



Central University of
Technology, Free State

ACADEMIC LEADERSHIP IN ENGINEERING EDUCATION AND APPLICATION IN AFRICA

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INTRODUCTION

- **Academic leaders have undergone a historical role transformation - from chief academic officer to chief executive officer.**
- **More emphasis is being placed on extramural funding, personnel decision making and alumni relations.**
- **The image of an academic leader as a quiet, scholarly individual is being overtaken by an executive image.**
- **An academic leader is seen as one who is politically astute and economically savvy.**
- **Once the custodians of collegiality, academic deans have now become the guardians of efficiency.**
- **The collegiate or academic leader has become more of a corporate manager.**
- **Deans are now known in many circles as 'chief executive officers'**

(Johnson & Cross, 2004:34-35.



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NEW MANAGEMENT PRIORITIES OF DEANS

The success of a dean depends on a number of attributes:

- Confidence;
- Competence (solid grounding in one or more areas of required expertise);
- Credibility (reputation for successful performance integrity and impact in the core academic and management functions. Deans must have a strong academic and scholarly records);
- Leadership (power to influence decision making);
- Effectiveness (getting the job done); and
- Efficiency (getting the job done with fewer personal and institutional costs)

(Wolterson et al 2002, quoted by Johnson & Cross, 2004:43):



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NICOLA'S (2002: 1-6) VIEWS ON THE ROLE OF AN ACADEMIC DEAN

- Deans need to keep current with the world of higher education and the challenges that are occurring.
- Some of best skills a dean can possess are the constant thirst for knowledge, commitment to lifelong learning, and the courage to embrace change in the ever evolving world of higher education.
- The dean as the leader actually creates the stage for future operations whiles managing day-to-day activities.
- Deans should be the gatekeepers of standards.
- They need to be caring and concerned more about the “consumers”, namely the students.
- Deans need to have much more sophistication in the area of finance.



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RESPONSIBILITIES OF DEANS

- Provide leadership and direction;
- Adopting a *faculty vision & mission statement*
- Developing and implementing
 - a *faculty strategy plan*;
 - *academic plan* for the faculty;
 - a *financial plan* for the faculty;
 - a *teaching and learning policy*;
 - A *faculty research and innovation plan*;
- Co-coordinating and *strategically aligning the activities* of the faculty’;
- Administering the *registration and academic records* of students;
- Administering and managing the budget;
- Promoting and coordinating *multi-disciplinary teaching and research* programmes;
- Promoting and developing marketing, *income-generation and fund-raising activities* to contribute to the sustainability of the faculty;
- Managing *recruiting, appointment, promotion and equity issues*;
- Enhancing quality assurance in the faculty.



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RESPONSIBILITIES OF HEADS OF DEPARTMENTS (CHAIR)

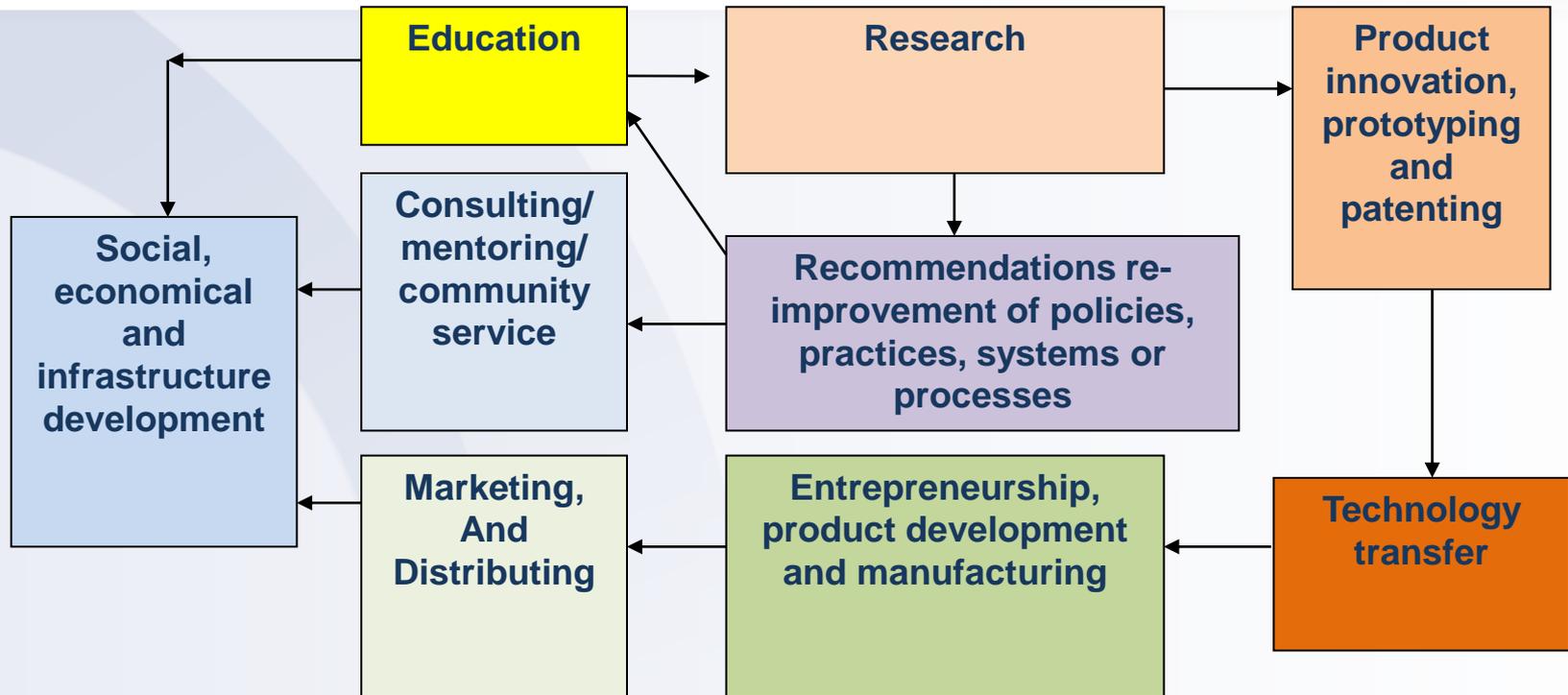
(Lucas, 1994:3)

- Motivating faculties
- Being an effective faculty developer
- Creating a supportive communication climate
- Developing good listening skills
- Facilitating faculty agreement on mutual goals
- Clearly defining roles and responsibilities
- Managing conflict effectively
- Addressing a dysfunctional departmental culture
- Evaluating performance and providing effective feedback
- Team building



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THE EDUCATION, RESEARCH AND DEVELOPMENT LOOP OF A FACULTY



(Van Wyk and Van Niekerk, 2006: 2)



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DOMAINS OF DEANS

Rossner, Johnsrud and Heck (2003:10), quoted by Van Wyk & Van Niekerk (2006), propose seven domains of leadership responsibility of deans:

- Vision and goal setting;
- Management of unit;
- Interpersonal relationship;
- Communication skills;
- Research, profession and community endeavours;
- Quality of the units' education; and
- Support for institutional diversity



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KANTER'S TEN STEP MODEL FOR CHANGE MANAGEMENT

Resolve (2005) with reference to Kanter's ten step model, quoted by Van Wyk & Van Niekerk (2006), offers valuable steps for change management including:

- Analysis of the organization and its needs;
- Creation of a shared vision and direction;
- Separation from the past;
- Creation of a sense of urgency;
- Strong, reflective and empowering leadership;
- Alignment with political sponsorship and constituencies;
- Development of an implementation plan;
- Creation of enabling structures and mechanism;
- Communicating regularly and openly; and
- Reinforcing and institutionalizing change.



“ADMINISTRIVIA” (GMELCH ET AL, 1999: 717)

Engineer academic leaders continually fight the instruction “administrivia” into their personal and scholarly lives as they attempt to balance their professional and personal affairs and their leadership and scholarly responsibilities.

Adding qualified staff to the dean’s and HOD’s office to deal with tasks, such as fund-raising, alumni relations, report preparation, and non-pressing personnel issues, might be a first step.

Such a move frees deans and HODs up to engage in reflective thinking about where the college is and where it should be in the future.



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QUALITIES OF A GOOD LEADER

(JOHNSON, 2008: 1-3)

- Leaders must make emotional connection with the management team that surrounds them.
- They must encourage these people to open, share dialog and reveal dreams.
- A good leader is not intimidated by the success others.
- Successful leaders feed off their people and allow their people to feed off of them.
- They give credit where credit is due.
- They give recognition as a means of gaining respect.
- They believe individuals can make a difference.
- This kind attitude gains trust and respect on the part of the employee.



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LEADERSHIP IN A CLIMATE OF EDUCATIONAL CRITICISM

(Lucas, 1994:4-6)

Challenges facing by institutions:

- Demographic change and its impact on enrollment patterns and cultural diversity.
- Increasing competition for students and funding,
- The demise of literacy among entering first years,
- A rapidly changing technological world.

Increasing complexity and a corresponding need for change require that, at every level in higher education, there be:

- Leaders capable of creating a vision & communicating that vision to others;
- Stimulating people to think in different ways;
- Formulating problems in the sophisticated, knowledgeable fashion that inspires creative solutions;
- Providing an organizational climate in which people achieve and feel appreciated;
- Establishes a professional culture;
- Setting of departmental norms; and
- The creation of a quality curriculum, responsive to major changes in the discipline.



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THE ROLE & SOURCE OF PERSONAL POWER

(Lucas, 1994:14-19)

- Personal characteristics such as charisma, the ability to attract others to identify with them and follow them;
- Fairness and reasonableness in dealing with faculty;
- The respect a leader is given within his or her own discipline;
- His/her consulting experience;
- Demonstrate respect for and acknowledgement of the work in which faculty members are engaged – people need recognition;
- Influence faculty to match their own goals with departmental goals, so he or she unleashes an enormous motivational force;
- Rewarding faculty does not require remuneration;
- A simple thank-you for having accomplished;
- Let them know we appreciate them, people need honest recognition of their work, genuine acknowledgement;
- Confront and change departmental cultures that maintain negative norms of behavior;
- The long-term development of people and institutions who prosper and grow; and
- Leadership development is ultimately self-development, the leadership challenge is a personal challenge.



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TRANSFORMATIONAL LEADERS

(Lucas, 1994:47 - 63)

Transformational leaders:

- create a shared vision - visionaries,
- energize others by communicating that vision at many levels,
- stimulate others to think in different ways to excel,
- give individual consideration to others,
- provide an organization climate that helps others to accomplish activities of value and feel appreciated;
- identify themselves as change agents;
- are courageous risk takers;
- believe in people and work toward the empowerment of others;
- are value driven;
- are lifelong learners;
- have the ability to deal with complexity, ambiguity, and uncertainty;
- revitalize faculty and improve their professional development;
- act as a catalyst to improve the departmental culture;
- use the untapped talents of faculty;
- help faculty formulate departmental goals and identifying new directions,
- create a quality curriculum responsive to major changes in the discipline.
- engages in an ongoing quest for quality, looking for opportunities to make things better.
- believe in people.



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TRANSFORMATIONAL LEADERS

(Lucas, 1994:47 - 63)

What motivates faculty members?

- A chance to feel intellectually and emotionally challenged by their work,
- to perceive opportunity for personal and professional growth,
- to participate in decisions affecting their own development,
- to feel that they are part of an important ongoing enterprise,
- to know that they make a difference, and
- to be given recognition and visibility – to the extent that these conditions are true in academe.



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**CHALLENGES FACED BY DEANS OF ENGINEERING
FACULTIES, FOCUSING ON INNOVATIVE
MANAGEMENT METHODS AND ORGANISATIONAL
PROCESSES: A GLOBAL PERSPECTIVE
*(DE JAGER, 2013: 16-30)***



CHALLENGE 1: THE QUALITY OF TEACHING AND LEARNING

The following innovative practices related to the quality of teaching and learning were identified from the case studies:

- A culture shift towards outcomes-based education - active learning by students;
- Courses and experiences to prepare learners for the global workplace - “Going Global” - the course examines the intertwined roles of economics, engineering, and environment;
- A strong focus on curricular review processes - curriculum committees;
- A conscious shift to learner-centred education and away from faculty-centred education;
- Ensuring a living and learning community and enhanced student success;
- The curricula are continually developed in order to balance theory with practical examples.
- Project-based learning has been introduced in teaching projects for first-year students;
- The delivery of locally pertinent and globally relevant engineering education.
- Students have considerable power in decision-making committees,
- A Women in Engineering programme,
- A Diversity Programmes Office was established, which supports student groups that are underrepresented in engineering;
- A well-structured student body and its involvement through various structures, both formally and informally, makes industry involvement and experiential learning easier for the faculty. The student Engineering Society is represented on the Management Council



CHALLENGE 2: THE QUALITY OF RESEARCH AND INNOVATION

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The following innovative practices related to the quality of research and innovation were identified from the case studies:

- Inter- or multidisciplinary research is viewed as essential,
- A postgraduate school was established in a particular faculty,
- Scholarship of teaching and learning is a recognised scholarly endeavour
- An active centre to support engineering education research has been established;
- A centre was established to help senior and postgraduate students to find resources and connect with employers, alumni, or faculty members



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CHALLENGE 3: STAFF RECRUITMENT, RETENTION AND DEVELOPMENT

The following innovative practices related to staff recruitment, retention and development were identified from the case studies:

- Employment of a number of staff from abroad, to raise the international status of the faculty;
- Faculty members to retirement in the coming decade - *“Institutions who chase hot topics continuously play catch up”*;
- Maintaining the good reputation of the faculty and its ability to raise private funds and to pursue external research funding are motivations for recruiting and retaining quality academic staff;
- The tension that has traditionally been encountered between undergraduate education and research/graduate education exists in some faculties. One dean mentioned, *“In reality that is a false tension, because one of the strongest suits that brings a faculty into the academy is the ability to work with and influence new scholars”*;
- In the German context, there is a discrepancy between the expected workload of academic staff from traditional universities and the expected workload of academic staff from technical universities, and
- The shortage of quality academic staff is perceived as a problem experienced in many countries.
- The challenge is to obtain efficient staff and retain them by introducing a flexible working environment and accommodating private consultation work.



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CHALLENGE 4: FACULTY STRUCTURE, GOVERNANCE AND PARTNERSHIPS

The following innovative practices related to faculty structure, governance and partnerships were identified from the case studies:

- Industry involvement - provision of a Vice-Dean for Industrial Relations - new industrial contracts;
- Public funds for higher education have declined in recent years, and faculties are fighting government policies determining higher education funding for engineering programmes. Set priority-based targets for funding and an endowment culture to fund endowed faculty chairs and create opportunities for students through scholarships;
- Specific ties to research initiatives, for example, a research unit, will have an advisory group from industry, which helps to ground the research and allows undergraduate students intern experiences in industry;
- In terms of faculty structure, governance and quality, academic staff feel isolated from decision making in faculties. Quality governance translates into involvement of academic staff in governance;
- A “Study Dean” has been appointed in each engineering programme in a faculty which focuses on quality of teaching and learning, and quality assurance in general. Director: Quality and Teaching;
- The links to industry, research, technology transfer, and continued education all enable students to benefit from the experience with local industry.
- A controversial issue in Germany at the moment is discussions of having a Professional²¹ Dean or professors for deans.



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A SUMMARY OF THE INNOVATIVE MANAGEMENT METHODS AND ORGANISATIONAL PROCESSES IDENTIFIED FROM THE CASE STUDIES

QUALITY OF TEACHING AND LEARNING

- A learner-centred approach
- Active and multi-layer academic support programmes
- Prepare students for the global workplace
- Implement project-based learning across disciplines
- Expose students to multiple cultures
- Structures and support to under-represented groups
- Ensure holistic learning
- Ensure curriculum relevance

RESEARCH AND INNOVATION

- Interdisciplinary research
- Promote scholarship of teaching and learning
- Contract research for industry
- Break down silos between academic departments
- Dedicated post-graduate structures
- Active research centres

Innovative management methods and organisational processes to promote quality teaching and learning and research in engineering

STAFFING

- Frequent contact and open relationship with students
- Multinational staff body
- Not necessary to have a tension between teaching and research - staff must do both
- Encourage interaction with industry and consultation work
- Innovative ways to attract and retain staff

STRUCTURE, GOVERNANCE AND PARTNERSHIPS

- Student involvement in decision making
- Staff involvement in decision making
- Strong industry involvement
- Innovative funding models
- Specific posts to monitor and promote quality
- Students to assist in recruiting



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THE LEARNING ORGANISATION'S LEADERSHIP QUALITIES

The learning organisation's leadership qualities as being:

- envisioning,
- empowerment and
- the leader's role in learning.

It is believed that the continuation of these innovative, entrepreneurial and managerial efforts will support the faculty in the development of the most needed engineering graduates for Africa – graduates who are:

- highly educated and competent professionals
- who can apply a combination of mathematics, science and technological knowledge,
- creative skills and engineering ingenuity
- to find appropriate solutions to the most challenging problems and
- to make remarkable contributions to social, economic , industrial, infrastructure and ecological development.



CONCLUSION

To deliver quality education and courses and provide experience to prepare learners for the global workplace and to respond to the global challenges that engineers are faced with. Delivery of locally and globally relevant engineering education is essential;

Alternative teaching methods must continually be introduced, such as project-based learning, where students become actively involved in their learning;

The lack of quality academic staff is perceived as a problem that is experienced in many countries. The challenge is to recruit efficient staff and to retain them, by creating a working environment that is conducive for them to flourish in their careers.

Public funds for higher education have decreased in recent years, and faculties are fighting government policies determining higher education funding for engineering programmes. Faculties will have to place much more emphasis on contract research, partnerships, and other third-stream income initiatives; and

A growing concern is the decrease in the number of prospective students that view engineering studies as their first choice of study. Engineering educators and faculty leaders must work together to restore engineering to one of the top choices of study for prospective students.



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