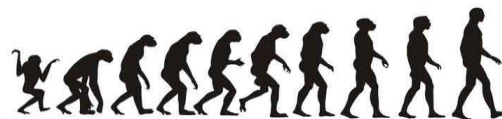
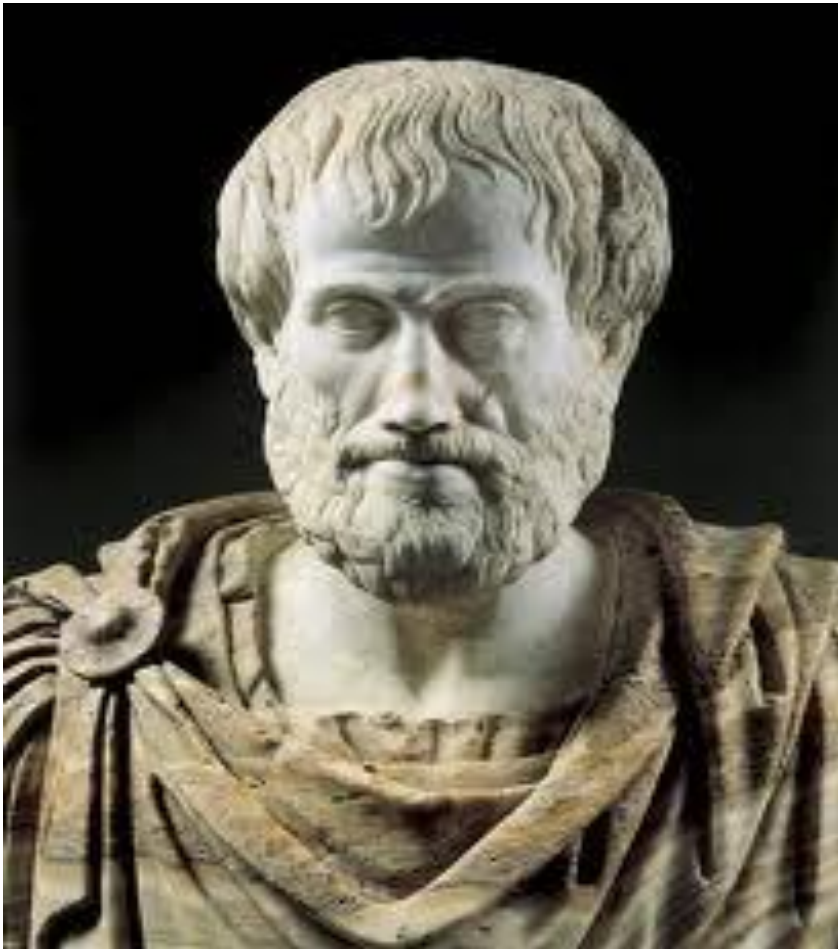


Re-thinking Construction Management Education

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President, CIOB Africa



Introduction



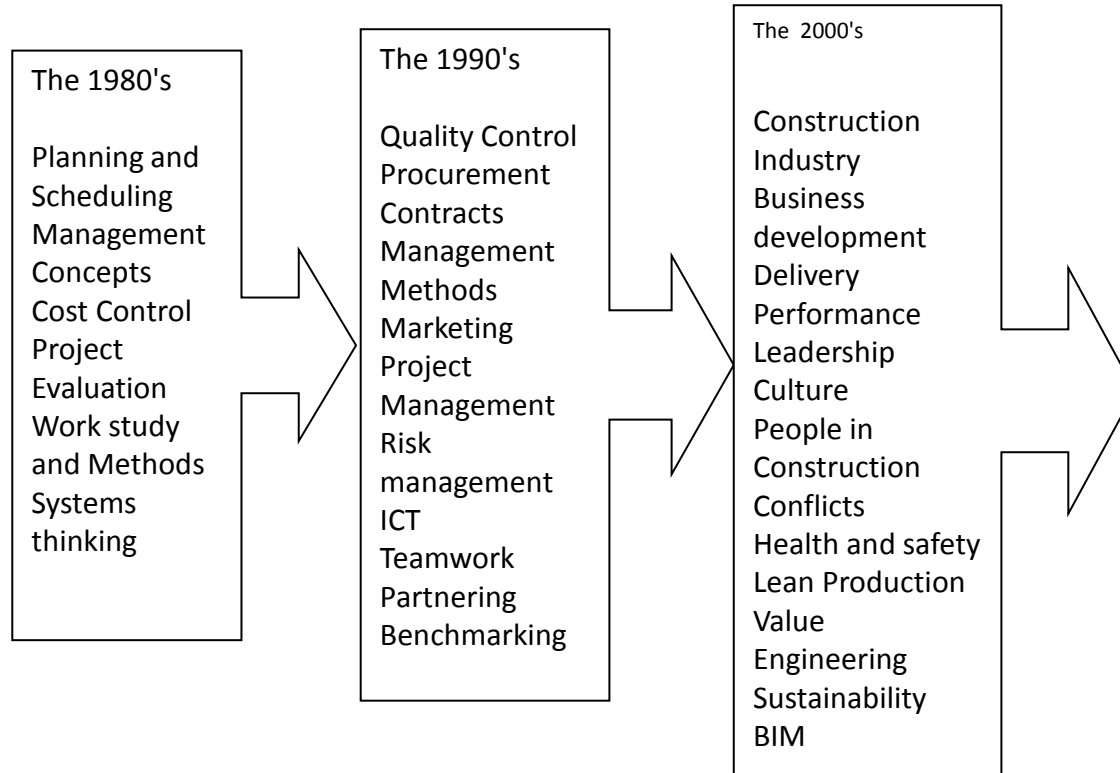
- *“The process of building is both **knowledge** driven and **purpose** driven: the building is a shelter against the elements, and the builder has to consider this **ultimate goal** for every step of production when choosing tools and materials ----- building users can judge whether a building is good or bad, not builders”.*

Aristotle 384BC - 322BC

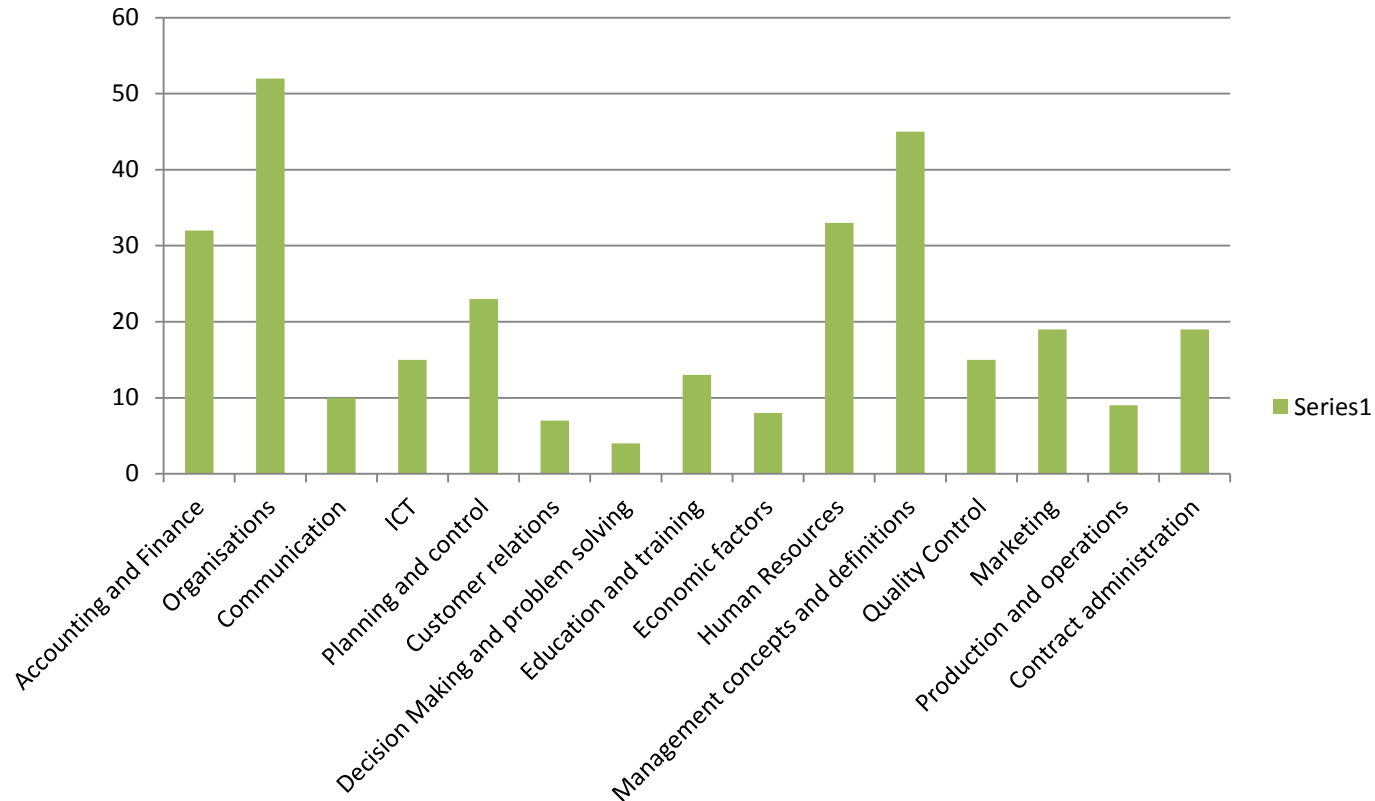
CM Development

- CM has evolved over 50 years!
 - Royal Charters: RIBA -1837, RICS- 1881, CIOB-1980
- Has developed around **management** of construction **processes** and construction **firms**
 - How has CM **developed as a discipline?**
 - Is the discipline/profession addressing the **challenges of society?**
 - Are our **teaching and learning** approaches appropriate?
 - Is there an elaborate **infrastructural support** for the development of the discipline?

CM Development



Published Books in CM areas



Some of the books that shaped CM Development - 1980's

- **Antill, J.M. and Woodhead, R.W., 1970**, *Critical Path in Construction*, John Wiley and Sons, New York
- **Oxley, R. and Poskitt, J., 1971**, *Management Techniques applied to construction Industry*, Lockwood, London
- Halperin, D.A., 1974, *Construction Funding*, John Wiley and Sons, New York
- **Hillebrandt, P.M., 1979**, *Economic Theory and the Construction Industry*, Mcmillan press Ltd London
- **Ahuja, H.N., 1976**, *Construction Performance Control by networks*, John Wiley and Sons, New York
- **Lock, D., 1977**, *Project Management*, Gower, Westnead
- Burgess, R.A. and White G., 1979, *Building Production and Project management*, The construction press, Lancaster
- **Cooke, B. and Jepson, W.B., 1979**, *Cost and financial control for construction firms*, Mcmillan press Ltd London
- **Fellows, R., 1983**, *Construction Management in Practice*, Construction Press, concord
- **Harris, F. and McCaffer, R., 1983**, *Modern Construction Management*, Collins, London
- Hillebrandt, P.M., 1989, *The management of construction firms, aspects of theory*, Mcmillan press Ltd London
- Kharbanda, O.P., 1983, *Project cost control in Action*, Gower, Hampshire
- Cleland, D.I. and King, W.R., 1983, *Systems Analysis and Project Management*, McGraw Hill Book Co, London

The 1990's and 2000's

- **Newcombe, R. Langford, D. and Fellows, R., 1990, *Construction Management1, Organisation systems*, Mitchell, London**
- **Newcombe, R. Langford, D. and Fellows, R., 1990, *Construction Management2, management systems*, Mitchell, London**
- **Clough, R.H. And Sears, G.A., 1991, *Construction project management*, John Wiley and Sons, New York**
- **Pilcher, R., 1992, *Principles of Construction management*, McGraw Hill Co, London**
- Norton, B.R. and McElligot, W.C., 1995, *Value management in Construction, a practical guide*, Macmillan Press, Ltd London
- Smith, N.J., 1999, *Managing risk in construction projects*, Blackwell Science, London
- Cooke, B. and Williams, P., 2009, *Construction Planning, programming and control*, Wiley – Blackwell, Oxford
- Loosemore, M. Dainty, A. and Lingard, H., 2003, *Human Resources Management, Strategic and operational Approaches*, Spon Press, London
- Thomas, G. and Thomas, M., 2005, *Construction partnering and integrated teamwork*, Blackwell Publishing, London

International Journals

- **Construction Management and Economics**, 0144-6193, E&FN Spon
- **International Journal of Project Management**, 0263-7863, Elsevier Science
- **Journal of Construction Engineering and Management**, 0733-9364, ASCE
- **Engineering Construction and Architectural Management**, 0969-9988, Blackwell Science
- **Journal of Management in Engineering**, 0742-597X, ASCE
- **Construction and Building Materials**, 0956-0618, Elsevier Science
- **Construction Innovation, Information, Process Management**, 1471-4175, Arnold Publishers
- Automation in Construction, ISSN 0926-5805, Elsevier Science,
- Building and Environment, 0360-1323, Pergamon,
- Building Research and Information, 9613218, E&FN Spon
- Building Research Journal, RC-MK-7094/ MK49624,
- Journal of Construction Education, 1522-8150, Associated Schools of Construction
- Journal of Construction Research, 9627723207, Hong Kong Research Institute of Building

Local Journals

- **Acta Structilia, UFS**
- **Journal of Engineering, Design and Technology, Emerald**
- Journal of construction project management and innovation, UJ
- Journal of Construction, ASOCSA

Research Approaches and Analysis

- Case studies
- Questionnaires
- Interviews
- Modelling
- Algorithms
- Comparative Studies
- System Analysis
- Uncertainty Analysis
- Computer Models
- Expert Systems
- Fuzzy Concepts
- Markov Chains
- Monte Carlo method
- Statistical Analysis
- 3,4D Modelling
- Measurement
- Quantitative Analysis
- Reports
- Sensitivity Analysis
- Simulation Models
- Cost Analysis
- Heuristics
- Stochastic

Bibliometric Indices and Impact factors

- ISI
- IBSS
- DOE
- SCOPUS
- h-Index
- InCites
- etc

Research Sources

- Educational Institutions
- Industry
- Government agencies

Construction Industry Challenges

- The construction industry has been **challenged for lacking innovation**
- Lack of innovation is attributed to imbedded **education** and the **processes**

Champions of Innovation

- Key individuals crucial in the success of innovation are:
- Invention and entrepreneurship
- Incentives and rewards
- Champions of change

Types of Champions

- Technical champion
- Business champion
- Executive champion

Construction Education and Innovation

- Construction education and training needs to continuously aligned with **the changing business and production processes and innovation.**
- Successful construction management education is to provide to students with the following key areas of knowledge:
 - Technical expertise
 - Social awareness
 - Multi and interpersonal expertise
 - Innovation

Project Stages

- CMs are involved in all the project life cycle
 - Conceive
 - Plan
 - Construct
 - close
 - Operate
 - De construct

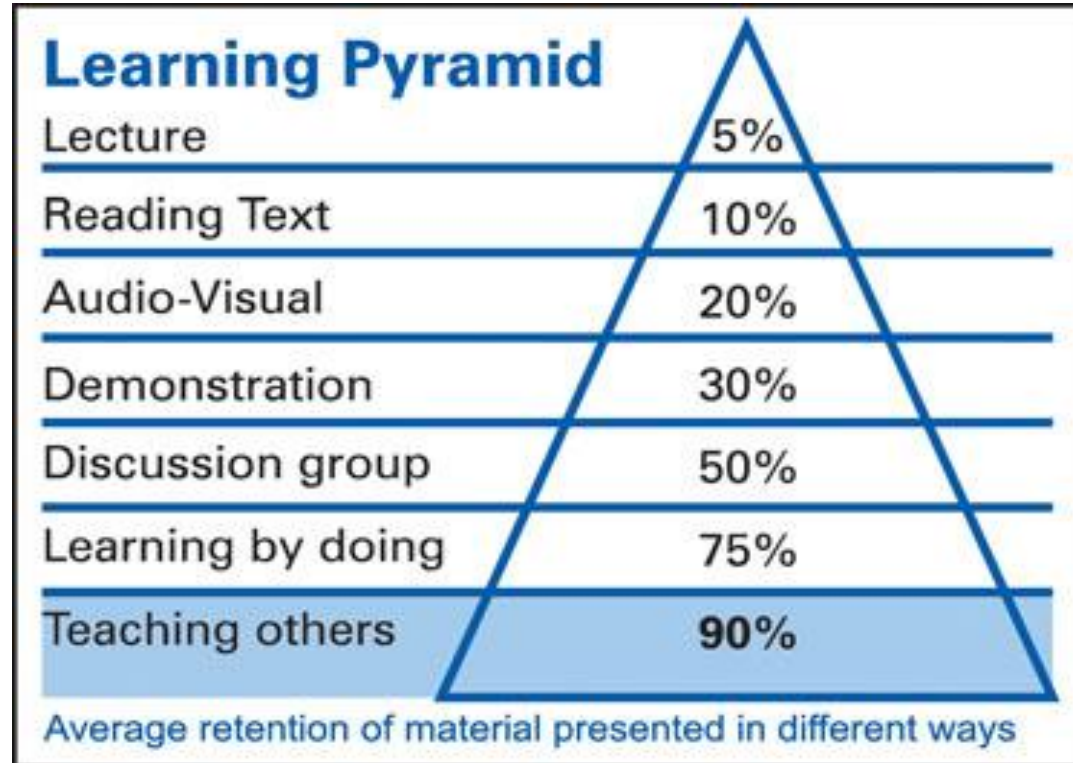
How can we achieve quality CM education?

- What is the range of knowledge, skills and attitudes that students should possess when they leave institutions of higher learning?
- How can we ensure that students learn effectively?

The Areas of knowledge

- Technical Knowledge
 - Underlying science
 - Core construction management fundamentals
 - Advanced Construction management fundamentals
- Personal and professional skills and attributes
 - Reasoning and problem solving
 - Knowledge discovery
 - Personal skills and attitudes
 - Professional skill and attitudes
- Interpersonal skills
 - Multidisciplinary teamwork
 - Communication
- Societal context
 - External Context
 - Enterprise and business context
 - System thinking

Teaching and learning



- Adapted from NTL Institute for Applied Behavioural Science
- The greatest methods of learning retention are at the base of the pyramid. This is achieved through discussion groups, practice by doing activities, sharing ideas and teaching others

Conclusion

- **CM education** system will have to take a different path that can lead to innovation, hence re-thinking.
- The **breadth and depth of knowledge** must be recognised in **teaching, learning and research**
- **Continuous development** of knowledge conscious of the **dynamic changes** in society
- **Teaching and learning methods** that are appropriate
- **Assessment methods** that are commensurate to the teaching and learning methods



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- Quin, J.B., 1985, Managing Innovation: Controlled Chaos. *Harvard Business Review*, May – June 31 (3) 77 – 84.
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