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The influence of teaching motivation and New Public Management on academic teaching

Uwe Wilkesmann and Sabine Lauer

Center for Higher Education, TU Dortmund University, Dortmund, Germany

ABSTRACT

Based on two surveys of German university professors that were conducted in 2009 and 2016–2017, this article asks if the influence of teaching motivation on the importance attached to methods of instructional design has changed with the implementation of New Public Management. Using Self-determination Theory and the concept of transformational and transactional governance, three hypotheses were tested via regression analyses. Whereas intrinsic motivation is the strongest predictor for the importance attached to methods of instructional design in both surveys, the impact of identified teaching motivation has only become statistically relevant since 2016–2017. Albeit weak in impact, the transactional and transformational modes of governance also gained influence in 2016–2017. However, a comparison of means reveals that feelings of guilt when neglecting one's teaching duties have considerably increased from 2009 to 2016–2017, while more autonomous forms (intrinsic, identified) of teaching motivation have remained unchanged.

KEYWORDS

Self-determination Theory; academic teaching; governance; New Public Management; supportive teaching culture

Introduction

Academic teaching is rumored to be the German professor's stepchild, who is neglected in favor of research. This same tendency can be seen in many other higher education systems. However, while some European countries already have well-established alternative career tracks for teaching (e.g. the UK or the Netherlands), in Germany academic careers are still widely dependent on research productivity (Land and Gordon 2015; Wilkesmann 2016). Other than research, teaching is largely organized as a collective action where universities (especially the respective departments) – and not single academics – are responsible for the coordination and management of whole study programs. However, it is unclear what leeway in decision-making in regards to 'managerial self-governance' (see de Boer, Enders, and Schimank 2007) German universities actually have to instigate and coordinate their professors' activities and, therefore, ensure desired outcomes from the top-down. The answer seems to be that they have a rather small leeway indeed. Musselin's (2007) definition of universities as 'special organizations' is particularly suitable for Germany because their legal status is quite unique in the world (see, for example, Dilger 2007) and this leeway in decision-making is accordingly weak as regards full professors (Hüther and Krücken 2013, 2018).

Over the last two decades, teaching at German universities has been affected by two major developments. First, as part of the New Public Management (NPM) reforms, performance-based indicators have been introduced as a new form of university governance (de Boer, Enders, and Schimank 2007; de Boer et al. 2015). New institutional economics theories, such as agency theory (Arrow 1985; Eisenhardt

CONTACT Uwe Wilkesmann uwe.wilkesmann@tu-dortmund.de Center for Higher Education, TU Dortmund University, Hohe Str. 141, Dortmund 44139, Germany

1989), often serve as a rationale for the re-organization of higher education institutions in the course of NPM (Lane and Kivisto 2008; Wilkesmann and Schmid 2012). In terms of teaching, the following three NPM instruments are especially relevant to overcome the agency problem:

(1) Performance-related pay: From 2005 onwards, all German professors have been automatically assigned to a new salary system. Two-thirds of their salary is a fixed-time wage and one-third is performance-based and can be increased via: (1) appointment negotiations, (2) additional management positions, and (3) outstanding research or teaching performance. In the case of teaching, the last bonus can be given, for example, when a professor is awarded a national teaching award or if they have developed new teaching methods for the whole university.
(2) Performance-related budgets: A performance-related budget is allocated to the global budget of German universities according to certain performance criteria. The most frequently used performance criteria include measures such as third-party funding, number of PhD candidates, and number of student enrollments. These performance criteria are internally passed on to the faculties and departments (Biester and Flink 2015). The faculties and departments then distribute the money onto the chairs, according to the same criteria. Teaching is usually only considered as a 'load-dependent factor,' whereby a high number of students and examinations are compensated by an additional budget.
(3) Management by Objectives (MbO): MbO has become a popular management instrument in the German HES (Nickel 2009). The rectorate negotiates with the deans or with the chairs to agree the single objectives that they have to achieve. Teaching can be subject to these agreements, such as when a new degree program has to be developed or introduced in the next one or two years. If the goal is achieved, then budgetary funds are raised. These funds can then be used to finance an additional research assistant position.

Teaching awards have also been introduced. In most cases, the prize money is rather low and symbolic where no clear correlation exists between performance and reward. Therefore, it is not a NPM instrument in the narrow sense (Wilkesmann and Schmid 2012) because only one academic will receive the award. Nevertheless, the awards are in many respects well-suited to the scientific community (Neckermann and Frey 2008).

Second, a plethora of financial support programs and competitions have been set up by the German federal government and private donor associations to substantially improve teaching and learning conditions (Brockerhoff, Stensaker, and Huisman 2014; Schmid and Lauer 2016; Lauer and Wilkesmann 2017). The most comprehensive funding program is the 'Quality Pact for Teaching' (*Qualitätspakt Lehre* 2018), which was launched in 2010 and which funds nearly 90% of all public German universities with grants worth over two billion Euros. This reform allowed German state-controlled universities to implement a broad spectrum of 'teaching improvement practices' (Wright and O'Neil 1994), such as: competitive teaching grants, exchange forums, e- and blended-learning offerings, further continuing education, peer-instruction and learning, human resources development, the extension of quality management systems, and the means to hire additional teaching and tutoring staff (which is probably the most important).

Despite these endeavors to make teaching count more, a significant change of the status quo of academic teaching has not yet taken place on a large scale (Schmid and Lauer 2016). In this paper, we want to explore whether the behavior of the professors, especially teaching-related behavior, is affected by these reforms and initiatives. Or, has individual teaching behavior and teaching motivation been more or less stable over time? A review of the literature shows that most organizational research for the German context on higher education institutions has focused on the governance of research (see, for example, Smeenk et al. 2009; Schubert and Schmoch 2010; Biester and Flink 2015), while only a few studies have examined the governance of teaching (Wilkesmann and Schmid 2012; Wilkesmann 2016; Lauer and Wilkesmann 2017).

Based on two surveys of German professors from the years 2009 and 2016–2017, we want to answer the following two research questions:

(1) What affects the importance that German professors attribute to their teaching activities?
(2) And, based on a comparison between these two surveys, has teaching motivation changed between 2009 and 2016–2017?

The rest of this article is structured as follows. First, we define our understanding of academic teaching. Second, we describe the theoretical underpinnings of our hypotheses where we differentiate between influential factors on the individual and the organizational level. Third, we sketch the survey design, and we also provide a description of the sample and the underlying methodology. Fourth, the deducted hypotheses will be tested in step-wise regression models. Fifth, a comparison will be made between recent survey data and survey data from 2009. Finally, this paper concludes with a discussion of the implications, relevance, and limitations of our findings.

Theoretical underpinning: academic teaching, Self-determination Theory, New Public Management, and supportive teaching culture

Academic teaching

Before we move on to the theoretical assumptions that will be used to test our research questions, we will first provide some further detail of the theoretical underpinnings of academic teaching itself. Given that there is no comprehensive definition or measurement model of academic teaching that covers the complete range of what it actually means to teach, in our earlier work we developed our own inventory of academic teaching in alignment with Cashin's proposal, which was then used as the basis of our survey (Cashin 1989; Wilkesmann and Schmid 2012). In Wilkesmann and Schmid (2012), the professors were asked about their attached importance and the real effort that they put into the following dimensions of teaching behavior:

- *Preparation and revision of content*: formulation of content, succession and composition of content areas, course fits within the larger curriculum, coordination of learning content with colleagues, course revisions, updating of content with new research findings and up to date examples.
- *Methods of instructional design*: conceptualization of methods of instruction, availability of additional learning aids, social organization of instruction (formation of learning/ working groups, coordination of project teams etc.), audio-visual means of instruction, conceptualization and communication of instructional goals.
- *Evaluation:* grading of exams, support, and consultation during the student's preparations for exams. (Wilkesmann and Schmid 2012, 41).

Self-determination Theory

Self-determination Theory (SDT) has previously been used to analyze the many aspects of academic teaching motivation (Ryan and Deci 2000a, 2000b, 2006; Wilkesmann and Schmid 2014). In particular, SDT differentiates two kinds of motivation: intrinsic motivation and extrinsic motivation. The main assumption of SDT is that there is a relationship between the perceived environment and the motivation. If the organizational structure is perceived as non-self-determined, then the caused motivation is either an amotivation or an extrinsic motivation. Amotivation is defined as any behavior that is not valuing or any compulsory task that is performed by actors who feel absolutely incompetent. In contrast, extrinsically motivated action is carried out for separable outcomes and it can be divided into four types, which differ in the degree to which they have been internalized into the self-concept. These four types can be arranged along a continuum from external control to autonomous self-regulation, as follows: *external*, *introjected*, *identified*, and *integrated* regulation (see Figure 1). With regards to teaching, *external* regulation can relate to merely fulfilling contractual agreements or it can include the receipt of selective incentives for teaching. Meanwhile, Ryan and Deci (2000a) define external motivation as a behavior that is rewarded or punished by superiors or by a routinized monitoring

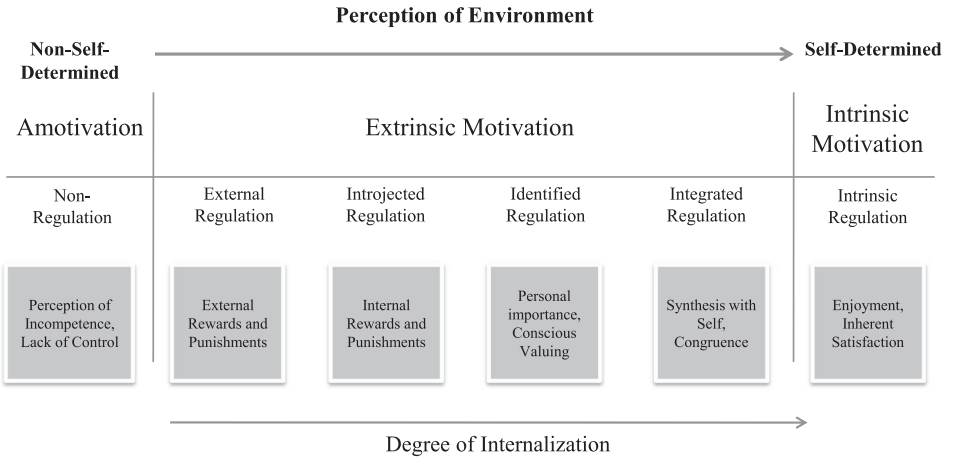

Figure 1. Self-determination Theory (Ryan and Deci 2000b, 72).

mechanism. *Introjected* regulation 'describes a type of internal regulation that is still quite controlling because people perform such actions with the feeling of pressure in order to avoid guilt or anxiety or to attain ego-enhancements or pride' (Ryan and Deci 2000a, 62). *Introjected* regulation to teach encompasses feelings of self-affirmation to perform well in the classroom or feelings of guilt when teaching duties are neglected. *Identified* regulation mirrors the next level of internalization, where social norms govern individual behavior by valuing behavior in accordance with the social norm as personally important. This means that teaching has become meaningful for oneself. The highest degree of internalization is *integrated* regulation, which implies that the teaching task is fully in line with an academic's self-perception. In other words, 'integration occurs when identified regulations have been fully assimilated to the self' (Ryan and Deci 2000a, 62). Therefore, teaching behavior is in alignment with the self-perception that a good academic is also a good teacher.

Finally, intrinsically motivated action describes any activity that is characterized by pure enjoyment and which fulfills the following three, basic and innate psychological needs: *relatedness*, *competence*, and *autonomy* (Ryan and Deci 2000b, 74; Ryan and Deci 2006). In terms of teaching, this means that the professors truly enjoy their teaching activities and they are genuinely interested in interacting with their students. The professors perform educational activities because they want to form an internal locus of control, which is autonomous and self-determined. The vital role of a self-determined perceived organizational environment while conducting teaching has also been confirmed in a recent study by Stupnisky et al. (2018), which examined the effect of the basic needs on teaching motivation and best teaching practices at 19 US universities. The highly autonomous motivated faculty in the sample employed more effective teaching methods than their less autonomous motivated colleagues.

Therefore, our first hypothesis states that:

> H1: Academics whose motivation to teach is more self-determined will tend to place more importance on the methods of instructional design.

To analyze the effect of the organizational environment on individual teaching behavior, we adopt the terms 'transactional' and 'transformational' from the 'full range leadership model' (Bass and Avolio 1993) and we then apply them to the governance discourse.

Governance of the teaching environment and the New Public Management

The relationship between regulatory style and the perception of the organizational environment is one of the main assumptions of SDT. In this paper, we will describe the more non-self-determined

organizational structure of SDT with the help of the concept of transactional governance (Wilkesmann 2013, 2016; Lauer and Wilkesmann 2017). Avolio, Walumba, and Weber (2009) define transactional governance as 'largely based on the exchange of rewards contingent on performance' (427). Bass and Riggio (2006) characterize the transactional mode of organizing as follows:

> Motivation to work is a matter of trade-offs of worker effort in exchange for rewards and the avoidance of disciplinary actions. Commitments remain short term, and self-interests are underscored … The partly transactional organization is an internal, competitive marketplace of individuals whose rewards are contingent on their performance … Cooperation depends on the organization's ability to satisfy the self-interests of the employees. (103)

Principal-agent theory (PAT) is the most important theoretical underpinning of transactional governance (Arrow 1985; Eisenhardt 1989; Lane and Kivisto 2008). PAT differentiates between two types of actors within the organization (i.e. principals and agents) and defines their relationship as follows:

> A contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision-making authority to the agent. (Jensen and Meckling 1976, 308)

Between principal and agent, there exists an information asymmetry (Eisenhardt 1989). The less information that the principal has about the motives, possible actions and actual performance of the agent, the greater the risk for the principal that the agent does not behave in the interests of the principal but only pursues their own self-interests. To overcome this information asymmetry, the principal will employ the agent with a contract that is based on selective incentives. If the agent behaves as the principal expects, then he or she will be rewarded with a bonus. Consequently, the principal has to monitor and measure the agent's behavior. According to the PAT, the three NPM instruments (i.e. performance-related pay, performance-related budgets, and MbO) are selective incentives. However, strictly speaking, only a bonus for outstanding research or teaching performance is a selective incentive in line with PAT in the case of performance-related pay (Arrow 1985; Eisenhardt 1989).

Wilkesmann and Schmid (2012) have shown that at an earlier stage of the implementation of NPM, the teaching behavior of German professors was (still) unaffected by the existence of these NPM instruments. Therefore, the authors had to reject the hypothesis that NPM instruments are positively related to the importance attached to teaching behavior, as well as the real effort put into them.

In this paper, we aim to compare the results of this previous study with recent survey data from 2016 to 2017.

Therefore, our second hypothesis summarizes these findings and states that:

> H2: Selective incentives for teaching are (still) not related to the importance attached to methods of instructional design.

As discussed earlier, a change to a more transactional NPM governance regime will probably have an effect on the perceived organizational environment, which then alters the perceived regulatory style of teaching motivation. Therefore, we will also investigate whether or not H2 is subject to temporal change due to the change in governance.

Given that NPM instruments, as a transactional mode of governing academic teaching, presumably still have no effect on teaching behavior, the next subsection will examine another governance mode.

Governance of the teaching environment and the supportive teaching culture

The perception of a self-determined organization structure in terms of SDT is related to transformational governance (Bass and Riggio 2006). The transformational mode can be characterized as a common vision of which goals are pursued in teaching and learning at the university. In particular, are common methods of instructional design (e.g. problem-based learning) shared and implemented? To achieve this goal, transformational governance creates a teaching environment with plenty of self-determined didactic support opportunities, such as peer coaching. This creates an atmosphere where talking about teaching is an accepted and prevalent social norm. For

example, professors in the same disciplines are encouraged to observe each other during their lectures and to develop didactic methods for peer coaching to work on a joint curriculum development and to continuously improve their teaching. Under transformational governance, a rectorate leads by example in being truly committed to pushing the teaching agenda forwards. They also provide support to bottom-up teaching initiatives (Schmid and Lauer 2016; Wilkesmann 2016; Lauer and Wilkesmann 2017). Besides intrinsic teaching motivation, this can also nurture more internalized regulatory styles of teaching motivation (Aitken and Sorcinelli 1994).

In general, transformational governance does not occur alone but is usually combined with elements of transactional governance (Wilkesmann 2016; Lauer and Wilkesmann 2017). The 'supportive teaching culture' (Paulsen and Feldman 1995; Feldman and Paulsen 1999) is a good example of a balanced relationship of top-down and bottom-up enforcement, which includes both transactional and transformational governance. In this culture, there is a commitment to, and support of academic teaching from the top of the organization. In addition, the organization offers general conditions that genuinely support teaching, such as: well-equipped classrooms; the establishment of organizational units such as centers of excellence in teaching and learning that offer personal training by professional didactic staff; or other (financial) resources to help improve teaching. In summary, in a supportive teaching culture, teaching is held in high esteem at both the departmental and the university-level, which is supported by shared social norms that promote quality teaching. Finally, professors who attribute more importance to their teaching duties can be a reinforcing factor.

Several studies have examined the faculty's perception of the institutional environment and its relationship to teaching behavior. For example, Lattuca and Pollard (2016) developed a framework of faculty decision-making about curricular change that is based on a comprehensive review of the literature. Curricular changes can include decisions about significant modifications to their own courses and comprehensive changes to the academic program that are made with colleagues. The framework encompasses external influences (e.g. labor market and quality assurance systems), internal influences (e.g. culture, vision, resources, department, and disciplinary cultures), individual influences (e.g. motivation, identity, knowledge, and beliefs), and motivation for change (e.g. expectations, utility, and interest). In this article, we focus on internal influences and individual motivation. In the US context, Blackburn et al. (1991) found that there was a positive relation between the self-reported effort that the faculty put into teaching and an institutional environment that appreciates teaching (e.g. institutional priorities, colleagues' commitment, existence of didactic support, and consensus of curriculum). However, Cox et al. (2011) could not confirm a relationship between institutional policies supporting teaching and learning, and the faculty's use of various pedagogical practices at research-intensive institutions.

Therefore, our third hypothesis states that:

H3: The higher the perceived level of supportive teaching culture, the more importance is attached to methods of instructional design.

Empirical evidence

Survey design and methods

Between November 2016 and March 2017, we invited over 19,000 professors at German research universities to participate in our online survey. A total of 22,405 emails were sent, and a net amount of 21,089 emails were successfully delivered. A total of 2663 filled out questionnaires led to an overall response of 12.6%. We only included full professors ($n = 2287$) who had indicated their university affiliation. Table 1 compares the most important key characteristics of the sample with the population of German university professors for the base year, 2016, which was derived from the Federal Statistics (Destatis 2017).

Table 2 shows the comparison sample, which was collected between May and July 2009 with the help of a disproportional sample limited to 8000 professors derived from 20,000 email addresses. This sample construction was intended to especially reach professors in the new W-salary system (Wilkesmann and Schmid 2012). Hence, all 3244 professors in the W-salary scheme at German research

Table 1. Sample description (2016–2017).

Categories for comparison	Population	Sample
New W-salary (W2+W3) (pay-for-performance)	69.8% (n = 14,919)	62.8% (n = 1421)
Old C-salary (C3+C4)	30.2% (n = 6440)	37.2% (n = 841)
Male	78.0% (n = 16,664)	72.9% (n = 1,638)
Female	22.0% (n = 4695)	27.1% (n = 608)
Age (in years)	53.8 (n = 20,229)	52.6 (n = 2243)
(Pure and applied) soft disciplines		
Humanities	15.9% (n = 3222)	22.4% (n = 511)
Sports	1.0% (n = 195)	1.0% (n = 22)
Social science	21.3% (n = 4318)	21.2% (n = 483)
Arts	9.8% (n = 1989)	0.8% (n = 18)
Pure hard disciplines		
Mathematics/natural sciences	23.2 (n = 4710)	28.6 (n = 651)
Pure applied sciences		
Human medicine and health science	11.5% (n = 2344)	9.1% (n = 208)
Forestry, nutritional science and veterinary medicine	2.5% (n = 514)	2.3% (n = 52)
Engineering	14.8% (n = 2994)	14.6% (n = 333)

universities were contacted to participate at the survey, while the 4756 professors in the old C-salary scheme were sampled via random sampling of the population of all professors in the C-salary scheme. In total, 1119 professors participated in the survey, which led to a response rate of 13.0%.

To ensure representativeness, both datasets can be subsequently weighted for specific descriptive evaluation.

Measurement

The dependent variable: academic teaching

In this survey, we decided only to use the items related to 'attached importance to methods of instructional design' of our teaching inventory because it discriminated best in another study (Wilkesmann and Schmid 2012). All of the items were measured on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree). The five items for 'How important are the following conceptual efforts for you in teaching, to' are as follows:

(1) … develop specific methods of instruction (e.g. discussions, lectures, experiments, case studies)?;
(2) … enrich the teaching and learning process with additional learning aids (e.g. handouts, motivational instructions, web-based resources)?
(3) … conceptualize/organize the social organization of the teaching-learning-processes (e.g. cooperative learning groups, project teams)?

Table 2. Sample description (2009).

Categories for Comparison	Population	Sample
Old C-salary (C3+C4)	68.6% (n = 14,388)	41.5% (n = 458)
New W-salary (W2+W3) (pay-for-performance)	31.4% (n = 6569)	58.5% (n = 645)
Male	83.6% (n = 19,109)	73.1% (n = 826)
Female	16.4% (n = 3914)	21.2% (n = 237)
Age (in years)	49.7 (n = 23,023)	49.0 (n = 1030)
(Pure and applied) soft disciplines		
Humanities	21.4% (n = 4915)	27.4% (n = 292)
Sports	0.8% (n = 187)	0.8% (n = 9)
Social science	14.8% (n = 3413)	20.2% (n = 215)
Arts	11.7% (n = 2687)	2.2% (n = 23)
Pure hard disciplines		
Mathematics/natural sciences	24.7% (n = 5678)	29.4% (n = 313)
Applied hard disciplines		
Human medicine and health science	12.5% (n = 2836)	9.1% (n = 97)
Forestry, nutritional science and veterinary medicine	2.8% (n = 635)	2.4% (n = 26)
Engineering	9.9% (n = 2282)	8.4% (n = 89)

Table 3. Principal component analysis of importance attached to methods of instructional design.

Dependent variable: importance attached to methods of instructional design (Cronbach's $\alpha = .732$)	
How important are the following conceptual efforts for you in teaching, to …	
… *develop specific methods of instruction (e.g. discussions, lectures, experiments, case studies)?*	.741
… *enrich the teaching and learning process with additional learning aids (e.g. handouts, motivational instructions, web-based resources)?*	.739
… *conceptualize/organize the social organization of the teaching-learning-processes (e.g. cooperative learning groups, project teams)?*	.727
… *conceptualize/organize the use of audio-visual media (e.g. instructional films, e-learning, videos, MOOC)?*	.659
… *formulate and communicate clear educational goals for your respective courses (e.g. content [area] coverage, intended learning outcomes [such as higher-order problem-solving skills])?*	.611

(4) … conceptualize/organize the use of audio-visual media (e.g. instructional films, e-learning, videos, MOOC)?
(5) … formulate and communicate clear educational goals for your respective courses (e.g. content [area] coverage, intended learning outcomes [such as higher-order problem-solving skills])?

As shown in Table 3, a principal component analysis with varimax rotation confirms the one-dimensional structure of the index with a KMO-value of .765 and explained variance of 48.6%. In terms of reliability, the computed index lies in an acceptable range with a Cronbach's Alpha of .732.

The independent variables

Motivation. Teaching motivation was assessed with items from Fernet et al.'s (2008) work tasks motivation scale for teachers (WTMST). All of the items were measured on a five-point Likert scale (Wilkesmann and Schmid 2014). Figure 2 shows the results from the confirmatory factor analysis (CFA), where we tested if the model with five latent variables and the respective items fit the data well. The analyses were performed in R using the *lavaan* package. Because the assumption of multivariate normality is not met, the parameters of the measurement model were estimated using unweighted least squares (ULS), resulting in a good model fit: GFI = 0.991, AFGI = 0.985; SRMR = 0.044 (Hu and Bentler 1999). Because we could not confirm the exact theoretical dimensionality of the SDT model, we deleted the integrated regulation from the overall scale. The reliabilities for the five latent variables are in an acceptable range considering the short-scale quality of the teaching motivation inventory (intrinsic teaching motivation: .735; identified teaching motivation: .768; introjected teaching motivation: .667; external teaching motivation: .779; amotivation: .662). Item *intromot4* had to be dropped due to a low factor loading (see Figure 2).

To test Hypothesis 2, the perceived number of NPM instruments is measured as a count variable that adds up the number of incentives of outstanding teaching performance. The professors were asked the following questions: Is a performance bonus for outstanding teaching as part of the new salary paid at the respective university? Is a teaching price awarded at the level of the department or at the university level? And, are there performance-related budgets and MbO with teaching objectives? This variable ranges from one to four, depending on whether or not these instruments exist at the university.

For Hypothesis 3 we make use of the following items to operationalize the supportive teaching culture variable:

(1) The perceived number of didactic support opportunities is also a count variable with a range from one to three. We ask if didactic offers from the department, personal training by professional didactic staff or peer coaching exist. The variable is also represented in the 2009 survey but is measured on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree) with a single item: 'My teaching environment is characterized by plenty of didactic support opportunities (department, personal training by professional didactic staff, or peer coaching).'

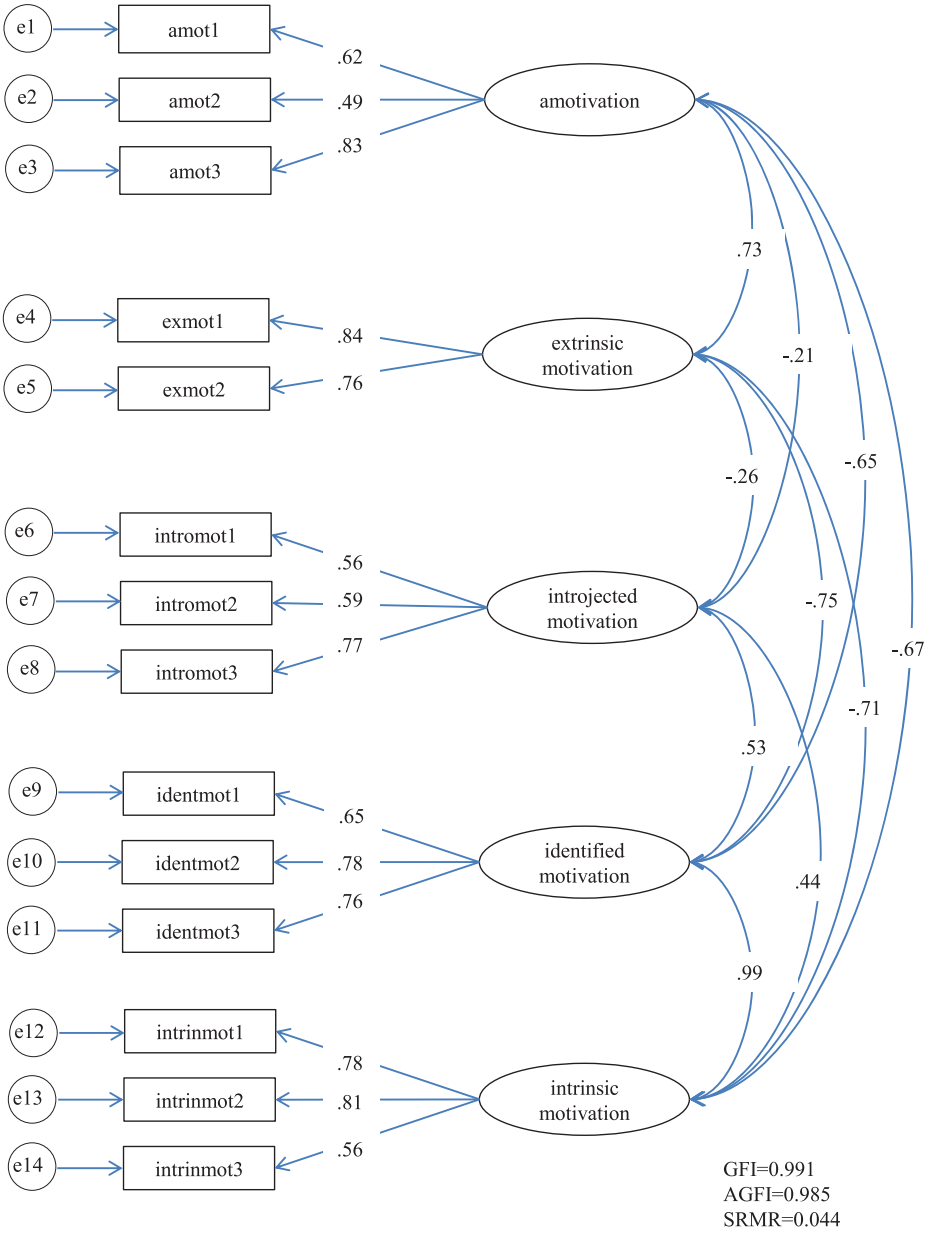

Figure 2. Confirmatory factor analysis (survey 2016–2017) of the teaching motivation inventory.

(2) One item asks about the degree of vivid exchange on teaching matters between colleagues ('Please rate the following item in regards to your teaching environment: There is a vivid collegial exchange about teaching practices').
(3) The last item measures the perceived constructive feedback by students ('Please rate the following statement in regards to your teaching environment: My teaching environment is characterized by constructive feedback by the students').

The last two items were measured on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree).

We also included standard control variables such as gender (1 = female, 0 = male), age (in years), and disciplines (1 = pure hard disciplines, 0 = rest). As for disciplines, teaching approaches can vary (Nevgi, Postareff, and Lindblom-Ylänne 2004; Wilkesmann and Lauer 2015), which could also be related to the self-reported importance attached to methods of instructional design.

Empirical results and findings

This section will present the multivariate findings. In total, we estimated four regression models to examine the relationship of individual teaching motivation and organizational environment on the self-reported importance attached to methods of instructional design (see Table 4). In particular, we used step-wise regression analysis to differentiate two models: Model 1 only encompasses individual teaching motivation and the control variables as independent variables, while Model 2 also considers the variables of NPM and supportive teaching culture. With step-wise modelling, we are able to check if there is an increase in the variance explained by NPM and supportive teaching culture on the outcome variable.

Hypothesis 1 (i.e. *Academics whose motivation to teach is more self-determined will tend to place more importance on the methods of instructional design.*) is fully confirmed. Intrinsic ($\beta = .17$, $p = .00$) and identified ($\beta = .10$, $p = .00$) regulatory styles of teaching motivation are indeed positively related to the dependent variable in both models. Meanwhile, introjected and external regulatory styles are not related to the importance attached to methods of instructional design.

Hypothesis 2 (i.e. *Selective incentives for teaching are not related to the importance attached to methods of instructional design.*) can also be confirmed and this corroborates the findings from 2009. The sign of the beta coefficient is slightly positive ($\beta = .04$, $p = .05$), where the p-value is just above the 5% significance level.

Hypothesis 3 (i.e. *The higher the perceived level of supportive teaching culture, the more importance is attached to methods of instructional design.*) is also confirmed. Scant evidence suggests that the importance attached to methods of instructional design is positively related to the perceived number of didactic support ($\beta = .07$; $p = .00$). This relation is stronger when professors are exposed

Table 4. Step-wise regression analysis for variables predicting importance attached to methods of instructional design ($N = 2162$).

	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
H1: SDT (teaching motivation)						
Intrinsic	0.21	0.03	.20**	0.17	0.03	.17**
Identified	0.13	0.04	.12**	0.11	0.04	.10**
Introjected	0.03	0.02	.03	0.03	0.02	.03
External	–0.00	0.03	–.00	0.01	0.03	.01
Control variables						
Gender (1 = female, 0 = male)	0.33	0.04	.18**	0.33	0.04	.18**
Discipline (1 = pure hard disciplines, 0 = rest)	–0.29	0.04	–.16**	–0.28	0.04	–.16**
Age (in years)	0.01	0.00	.08**	0.01	0.00	.12**
H2: NPM						
Perceived number of structural incentives				0.03	0.01	.04
H3: Supportive teaching culture						
Perceived amount of didactic support				0.05	0.02	.07**
Vivid exchange on teaching matters with colleagues (1 = not at all, 5 = to a large extent)				0.08	0.02	.11**
Constructive feedback from students (1 = not at all, 5 = to a large extent)				0.05	0.02	.06**
R^2		.16			.19	
F for change in R^2		58.90**			20.32**	

*$p < .05$.
**$p < .01$.

to a work environment where a vivid collegial exchange about teaching ($\beta = .11$; $p = .00$) and constructive feedback from the students ($\beta = .06$; $p = .00$) is present.

Although all three hypotheses can be confirmed, the most influential predictors can be found in the control variables. The high influence of gender ($\beta = .18$; $p = .00$) on the attached importance to methods of instructional design is of note. The reflection on teaching methods is apparently female connoted. With the strong effect of gender, it is not surprising that we can also observe a discipline effect where professors from the pure hard disciplines (Biglan 1973a, 1973b) attach a lower significance to the methods of instructional design than their colleagues from the pure/applied soft disciplines and applied hard sciences. Finally, age also matters. Older professors significantly report a higher importance attached to methods of instructional design than their younger colleagues. This may happen because research output becomes less important in terms of academic career advancement by age, and so more time can actually be devoted to teaching.

Overall, the increase of R^2 from Model 1 ($R^2 = .16$) to Model 2 ($R^2 = .19$) is rather low; that is, the increase of explained variance by NPM and supportive teaching culture has not considerably changed with 3%. Most of the variance of the dependent variable can be explained by individual factors, such as teaching motivation and the control variables (gender, discipline, and age). In terms of teaching motivation, intrinsic and internalized forms of regulatory styles are the most important predictors to explain academic teaching behavior.

Comparison between the surveys from 2009 and from 2016–2017

To compare the results of the regression analysis, we estimated the same two regression models with the 2009 data (see Table 5).

In the 2009 survey, the attributed significance of instructional design is only positively related to the intrinsic motivation to teach. However, in the 2016–2017 survey, the identified regulatory style also plays a significant role with regards to the perception of teaching significance. Meanwhile, age became a more important control variable. In contrast to the 2009 survey, the influence of

Table 5. Step-wise regression analysis (survey 2009) for variables predicting importance attached to methods of instructional design ($N = 980$).

	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
H1: SDT (Teaching motivation)						
Intrinsic	0.16	0.04	.16**	0.16	0.04	.16**
Identified	0.09	0.05	.08	0.09	0.05	.08
Introjected	0.01	0.02	.01	0.01	0.02	.01
External	–0.00	0.02	–.01	–0.00	0.02	–.00
Control variables						
Gender (1=female, 0=male)	0.40	0.06	.21**	0.38	0.06	.20**
Discipline (1 = pure hard sciences, 0 = rest)	–0.25	0.05	–.15**	–0.20	0.05	–.13**
Age (in years)	–0.01	0.00	–.06	–0.01	0.00	–.05
H2: NPM						
Perceived amount of structural incentives				–0.01	0.02	–.01
H3: Supportive teaching culture						
Availability of various didactic supports (1 = not at all, 5 = to a large extent)				–0.03	0.02	–.05
Vivid exchange on teaching matters with colleagues (1 = not at all, 5 = to a large extent)				–0.03	0.02	–.05
Constructive feedback from students (1 = not at all, 5 = to a large extent)				0.02	0.02	.03
R^2		.12			.12	
F for change in R^2		20.50**			1.13	

*$p < .05$.
**$p < .01$.

age gained in significance in the 2016–2017 survey. Gender remains the strongest predictor in both surveys; that is, in 2009, teaching was also female connoted and discipline mattered.

Interestingly, no difference exists between R^2 in Model 1 and Model 2. The NPM and supportive teaching culture variables have no influence on the perception of the importance attached to this kind of teaching behavior. Therefore, Hypotheses 2 is confirmed and Hypothesis 3 has to be rejected for 2009. In addition, Hypothesis 1 is confirmed but with the limitation that, of all of the regulatory styles, only intrinsic motivation has an effect. In 2009, teaching motivation was still a purely internally-induced action.

Although we could not detect any differences between the two surveys in regards to the relation of NPM and teaching behavior, we do expect changes in the respective types of teaching motivation. Given that the selected items that we used for comparison are nearly identical, we can contrast the results and investigate if the experience of seven years of the NPM regime has caused a shift in teaching motivation over time. Hence, to answer our second research question (Has teaching motivation changed between 2009 and 2016–2017?) we hypothesize that NPM has nonetheless changed the institutional environment in a more non-self-determined direction. In concrete terms, at an earlier stage of the implementation of NPM, most professors were still socialized in a higher education system that was characterized by a high degree of academic autonomy and leeway. This has changed and we are now in a later stage of NPM, where professors are increasingly being socialized to accept more managerial control, monitoring, and accountability.

We begin by taking a closer look at the teaching motivation inventory and we will compare the results of both surveys (see Table 6). The CFA of the motivation scale of the survey in 2009 and the Cronbach's α values of the latent variables are shown in Appendix 1. Whereas intrinsic and identified teaching motivation remains stable over time, we can observe an increase of the respective means in all items of introjected teaching motivation. In comparison to the 2009 data, the 2016–2017 data shows that professors are more inclined to feel like a failure and suffer from a bad

Table 6. Comparison of teaching motivation.

Variable name in CFA	Items	Survey 2009 Mean (SD)	Survey 2016–2017 Mean (SD)
The reason why I teach is …			
Intrinsic teaching motivation			
inmot1	… because I derive much pleasure for my teaching.	4.36 (0.84)	4.25 (0.79)
inmot2	… because I find teaching interesting.	4.24 (0.87)	4.13 (0.86)
inmot3	… because I lose myself in teaching.	2.55 (1.19)	2.80 (1.14)
Identified teaching motivation			
Identmot1	… because, for me, the task of teaching is of personal importance.	4.48 (0.76)	4.41 (0.76)
identmot2	… because I see my teaching as a significant contribution to my students' overall academic progress.	4.31 (0.84)	4.25 (0.84)
identmot3	… because the task of teaching provides the chance to realize an aspect of my academic profession that is of personal meaning to me.	3.97 (1.06)	3.97 (1.02)
Introjected teaching motivation			
intromot1	… because my aspiration is also to be successful at teaching, otherwise I would feel like a loser.	**2.79 (1.26)**	**3.48 (1.15)**
intromot2	… because I have a bad conscience if I have neglected my teaching duties.	**2.34 (1.14)**	**3.84 (1.15)**
intromot3	… because I would feel uncomfortable if I have neglected my teaching duties.	**2.99 (1.33)**	**3.93 (1.01)**
Intromot4	… because my self-concept as a professor is also determined by quality teaching.	**3.66 (1.13)**	**4.21 (0.91)**
External teaching motivation			
exmot1	… because my university/employment contract demands that I teach.	2.84 (1.47)	1.52 (0.89)
exmot2	… because I get paid for it.	2.82 (1.42)	1.37 (0.81)
Amotivation			
amot1	I don't know why, because the work conditions provided for academic teaching are unbearable.	1.83 (1.1)	1.61 (0.95)
amot2	I don't know why, sometimes I don't see the actual purpose of teaching.	1.58 (0.92)	1.68 (1.0)
amot3	I don't care much for teaching because I don't know what it effects.	1.30 (0.68)	1.36 (0.73)

conscience if they neglect their teaching duties. The shift in means also indicates that a good teaching performance in the classroom has become a more important part of the professorial self-concept. Under reservation, we can tentatively interpret these findings as the start of an internalization process of purely extrinsic regulatory styles to teach while the intrinsic and identified motivation to teach keeps unaffected. However, the question if the shift in introjected teaching motivation is caused by NPM, and/or a growing awareness and interest for quality teaching in Germany in general cannot be answered by this comparison.

The differences in the items for external motivation are mostly caused by a more precise wording of both items in the survey from 2016–2017.

Discussion

In this paper, the relation between individual teaching motivation, NPM, aspects of a supportive teaching culture and the importance attached to methods of instructional design has been tested empirically. Taken together, our findings from the 2016–2017 data suggest that the significance that is given to teaching is still mostly self-determined, which is good news in support of SDT. While controlling for gender, age, and discipline, intrinsic motivation is a very strong predictor, closely followed by identified teaching motivation. In contrast, the introjected and external regulation was not significantly related to the importance attached to instructional design. Additionally, the perceived supportive teaching culture positively predicted the dependent variable while only a weak relation could be revealed for the perceived NPM instruments. Therefore, we can preliminarily conclude that selective incentives continue to remain more or less unimportant in regards to the importance that professors attach to methods of instructional design. One explanation for this could be that a fair number of professors are still simply ignorant of their institutional environment, as analyses from the items related to the existence of the respective NPM instruments reveal. This has not substantially changed in the data between 2009 and 2016–2017 (see Appendix 2). Only teaching awards have become much better known in the meantime. If an instrument is unknown, then it cannot influence behavior. In addition, the majority of the surveyed professors who affirmed the existence of these NPM instruments in the 2016–2017 data attribute a rather relative effectiveness to them (see Appendix 3). Nonetheless, the attributed effectiveness significantly increases when the professor has already received the respective NPM instruments.

Another argument to explain why the NPM instruments are not as effective as predicted by PAT is that selective incentives require a measurement to monitor and reward the respective teaching behavior to determine the level of teaching performance eligible for bonus pay, which requires accurate measurements. In comparison to other countries, such as the UK, measurements to capture teaching quality as implemented with the National Student Survey (NSS) and the Teaching Excellence Framework (TEF) are still absent in German academia. Not surprisingly, the bonus measurements that are currently used in practice are still rather vague and woolly. Given that measuring instruments for teaching are not yet common in Germany, it can be assumed that their acceptance is not yet widespread.

Returning to the control variables, the most important result is that reflection on teaching methods is (still) female. This finding can be explained if one assumes that female professors are more prone to use student-focused approaches to teach than men, which has recently been confirmed by Wilkesmann and Lauer (2015) and a study from Nevgi, Postareff, and Lindblom-Ylänne (2004). Both of these studies report that women score significantly lower on a teacher-focused approach to teach than men. However, a study from Stes, Gijbels, and Van Petegem (2008) cannot confirm a gender effect on a lecturer's teaching approach. In addition, Lacey and Saleh (1998) found that female professors grant students more freedom in what and how to learn in their courses, which could also be related to more reflection in instructional design.

This explanation is in line with the observation of a discipline effect where professors from the pure hard disciplines (Biglan 1973a, 1973b) attach a lower significance to the methods of instructional design than their colleagues from the pure/applied soft disciplines and applied hard sciences.

According to Kreber (2002), faculty adhering to a rather teaching-focused teaching approach (Trigwell, Prosser, and Waterhouse 1999) do not reflect much on their teaching performance; hence, time spent to reflect on their teaching is less likely and is more frequently seen as a waste of time. Consequently, Wilkesmann and Lauer (2015) showed that a more teacher-focused approach to teaching is more likely in the hard disciplines.

Our second research question asked if teaching motivation has been stable between 2009 and 2016–2017. The 2016–2017 data shows that, in comparison to the 2009 data, professors are more inclined to feel like a failure and suffer from a bad conscience if they neglect their teaching duties. We can interpret this as a hint of the influence of a changing academic environment in regard to teaching. However, further investigations are required to prove a possible influence on the socialization process of professors by changing governance structures due to NPM.

The current study has observed several limitations. First, the fairly humble increase in explained variance caused by the organizational level variables in both surveys indicates that important predictors have not been considered in our models. For example, future research should especially focus on the perception of departmental cultures (Knight and Trowler 2000) in more detail and consider more recent developments in German higher education, such as the inevitable increase in accountability due to the rise of quality management systems (Seyfried and Ansmann 2017).

Second, the importance attached to instructional design as the only dependent variable is just one aspect to measure aspects of the multi-faceted task of teaching. We rationalized this by referring to earlier studies because this aspect of teaching discriminated best among German professors in regards to their teaching engagement. However, this could have changed now and future studies are recommended to include items addressing the interactional component of teaching (with students, colleagues and departmental leaders) in more detail.

Third, this study only provides cross-sectional evidence that is limited to the German case. Although we could compare results from two surveys from the same population, the data is not longitudinal and it does not allow causal interpretations to be made. However, experience has told us that teaching-related surveys are not necessarily the most important item on a German professor's agenda. Therefore, a longitudinal study might be difficult to implement without further political or institutional pressure to ensure participation.

Nevertheless, the shift in teaching motivation between 2009 and 2016–2017 is probably the most striking finding of our study and it needs further examination. Therefore, we suggest that further research should integrate longitudinal data from different higher education systems if it wishes to examine the impact of organizational interventions on teaching and specific regulatory styles in academic teaching motivation in the long run.

Disclosure statement

No potential conflict of interest was reported by the authors.

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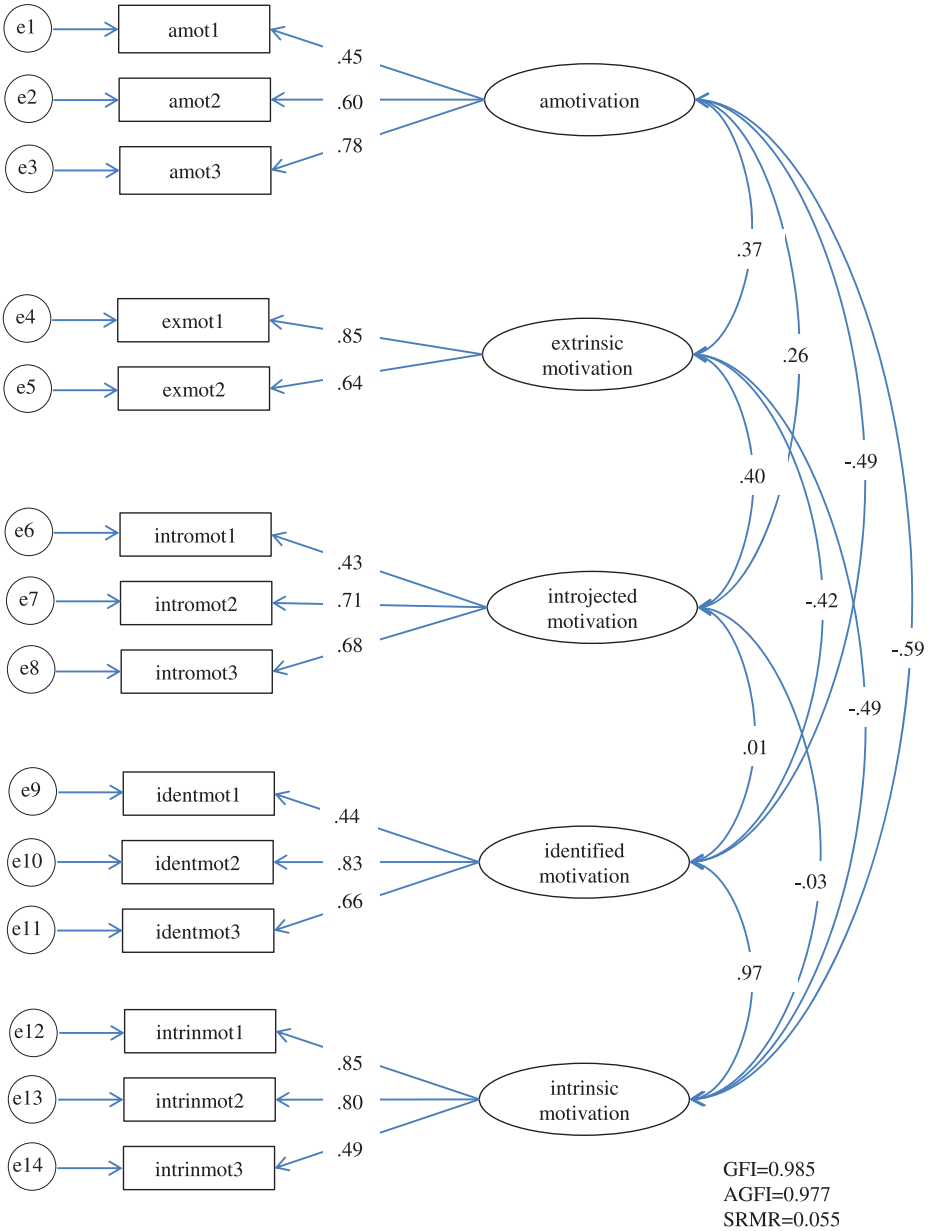
Appendices

Appendix 1. Confirmatory factor analysis II (Survey 2009) for teaching motivation (Cronbach's α: intrinsic teaching motivation .715; identified teaching motivation .663; introjected teaching motivation .634; external teaching motivation .706; amotivation .597)



Appendix 2. Level of ignorance of NPM instruments (2009 and 2016–2017 survey)

Ignorance – NPM instruments	2016–2017 ($n = 2287$)	2009 ($n = 1119$)
Performance-based Pay	28.5% ($n = 655$)	30.2% ($n = 338$)
Teaching awards	14.1% ($n = 318$)	24.0% ($n = 263$)
Management by Objectives (MbO)	23.8% ($n = 538$)	11.8% ($n = 132$)
Performance-related budget	14.1% ($n = 319$)	13.3% ($n = 146$)

Appendix 3. Effectiveness of NPM instruments (2016–2017 survey)

Effectiveness – NPM instruments	*n*	Mean (SD)
Performance-based Pay	503	2.96 (1.28)
Received – Yes	47	**3.53 (1.14)****
Received – No	456	**2.90 (1.27)**
Faculty Teaching Awards	955	2.60 (1.15)
Received – Yes	89	**3.08 (1.20)****
Received – No	866	**2.56 (1.14)**
University Teaching Awards	1413	2.46 (1.15)
Received – Yes	50	**2.88 (1.13)***
Received – No	1363	**2.44 (1.14)**
Management by Objectives (MbO)	515	3.13 (1.15)
Received – Yes	28	3.36 (1.28)
Received – No	487	3.11 (1.13)
Performance-related budget	895	3.02 (1.25)
Received – Yes	98	**3.43 (1.18)****
Received – No	797	**2.96 (1.25)**

**Sig. 0.01, * Sig. 0.05, based on Mann–Whitney *U* test.