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Journal of Rajasthan Statistical Association (JRSA)

(A Biannual Peer Reviewed International Research Journal)

[In Memory of Late Prof. Jokhan Singh]

Chief Editor
Dr. Jayant Singh

Rajasthan Statistical Association

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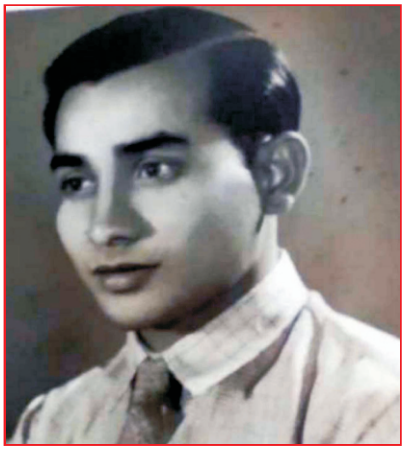


Prof. Jokhan Singh

(14.11.1937 to 07.09.2020)

Professor, J. Singh born in 1937 passed high school and intermediate examinations from UP Board in 1953 and 1955 respectively with distinction in Mathematics. He obtained his B.Sc. degree from BHU in 1957 securing third position and master degree from the University of Lucknow in 1959 and awarded merit Scholarship. He completed his Ph.D from University of California, Barkeley, USA in 1969 by crediting Scholarship.

Prof. Singh has proved himself a disciplined and productive teacher. He served in the capacity of Reader and Professor for more than 30 years at Banaras Hindu University and Vikram University Ujjain. Five Ph.D. Candidates were successfully supervised by him. He published more than 40 research papers in Indian and foreign journals including several research papers presented and read in various Seminars/ Symposia of the universities. His interest to the common people is reflected by his keen interest to write books in Hindi; one on Computer Programming and other on Statistical Inference which was published by the Government of MP.

Owing to his sound academic, administrative ability and analytical approach Prof. Singh was assigned responsibility of various bodies of UPSC, UPPSC, MPPSC and BPSC. Prof. Singh in addition to his teaching and research activities took the responsibility of Member, Finance Committee, Chairman, Sports Committee, Coordinator Central Evaluation, Member-Library Committee in the Vikram University and Administrative warden and Secretary, Athletics Association in Banaras Hindu University. He was member of research degree committee of several Universities.

Professor Singh being the pioneer in the field of internal statistics and human touch with the students and faculty head very high level administrative capability. He served as visiting Professor, Department of Statistics, University of Jammu from July 1998 to June 2001 and Department of Statistics, University of Rajasthan, Jaipur from July 2001 to April 2002. He was UGC; National Lecturer from 1984-1985 and several times UGC visiting Fellow. Prof. Singh being the senior most professor headed the Department of Statistics, Vikram University, Ujjain for a quite long period from 1977-1998. For a several years he had been the Executive Council Member of Vikram University. He occupied a very prestigious position as Rector of the Vikram University and served from 1990-1992. Finally his academic and administrative ability was recognised by the Government of MP and he was honoured by appointing him as the Vice Chancellor of Vikram University in March 1994.Prof. Singh created a very good administrative and Academic environment and made several innovative reforms during his tenure till 1997.

Prof. (Dr.) Jagdish Prasad
Former, Head Department of Statistics,
University of Rajasthan, Jaipur
Presently, Professor of Statistics &
Coordinator, Amity School of Applied Sciences (ASAS)
Amity University Rajasthan, Jaipur

Patron's Desk

I feel proud, privileged and honoured to write an academic biography of Late Professor J. Singh, Former Professor and Head Deptt. of Statistics and former Vice-Chancellor, Vikram University, Ujjain (M.P.)

Professor J. Singh was born in 1937 and passed high school & intermediate examination from U.P. Board 1953 and 1955 respectively with distinction in Mathematics. He obtained his B.Sc. degree from Banaras Hindu University (B.H.U.) Varanasi in 1957 securing third position and M.Sc. degree in Statistics from the University of Lucknow, U.P. in 1959 and was awarded Merit Scholarship. He has completed his Ph.D. from University of California, Barkley, U.S.A. in 1969 by crediting scholarship.

Prof. Singh proved himself a disciplined, popular and productive teacher. He served in the capacity of Associate Professor and Professor for more than 30 years at Banaras Hindu University and Vikram University, Ujjain. Five PhD, candidates completed their research work under his supervision. He has published more than 40 research papers in very reputed Indian and Foreign Journals. He has also presented his research work in various National and International Conferences, Seminars, Symposia and Workshops of the Universities. His interest to the common people was reflected by his keen interest to write Statistics books in Hindi medium. He has written two books entitled "Computer Programming" and other one on "Statistical Inference", which were published by the Government of M.P.

Owing to his sound academic, administrative ability and analytical approach, Prof. Singh was assigned responsibilities of various bodies of UPSC, UPPSC, MPPSC and BPSC. In addition to teaching and research, Prof. Singh took academic and administration assignments as a Member of Finance Committee, Chairman Sports Committee, Coordinator Central Evaluation, Member Library Committee, and many more in the Vikram University Ujjain. He was an Administrative Warden and Secretary Athletics Association in Banaras Hindu University. He was member of Research Degree Committee of several Universities. He served as a Visiting Professor, Department of Statistics, University of Jammu from July 1998 to April 2002 and Department of

Statistics, University of Rajasthan, Jaipur from 2001 to April 2002. Added to that, he was UGC National Lecturer from 1984 to 1985 and served as UGC Visiting Fellow. Prof. Singh being a senior most Professor was appointed as head, Department of Statistics, Vikram University, Ujjain for a quite long period from 1977 to 1998. For several years, he had been the Executive Council Member of Vikram University, Ujjain. He was appointed on a very prestigious position as a Rector of the Vikram University, Ujjain M.P. Finally, looking to his academic, administrative and research ability the government of M.P. has honored him by appointing him as the Vice-Chancellor of Vikram University, Ujjain in 1994. As a Vice-Chancellor, Prof. Singh has created a very good administrative, academic and research environment and made several innovative reforms and changes during his memorable tenure 1994-97.

He was a thorough gentleman, kind hearted, soft spoken and straight forward in day-to-day dealings. He always appreciated my research work and was very happy to see me as an administrator in the University of Rajasthan. I want to mention here that he has two sons, namely Dr. Jayant Singh, Associate Prof. Deptt. of Statistics, University of Rajasthan, and Director DLL, UOR, Jaipur and Dr. Rajesh Singh, Professor, Deptt. of Statistics, Banaras Hindu University. Both are giving their services to the Subject of Statistics. I have seen Prof. Singh, as a best teacher to teach Statistics in a very simple way and I have learnt so many things from him. In the end, I can say he was a very good academician, administrator, researcher, and human being.

Dr. Jayant Singh
Associate Professor
Department of Statistics &
Director of Department of Life Long Leaning
University of Rajasthan, Jaipur

JRSA SPECIAL ISSUE-IN MEMORY OF LATE PROFESSOR JOKHAN SINGH JI

FROM THE DESK OF EDITOR-IN-CHIEF

With great pleasure, Rajasthan Statistical Association is releasing special issue of Journal of Rajasthan Statistical Association (JRSA), a peer-reviewed and bi-annual journal. The present volume is in the memory of ***Late Professor Jokhan Singh ji*** who is distinguished statistician with notable contribution in the field of Statistical Inference and Computer Science. It gives great level of satisfaction to present it to the fellow researchers, scholars of sciences and social sciences.

Journal of Rajasthan Statistical Association (JRSA) continues its endeavour to initiate and promote quality research and in facilitating a platform of discussion about research in sciences and social sciences. An attempt has been made to make the journal and its entries more interdisciplinary ensuring its quality and originality of papers at the same time. I believe that the most critical components of any scientific journal's success are the submission of high-quality manuscripts, the dedication of members of its editorial board, and excellence of those reviewing the manuscripts. We take utmost care for rigorous peer review of all submitted manuscripts to accept only quality contents without any fringe of conflict for publication.

With my editorial staff, I will explore new means to improve journal manuscript handling efficiency with modern electronic applications and tools. Suggestions for further qualitative enrichment of the journal are warmly solicited and so is a further dialogue on the research articles published, in form of response and rejoinder.

At last, I would like to add that it is only the tireless and incessant labour of the people associated with the journal that the current issue sees the light of day. I extend heartfelt thanks to entire editorial board, our many reviewers who helped to maintain the journal standard and Rajasthan Statistical Association for the pain they have taken during these tough times prevailing due to COVID-19. We are thankful to all the contributors of papers and our readers for their continuing support and look forward for their valuable suggestions.

This special issue covers all backlogs of JRSA.

Prof. Padam Singh
Director,
Invision Communications and Research Private Limited
Retired Professor of Statistics at PUSA, Delhi

Message

Professor Jokhan Singh was born on November 14, 1937 at village Mai district Jaunpur Uttar Pradesh. He had brilliant academic record; Matriculation (1953) and Intermediate (1955) with Distinction from U.P. Board , B.Sc.(1957) from B.H.U. Securing 3rd Rank , M.Sc. (1959) from University of Lucknow with Merit Scholarship and Ph.D.(1969), from University of California, Berkley, U.S.A., obtaining Credit Scholarship.

Professor Singh served as Professor of Statistics for more than 3 decades at B.H.U., Varanasi and Vikram University, Ujjain. Through his stewardship he inspired young statisticians in their carrier.

Professor Jokhan Singh guided half a dozen students for their Ph.D. degrees mentoring them to achieve their full potential.

He published about 50 papers in National and International Journals of repute. Importantly, he authored 2 books in Hindi on important subjects of Computer Programming and Statistical Inference published by Government of Madhya Pradesh.

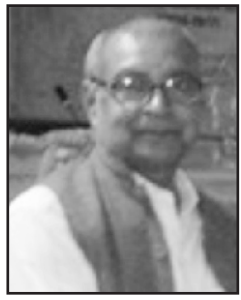
While being teacher par excellence, he shouldered other responsibilities in the University as Chairman/ Member of several committees.

He was expert adviser to many important bodies like UPSC, UPPSC, MPPSC, BPSC as well as research degree committees of several Universities.

He left for heavenly abode on September 7, 2020.

As a tribute to his contributions the present issue of Journal of Rajasthan Statistical Association is dedicated.

Prof. R. C. Yadava
Former Head
Department of Statistics &
Dean Faculty of Science
Banaras Hindu University
Varanasi-221005



Message

My first face to face introduction with Prof. Jokhan Singh started when I took admission in M.Sc. (Previous) Statistics, Banaras Hindu University, in the session 1964-65. At that time, Prof. Jokhan Singh was serving as lecturer in the Department of Statistics, Banaras Hindu University. In that session, he was assigned to teach the course of "Multivariate Analysis" to M.A./M.Sc. (previous) students. Multivariate Analysis was considered to be a tough course at that time and hardly few books were available for the course and those too were very expensive. So, most of the students were not able to purchase any book for the course. However, teaching methodology of Prof. Jokhan Singh was so simple and excellent that we were able to learn the course very easily with much clarity without having any book for the course. Prof. Singh's class notes became sufficient for us. This shows the superior quality of his teaching methodology.

In the next year, when we reached to M.Sc. (Final), unfortunately for us Prof. Jokhan Singh was not assigned any course to teach to the students of M.Sc. (Final). Thus, we were not able to get any benefit of teaching from him. However, whenever he met us out of the class rooms, he always used to enquire about our studies and encouraged us for better performance. Here, it is pertinent to mention about one incidence which describes about the personality of Prof. Jokhan Singh in the eyes of his students. The teaching of Statistics in postgraduate level at Banaras Hindu University started only from 1962-63 sessions. Since that time there became a custom to give farewell party to M.Sc. (Final) students by M.Sc.(Previous) students. In this party, apart from other activities, the students of M.A./ M.Sc. (Previous) students used to give title to M.A./ M.Sc. (Final) students while M.A./ M.Sc. (Final) students used to give title to teachers. The students used to discuss among themselves and finally used to decide a title for each teacher. In that year, the title decided for Prof. Jokhan Singh was

'राम झरोखे बैठ के सबका नजरा लेहु।'

It is quite difficult for me to give an exact translation of the above in English, but in simple way it can be described as below:

Sitting from a place, keeps eyes on activities of all without making any interference in their activities. This describes about the personality of Prof. Jokhan Singh in the eyes of his students.

In fact, he was very popular among the students and very friendly to all the teachers of the department. When I passed my M.Sc. examination, almost at the same time, Prof. Jokhan Singh proceeded to United States of America for higher studies. After obtaining his Ph.D. degree from U.S.A., he came back to India and joined the department as lecturer in Statistics. Further he was selected as Reader in Statistics in the department. After serving as reader in Statistics for few years at B.H.U., he was selected as Professor of Statistics at Vikram University, Ujjain and he joined there. Due to which his official relationship with B.H.U., ceased but he was always in close contact with members of the Department of Statistics, B.H.U.

As my teacher and colleague, Prof. Singh always gave me his support and guidance.

Overall, Prof. J. Singh will be always remembered as an excellent teacher, able administrator and humble person with simple life style.

Prof. K. N. Singh Yadava
Ex-Head (Retired), Department of Statistics
Banaras Hindu University ,Varanasi-221005
Advisor, University of Patanjali, Yogapeeth, Haridwar.
Former Vice-Chancellor, RDVV, Jabalpur,
APS University, Rewa and UPRTOU, Allahabad.

MESSAGE

PROF. JOKHAN SINGH: A GREAT HUMAN BEING, DARING SPEAKER, AND A GOOD ADMINISTRATOR

Being a student at P.G. level, colleague in the Department of Statistics, Banaras Hindu University and also being in touch throughout his life I can only say that Prof. Jokhan Singh was a very gentle man, a nice human being, an excellent teacher, daring speaker and a good and strict administrator. I am happy to write few words in the memory of my teacher Late Prof. Jokhan Singh Ji. Besides above mentioned profiles, I found him as an excellent advisor and mentor too at many occasions during my service period. I have also seen him as a good and daring speaker and administrator whether he was administrative warden of a PG student's hostel at the Banaras Hindu University or as a Vice-Chancellor of Vikram University, Ujjain, Madhya Pradesh.

Prof. Singh taught me Inference course at the M.Sc. level. I found him a very noble, punctual and a teacher of clear understanding with through knowledge of the concerned subject/programmes. A hundred per cent regular attendance of the students in his class indicated a clear proof of the above mentioned profiles of Prof.Singh.

I must remember Prof. Singh as a very nice gentleman and human being. Once upon a time in 1989, when I was suffering from fever and was living in Broacha hostel in the warden's capacity, Prof Singh visited the Department of Statistics, B.H.U. for a day and when he came to know about my health, he immediately visited me in hostel and enquire about my health. It shows his sympathetic attitude towards the students and colleagues as well.

In 2007, when I was Vice-Chancellor of the U.P. Rajarshi Tondon Open University in Allahabad, I requested him to grace the occasion of teacher's day on 5th September, he very kindly accepted my request and travelled from Varanasi to Allahabad in spite of the fact that during that period he was not travelling anywhere due to his bad health. Teachers and students of UPRTOU still remember his speech given on "Guru-Shishya relationship at present and past". This again shows Prof. Singh's generousness towards his students and colleague like me.

I found him as a good advisor and administrator too. When I was appointed Vice-Chancellor of Rani Durgawati University, Jabalpur in December, 2011, I was looking for a person who can give me some idea about the Universities of M.P. and way of functioning there in. I looked around and immediately found that no one other than Prof. Jokhan Singh would be a better advisor at this juncture. I visited Prof. Singh residence. He was so happy, congratulated first and gave me many Mantras how to run a University of Madhya Pradesh as VC. Among several mantras, his main emphasis was not to interfere in the functioning of Registrar particularly his/her functions as controller of Examinations and financial matter. I did so and successfully completed my tenure as Vice-Chancellor of both RDVV, Jabalpur and APS University, Rewa.

During my tenure as VC in M.P., I visited Vikram University, Ujjain a couple of times. I was felt very happy and delighted to hear several appreciable words from the faculties of Vikram University about Prof. Singh regarding his functioning as Vice-Chancellor of the Vikram University, especially compliments like daring speaker and a good administrator.

Dr. Umesh Singh
Ex-Head & Professor of Statistics (Retired)
Department of Statistics
Banaras Hindu University
Varanasi - 221005

Message

PROF. JOKHAN SINGH: A PROMOTER OF BASIC CONCEPTS OF STATISTICS

My interaction with Dr. Jokhan Singh started in mid-seventies of twentieth century when I joined Rajasthan University for my Ph.D. degree under the supervision of Dr. V. P. Gupta. During a discussion Dr. Gupta said that if you have any confusion regarding basic of Statistics, discuss it with Dr. J. Singh as he has command over the foundation of Statistics and I found that its much more than what I was told about him.

Prof. Singh was meritorious student from his childhood. He used to study for good grasp of the subject rather than developing a superficial knowledge. Even with this motive, he was position holder in all his studies. He was awarded various merit scholarships. He completed his B.Sc. Degree from Banaras Hindu University as a rank holder of the University. At this time, he developed interest for Statistics and Lucknow was the nearest centre for the study of Statistics at post graduate level, therefore he joined Lucknow University. He was recipient of merit scholarship during his post-graduation study and was awarded Master's degree in Statistics in 1959. His quest for statistical knowledge continued and he went abroad for pursuing Ph. D. Degree. His field of interest was Statistical Inference. He contributed significantly for developing the inferential procedures for incompletely specified models. He is one of the early proposers for the use of preliminary test estimators. He completed his Ph.D. degree from University of California, Berkeley, United States of America. During discussions, he used to comment on the Neyman-Pearson theory of testing of hypothesis that it unnecessarily puts enough weight on type one error where as in many of the practical situations type two error is equally serious. Perhaps this motivated him to propose the test procedure which minimizes the sum of probability of both types of errors.

In addition to being a good research worker, Prof. J. Singh was an outstanding teacher. Although I never got a chance to attend his classes but my colleagues whom he has taught appreciated his teaching method by saying that whatever he taught settled down in the mind effortlessly and never had a problem in future in recalling it whenever needed. He use to strengthen the foundations of the topic. He was of the opinion that if basics are clear the associated mathematical derivation can be easily done. What I

could guess from his discussion that he was believer that Mathematics provides the strong tool for Statistics but Statistics is not Mathematics. It is in tune with my belief that Mathematics is exact science but Statistics is probable science and we all know that nothing in this world is certain except God whom we can feel only. Therefore solution to the worldly problems can be statistical solutions only. I recall that during a seminar on the topic "Future of Statistics in India" organised in the department of Statistics, Banaras Hindu University, Varanasi, he very emphatically said that there is no need to emphasise the need of Statistics. It is going to increase day by day whether we want it or not. But to meet the requirement of future demand of Statistics our way of teaching should be changed. We should not remain confined to teaching of theories only. In the classes itself students should be taught the genesis for the development of the theory and its implementation for the practical field problems. He said this twenty years before and you can realise that how relevant it is even today. Therefore I respect him as Zeitgeist.

Prof. Singh was unparalleled in many senses. It is believed that a good teacher and researcher cannot be a good administrator but he broke this myth. He started exhibiting it when he was appointed as administrative warden of Ramakrishna hostel of Banaras Hindu University. He never forced students to be disciplined but motivated them to be disciplined. That's why he was the most liked and most respected hostel warden. He held many administrative positions in Banaras Hindu University and Ujjain University and finally got retired as Vice-Chancellor of Ujjain University.

Prof. Dilip Kumar Ghosh
Department of Statistics
Saurashtra University,
Rajkot, Gujarat, India

Message

Dr. Jokhan Singh was born in 1937 in Banaras. He passed high school and Intermediate with distinction in Mathematics from U.P. board in 1953 and 1955 respectively. He obtained his Bachelor of Science(B.Sc.) degree from Banaras Hindu University, Varanasi in 1957. He secured third position in the University, He obtained his Master degree in Science from University of Lucknow in 1959 and got the merit scholarship there. He was awarded scholarship during his Ph.D. degree programme at University of Berkeley, USA which he completed and got Ph.D. degree in 1969.

He served as Reader and then Professor at Banaras Hindu University and Vikram University, Ujjain respectively for more than 30 years. He proved himself as one of the best and dedicated faculty members during his teaching tenure. He supervised five Ph.D. students successfully. He had credit of publishing more than forty research papers in National and International journals. He presented several research papers at National and International conferences in India and abroad.

He had written two books namely (i) Computer Science and (ii) Statistical Inference and got them published by Government of Madhya Pradesh. The specialty of both the books was that it got published in Hindi language. It shows his keen interest and devotion to develop national language Hindi.

On the basis of his merit, sound academic ability, efficient administrative power, and analytical approach etc, Professor Singh was assigned various academic activities and administrative jobs at various places. He served and performed his responsibility at UPSC, UPPSC, MPPSC, BPSC etc. In addition to his teaching and research activities, he served as Member of Finance Committee, Chairman sport committee, Coordinator Central Evaluation, Member Library Committee at Vikram University, Ujjain. He also served as Secretary Mathematics Association, administrative warden at Banaras Hindu University. He was member of research committee at various Universities in India.

I had opportunity to met him several times at several places. We even met together at UPSC. We often met at University of Rajasthan, Jaipur and Devi Ahilya University, Indore where he used to discuss various academic activities. He was a simple, down to earth and a great academician.

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Message

It is indeed a matter of great pleasure to learn that the Rajasthan Statistical Association (RSA) has decided to publish a special issue of its biannual peer reviewed research journal, JRSA, in the memory of Late Prof. Jokhan Singh, Ex-Vice Chancellor, Vikram University, Ujjain. This would really be a great tribute to Prof. J. Singh from the entire fraternity of statisticians not only for his academic achievements in the subject through his research contributions but also for being an excellent teacher with conceptual clarity- a virtue so rarely found in Statistics, a mentor with unstinted moral support, inspiration, guidance and wise counsel to thousands of his students and for his integrity in professional as well as in personal life.

Prof. J. Singh, born in1937, completed his High School and Intermediate respectively in 1953 and 1955 through U.P. Board, B.Sc. degree from Banaras Hindu University, Varanasi in 1957 and post-graduation in Statistics in 1959 from Lucknow University. He joined University of California, Barkeley, USA for his Ph.D. work and was awarded Ph. D. degree in Statistics in 1969. After returning the country, he joined the Department of Statistics, Banaras Hindu University, Varanasi as Reader and then Vikram University, Ujjain in the capacity of Professor of Statistics. During his bright teaching career of more than 30 years, he supervised five Ph. D. scholars and published more than forty research papers of repute.

Besides his sound academic capacity, realizing his tremendous administrative ability and analytical approach in working, he was bestowed upon many high level administrative responsibilities in Vikram University. He served the Department of Statistics, Vikram University as Head for a long period during 1977-98 and as Executive Council Member of the university for several years. Later on, he served as Rector of the University- a prestigious position, during 1990-92. Recognizing his excellent and

dedicated administrative capacity, M.P. Government appointed him as Vice Chancellor of the University in March, 1994. After his superannuation, he served the University of Jammu and University of Rajasthan as Visiting Professor in the respective Departments of Statistics during 1998-2001 and 2001-2002.

I personally have a great respect and affection for Prof. Singh in my heart for many reasons. I had the unforgettable privilege of being his student in my graduation and post-graduation courses continuously from 1968 to 1972 in the Department of Statistics, B. H. U. I was deeply impressed by his method of teaching and way of presentation of complex theories of Statistical Inference in simplest and easiest form. He was also my first Ph. D. Supervisor in B.H.U. Having registered for Ph.D. degree, when I had my first interaction with him, he asked me to meet next time after going with the theories and concepts thoroughly presented in the book 'Linear Statistical Inference and Its Applications' by C. R. Rao. Unfortunately, I could not continue my research under his noble guidance due to his joining in Vikram University as Professor. However, being a faculty member in the Department of Statistics, B.H.U., I was fortunate enough to meet him quite frequently and to have fruitful academic discussions with him whenever he visited the Department till my superannuation.

I am proud of the team associated with the publication responsibilities of this special issue of JRSA, dedicated to the loving memory of our beloved teacher and mentor, Late Prof. J. Singh.

Dr. Rajesh Singh
Professor of Statistics
Department of Statistics
Banaras Hindu University
Varanasi-221005

MESSAGE

PROFESSOR JOKHAN SINGH: LOVING FATHER, INTELLECTUAL, ADMINISTRATOR AND GREAT SOUL

Professor J. Singh was born on 14th November, 1937 in a village called Mai of Jaunpur district, U.P. He lost his father at a very early age which led to a difficult childhood for him and the struggle began. He went through extreme hardships in his initial days of schooling. Prof. Singh was exceptionally bright as a child and was best at everything he did. He completed his higher secondary education from T.D. College, Jaunpur. After completing school, he took admission in B.H.U., one of the prestigious University of eastern U.P. for bachelor's study. For post graduation, he joined Statistics Department of Lucknow University. He was a meritorious student and received merit scholarships during his U.G. and P.G. studies. He started his teaching career from Vikram University, M.P.. Later he joined B.H.U. In between he got an opportunity to join the prestigious University of California, Barkley, U.S.A. for Ph.D. programme. Destiny took him to Ujjain again where he joined as Professor in School of Studies in Statistics and later became Rector and Vice-Chancellor of the same University. His kind nature made him popular amongst the students, teaching and non teaching staff and was known for his regularity and honesty. He had special bonding with late Dr. Shiv M. S. Suman. On the request of his friend Prof. G. S. Pandey, Ujjain who was the Chairman of M.P. Hindi Granth Academy at that time, Prof. Singh penned two books named Statistical Inference and Computer Programming in Hindi. He spent rest of his time at his residence in Varanasi where he went on with his passion for writing poems. Rudan is a small compilation of his poems in Hindi and Bhojpuri at last. He left for heavenly abode on 7-09-2020. His life is a lesson for all of us that 'Every Struggle is a Victory'.

''मैं भूल गया था पथ अपना
जीवन में भटकन थी आई
मैं गलियों कूंचों में घूमा
पर शांति नहीं थी मिल पाई
कोई न मिला जो पथ दिखलाता
या मंजिल तक मुझको पहुंचाता
मंजिल तो है दूर अभी
आगे बढ़ते ही जाना है
शायद पथ में मिल जाए कोई
वह अपना हो या गैर कोई''

–जोखन सिंह

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SHORT NOTE ON NEUTROSOPHIC STATISTICS AS A GENERALIZATION OF CLASSICAL STATISTICS

[1]Florentin Smarandache

While the Classical Statistics deals with determinate data and determinate inference methods only, the Neutrosophic Statistics deals with indeterminate data, i.e. data that has some degree of indeterminacy (unclear, vague, partially unknown, contradictory, incomplete, etc.), and indeterminate inference methods that contain degrees of indeterminacy as well (for example, instead of crisp arguments and values for the probability distributions, charts, diagrams, algorithms, functions etc. one may have inexact or ambiguous arguments and values).

The Neutrosophic Statistics was founded by Prof. Dr. Florentin Smarandache, from the University of New Mexico, United States, in 1998, who developed it in 2014 by introducing the Neutrosophic Descriptive Statistics (NDS). Further on, Prof. Dr. Muhammad Aslam, from the King Abdulaziz University, Saudi Arabia, introduced in 2018 the Neutrosophic Inferential Statistics (NIS), Neutrosophic Applied Statistics (NAS), and Neutrosophic Statistical Quality Control (NSQC).

The Neutrosophic Statistics is also a generalization of Interval Statistics, because of, among others, while Interval Statistics is based on Interval Analysis, Neutrosophic Statistics is based on Set Analysis (meaning all kind of sets, not only intervals).

Neutrosophic Statistics is more elastic than Classical Statistics. If all data and inference methods are determinate, then the Neutrosophic Statistics coincides with the Classical Statistics.

But, since in our world we have more indeterminate data than determinate data, therefore more neutrosophic statistical procedures are needed than classical ones.

Neutrosophic Numbers of the form N = a+bI have been defined by W. B. VasanthaKandasamy and F. Smarandache in 2003 [see B2], and they were interpreted as "a" is the determinate part of the number N, and "bI" as the indeterminate part of the number N by F. Smarandache in 2014 [see B3].

Neutrosophic Statistics is the analysis of events described by the Neutrosophic Probability.

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Neutrosophic Probability is a generalization of the classical probability and imprecise probability in which the chance that an event A occurs is t% true - where t varies in the subset T, i% indeterminate - where i varies in the subset I, and f% false - where f varies in the subset F. In classical probability the sum of all space probabilities is equal to 1, while in Neutrosophic Probability it is equal to 3.

In Imprecise Probability: the probability of an event is a subset T in [0, 1], not a number p in [0, 1], what's left is supposed to be the opposite, subset F (also from the unit interval [0, 1]); there is no indeterminate subset I in imprecise probability [see B9].

The function that models the Neutrosophic Probability of a random variable x is called *Neutrosophic distribution*: NP(x) = (T(x), I(x), F(x)), where T(x) represents the probability that value x occurs, F(x) represents the probability that value x does not occur, and I(x) represents the indeterminate / unknown probability of value x [see B3].

More than 100 papers, nine books, one PhD thesis, and five international scientific seminars have been published or presented on neutrosophic statistics, including many journals by Elsevier and Springer of high impact factor.

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S1. *History of Neutrosophic Set, Logic, Probability and Statistics and their Applications*, Mathematics and Statistics Departments, King Abdulaziz University, Jeddah, Saudi Arabia, 19 December 2019.

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S3. N*eutrosophic Set and Logic / Interval Neutrosophic Set and Logic / Neutrosophic Probability and Neutrosophic Statistics / NeutrosophicPrecalculus and Calculus / Symbolic Neutrosophic Theory / Open Challenges of Neutrosophic Set,* by F. Smarandache, Ho Chi Minh City University of Technology (HUTECH), Ho Chi Minh City, Vietnam, 30th May 2016.

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