



7th Annual INCOSE SA Conference: **Tutorial Details**

17 August 2010

CSIR International Convention Centre, Pretoria, South Africa

Full day tutorials:

Tutorial 1: Prof. Johann Kinghorn

Complexity, Knowledge and Organisation

Tutorial 2: Dr Richard Weeks

Service Systems Design, Implementation and Management: A Project Management Approach

Tutorial 3: Mr Lemmer Lusse

Technical Risk Assessment

Half day tutorial (lunch included):

Tutorial 4: Prof. Ad Sparrius

ISO 15288 and its Implications

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INCOSE Website, www.incose.org.za for tutorial registration form

Complexity, Knowledge and Organisation

ABOUT THE PRESENTER

Johann Kinghorn is Chair of the Centre for Knowledge Dynamics and Decisionmaking at Stellenbosch University.

While he was Director of the Programme in Value and Policy Studies he encountered the topics of Knowledge Management and Organisational Sensemaking in the early 1990's. From this grew the Stellenbosch Programme in Information and Knowledge Management (MIKM) in 2000. At the same time he was also the founder of the Centre for Knowledge Dynamics and Decisionmaking which houses the MIKM. Today the MIKM attracts large numbers of students from all over Southern Africa and further afield. An international panel in 2005 found the MIKM to be "at the forefront of the development of innovative 21st century programmes" and the Centre to be "world class".

Core to the MIKM is the understanding of complexity and how such an understanding reshapes organisational life, the importance of sensemaking for management and the role of knowledge dynamics in a complex world.

He teaches on the topics: knowledge, sensemaking in organisations, knowledge economy and research logic.

For an introduction to organisational sensemaking see his chapter in Leibold, Probst & Gibbert (2002) *Strategic Management in the Knowledge Economy*. Wiley (315-324)

Websites at www.informatics.sun.ac.za and www.informatics.sun.ac.za/mikm
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TUTORIAL SUMMARY

This one day tutorial/workshop will address the topic of complexity theory and its applicability to future progress.

Complexity is neither a method nor a model. It is a world view which significantly deviates from the Newtonian world view on which much of science and almost all of the generally held theories of business, economics and state are built.

Since the 1980's it has become increasingly clear that the Newtonian view (and its derivatives) provide little help if we are to understand the dynamics of modern systems and societies. In the fields of Physics and Biology this insight came already decades earlier.

Complexity theory, dealing with systems that are inherently uncertain and unpredictable, is emerging as a radical new way to understand the driving forces of the modern world. It opens up new possibilities to imagine and reshape organisational life and it allows for a redefinition of knowledge which is liberating and creative. Understanding complexity also helps to explain the emergence of the knowledge economy.

The tutorial will trace the constituent notions of complexity theory. Then we will explore the implications for organisational life, focusing in particular on management through sensemaking, distributed knowledge, strategy and scenario building and organisational design.

Service Systems Design, Implementation and Management: A Project Management Approach

ABOUT THE PRESENTER

Richard Weeks holds a D.Com from Rand Afrikaans University (RAU), awarded in 1991 based on the thesis "*The management of strategic and organisational change within a turbulent context: A strategic management approach*" and a D.Phil (also from RAU in 2002) with the thesis "*Key determinants in strategic realignment within a digital global business environment*". Richard started with a National Diploma for Technicians (Electrical Engineering) in 1973 and was accepted as a Graduate Member of the South African Institute of Electrical Engineers April 1974. He obtained a B.Com in Business Economics & Transport Economics from University of Suth Africa (UNISA) in 1985 which he followed with an honours in Business Management in 1987. His studies continued through to a M.Com (Cum Laude) at RAU in 1989 with the thesis topic "*The interactive role of organisational strategy and culture: a strategic management approach*"

Richard has extensive experience in consulting to industry and lecturing at university. He is passionate about the subject of service systems and the application of the complex adaptive systems approach.

TUTORIAL SUMMARY

Background:

The World Economic Form Global Competitiveness Report for 2009-2010 reveals that Services now constitute not only the largest sector of the global economy, but also represents the most significant sector of the South African economy as well. In the case of South Africa services currently represents 66% of the country's GDP. It is therefore not surprising that many manufacturing institutions are currently trying to add a services layer to their operations so as to improve their revenue and profit generating capability, but also to improve their ability to more effectively compete within the marketplace. As may be seen from media publications, public sector service delivery is also coming under increasing scrutiny and in many instances criticism for failure in terms of effective delivery. At the core of the problem of services management is deemed to be the fact that in many instances the institutions involved often experience difficulty in adopting a sound "systems based" approach in the reformulation of their business model and consequently effective service delivery. Merely adding layers of services to existing manufacturing operations is fraught with difficulty and in many cases are doomed to failure, as services inherently are very different in nature from a product centric systems approach. The design of service resilient systems that can deal with unforeseen and unexpected events, such as the economic meltdown, implies a very definite need for a complex adaptive systems approach in dealing with project management.

Aspects dealt with in the tutorial:

With the above serving as a brief introductory background the tutorial to be presented focuses on the following:

- The emergence of the global services economy, the nature of services and how they differ from products.
- A brief review of the key characteristics of the global services economy, with specific reference to the need for service systems resiliency.
- The analysis of a business model that reflects a services orientation.
- An exploration of services design – key factors that need to be considered.
- Services implementation and management, avoiding the pitfalls.
- Exploring project management from a services perspective – the difficulties frequently encountered are analysed

Approach adopted in presentation of the tutorial

It is assumed that most of the delegates will have some experience in having to deal with the introduction or management of services in their respective institutions. With this in mind the presenter will provide an introduction to contemporary “service science” management theory as it relates to practice, which will serve as a foundation for group discussion and interaction. To provide delegates with a hand on approach, they will be given a case study to explore and analyse – the objective being to learn from each others experience and knowledge in dealing with difficulties encountered in service system design and implementation in practice.

Technical Risk Assessment

ABOUT THE PRESENTER

Lemmer Lusse started his career as an electronic technician in the South African Broadcasting Corporation (Outside Broadcasting) in 1982 where after he pursued a qualification in the natural sciences at the Rand Afrikaans University (University of Johannesburg). He was subsequently employed by an ARMSCOR affiliated company (Naschem) as an assistant scientist in the field of exterior ballistics. From here he was employed at ESKOM in the nuclear safety division, and since has been working in the field of probabilistic risk assessment (PRA)¹ in the nuclear power generation industry for the past 20 years, where he gained experience in the principles and detail of quantitative risk assessment of a complex technical installation in a highly regulated environment.

TUTORIAL SUMMARY

Objectives:

This tutorial addresses the method of conducting an integrated qualitative risk assessment which can be used to evaluate a technical “system” (or plant) in terms of one or more pre-defined risk metrics, under the following tutorial topics.

- Analysis Objectives
Purpose, scope, level of detail, approach overview
- Initiating events analysis
Event categories, methods of deriving initiating events, occurrence frequency quantification
- Event sequence development
Safety functions, functional event tree, end state definition and success criteria, detailed event tree
- Fault tree analysis
General approach, cut-set analysis and quantification
- Dependency analysis
Functional dependency, location dependency, common cause failures, models and quantification
- Human reliability analysis
Categories, performance shaping factors, dependencies and recovery effects, quantification
- Reliability data
Sources, models
- Consequence analysis
Applications and Insights
- Sensitivity and uncertainty analysis
Aleatory and epistemic analysis

¹ Also referred to as probabilistic *safety* assessment (PSA)

ISO 15288 and its Implications

ABOUT THE PRESENTER

Ad Sparrius has been awarded four degrees - B Sc, B Eng, MSEE, and MBL, and is professor extraordinarius at UNISA's Graduate School for Business Leadership.

Ad got involved in system engineering during the late 1970s, and has been passionate about that discipline ever since. Most of South Africa's system engineers had their initial system engineering and project management training with Ad Sparrius.

Ad is also INCOSE SA's representative on the local SA Bureau of Standard's workgroup that mirrors the ISO workgroup.

TUTORIAL SUMMARY

Duration: One half day.

Tutorial Objective: To provide a detailed discussion of the far-reaching implications of a set of ISO standards that have been, and are currently being, generated by Workgroup 7 (Life Cycle Management) of Subcommittee 7 (Software and System Engineering) of ISO's Joint Technical Committee 1 (Information Technology). These standards crucially affect the body of knowledge of system engineering. ISO 15288 (2008); Systems and Software Engineering—System Life Cycle Processes, has become the foundation of system life cycle management, including the crucial acquisition process. For instance, the INCOSE CSEP certification is exclusively based on the INCOSE Systems Engineering Handbook (version 3.2, Jan 2010), which in turn is completely based on ISO 15288. For instance, the SANDF's new logistics processes will be partly based ISO 15288. The intent of this tutorial will be to discuss the content of ISO 15288 (2008) and the explanatory technical reports that accompany it, and investigate its implications.