



## CHALLENGES of IMPROVING STATISTICAL LITERACY in IRAN

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### Abstract

Understanding the world and perspective taking have always been the main issues of human being development process. Improving the world’s understanding and empowering the perspective taking in order to know how to relate to others, perceive thoughts, feelings, and emotions of others, as well as the ability to empathize with others and see things from various perspectives actually requires a universal language to find, design and read mind patterns. Obviously, this common language should be based on two fundamental components. Grammatical framework based on uncertain rules of mathematics to guarantee the achievement of maximum level of coordination with the real world, and data sets as the language’s universal alphabet which is recognized as the evidence of the real world. This language, known as “Statistical Literacy”, is a universal language to talk about mind patterns extracted from data to have understanding and perspectives taking. In this paper, I, as the ISLP coordinator, will describe how this language has been developing so far in Iran and finally make some suggestions for future activities of ISLP.

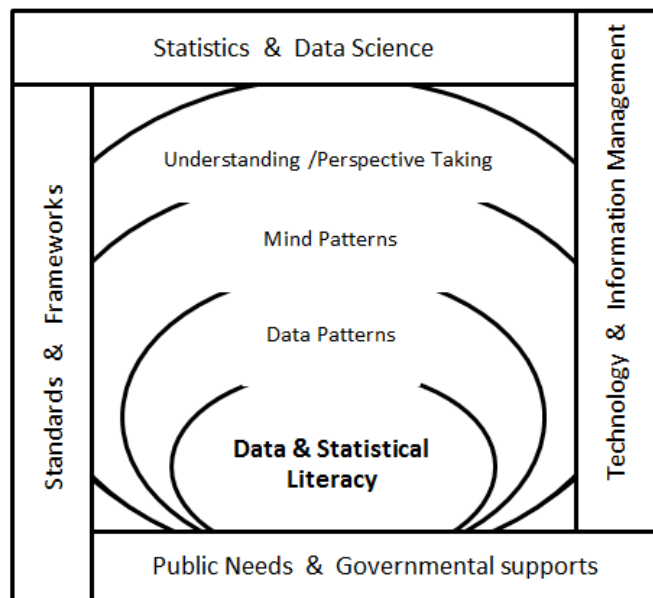
**Keywords:** Data and Statistical Literacy; ISLP; Developing countries.

### 1. Introduction

Let’s consider the shape of the relationship between understanding or perspective taking, and Statistical Literacy as a twister whose narrow end touches Statistical Literacy. In fact, “Statistical Literacy”, is a universal language to talk about mind patterns, which are extracted from data patterns, in order to have understanding and perspectives taking. The base or input of this system is statistical literacy and the result or output of this system is perspective taking.

This twister system is confined in the space built by four elements of: technology and Information Management, statistics and data science, international as well as the local standards and frameworks, and also public needs and governmental supports. If the size of these elements increased somehow by developments or improvements, then the possibility of improvement in statistical literacy could be considerable.

I have proposed this concept in my various workshops as an idea about the necessity of statistical literacy. My first two workshops, one at Isfahan Statistics House in 2005, and the second one at Isfahan Town Hall in National Day of Statistics, 2008 were not very successful in absorbing enough attention of the ordinary people. Therefore, the necessity of comprehensive activity plan was obvious.



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## 2. Comprehensive plan for Statistical literacy in Iran

The following activities were compiled and created in 2010 World Statistics Day as a comprehensive plan for statistical literacy in Iran.

- Design a free Persian website about Statistical Literacy
- Publication of an online statistical literacy journal
- Preparation and organization of several presentations and Workshops about statistical literacy
- Publication of two books in Persian language (one story book in 2010 and one scientific book in 2015 in the field of statistical literacy)
- Organization of poster competition of ISLP for Iranian students in 2011, and
- Research on statistical literacy in financial systems, preparation of a book in the field of statistical management of financial systems specialized for banking, development of concepts of big data mining in statistical banking systems, and finally the empowerment of statistical literacy.

### Website in Persian language

To increase the number of statistically literate citizens, I have designed an educational Persian website in 2010 known as statistical literacy in Persian language “SavadeAmari” (<http://savadeamari.com/index-en.html>), tailored to users of the countries such as Iran, Tajikistan and Afghanistan. The cost of host and domain of website is paid personally and the membership is completely free of charge. To decrease the costs, all elements of this website were designed by me. The logo of this website, which is a man standing on a chart looking at the “Statistical Literacy” above the tallest bar, represents the concept of progress and excellence. Also the logo of online journal is a snake reading a book with the printed number of journal volume on its page. The purpose of using snake is because the translation of the word "statistics" in Persian language is "AMAR", "MAR" means "SNAKE", so the logo is a combination of “ا” (A) and “مار” (snake). It was important to me to design a creative and attractive appearance for the website. The website was designed in two layers which are accessible for everyone. The first layer contains four pages, their links available at the top of each page with following titles: main page, educational resources, statistical literacy and nomination in website.



In this layer, users get familiar with the term of statistical literacy. The main goal of this layer is to motivate visitors to register in the website by showing the importance of the statistical literacy with the use of competitions, Persian poems and idioms about statistical literacy composed by me, statistical jokes, introducing my books about statistical literacy available for free download, news of statistical literacy, showing the use of statistical methods in different scientific fields and economic news in media, etc.



- First page: "Main page"
- The first page of the website contains two files in pdf format with the following subjects: "statistical literacy in last week’s news in journals and newspapers", and "Statistical literacy in economical news over the last month". These two files are updated every week/ month and many visitors like to read these reports.
- Additionally, a triangle in Persian is designed which mentions the following concept:

*Statistics = Correct Information*

آمار = اطلاعات درست

Statisticians = ?



? = آماردان

Statistics Users = ?

? = آمارخوان



- By using this triangle, the website is trying to make a question for visitors that although there are not mistakes in the Statistics itself, there could be in the two other players of this story i.e. statisticians or the users of the statistics. I called it the "Statistical literacy triangle"!



- Second page: "Educational Resources"
- This page contains Mr. Ban Ki-Moon's message about World Statistics Day and year, also my books about statistical literacy in Farsi (Persian) and news about seminars, workshops and talks on statistical literacy.
- Third page: "Statistical Literacy"
- This page contains a link to the second layer which is a Persian online Statistical literacy journal, a text to introduce statistical literacy and a poem about it, composed by me. This is the first poem about statistical literacy in the history of Persian language! It mentions that if people are not aware of statistical literacy, then the whole of their life will be somehow vulnerable and the two last lines recommend youth to follow the statistical literacy for a better future.
- Forth page: "Nomination in Website"
- This page is linked to a database of the users information. It requires the visitors' email address to inform them the new materials and articles on the website and prevent them wasting their time for unnecessary checking the website when there is not new information. Therefore, the website recommends visitors to register in the website and receive new materials by email.

The website's statistics shows that 80000 page views have been occurred by visitors from 131 countries since 2010, mostly from Iran, United States, Brazil, Canada, Germany and Great Britain.

#### **Online statistical literacy journal**

The second layer of Persian statistical literacy website is an online journal (<http://savadeamari.com/tarfand.html>). This is available in a separate layer of website to be used by the visitors who are attracted by the first layer. In this part of website, there are 60 articles about statistical literacy in different volumes of the journal from different Iranian authors and specialists. The articles are in various electronic formats such as: pdf, Flash or films and videos.

#### **Cooperate with the Iranian Statistical Society**

Iranian Statistical Society was founded in 1991 as an NGO, to support and continue the work of statistical societies, establish a national journal and newsletter, and also host national and international conferences of statistics in Iran. The national Society now represents Iranian and overseas statisticians. The overall objective of the Society is to further improve the study, application and good practice of statistical theory and methods in all branches of learning and enterprise. It seems beneficiary to cooperate with this NGO, as a representative of all Iranian statisticians, professionals and academic members to plan mutual programs about statistical literacy. Therefore, I performed the following activities in cooperation with Iranian Statistical Society:

- Writing articles for a permanent chapter of Iranian Statistical Society<sup>2</sup> newsletter from 2013.
- Writing a letter and convincing the Iranian Statistics Society to accept statistical literacy as one of the main sessions of Iranian statistical conference which takes place every two years in Iran with around 1000 participants.
- Making an agreement to mention the link of Persian statistical literacy website in the main page of Iranian Statistical Society website.
- Reviewing two books about statistical literacy by editorial committee of Iranian Statistical Society and receiving the acceptance and confirmation to be published under the name of this important national statistical NGO.
- This society rarely accepts to support a book under its name, but fortunately both books of statistical literacy in Persian language were confirmed by editorial board of the society.

#### **Publishing books**

The first book entitled "**One Day with Statistics**<sup>3</sup>" was selected to be released in World Statistics Day, written by me and published by Iranian Statistical Society. A novel about a young statistician who looks for a job and faces with a lot of daily events related to the concepts of statistical literacy. It was written to popularize the statistics and was published by the confirmation of the publication

<sup>2</sup> [www.irstat.ir](http://www.irstat.ir)

<sup>3</sup> ISBN 8-625-318-964-978



committee of Iranian Statistical Society as the selected book of World Statistics Day celebration in Iran. It was distributed in different ceremonies of this event throughout the country.



Recently, I received a letter from the dean of Department of Statistics at the University of Rafsanjan declaring that the book has been presented in Nonparametric Statistics course at their University as a two days seminar, and the students are interested in the concepts of the book.

The **second book** “**Statistical Literacy in Economic and Social Studies**”<sup>4</sup> is the first book dealing with Statistical Literacy in scientific language. It was released in 2015, written by me again, and published by mutual supports of Iranian Statistical Society and Isfahan House of Statistics. In the first year, this book was selected by Iran’s Ministry of Education to be used and mentioned as a reference for Mathematics and Statistics book in high schools, as one the three books, selected from all Persian candidate books, beside of five English references. It was a great success for statistical literacy to be educated and mentioned in the books of high school students providing them the opportunity to understand the concepts of statistical literacy.



This 111 page book is about statistical literacy with lots of examples in economic and social studies. The book comprises of three chapters that deal with data collection, interpretation and report writing based on statistical literacy.

The objective of the book is to explain the meaning of the results of any organized set of observations or experimental manipulation in economic or social studies. Stories, actual examples, and simplified statistical facts are combined together to make a simple textbook, allowing the public to understand and use statistics in their daily lives. The book is written in Persian/Farsi and its electronic copies are available in the Isfahan Statistics House and Iranian Statistical Society websites for free. The author’s note on back-cover of the book states that any optional payment is donated to charities.



The appreciation in the celebration ceremony of National Day of Statistics in Iran was the second success for this book.

Publishing these two books, as an experiment, shows that although we are living in the world of technology and internet, but still, hard copy publications are playing the main role in drawing attention of different parts of society.

The **third book** that I am going to publish soon is about banking statistics and data management in 300 pages. In fact, the financial crisis of 2007-08 prompted a number of statutory and supervisory initiatives that require greater disclosure by financial firms of their data. Banks typically have collected aggregate data from their branches by reporting returns structured like standard financial

<sup>4</sup> ISBN 978-600-04-4712-0





statements, but there are a lot of benefits in having access to granular data. For example, financial data scientists are able to work on big data mining in banks' micro data sets, enhance the analytical toolkit, and improve the operational efficiency of banks. This book is going to describe all requirements from planning to implementation, evaluation and dissemination of banking data and statistics management systems in the language of data scientists who are familiar with management of banking data, banking statistics and information technology. Subjects such as data literacy, statistical literacy, big data mining and micro-data in banking statistics will be included in this book.

#### **Talks and Workshops on statistical literacy**

Statistical literacy as a universal language of mind patterns, extracted from data in order to have understanding and perspectives taking was discussed in two workshops. The first workshop took place at Isfahan Statistics House in 2005 and the second one was at Isfahan Town Hall in National Day of Statistics, 2008. Participants had the opportunity to get involved in the learning process by a lot of real examples and practices.

The experiences in running these workshops were very helpful to improve the design and plan the further talks and workshops. Therefore, I arranged different workshops to teach the main concepts of statistical literacy by games, stories, real life examples, jokes, role plays, small group discussions, etc. to everyone with any level of statistics knowledge, as it follows:

- 2009 – Central Bank of Iran – 34 hours course on Statistical literacy for economic statistics and price indices specialized for researchers of Central Bank of Iran. In this course, I gave participants opportunities to craft their own department's statistical reports and data management process on related topics to statistical literacy and make a report included the necessary corrections to the dean of departments.
- 2010 - Shafagh House of Culture in Tehran - Workshop on the importance of Statistics and Statistical Literacy, presented at International Day of Statistics ceremony.
- 2010 - Sheikh Bahayeie University - Workshop on the Statistical literacy and its application in our daily life management, presented at the ceremony of national Day of Statistics.
- 2010 - Isfahan University, Isfahan University of Technology & Mathematics House - Workshop on the Statistics Hacks, presented at Seminar of Statistics and Development as International Day of Statistics ceremony in accompany with Prof Samad Hedayat from Illinois University of USA and Prof Mohamad Reza Faghihi from Shahid Beheshti University of Iran.
- 2011 - Isfahan Statistics House - Round table of investigation in the root of problems and requirements of Statistical literacy.
- 2011 - Economic Statistics Department of Central Bank of Iran - A talk about Statistical Literacy in Economic Statistics in Educational Seminar of Economic Statistics with 380 audiences.
- 2012 - University of Malayer - Workshop on the Statistics Literacy and Statistics Hacks.
- 2013 - Thirty fifth Educational Career of Economic Statistics of Central Bank of Iran employees – A talk about necessity of Independency of Official Statistics Producers and the use of statistical literacy in banking statistics for 400 participants.
- 2013 - Kerman University – A talk about Statistical literacy in banking statistics in National Day of Statistics Ceremony.
- 2015 - University of Medical Sciences - Workshop on the Statistical Literacy for Medical Sciences specializing in child cancer.
- 2016 - Education Centre of Central Bank of Iran – one week workshop on Management Information Systems in Banking Sector and the use of statistical literacy in banking statistics for Senior Officers of Iranian Banks.

The attractive plan of talks and workshops was the result of all of these invitations to different ceremonies, seminars and on job careers. Statistical literacy finally became the main concern for many Universities, professional institutions and even media and public. The requests for these kinds of talks



and workshops have been growing, to the extent that I usually persuade to reject some invitations every year.

All payments of these workshops were allocated to charities, specially the Society to Support Children Suffering from Cancer in Iran. Some of the workshops were recorded and distributed to libraries, universities and others who were interested but could not attend on that specific time.

### **Poster competition**

Iran participated in ISLP poster competition which had invited school students to design a statistical poster reflecting or illustrating analysis, interpretation and communication of statistics or statistical information. First of all, I translated the ISLP instructions for this competition in Persian language and distributed among all schools by using the Persian website of statistical literacy as a reachable platform on internet. The poster shown on the right was selected as the country's number one poster by cooperation of Iranian Statistical Society and participated in the ISLP poster competition from Iran.



In this poster, two students, Heliye Molalame and Maryam Analouyee, with supervisory of their teacher, Mana Naderimoghadam, have used the different parts of music instruments as bar charts to show the result of answers to the questions such as:

- If you go to musical instrument store, what do you prefer to buy?
- If you go to musical instrument store, what will affect your choice?
- How many hours per day do you listen to music?
- What types of music do you prefer?
- What do you consider when you listen to music?

Each of them received an album of Iranian coins set and a volume of "One Day with Statistics" book as a gift from me, and the membership of Iranian Statistical Society and all its journals and newsletters for two years as a gift from ISS.

### **3. Results**

The result of the comprehensive activity plan, which was designed around 8 years ago, has been completely felt in recent years. The main important achievements are:

- Iranian statistical authorities' speakers and managers, especially Statistical Center of Iran and Central Bank of Iran, are using the buzzword of "statistical literacy" in almost all national speeches and talks.
- The statistical literacy concepts are mentioned in high school mathematics books from 2016 and the book of "Statistical Literacy in Economic and Social Studies" has been recommended to students for further studies.
- Statistical literacy is one the main subjects of Iranian Statistics Conference, the major event for Iranians working in the fields of statistics and probability.
- There are two books in Persian language about Statistical literacy.
- Almost all of Iranian professionals in statistics are familiar with ISLP and its activities.
- Finally, even charities and their members are familiar with statistical literacy as one of their supporters.

### **4. Suggestions**

The ISLP may conduct an "impact/effort" assessment of the recommendations of professionals, firstly by its country coordinators scoring based on a pre-defined criteria and secondly by the collective wisdom of International Statistical Institute (ISI) members. This methodology will lead to consensus result within the group, guide and assist the ISLP to identify recommendations, which yield the highest impact while taking the required efforts into account. The ISLP could seek for the quick-wins



and also those requirements which need further support from the ISI. The suggestions such as following items:

- Setting up a committee for preparation of data literacy and subsequently, statistical literacy standards for preparation of better metadata and more beneficiary granular data and micro-data sets, as the most important subjects of recent years, by concentrating on statistic supply chain from gathering data of responders and data owners to business intelligence results of professional organizations.
- Organizing a common seminar on "the role of Statistical literacy in the process of two important statistical authorities: National Statistics Centers and Central Banks".
- Setting up a committee for
  - Publishing statistical literacy books and resources on the base mobile apps with the aim of popularizing statistical literacy and data literacy.
  - Translating current available books in different languages and distributing them online for free by ISLP.
- Preparing international mandatory standards and frameworks for implementing statistical literacy concepts in organizations to make motivation to allocate enough budgets to support it. Lack of funding locally to put plans made by professional committees of statistical literacy into practice, prevents anything happening in long time. The ISLP can also build a portfolio of good practices among institutions engaged in statistical literacy, in order to inspire specific initiatives associated to some recommendations.
- People are not interested in important subjects only because some professionals says that they are important; they are interested in understandable problem solving methods for their needs and life requirements. The websites, books, seminars and workshops can only help to make user-friendly foundations as the point of view of professionals, but the important point is what the people really concern in their real life and how statistical literacy can help them to lead to a good understanding and problem solving by interactive methods. Therefore, I suggest an MSc career to train statistical literacy specialists. The graduate people of this career should have required knowledge and competencies to act as a mentor for reporting agents, dissemination channels like social media, governing councils, Journalists/media, researchers/academia, important institutions and high volume data users. This will affect the statistical literacy level of general public subsequently in long run.
- Having plans to bow out of talking about statistical literacy for a special group of society. It is actually as important as the starting phase. In my opinion, it is necessary to study the requirements of people internationally by ISLP and also, prepare some recommendations about the correct and exact concepts of statistical literacy for different type of society groups.

### 5. Acknowledgment

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

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