effective statistical reporting – turning data into useful information
- Appreciating that communicating information accurately is vital for decision-making
- Ensuring professional integrity through accurate and unbiased statistical commentary
- Making sure that statistical confidentiality rules and other ethical matters are addressed

## **3. Work of the Statistical Training Institute**

### **3.1 Our approach**

STI strives to provide the highest quality statistical training services in the region, operating for the benefit of statisticians and non-statisticians interested in developing their official statistics skills from both methodological/technical and leadership/management perspectives. It seeks to address the needs of a wide range of customers; including SCAD staff, other Abu Dhabi Government Entities (ADGEs), wider public and private sectors, and international organisations and individuals. STI adapts its strategies accordingly to serve the needs of SCAD and the Statistical System of Abu Dhabi (SSAD). A variety of STI performance measures relating to 2015 can be found at Table 1.

### **3.2 Our core business**

- Delivering the training needs of the statistical community in Abu Dhabi
- Focusing on the practical application of official statistics to meet the needs of data producers and users
- Providing integrated certified training modules to strengthen the statistical system of Abu Dhabi
- Forging key partnerships with statistical training institutes around the world
- Harnessing a wide network of leading international trainers in official statistics
- Maximising international statistical experiences of staff through the organisation of seminars, conferences, and overseas placements

### **3.3 Established programmes**

#### **3.3.1 Statistical Foundation Programme - Basic**

The STI Statistical Foundation Programme (SFP) is a suite of course that focus on the introduction to Official Statistics – designed for new starters and staff without any existing statistical background. It comprises modules on: Developing Administrative Data; Statistics for Non-Statisticians; Introductions to Statistical Systems; Fundamental Principles of Official Statistics; and Statistics Report Writing and Presenting Data.

### **3.3.2 Data Manager Programme - Basic Intermediate**

The STI Data Manager Programme (DMP) is a suite of courses that focus on the management of data in its various forms – designed for SCAD and ADGE employees engaged in handling basic data in some capacity. It comprises modules on: Statistics Databases, Data Mining, Big Data; Business intelligence; Data Warehousing; Analytics; Data Needs Analysis; Statistical Metadata; and Statistical Data Quality Management.

### **3.3.3 Data Analyst Programme - Intermediate**

The STI Data Analyst Programme (DAP) is a suite of courses that focus on the analysis of data in its various forms – designed for SCAD and ADGE employees engaged in statistical roles with exposure to complex data. It comprises modules on: Survey Methods; Non-Sampling Errors and Non-Response; Time Series; Data Analysis; and Econometrics.

### **3.3.4 Statistical Leadership Programme - Advanced**

The STI Statistical Leadership Programme (SLP) is a suite of courses that focus on statistical impact, great communication and effective presentation - designed for SCAD and ADGE directors and heads of unit with responsibilities for managing individuals, business groups, activities and projects. It targets those who want to maximise their impact in their organisational roles; be able to influence key client groups; enhance the effectiveness of their relationships, consultations and interactions with statistical and non-statistical colleagues and clients; and increase confidence in communication and presentation at all levels. It seeks to improve leadership and management capacity to maximise the performance of work teams. It enhances the understanding of effective teamworking, management, supervision and leadership behaviours; and enhance overall impact and effectiveness through increased self-awareness and the use of productive communication and presentation approaches.

### **3.3.5 Internal Statistical Training Programme**

To complement the various suites of modular courses, STI organises and delivers – using in-house SCAD resources - a variety of ad-hoc courses, at different difficulty levels, to meet the specific competency gaps identified within SCAD and across all ADGEs. Based on a comprehensive training needs analysis, these courses, available in Arabic and English, include subjects such as: SCAD-Specific Business Area Training; Project Management; Presenting Data in the Modern World; Customer Service; Organisational Change; Human Resources Tools; and many more.

### **3.3.6 Statistical Seminar Programme**

To promote SCAD and ADGE exposure to global statistical issues, STI organises seminars delivered by renowned experts in the statistical or related fields. Around three times per year, STI invites a prominent international statistician or academic to deliver a relevant seminar to a diverse audience of around 200 people. Usually held in a university auditorium or hotel conference centre, recent examples include: “The Data Revolution” by Prof. Enrico Giovannini (Rome University),

“Transparent Modelling” by Prof. Roy Welsch (MIT), and “The Work of the International Statistical Institute” by Prof. Vijay Nair (University of Michigan).

### **3.3.7 SCAD Overseas “Ma’refati” Programme**

In pursuit of maximising the international statistical experiences of SCAD staff, STI leads the organisation for the SCAD “Ma’refati” (or “My Knowledge”) Programme. The Ma’refati Programme involves organising a series of short-term traineeships (or placements or job attachments) for selected SCAD employees at renowned national statistical offices and international statistical institutions around the world. Recent placements have been completed successfully at DESTATIS (Germany) and KOSTAT (Korea).

## **3.4 Recent initiatives**

### **3.4.1 Field Manager Programme - Intermediate**

The STI Field Manager Programme (FMP) is a prototype suite of courses that focus on the core skills set for statistical field managers – designed for SCAD and ADGE employees engaged in statistical fieldwork, engaging in face-to-face interviews. It will comprise modules on: Data Collection Design and Operation; Statistical Survey Planning and Questionnaire Design; Frame Sampling Techniques and Estimations; Sample Survey and Survey Analysis; and Survey Methodology.

### **3.4.2 Survey Methodologist Programme - Advanced**

The STI Survey Methodologist Programme (SMP) is a prototype suite of courses that focus on the core skills set for survey methodologists – designed for SCAD and ADGE employees engaged in complex and challenging statistical methodological work. It will comprise modules on: Data Collection Design and Operation; Statistical Survey Planning and Questionnaire Design; Frame Sampling Techniques and Estimations; Sample Survey and Survey Analysis; and Non-Sampling Errors and Non-Response.

### **3.4.3 Biennial Abu Dhabi Statistical Symposium**

In May 2015, SCAD hosted its first Abu Dhabi Statistical Symposium (ADSS) under the theme “Building Excellent Statistical Technologies (BEST)”. Building on elements of the successful Abu Dhabi Statistics Conference 2013, the symposium aimed were to encourage the fruitful exchange of information, promote valuable interactions and facilitate significant delegate participation. The agenda was designed to reflect the rapid growth in the volume of available statistics and the need to make sense of it all. Its main objectives were to raise awareness of recent statistical advancements in statistical technology; to highlight how statistical technology can help improve international coherence and tackle real world problems; and to foster the development and use of new statistical innovations. The one-day event comprised a keynote address, themed sessions and a round table. At its height, it brought together around 500 national and international delegates - including government policy makers, academics, industrialists, researchers, students

and practitioners from many other fields - to share insights into the chosen theme. The next ADSS is being planned for 2017.

#### **3.4.4 Royal Statistical Society Examinations**

Following UK Royal Statistical Society (RSS) authorisation for STI to become an approved RSS Examination Centre, STI organised its pilot programme of courses in 2015-16, leading to the RSS Certificates in Statistics. The programme offers a broad introduction to statistical concepts and techniques on topics relevant to much of the work of official statisticians within government. It is primarily for staff who do not have a formal background in official statistics, providing the opportunity to obtain a widely recognised certificate through formal examinations that take place in May each year. The training programme comprises a mixture of lectures and tutorials packed with theory, illustrative examples and practical exercises. These include: Data Collection; Sampling Methods, Frames and Errors; Condensing and Summarising Data; Time Series and Index Numbers; Regression and Correlation; and Probability. The pilot resulted in moderate success with six out of eight students passing at least one module, and one student gaining the RSS qualification.

#### **3.4.5 Certified Fieldwork Licensing Programme**

To ensure the highest quality of data collected by specialist staff across a number of surveys and opinion polls, STI has successfully trained and licensed over one thousand SCAD enumerators. The licensing programme focuses on adherence to the fundamental principles of official statistics, maximising the collection of reliable and trustworthy data. A mixture of statistical and general modules are covered, including: data collection methods; data quality; international classifications and standards; GIS; how to fill in the questionnaire; statistical disclosure; statistical analysis; customer service; problem solving; teamwork; professionalism; and communication skills.

### **3.5 Future aspirations**

#### **3.5.1 Statistical award schemes across job families to support continuous progression**

STI wants to create a SCAD learning environment where, wherever one is in the organisation, there is always an opportunity to progress. A clearly identifiable training progression mechanism by which every member of staff – across all levels of ability and discipline – would have the opportunity to progress through a number of statistical learning levels. This “learning ladder” approach would be facilitated by the integration of a wide range of training courses within the established framework, and supported by recognised award schemes at each rung of the ladder.

#### **3.5.2 Establishing internationally accredited official statistics programmes**

STI wishes to develop a Professional Diploma in Official Statistics in collaboration with an established UAE university and supported by renowned international institution. This diploma would cover the core skills and knowledge needed by professional government statisticians, and be available on full-time basis, or part-time basis for those working full-time in the field of official statistics or related area. It would take the form of a modular programme structure to enable

tailoring to individual needs. Successful completion of the required number of compulsory and optional modules would lead to the award of the Professional Diploma by the established UAE university, in line with its other qualifications. The establishment of diplomas and other qualifications offered by STI, whether academic or vocational, would have to undergo lengthy rigorous scrutiny from the likes of the UAE National Qualifications Authority (NQA), the Ministry of Higher Education and the Abu Dhabi Centre for Technical and Vocational Education and Training (ACTVET). STI is already in discussion with NQA to begin this process.

### **3.5.3 The Abu Dhabi Statistical Fellowship – Statistical Literacy**

The creation of an Abu Dhabi Statistical Fellowship<sup>[2]</sup> (ADSF) would put statistics at the heart of decision-making. Statistical literacy would then form a vital pillar of ADSF, enabling Emiratis to be more statistically literate, so that their understanding of data, risk, and probability could inform their daily decision making, leading to better outcomes. Activities would involve: promoting the public understanding of statistics; statistical training and support for ADSF members seeking to improve their confidence and competence in statistics; and organising professional examinations to provide sound grounding in the principles and practice of statistics, with emphasis on practical data collection, presentation and interpretation (Figure 1).

### **3.5.4 Broadening the scope of statistical literacy beyond traditional borders**

Having established itself as one of the region's leading statistical institutes, STI is now well placed to expand its services to a wider demographic and geographic market. Since its establishment in 2011, STI has processed more than 2,300 SCAD training places and more than 1,000 ADGE training places. Whilst both the number of courses and number of trainees grew considerably in its first operational year, the situation more or less stabilised for around three years before dropping back in 2015 due to budgetary issues (Figure 2). Given its established physical infrastructure, its strong stock of course resources, and its growing in-house expertise, STI is ready, when conditions allow, to broaden the scope of statistical literacy beyond its traditional borders.

## **3.6 Challenges**

### **3.6.1 Staff turnover**

Whilst the turnover of SCAD staff is higher than one might expect, most employees move to other ADGEs within the ADSS. As the more junior places are refilled at SCAD, there is a greater need for continuous basic level statistical training.

## 4. Conclusion

All of these established programmes, recent initiatives, future aspirations, and overcoming challenges form part of STI's commitment to delivering on the SCAD/SSAD strategy; to promote informed decision-making and evidence-based policy by improving the statistical skills and knowledge base across government. The extent of the success of STI's statistical literacy strategy will be measured in many ways, not least by improvements in statistical performance of SCAD and other ADGEs in the eyes of those at Emirate, national and international levels. Other measures of success will include:

- Staff satisfaction levels (Figure 3)
- Enhanced statistical capacity within SCAD and ADGEs
- Enhanced statistical capacity within the UAE and the Gulf region
- Measurable statistical business benefits for SCAD and ADGEs
- Visible improvements to statistical practices in SCAD and ADGEs
- Improved products and services in SCAD and ADGEs
- Attracting high profile speakers and leaders from the international statistical community
- Staff gained internationally recognised qualifications in statistics
- Improved trust and reputation of STI and SCAD
- Well trained and motivated workforce

Statistical literacy is essentially the ability to find, access, utilise, understand and communicate the story contained within the data. Sound understanding, interpretation and critical evaluation of statistical information can then contribute to decision making. The importance of statistical literacy in our modern society means that it has now become a core competency like reading and writing.

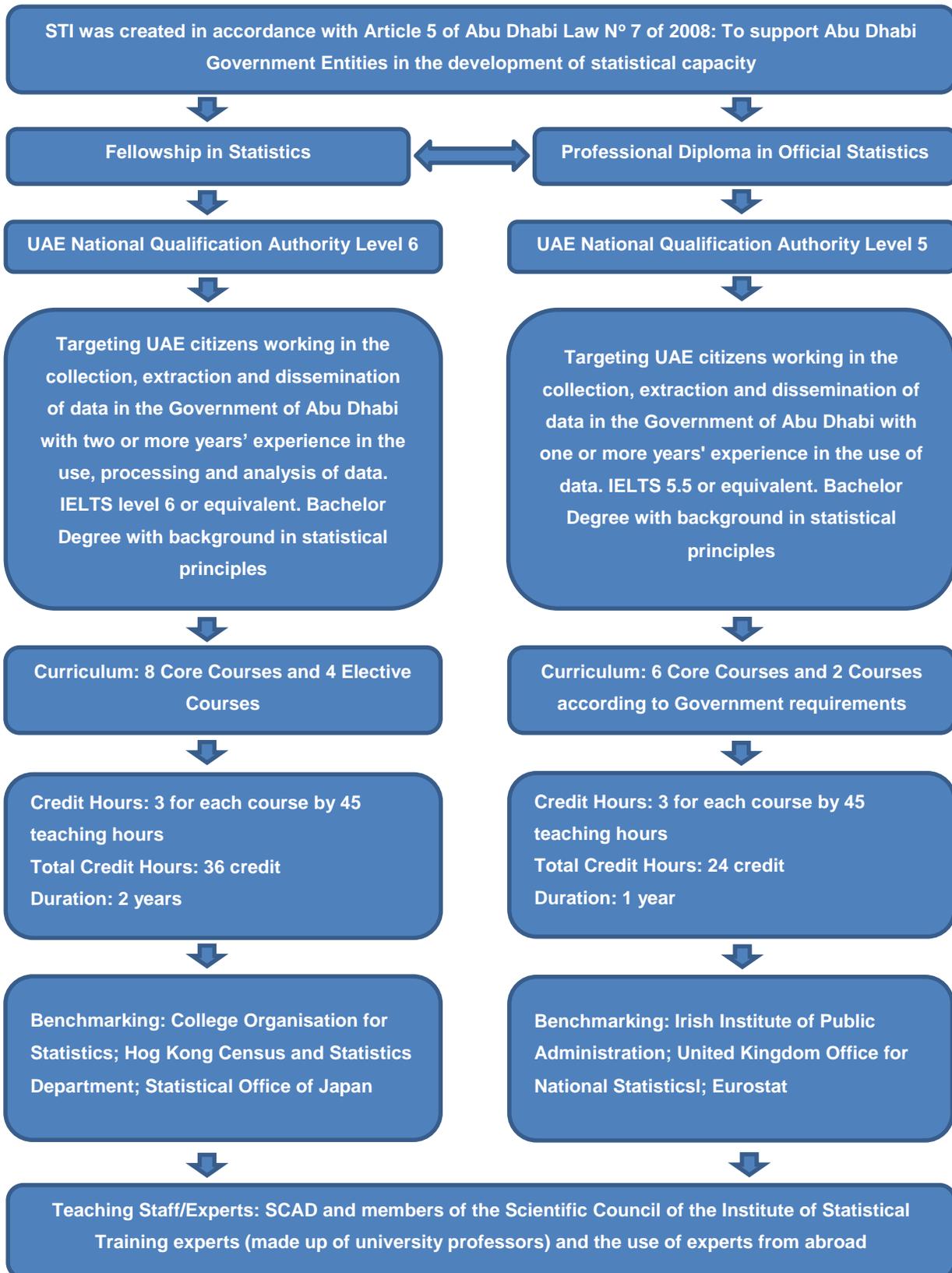
Statistics infiltrate and influence every aspect of our life, via the media and advertisements, persuading us to agree with a certain point of view or take some kind of action. Therefore it is in every Emirati's interest to be statistically literate, to have a good understanding of statistics and the ability to use and interpret them effectively and appropriately.

## 5. References

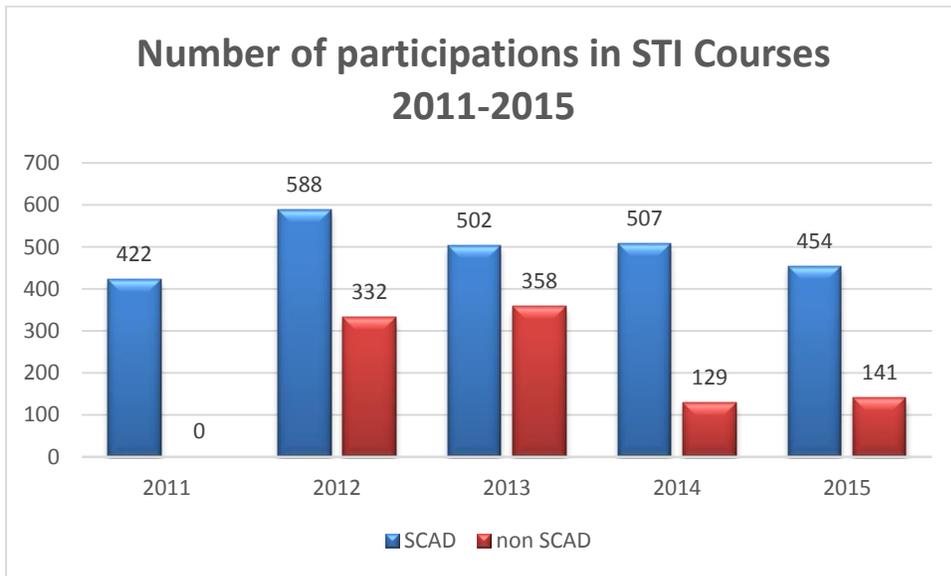
- [1] Published in the American Statistical Association Journal (1951)
- [2] Based on the UK Royal Statistical Society model

## 6. Figures

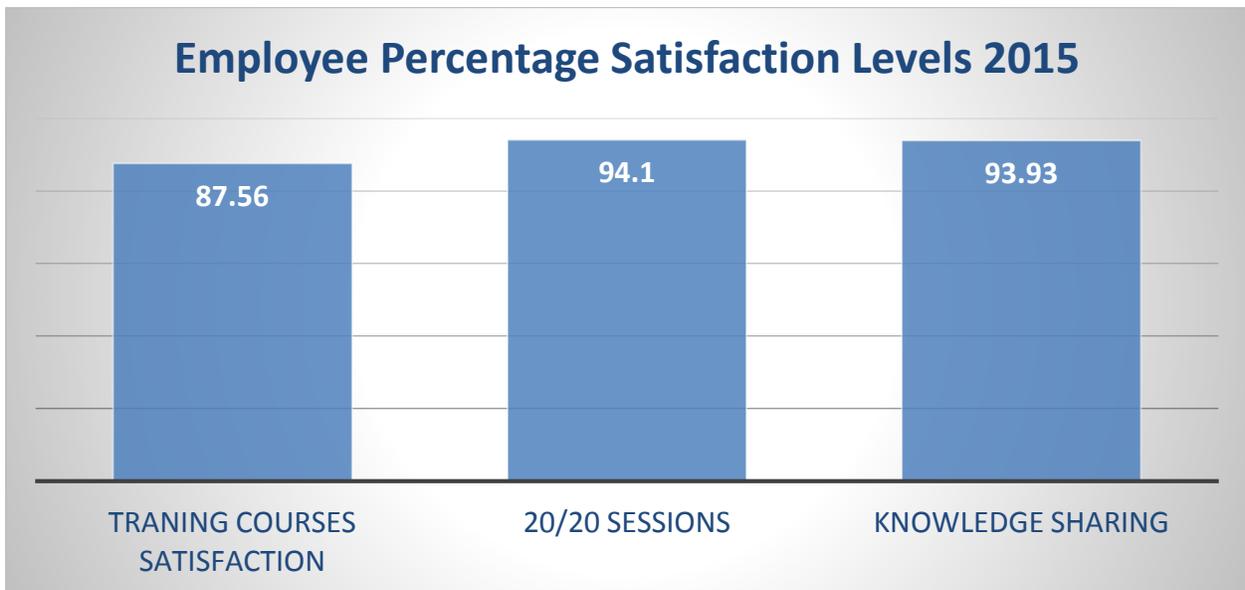
**Figure 1: Professional Diploma in Official Statistics and Fellowship in Statistics**



**Figure 2: Number of Participants in STI Courses 2011-2015**



**Figure 3: Employee Percentage Satisfaction Levels 2015**



## 7. Tables

**Table 1: The Statistical Training Institute in Numbers for 2015**

#	The Statistical Training Institute in Numbers for 2015	Number
1	Total number of training hours for SCAD employees	12,838
2	Total number of UAE nationals participated in training courses	454
3	Total training programmes conducted in 2015	35
4	SCAD employees participated in international conferences	34
5	Papers presented by SCAD at international conferences	8
6	SCAD employees participated in training courses as per their Personal Development Plans	157
7	Attendees to 2015 Abu Dhabi Statistical Symposium	400
8	Attendees to STI courses, workshops, seminars from UAE Government entities	625
9	Students visited SCAD from different colleges, universities and schools	101
10	SCAD employees conducted Knowledge Sharing sessions	45
11	SCAD employees conducted 20/20 sessions	41