

Management of Engineering Faculties in Germany and its Influence on Teaching and Research

Faculty management has to organize the effective operation of a faculty and to solve all occurring problems. As the work will be done mainly behind the scenes, faculty management's influence on performance and development of a faculty often is underestimated. The challenge for faculty managers lies in balancing the conflict between governing and supporting faculty members while being in an uncomfortable sandwich position – between the central university administration and the faculty members. The big ambition of administration should be to appear “invisible” for the scientific faculty or university staff, to be efficient and to avoid to waste faculty resources. Nevertheless, administration has a strong position in a higher education institution. Its decisions about resources and facilities are able to influence teaching and research to the advantage or disadvantage of a higher education institution's structural unit. The paper explains typical tasks of faculty management and shows in which way it influences engineering teaching and research by using examples from the daily working practice. Additionally, author gives advices how to improve faculty administration at engineering faculties. Efficient faculty management can contribute to teaching and research immensely, but also quality and motivation of administrative staff is of high importance.

Keywords: *Faculty Management, Administration, Engineering Education and Research*

Introduction

Elementary for the success of a higher education institution is good management. But, concepts of good management and how to achieve it differ. These differences might arise from variations in culture and traditions, historic experiences or from levels of development, to name just a few reasons (Fedrowitz et al. 2011).

Since the invention of New Public Management (NPM) at German Universities approximately 17 years ago, management methods and instruments are used to optimize and to measure universities' academic and financial outcome. Behind the idea of NPM stands a comprehensive reform concept for the modernization of public administration in order to manage it in a similar way like enterprises (Knopp 2010). The objective is to increase efficiency and effectiveness in public administration (Burth and Gnädinger 2015). The success of NPM methods may be controlled by target agreements between the public grant authority and the financed organizations. Targets often include the quantity of enrolled students, external funding received, number of outgoing or incoming foreign students, gender equality, drop-out rates and cooperation with enterprises. If universities do not sign the target agreements they risk to receive much less money from the state and to lose staff (Quapp

1 and Holschemacher 2016).

2 The central university management, in turn, normally conclude target
3 agreements with the faculties which form the basis for universities' internal
4 resource allocation. The better the faculties perform, the more resources they
5 are able to demand from the university administration.

6 This change in public administration management over the last years is the
7 reason why qualified management is of high importance for a faculty.

8 To faculty management, not exclusively at German universities, normally
9 belong the dean, vice deans, deans for study affairs and the faculty manager.

10 The paper gives an overview about basic methods in faculty management
11 under consideration of relevant literature. Furthermore, the authors focus on
12 faculty management at engineering faculties followed by recommendations for
13 improving management quality. The paper will close with conclusions.

14 15 16 **Literature Review**

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18 There is a huge amount of literature how to manage an enterprise or how to
19 lead teams in economy and the open market. But, managing structural units or
20 leading a team at higher education institutions is a completely different issue.
21 Some literature exist about how to manage universities or faculties (see for
22 example Scholz and Stein 2014, Fedrowitz et. al. 2011, Leaming 2006) and
23 NPM (e.g. Broucker and De Wit 2015, Gunter and Fitzgerald 2013), but only
24 less information about the specific management of the several faculties (see for
25 example Viera and Kramer 2016). As the authors experienced, there is nearly
26 no literature which deals with managing an engineering faculty or department.

27 28 29 **Basics of Faculty Management**

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31 Managing structural units or leading a team at higher education institutions
32 significantly differs from managing a company or an enterprise. Reason for that
33 is, for example, the difference in funding. In Germany, and many other parts of
34 the world, higher education institutions are mainly funded by the state or the
35 public hand. Thus, university staff normally must not be feared of an
36 insolvency of their employer. Of course, however, there may be exceptions for
37 private financed higher education institutions.

38 In Germany, university staff works in public service with special legal
39 provisions, e.g. regarding labor law. Normally, professors receive an
40 engagement inclusive their status for life. Also, for academic and
41 administrative staff, public higher education institutions offer high employment
42 security, especially in cases of economic downturn or crisis situations (such as
43 for example in the current Covid-19 pandemic). However, due to the absence of
44 a hire and fire policy, sometimes motivating university staff may be a
45 challenging issue.

1 Furthermore, official authorities are charged with administrative,
2 functional and/or legal control over the universities, depending on the
3 countries' legislation. That means less flexibility for higher education
4 institutions in developing a strategy and strict requirements resulting from
5 higher education acts and from various regulations elaborated by the
6 responsible authorities, e.g. ministries for higher education. Furthermore, in
7 Germany the salary and the number of state financed staff is restricted and
8 universities are unable to easily adapt their human resources to their current
9 needs.

10 Due to the above mentioned specialties of universities compared to
11 companies and enterprises, rules, principles and experiences from the economy
12 and the open market can only be adapted to management of higher education
13 institutions to a very limited extent.

14 Of course, some management guidelines also can be used to run a faculty
15 successfully. Some principles of office management, such as documentation,
16 deadline management and absence management for staff, just to name a few,
17 are appropriate instruments for facilitating the functioning of a dean's office.

18 However, the authors experienced a significant difference between
19 organizing engineering faculties and other higher education institution units
20 (e.g. faculties of law) due to partially different targets, performance indicators
21 and culture of the academic disciplines. The specifics of the various subjects
22 may have a not insignificant effect on the management of the respective
23 faculties. Understanding the culture of an academic discipline enables the
24 responsible persons in the faculty's administration to lead the staff, to come to
25 decisions and to find solutions which will be accepted by all or at least the
26 majority of the academics who work at the higher education institution's
27 structural unit. That is why this paper only focuses on management of
28 engineering faculties.

31 **Faculty Management at Engineering Faculties**

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33 Faculty management organizes and supports teaching as well as research.
34 Additionally, it is responsible for self-administration (including strategy,
35 preparation and conduct of meetings of the faculty's councils and boards),
36 finances, human resources, quality management, internationalization and many
37 things more. The following part of the paper will focus only the most
38 important responsibilities of faculty management.

39 *Organization of Teaching*

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42 Teaching is one of the basic tasks of all universities. Depending on the
43 special type of higher education institution and the country in which it is
44 located, professors and lecturers have more or less hours of teaching load.
45 Faculty administration is obliged to organize teaching and examinations at the

1 faculty and to support the scientists as much as possible in the high quality
2 education of students.

3 The organization of teaching by faculty management starts with
4 accompanying the process of creating study programs. According to German
5 Law, professors are responsible for the courses of degree programs, especially
6 they may define content and method of their courses, such as topic, form
7 (lectures, seminars, practical and non-practical exercises), structure and
8 duration (Fehling 2012). All professors in a degree course have the same
9 fundamental rights of free teaching. But in the case all professors would
10 enforce their right, efficient course planning would not be possible. Thus, to
11 enable conception of study plans, there must be a balance in practicing
12 lecturers' fundamental rights. That means, faculty management has to provide
13 assistance to put the subject specific decisions in an administrative and legal
14 frame. Because of that, the faculty's Academic Committee is responsible for
15 proposals for new degree programs or changes to existing curricula. This
16 Academic Commission usually includes both professors and students and
17 discusses the subjects in the curriculum, their duration, the amount of working
18 hours and many other details (Quapp and Holschemacher 2017). But the final
19 decision about a curriculum is made by the Faculty Council, which represents
20 all faculty member groups such as professors, scientific and administrative staff
21 members as well as students.

22 Furthermore, the organization of teaching includes providing teaching
23 facilities such as lecture rooms and technical equipment, to prepare course
24 planning and to create timetables for students and staff. At the end of the study
25 year, faculty administration may support the professors and lecturers in the
26 documentation processes of their offered lectures.

27 *Human Resources*

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30 The true treasure of a higher education institution are its human resources.
31 The faculty's success in teaching and research is significantly dependent on
32 high qualified and motivated staff. Thus, for example, with many specialized
33 research and teaching assistants, professors are able to apply for more research
34 projects, to gain third party funds for the faculty and to deliver teaching of high
35 quality.

36 But, to hire qualified staff for engineering faculties in Germany currently is
37 a huge problem. Most of the German Universities are state universities and the
38 salary is lower than in industry. Furthermore, mostly only temporary
39 employment for research and/or teaching assistants can be offered. That's is
40 why working at higher education institutions is not quite attractive for many
41 excellent educated engineers. Additionally, the lack of qualified engineers
42 makes the situation more demanding for universities.

43 Faculty administration is responsible for organizing all human resources
44 processes at the faculty, starting with developing and posting a position, to
45 organizing the application process and the job interviews. This should always

1 be done in compliance with the legal requirements as well as university's
2 gender and diversity strategy.

3 Furthermore, the dean's office manages the provision of an appropriate
4 working environment including office space, necessary technical equipment
5 and all useful information. It is responsible for all occurring questions and
6 problems and must try to give feedback and to motivate the faculty staff. One
7 of the means for doing that can be regular employees meetings and interviews.

8 Good human resources management at higher education institutions in
9 Germany is challenging because the ways to motivate or to discipline are
10 limited. Furthermore, many different staff groups are working at a university,
11 such as professors, lecturers, scientific as well as administrative staff who are
12 paid by the state or by external funding, which all have different educational
13 backgrounds, needs, intentions and problems. To form them to a team is the
14 main challenge of faculty management.

15 16 *Budget*

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18 Key tasks of faculty management are financing and budget of the faculty.
19 Around 72 per cent of German universities (Statistisches Bundesamt 2020) are
20 state institutions and therefore funded by the German Federal States. Once a
21 year, higher education institutions receive their operating budget from the state
22 and distribute a part of it by means of a fund allocation system over the
23 faculties.

24 The administration of the faculty may distribute all or a part of the faculty's
25 operating budget among the faculty members for their own use. Another system
26 is to allocate the money on the basis of applications of faculty members to the
27 faculty management.

28 At Faculty of Civil Engineering at HTWK Leipzig, the operating budget is
29 distributed to the professors or institutes by means of a two-pillar-model. One
30 part of the budget is distributed non-performance based, e.g. on the basis of the
31 number of professors and corresponding state employees. The second part of
32 the budget is distributed performance-based using performance indicators such
33 as individual teaching load, successfully supervised degree theses, acquired
34 third-party-funds, international activities, publications, conference organizations,
35 memberships in scientific organizations, awards and much more. This system
36 allows to reward faculty members' activities in various fields of strategic
37 importance.

38 39 *Quality Management*

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41 Faculty management is responsible for quality assurance in teaching and
42 research. Methods can be for example course evaluation, study program
43 accreditation and process evaluation. There is no doubt that evaluation and
44 accreditation of programs and courses done by students and external
45 organizations are an outstanding opportunity for testing the competitiveness of

1 universities, detecting any existing problems and providing a stimulus for
2 revisions in programs and faculty strategy. Nevertheless, a clever faculty
3 management knows that quality assurance measures should not be used without
4 any critical reflection. In Germany, study program accreditation and course
5 evaluation by students has been discussed controversially since years (see
6 Quapp 2014, Quapp 2018) because these quality assurance measures affect the
7 constitutionally guaranteed freedom of science to a not inconsiderable extent.
8 That's why, faculty management should adapt quality assurance methods to the
9 individual needs of the faculty to achieve the best possible results. Additionally,
10 faculty management must secure that quality assurance does not lead to such a
11 high workload for the scientific and administrative staff that main tasks will be
12 neglected.

13 *Internationalization*

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16 Internationalization has become a central issue at universities in the last
17 years with the aim to participate intellectually and financially in the global
18 academic resources. Due to the reduced numbers of local first-year students
19 resulting from the decreasing population in European countries, German
20 universities depend on foreign students. Furthermore, European universities'
21 internationalization efforts are driven by the desire to get larger share of the
22 academic cake that the major countries of academic mobility, namely the
23 United States and Great Britain, divide up among themselves (Michel-Quapp
24 and Holschemacher 2009).

25 Internationalization often is a part of target agreements. But not only
26 because of that, faculty management should intent to create an international
27 atmosphere at the faculty. Successful internationalization includes to provide
28 possibilities for students and staff mobility, to welcome international guest
29 scientists and include them in the faculty daily working process, to motivate
30 faculty members to participate in international conferences and committees as
31 well as to visit partner universities to broaden their horizon.

32 *Support of Research*

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35 Universities in Germany must foster sciences, culture and education by
36 teaching, research and degree programs (e.g. Federal State of Saxony 2019).
37 Due to their research activities, higher education institutions contribute to
38 development and improvement of the society. Especially in the fields of
39 medicine and engineering, innovations as a result of research are especially
40 tangible for the people.

41 Mainly in engineering faculties, third-party funded research and
42 development plays a major role. Faculty management is able to support
43 scientist to increase research activities by reducing the administrative efforts,
44 e.g. for hiring staff, purchasing research equipment and spending research
45 overheads. Furthermore, it should provide appropriate research facilities such

1 as technical equipment and labs. But administration must also coordinate the
2 faculty's active research projects if there is a need to use the same facilities.
3 This avoids conflicts among the researchers. Furthermore, faculty management
4 has the task to monitor the application of health and safety regulations in
5 offices, labs and while all research activities.

6 Making research understandable and relevant for society – the so called
7 Third Mission - is one of the current topics in German universities' daily life.
8 The politics urges the sciences to leave their "academic ivory tower" and to
9 increase lifelong learning offers as well as the knowledge and technology
10 transfer to practice (Tauch 2011). To manage that task, faculty administration
11 will be the ideal contact point between science and society.

12 Alumni contacts and fundraising have become more and more important in
13 the competition for industry funded research projects or external financial
14 support for student excursions or student competitions. And for the amount of
15 third-party funds from the industry, faculty management's activities and the
16 quality of contacts to the industry are important as well.

17 *University Self Administration*

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20 For the university leadership, faculty management is partner on the one
21 side and counterweight on the other side. It has to execute the rectorate's top
22 down decisions and is responsible for negotiate and sign target agreements with
23 the rectorate. In close contact to the president of the university, the deans
24 should do their best to influence the university strategy to the benefit of their
25 faculty.

26 On faculty level, faculty management is responsible for strategy
27 development which substantially must correspond to the university strategy.
28 Furthermore, it has to prepare and lead all meetings of the councils and boards
29 of the faculty and to execute their decisions. The dean may criticize decisions
30 of the Faculty Council as well as other boards which seem to be not in
31 compliance with the legal regulations.

32 *Safety and Hazard Management*

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35 An efficient safety and hazard management is the basis for successful
36 teaching and research. It avoids accidents, protects staff from injury, secures
37 the functional capability of technical equipment, and therefore prevents
38 cancellation of courses or delays in research projects.

39 Safety and hazard management benefits from fixed check-up deadlines,
40 lists with (mobile) phones numbers of contact persons and clear instructions for
41 the case of emergency. Faculty staff should be familiar with these information.

42 Particular attention must be paid to people with special needs. For pregnant
43 students or faculty members, individual solutions have to be developed,
44 especially in using toxic materials and dangerous (lab or experimental) works.
45 In case of emergency, disabled people can be limited to protect and/or to help

1 themselves, for example if they are not able to use elevators in case of fire.

2 3 Safe Occupational Environment

4 Safe and ergonomic working places contribute to the health and working
5 ability of faculty members. That's why, periodical check-ups of offices, labs
6 teaching rooms and other facilities are required. To guarantee a high quality
7 evaluation of the occupational safety, it is recommendable to appoint a staff
8 member as safety officer and to provide him/her regular further training.

9 Especially in labs or experimental halls, a detailed safety concept is
10 required due to sensible technical equipment and toxic substances or harmful
11 materials. Lab and hall safety first of all benefits from access restriction and
12 access documentation. Each person working there, whether staff or students,
13 must be instructed how to behave and how to ensure a safe working
14 environment. Elaborating lab or experimental hall users' guidelines can be
15 helpful. Toxic or harmful substances must be inventoried and stored under lock
16 and key.

17 18 General Safety at Faculty

19 A general safety concept provides a feeling of security to staff and
20 students. This includes, if not already forbidden by law of the respective
21 country, the prohibition of weapons on the campus. Also, access regulations for
22 outside persons to the campus and its documentation may contribute to a
23 feeling of security to all university members. Especially facilities where toxic
24 materials, expensive technical equipment or other relevant resources are stored,
25 must be under lock and key. However, in doing so, faculty management shall
26 balance the safety interests of the structural unit with the access needs of
27 students, especially to PC-pools in the evening, at night and at the weekend.
28 For realizing the students' access outside office hours, a flexible key card
29 access system and a video monitoring system as theft protection may be
30 installed.

31 32 Preparation for Unforeseen Occurrences

33 As currently experienced by the Covid-19 pandemic, unforeseen
34 occurrences may affect universities and their structural units to a greater extent.
35 Economic troubles, natural disasters, pandemics, civil unrest, war or terrorism
36 are likely to influence the regular functioning of a faculty.

37 Due to the Covid-19 pandemic, universities all over the world were forced
38 to reorganize teaching and research to protect staff and students from an
39 infection. First problem was to change the high share of presence teaching in
40 university rooms by online teaching without any personal contact. Faculties had
41 not only to identify suitable online teaching tools, but also to purchase
42 necessary hard and software. Furthermore, face-to-face interactions and oral
43 examinations became impossible which had to be replaced by alternative
44 examination forms without any personal contact.

45 In Germany, the type of teaching and examination must be fixed in the

1 study and examination regulations for each study program. The faculty council
2 had to adopt and the university's rectorate shall authorize the faculty's study
3 and examination regulations. In the Corona crisis, faculties were not allowed to
4 simply modify teaching and examination types what required a change of the
5 respective regulations. Elaborating new study and examinations regulations for
6 each of the programs and ensuring the relevant decisions in the boards and
7 councils was a time consuming work. A further challenge was to deliver
8 complete and early information to students and staff. Universities and
9 responsible state authorities currently discuss how to deal with the summer
10 term regarding state financial promotion of students or the recognition of the
11 semester as regular semester within the study time.

12 Also, conducting research projects in times of the Covid-19 pandemic
13 posed a huge challenge to universities' structural units. Although some research
14 funding organization announced a prolongation of project duration and/or
15 funding, faculty management had to develop ideas how to enable a
16 continuation of the projects in compliance with all the new hygienic guidelines.

17 Regarding the health protection of human resources, many faculties
18 organized home office for staff. Essential for effective working in home office
19 is to provide the staff with the necessary hard and software to enable a work
20 result similar to them gained in the offices on the campus.

21 Universities have learned from the Covid-19 pandemic that staying calm,
22 keeping the overview and having fast and defined decision finding procedures
23 may support an efficient and clever reaction on such a crisis. The future will
24 show, if higher education institutions will use the pandemic as a chance to
25 rethink teaching, research and working area. Unforeseen occurrences, also if
26 they are unpleasant, forces management to evaluate the status quo and, by this,
27 create a new approach to faculty management.

28 Of course, faculty management is not able to prepare for all potential
29 situations but faculty leaders should use the experience from former
30 occurrences and document the found decisions and used measures. Ideally, next
31 generations in faculty management will use these information to learn from the
32 situation and, if necessary, to improve the hazard management.

35 **Improvement of Faculty Management**

37 Faculty management is in an uncomfortable sandwich position between the
38 central university administration and the faculty members. It must enforce
39 faculty interests towards the university management and, on the other side,
40 implement the university strategy on faculty level.

41 Essential to have is qualified administration staff which does not take itself
42 too seriously. Faculty management must be considered as a service unit with
43 the aim to support the faculty members in performing at their best.
44 Administration is not an end in itself.

45 If all administration processes are working efficiently, the scientific faculty

1 staff is able to concentrate on their actual job and to deliver high quality
2 outcomes, to improve teaching and to increase research activities. That is why
3 administration must be as less as possible but as much as required.

4 5 *Human Resources*

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7 For universities it is not easy to apply methods of NPM because they are
8 not compatible with an education and science oriented institution. Attempts of
9 managing universities in a way like enterprises cannot be successful due to the
10 different preconditions in tasks, funding, image and especially intentions of the
11 staff (Turner 2015). Normally, staff in enterprises has an interest to achieve
12 optimal results by increasing production or shareholder value. This will secure
13 existing jobs and generate new ones. For scientific staff at universities, success
14 achieved by the home university is only of secondary importance. First of all,
15 they are interested in their own scientific reputation among other researchers
16 and the acceptance among students (Turner 2015). One reason may be that
17 university staff does not participate directly and financially in the success or
18 failure of their institution.

19 Using the few performance oriented instruments which are available at
20 universities, faculty management must be careful with the consequences a
21 competitive situation among faculty staff could have. It may encourage
22 motivation but also often can create feelings like envy and jealousy.

23 Furthermore, modern management instruments are working only in
24 conjunction with a modern human resources management. Some of the big
25 problems for faculties in human resources management are low salaries for
26 researchers, less flexibility and only average working conditions in comparison
27 to other (foreign) performance oriented university systems or the industry.

28 Organizing and controlling the work performance at a faculty while, at the
29 same time, giving the staff a feeling of respect and support, represents one of
30 the biggest challenges for faculty management. It is important to prevent
31 mobbing or unethical behavior, to support competition without causing
32 jealousy and distrust and to illustrate a common goal to all faculty members. If
33 faculty staff enjoys working at the institution, they will be more productive
34 which increases the success of the faculty. That's why, providing a common
35 goal to work for is one of the secrets for successfully running a university's
36 structural unit.

37 38 *Less Bureaucracy*

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40 The big ambition of administration should be to appear "invisible" for the
41 scientific faculty or university staff. And, faculty management must be very
42 efficient and should avoid to waste faculty resources.

43 Additionally, it is expected that management will take serious all concerns
44 of the faculty members and try to assist them as good as possible.

1 Furthermore, in the last years, staff surveys and other quality management
2 measures increased rapidly. Of course, these feedback tools are necessary to be
3 informed about problems or needs of faculty members but their use is time
4 intensive for both administration and staff. It will be more efficient to use the
5 old school techniques of informal direct feedback to the faculty management.

6 7 *Support for Teaching and Research*

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9 The best way for supporting teaching by administration is to give lecturers
10 time to prepare high quality courses, to offer consultations to students, to
11 extend their knowledge and to go abroad to broad their horizon – that means, at
12 the end, to prevent them from too much administrative work.

13 The same applies for the aim to increase research activities at the faculty.
14 The better variety of possibilities in obtaining third-party funds from industry
15 for research and development seems to give an advantage to civil and structural
16 engineering faculties in contrast to social sciences and humanities.

17 By the means of a performance based fund allocation model, faculty
18 management may encourage researchers to increase efforts in application for
19 research funds and to publish their research results. Young researchers could be
20 motivated with a start-up funding for development of their own research ideas.

21 But, rigorous output orientation in teaching and research will have its
22 price. Faculty management must protect its researchers from exaggerated
23 expectations regarding the research outcomes of a faculty. Otherwise, that will
24 have an effect on the research and paper quality. Furthermore, basic research
25 which needs more time will be less attractive. Science is based on a slow,
26 steady, methodical process, and should not be expected to provide fast and easy
27 answers to society's problems. Scientists need time to think, to read and to fail
28 (Slow Science Academy 2010).

29 30 31 **Conclusion**

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33 The authors conclude that efficient faculty management can contribute to
34 teaching and research immensely, for example by enabling high quality in
35 teaching and by guaranteeing the efficient and successful conducting of
36 research projects. Quality and motivation of administrative staff is of particular
37 importance.

38 Exactly as an orchestra, a higher education institution's structural unit
39 consists of many heterogeneous people. Faculty management must act like a
40 conductor and should understand, respect and support the staff's diverse
41 intentions, responsibilities, wishes and needs. That's why, communication is an
42 essential tool in modern faculty management, but time consuming as well. All
43 faculty members are high qualified specialists and play their "instrument" in a
44 very masterly way. But only the conductor can bring them into a perfect
45 harmony and motivate them to show their best performance. Encouraging

1 scientific staff by the administration is an excellent way to bring lecturers and
 2 scientist to maximum performance. However, in doing so, faculty
 3 managements' challenge lies in balancing the conflict between governing and
 4 supporting faculty members.

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