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Faculty members' motivation for teaching and best practices: Testing a model based on self-determination theory across institution types

Robert H. Stupnisky[a,*], Allison BrckaLorenz[b], Bridget Yuhas[b], Frédéric Guay[c]

[a] University of North Dakota, United States
[b] Indiana University, United States
[c] Université Laval, Canada

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ABSTRACT

This study tested a conceptual model based on self-determination theory to examine how university faculty members' motivation for teaching predicts their utilization of teaching best practices, and explored if faculty at various higher education institution types are differentially motivated for teaching. Data from a national online survey of 1671 faculty from 19 universities was analyzed using structural equation modeling. Support for the overall model showed faculty autonomy, competence, and relatedness positively predicted autonomous motivation (intrinsic, identified), but not controlled motivation (introjected, external). Autonomous motivation, in turn, predicted greater incorporation of effective teaching strategies, namely instructional clarity, higher-order learning, reflective and integrative learning, and collaborative learning. There were no differences found across faculty at Doctoral, Master's, and Bachelor's institutions in terms of autonomous motivation mean levels, nor for the predictive effects of autonomous motivation on teaching best practices. The findings have implications for the faculty motivation and teaching research literatures, as well as for faculty development initiatives aimed at improving teaching effectiveness.

1. Introduction

Relationships between effective teaching and student gains in university have been widely demonstrated, both cognitively in general and at the course level specifically (McKeachie, 2007; Pascarella & Terenzini, 1991, 2005). Frequently cited research-based "teaching best practices" include well-organized class sessions, providing clarity during instruction, giving prompt feedback on student work, integrating previously taught material with new concepts, encouraging reflection on course material, and facilitating student collaboration (Chickering & Gamson, 1987; Nilson, 2016). Studies using national US datasets show the quality of faculty teaching, in turn, affects college student engagement and deep approaches to learning (BrckaLorenz, Ribera, Kinzie, & Cole, 2012; Umbach & Wawrzynski, 2005).

However, not all faculty members use best practices when teaching despite their well-documented effectiveness. Motivation may be an important determinant of how faculty teach, as "a common assumption is that faculty could teach better if only they would try harder" (Blackburn, Bieber, Lawrence, & Trautvetter, 1991, p. 363). Many professors enjoy teaching as an opportunity to facilitate student learning by creatively sharing their knowledge and expertise; alternatively, other faculty find teaching a paid requirement of their job that evokes anxiety or boredom (Stupnisky, Pekrun, & Lichtenfeld, 2016). Optimally (intrinsically or autonomously) motivated faculty may be more likely to utilize teaching best practices as their high engagement facilitates innovation and excellence, whereas sub-optimally (extrinsically or controlled) motivated faculty may choose less effective strategies as their goal is the shortest path to outcome completion (Deci, Kasser, & Ryan, 1997). Understanding how motivation predicts faculty teaching practices, as well as the precursors to optimal motivation, would greatly benefit faculty development officers and administrators aiming to increase teaching quality and optimize student learning.

A potentially important, although rarely empirically explored, moderator of faculty teaching practices and motivation for teaching may be institution type. A common complaint about higher education in the United States, particularly Doctoral and Master's universities, is that faculty are more interested in research than teaching, which detracts from faculty instruction, advising, and curriculum development (Serow, Brawner, & Demery, 1999). Indeed, some have regarded teaching as "the professoriate's neglected stepchild" (Wilkesmann & Schmid, 2014, p. 6). Others have posited that faculty who are productive researchers also are good teachers because they are on the

* Corresponding author at: University of North Dakota, 213 Centennial Drive Stop 7189, Grand Forks, ND 58202-7189, United States.
E-mail address: Robert.Stupnisky@und.edu (R.H. Stupnisky).

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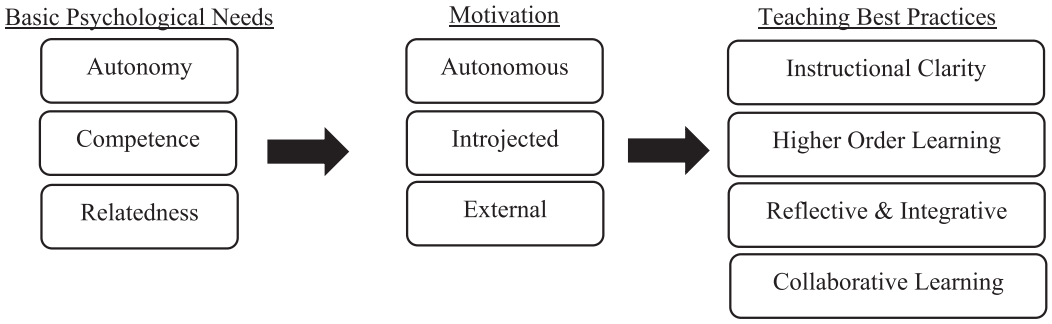

Fig. 1. Conceptual model of faculty motivation for teaching best practices.

cutting-edge of their field and draw on that expertise to the benefit of their students, yet research has shown the linkage between faculty research productivity and teaching quality is nearly zero (Hattie & Marsh, 1996; Marsh & Hattie, 2002). Smaller Bachelor's universities, alternatively, employee faculty who are focused almost exclusively on teaching and thus are perceived as more "student-centered" and effective (Marginson, 2006). It is yet unknown if faculty motivation for teaching is different across varying institution types and the extent to which these motivational differences relate to teaching practices.

The purpose of the current study was to test a model hypothesizing that faculty members' motivation is an important predictor of teaching best practices (Fig. 1). Based on self-determination theory (SDT; Ryan & Deci, 2017), the model was also used to examine the precursors of faculty motivation to teach. We additionally explored if faculty at various higher education institution types (Doctoral, Master's, Bachelor's) are differentially motivated for teaching, and if motivational differences lead to different teaching practices.

1.1. Motivation

A leading perspective on human motivation is self-determination theory (SDT, Ryan & Deci, 2017). SDT endorses an organismic perspective on individual functioning whereby individuals—in the present case, faculty—are inherently self-motivated to master their environment. They are eager to learn, develop their skills, and assimilate institutional values. However, faculty may be unmotivated, feel incompetent, achieve little, and eventually leave the profession. SDT suggests that these behaviors could be explained, albeit in part, by the failure to support psychological needs.

According to SDT, different types of motivation exist, and they differ in their degree of self-determination. Intrinsic motivation is the most autonomous form of motivation. It occurs when an individual engages in an activity for its own sake, for the pleasure and satisfaction derived from it (Ryan & Deci, 2017). However, not all behaviors are intrinsically motivated; some are extrinsically motivated. Extrinsic motivation involves engaging in an activity for non-intrinsic reasons. SDT proposes four types of extrinsic regulations according to degree of autonomy or self-determination. From the lowest to highest degree, they are external regulation, introjected regulation, identified regulation, and integrated regulation. External regulation refers to behaviors that are not internalized in the self but are instead regulated by external means such as rewards, constraints, and punishments. Regulation is introjected when behaviors are partly internalized in the self, but this internalization is not coherent with other aspects of the self (i.e., it is not autonomous). This degree of internalization tends to prompt behaviors in the absence of environmental cues in order to satisfy esteem concerns based on shame and guilt. Identified regulation occurs when behaviors are performed out of choice and volition, such as when the individual considers them to be important. Integrated regulation occurs when the activity is congruent with the individual's identity, values, and needs. This last form of regulation was not addressed in the present study because it has been found to be highly correlated with intrinsic and identified regulations (Wilson, Rodgers, Loitz, & Scime, 2006).

Many researchers have classified these types of regulation into two broad categories: autonomous and controlled regulations (Van den Broeck et al., 2011). Autonomous regulation includes intrinsic and identified regulations, whereas controlled regulation includes introjected and external regulations. Recent evidence suggests that it could be suitable to build an autonomous construct of motivation because intrinsic and identified regulation usually correlate highly (Guay, Morin, Litalien, Valois, & Vallerand, 2015). Combining introjected and external regulations together, however, could be misleading because these concepts do not overlap and could lead to different consequences. For example, introjected regulation positively correlated with perceived academic competence among students, whereas external regulation did not relate significantly to this criterion variable (Guay et al., 2015). Thus, SDT asserts that the *type* of motivation is more important than the strength of motivation in predicting outcomes (Deci & Ryan, 2008; Howard, Gagné, Morin, & Forest, 2016).

The self-determination continuum is based on a premise that the most self-determined forms of motivation emanates when three psychological needs are satisfied. These needs are the *need for competence* (a desire to interact effectively with one's environment and to seek challenges that are slightly beyond their current capacities), *the need for relatedness* (the necessity for close and secure emotional bonds with significant others) and the *need for autonomy* (the necessity of experiencing a sense of choice, willingness, and volition as one behaves; Ryan, 1995; Ryan & Deci, 2000). In contrast, introjected and external regulations are triggered when these needs are thwarted (Ryan & Deci, 2017).

1.1.1. Faculty motivation for teaching

The current study tested a conceptual model of faculty motivation for teaching. With the model, we posited that when faculty basic psychological needs of autonomy, competence, and relatedness are supported, they would be autonomously motivated to teach, resulting in greater use of effective teaching practices. Alternatively, when faculty basic needs are thwarted, their motivation for teaching will be less autonomous and more controlled, resulting in less use of teaching best practices. The SDT framework has been linked to faculty teaching, although empirical studies testing these assertions are few. Deci et al. (1997) described teaching as having good potential for intrinsic motivation for reasons that align with the basic needs of SDT. Teaching could satisfy the needs for competence (when professors have a meaningful impact on their students, such as "ah-ha moments"), autonomy (professors have freedom to teach lesson content in their own way), and relatedness (opportunities for professors to relate to colleagues and students). However, faculty are also paid, evaluated, required to meet deadlines and follow particular curriculum, and may work with difficult colleagues—all factors that can lead to extrinsic motivation and negative consequences.

The majority of support for SDT as a sound explanation of teaching motivation comes from studies of K-12 teachers. Gorozidis and Papaioannou (2014) triangulated qualitative and quantitative methods

to find high-school teachers with highly autonomous motivation were more determined to participate in training and implement innovative teaching strategies (see also Aelterman, Vansteenkiste, Van Keer, & Haerens, 2016). Along the same lines, Hein et al. (2012) found physical education teachers from five European countries who reported being autonomously motivated to teach also adopted more student-centered teaching styles, while those not autonomously motivated teachers adopted more teacher-centered teaching styles (see also Korthagen & Evelein, 2016). Finally, Klassen, Perry, and Frenzel (2012) found teachers' satisfaction of the needs for autonomy, competence, and relatedness (with students more so than relatedness with colleagues) led to higher levels of engagement, as well as more positive and fewer negative emotions.

Studies of university faculty members teaching motivation conceptualized with an SDT framework are less common. Bouwma-Gearhart (2012) interviewed STEM faculty members of all ranks to find fulfilling the needs of autonomy, competence, and relatedness motivated them to engage in teaching professional development. Cook, Ley, Crawford, and Warner (2009) combined data from four US studies to find intrinsic motivation to be the most endorsed reason for faculty to teach electronic or distance courses, beyond many external factors including monetary rewards and job advancement. Wilkesmann and Schmid (2014) surveyed 2061 German professors to examine the factors influencing their teaching motivation. They found the strongest predictors of intrinsic motivation for teaching were competence, relatedness with students, and autonomy (among professors at universities of applied sciences but not research universities). Alternatively, the basic psychological needs of SDT did not significantly predict faculty introjected motivation.

Most recently, Stupnisky, Hall, Daniels, and Mensah (2017) tested a conceptual model positing that when pretenure faculty members' social-environmental concerns are resolved (balance, clear expectations, collegiality), their basic psychosocial needs will be satisfied, resulting in intrinsic motivation, and yielding greater reported success in teaching and research endeavors. Result from the teaching domain indicated collegiality predicted better faculty relatedness, satisfying this need related to increased intrinsic motivation, and ultimately greater perceived success. That study was limited, however, by examining only one motivation type (intrinsic), a brief measure of general teaching success, and utilizing a small sample ($N = 105$) from two universities with similar location (Midwestern U.S.) and research emphases (Higher Research Activity). Overall, strong conceptual linkages and building empirical evidence suggest motivation to be an important predictor of faculty members' motivation for teaching, but further testing is needed to understand the conditions that support the SDT basic needs and how motivation relates to faculty teaching performance.

1.2. Teaching Best Practices

The current study focused on four teaching best practices: instructional clarity,[1] higher-order learning, reflective and integrative learning, and collaborative learning. These reflect a range of the best practices captured in the research literature. The construct of instructional clarity reflects methods of instruction in which "faculty demonstrate a level of transparency in their approach to instruction and goal setting in an effort to help students better understand expectations and comprehend subject matter" (BrckaLorenz et al., 2012, p. 150). Results from the 2007 and 2010 Wabash National Study for Liberal Arts Education indicated that positive student perceptions of faculty practices, such as clarity of communication, use of examples to illustrate complex points, and timely feedback on assignments, were linked to students' increased problem-solving skills, persistence in higher education, and interest in life-long learning (Pascarella & Blaich, 2013). Instructors who organize and communicate information in the classroom effectively often yield positive student outcomes. For example, clarity of communication from instructor to learners and logical organization of course material have been positively linked with reading comprehension, mathematics, and writing skills (Pascarella & Terenzini, 2005) as well as persistence to the second year in college (Pascarella, Salisbury, & Blaich, 2011). Student achievement and satisfaction are also positively related to instructor clarity (Chesebro & McCroskey, 2001; Hativa, Barak, & Simhi, 2001; Pascarella & Terenzini, 2005).

Higher-order learning takes place when students make connections between concepts and information (Lewis & Smith, 1993), such as when instructors give students the opportunity to apply previously learned concepts to new situations, deconstruct an idea into its component parts, construct new concepts, and evaluate sources of information. Students who engage in these "deep approaches to learning" (Marton & Säljö, 1997), which go beyond rote memorization, are more likely to be motivated to learn and better able to use these conceptual and evaluative skills outside of the classroom (Biggs, 1988; Merrill, 2002). Instructors who facilitate students' active engagement in classroom dialog and who intentionally structure lessons to frame students' thinking about the material are more likely to influence higher-order learning in a positive direction (Pehmer, Gröschner, & Seidel, 2015).

Reflective and integrative learning represents an additional aspect of deep approaches to learning (Marton & Säljö, 1997) characterized by encouraging students to see others' viewpoints, connecting ideas across courses, appreciating diverse perspectives, and evaluating their own viewpoints. Instructors who emphasize reflective and integrative learning allow students to build skills that lead to increased academic achievement and retention rates (Nelson Laird, Shoup, & Kuh, 2005; Zeegers, 2004). Huber and Hutchings (2005) noted that these skills are important outside of the classroom as students enter a world and workforce that is increasingly fast-paced and globally-focused. In addition, Nelson Laird, Seifert, Pascarella, Mayhew, and Blaich's (2014) recent examination of the effect of students' reflection on materials suggests that such practice is a key component in increasing critical thinking, cognition, and literacy skills in college.

Collaborative learning involves students working together to help each other understand course content, prepare for exams, and complete projects on course material. Chickering and Gamson (1987) noted collaborative learning as a key pillar of the undergraduate learning experience. Cabrera et al. (2002) found that collaborative learning is a predictor of numerous positive student outcomes, including analytical skills, appreciation of art, and understanding of science and technology. Retention rates are also improved with increased positive interaction between students (Tinto, 1997). Collaborative learning benefits extend outside of the classroom, as students who learn the skills of "dialog, deliberation, and consensus-building" become stronger members of our shared civic life (Smith & MacGregor, 1992, p. 14). Effective teaching is clearly a cornerstone of student learning and success in higher education, thus the current study sought to understand the extent to which faculty motivation predicts teaching best practices.

1.3. Faculty Differences Across Institution Type

Faculty from three types of American higher education institutions (Bachelor, Master's, Doctoral based on Carnegie Classification of Institutions of Higher Education, 2017) were compared in the current study based on several potential reasons why faculty motivation for teaching, and by extension use of teaching best practices, may vary. First, graduate school may socialize faculty to be differentially motivated for teaching. Finkelstein (1984) posited that Ph.D. graduates from highly research-intensive institutions will have lower interest in teaching, compared to graduates with less advanced degrees from universities of other Carnegie classifications, because they have been

[1] The instructional clarity scale is named "Effective Teaching Practices" in the FSSE, but was renamed in the current study to reduce redundancy with the overall set of constructs.

socialized to value research activities early in their careers and they continue to find them attractive. As students from highly research-intensive graduate programs tend to be hired as faculty at research-intensive doctoral universities, their motivation for teaching may be lower than those at Master's and Bachelor universities. Finkelstein suggested, "Given the high degree of autonomy faculty enjoy, what faculty do on the job is what they want to do" (p. 221). Indeed, Bentley and Kyvik (2013) found faculty interest in research was the strongest predictor of faculty time on research. Blackburn et al. (1991) found faculty at Bachelor institutions have the highest interest in teaching, whereas faculty at Master's and Doctoral institutions having lower interests in teaching on average (though notably still high).

Second, faculty time devoted to teaching varies by institution type. The 2013–14 Higher Education Research Institute (HERI) Faculty National Survey found when full-time undergraduate faculty were asked to identify the "principle activity" of their current position, those at 4-year colleges (Bachelor) reported averages of 90.4% teaching and 0.8% research, whereas faculty at public Doctoral and Master's universities identified 55.8% teaching and 32.7% research (Eagan et al., 2014). Similarly, Blackburn et al. (1991) found two-year college faculty reported twice as much time given to teaching (i.e., Bachelor's, 70%) than did research university faculty (Doctoral, 35%), while comprehensive 1 were in the middle (Master's, 60%). Faculty working in positions with more time devoted to teaching may have superior motivation for that task as they can devote greater cognitive and emotional resources to building competencies in best practices; alternatively, faculty in jobs with less time for teaching have more competition for their motivational resources with research tasks.

Third, faculty may be differentially motivated for teaching based on how their institution rewards their efforts. Stephan and Levin (1992) suggested many faculty would seek to maximize the utility of their time in terms of income and prestige. For instance, as promotion and tenure at doctoral research-intensive universities is foremost dependent on published output, faculty will use as much time as possible for research until no further status gains are expected. Alternatively, faculty at predominantly teaching institutions (i.e., Bachelor's) would be more recognized for high quality teaching, thus will use as much time as possible for teaching. Appreciation and support for teaching by their institution may also foster a greater sense of relatedness with colleagues and students in the classroom, which according to SDT would foster more intrinsic motivation for teaching (Deci & Ryan, 1985). Faculty from Bachelor's, Master's, and Doctoral institutions were selected for comparison in the current study as they represent the spectrum of the value, time, and rewards given to faculty for teaching that may translate into motivational differences, and in turn teaching practices.

1.4. Aims of the Present Research

The current study aimed to test a model of faculty basic psychological need satisfaction and motivation as predictors of teaching best practices, as well as to compare these relations among faculty working at different institution types. There has been limited utilization of existing theoretical frameworks of motivation to understand how these pieces work together to explain faculty motivation and success. While empirical studies of faculty teaching have suggested an important role of intrinsic motivation, no studies to date have examined SDT's basic psychological needs as predictors of faculty motivation, and in turn motivation's relation to teaching outcomes. The potential differences in faculty teaching motivation across institution types is also untested in the research literature despite its potential as a key moderating factor.

The current study contributes to previous research in the following ways: (1) using a large, national sample of faculty members across a variety of disciplines; (2) examining faculty motivation beyond intrinsic motivation, namely introjected and external extrinsic motivations that are believed to be less optimal; and (3) predicting an outcome of faculty best teaching practices demonstrated to be related to student learning. The current study results have implications for the educational psychology, motivation, and higher education research literatures, as well as for faculty development officers and administrators seeking to understand and improve teaching on their campuses.

2. Method

2.1. Procedure

In the 2016 administration of the Faculty Survey of Student Engagement (FSSE), 14,512 faculty members responded from 119 Bachelor's-granting colleges and universities in the United States and Canada. FSSE was designed to explore faculty perceptions of student engagement, the importance faculty place on various areas of learning and development, the nature and frequency of student-faculty interactions, and how faculty organize their time in and out of the classroom. Institutions elect to participate in FSSE, and participating FSSE institutions select their own faculty samples. Faculty members at participating institutions are invited through email to respond to the online survey with administrations taking place between the end of March through the end of May. In 2016, 41% of contacted faculty responded to the survey with an average institutional response rate of 46% (ranged from 13% to 78%). FSSE 2016 institutions were similar in many ways to the profile of Bachelor's-granting colleges and universities in the United States, reflecting a wide range of institution types, helping to ensure that FSSE results represent a broad cross section of faculty members in the United States (FSSE, 2016b). The FSSE survey instrument and resulting data are routinely assessed as part of FSSE's commitment to transparency and continuous improvement. A framework and portfolio of studies examining the validity, reliability, and other quality indicators of FSSE's instrument and data can be found in the FSSE Psychometric Portfolio (FSSE, 2017).

The focus of this study was on an experimental extra item set about faculty motivation for teaching appended to the end of the FSSE survey for a subset of participating institutions. These nineteen institutions were selected at random from the pool of institutions that had not already appended two standard item sets to their FSSE administration. Of the institutions participating in FSSE in 2016, 59 institutions were eligible to receive one of three experimental items sets, resulting in the random selection of 19 institutions for the current study item sets. Although institutions could decline participation in this experimental set, none of the institutions did so. The average response rate for this subset of institutions was 46%, yielding a final sample for the current study of 1,671 participants.

Using the 2015 Basic Carnegie Classification system (2017), of the institutions that participated in this extra item set, three were Doctoral-granting universities (one with highest, one with higher, and one with moderate research activity), seven were Master's-granting colleges and universities (four with larger programs and three with medium programs), and nine were Bachelor's-granting colleges (three with an Arts & Sciences focus and six with a Diverse Fields focus). Thirteen of the institutions were private (not for profit) institutions, and the remaining six institutions were publicly controlled. This proportion of institutions mirrors the profile of four-year institutions in the United States (FSSE, 2016b). The undergraduate enrollment size of these institutions ranged from as small as 500 undergraduates to 40,000 undergraduates. These institutions were from a variety of locations representing the far West, mid-East, New England, plains, Southeast, and Southwest regions of the United States.

2.2. Participants

Respondents worked in a variety of academic disciplines. The largest proportions were in Arts and Humanities (21%), Social Sciences (14%), and Physical Sciences, Mathematics, and Computer Science (11%) disciplinary areas. About a quarter held an academic rank of

Assistant (23%), Associate (24%), and Full Professor (25%), while smaller proportions were full-time (16%) or part-time (13%) Lecturer or Instructor. Many participants were tenured (39%), a smaller proportion was on the tenure track (16%), a third were not on the tenure track (33%) although their institution has a tenure system, and the remaining worked at an institution without a tenure system (12%). For their highest degree earned, the majority of faculty held a doctoral (68%) or Master's degree (28%).

On average, these faculty had 17 years of teaching experience and spent 21 hours per week on teaching activities (preparing, teaching class sessions, grading, meeting with students outside of class, etc.); 8 hours on research, creative, or scholarly activities; 8 hours on service activities (committee work, administrative duties, etc.); and 5 hours advising students. The respondents had an average age of 51, identified almost equally as men (47%) or women (49%), and the majority were straight/heterosexual (82%). Three-quarters (75%) of the faculty identified as White with smaller proportions identifying as Black or African American (5%), Hispanic or Latino (4%), and multiracial (3%). Specifically, in terms of disciplinary area, gender identity, and racial/ethnic identification, the respondents in this study mirror the profile of faculty members participating in FSSE overall; as well as faculty members in the United States (FSSE, 2016b). One area of discrepancy is in employment status. Although the proportions of faculty in this study mirror the profile of faculty participating in FSSE overall in terms of full- or part-time status and academic rank, FSSE respondents are heavily overrepresented by full-time faculty (82% in FSSE versus 58% in the United States; FSSE, 2016b). For more details on respondents, see Table 1.

Table 1
Respondent characteristics.

		Count	Percent
Disciplinary Area	Arts & Humanities	353	21.3
	Biological Sciences, Agriculture, & Natural Resources	121	7.3
	Physical Sciences, Mathematics, & Computer Sciences	176	10.6
	Social Sciences	232	14.0
	Business	168	10.1
	Communications, Media, & Public Relations	71	4.3
	Education	168	10.1
	Engineering	34	2.1
	Health Professions	145	8.7
	Social Service Professions	81	4.9
	Other disciplines	109	6.6
Academic Rank	Full Professor	397	25.3
	Associate Professor	368	23.5
	Assistant Professor	353	22.5
	Full-time Lecturer/Instructor	254	16.2
	Part-time Lecturer/Instructor	196	12.5
Tenure Status	No tenure system at this institution	194	11.9
	Not on tenure track, but this institution has a tenure system	545	33.4
	On tenure track but not tenured	265	16.2
	Tenured	630	38.6
Highest Degree Earned	Doctoral degree (Ph.D., Ed.D., etc.)	1122	68.0
	Professional degree (J.D., M.D., D.D.S., D.V.M., etc.)	40	2.4
	Master's degree (M.A., M.S., M.F.A., M.B.A., M.S.W., etc.)	456	27.6
	Bachelor's, Associate's, or other degree	32	1.9
Gender Identity	Man	766	46.6
	Woman	812	49.4
	Another gender identity	4	0.2
	I prefer not to respond	63	3.8
Racial/Ethnic Identification	American Indian or Alaska Native	7	0.4
	Asian	53	3.2
	Black or African American	83	5.0
	Hispanic or Latino	62	3.8
	Native Hawaiian or Other Pacific Islander	2	0.1
	White	1239	75.2
	Other	22	1.3
	Multiracial	45	2.7
	I prefer not to respond	134	8.1
Sexual Orientation	Heterosexual	1358	82.3
	Gay	49	3.0
	Lesbian	32	1.9
	Bisexual	19	1.2
	Another sexual orientation	4	0.2
	I prefer not to respond	189	11.4

2.3. Measures

2.3.1. Basic psychological needs

A version of the Work-related Basic Need Satisfaction scale (W-BNS) from Van den Broeck, Vansteenkiste, Witte, Soenens, and Lens (2010) adapted for faculty (Stupnisky et al., 2017) assessed faculty members' perceived level of need satisfaction for teaching. Twelve items in response to the stem "*In your teaching*, how often do you feel the following" were evenly distributed among three subscales (4 = *Very often*, 3 = *Often*, 2 = *Sometimes*, 1 = *Never*). Example items for each construct were autonomy ("I have a sense of freedom to make my own choices"), competence ("I have confidence in my abilities to do things well"), and relatedness ("I am supported by the people whom I care about (students, colleagues, etc.))." See Table 2 for descriptive statistics on all scales.

Exploratory factor analysis (EFA) examined the dimensions of the basic needs scales as slight modifications from previous versions have not been tested, nor have the scales been examined among faculty from a range of institution types. The analysis utilized principle axis factoring, eigenvalues, scree plots, and percentage of variance accounted to determine factor extraction, and an oblimin oblique rotation for interpretation to account for correlated factors. The results supported a three-factor solution in line with past research (Stupnisky et al., 2017) and the SDT framework (Ryan & Deci, 2017), although we noted a two factor solution also fit the data which was not surprising given the high correlations among the factors and one autonomy item was cross loading onto the other factors (Auton4).

2.3.2. Motivation

Items from Frenet, Guay, and Senecal (2004) adapted for faculty members (Stupnisky et al., 2017) asked, "To what extent are the following reasons for why you teach?" (4 = *Very much*, 3 = *Quite a bit*, 2 = *Some*, 1 = *Very little*). Each scale was comprised of three items, for example: "I like teaching." (intrinsic), "It is important for me to teach." (identified), "I would feel guilty not teaching." (introjected), and "Because I am paid to teach" (external). EFA results supported a three-factor solution in which intrinsic and identified motivation combined into one autonomous factor, while introjected and external motivation formed unique factors. When we specified a four-factor solution the items separated into four factors with strong loadings (greater than 0.50) in line with SDT, however the factors for intrinsic and identified motivation were highly correlated at 0.71. Thus, for the main analyses intrinsic and identified were combined into one autonomous motivation factor, with supplemental analyses highlighting the unique results individually for intrinsic and identified motivation.

2.3.3. Teaching best practices

The four best practices scales were from the FSSE core survey (FSSE, 2016a). The instructional clarity scale utilized eight items asked in regards to the stem, "In your undergraduate courses, to what extent do you do the following?" (4 = *Very much*, 3 = *Quite a bit*, 2 = *Some*, 1 = *Very little*), for example "Teach courses in an organized way." The

Table 2
Scale descriptive statistics.

Variable	Range	*M*	*SD*	Skewness	Kurtosis	Cronbach's α Reliability
Basic Needs						
Autonomy	15–60	50.01	9.78	−0.83	0.07	0.76
Competence	20–60	53.22	8.54	−1.15	0.58	0.81
Relatedness	0–60	46.25	12.56	−0.62	−0.40	0.87
Motivation						
Autonomous	0–60	52.07	9.53	−1.35	1.69	0.81
Introjected	0–60	16.03	17.39	1.02	0.11	0.79
External	0–60	33.67	20.81	−0.18	−1.34	0.80
Teaching Best Practices						
Instructional Clarity	20–60	49.12	8.43	−0.54	−0.49	0.77
Higher−Order Learning	0–60	43.65	12.99	−0.63	−0.04	0.75
Ref. & Int. Learning	0–60	45.07	13.23	−0.82	0.06	0.87
Collaborative Learning	0–60	37.22	16.08	−0.25	−0.76	0.83

Note. All measures were transformed from a 1–4 scale to a 0–60 scale.

three remaining scales asked faculty about one particular undergraduate course section they are currently teaching or have taught during the current school year, which provided a more focused point of reference for their responses. The higher-order learning scale included four items asking faculty how much their coursework emphasizes activities such as "Analyzing an idea, experience, or line of reasoning in depth by examining its parts" (4 = *Very much*, 3 = *Quite a bit*, 2 = *Some*, 1 = *Very little*). The reflective and integrative learning scale included seven items that asked how important it is to the faculty that students typically engage in behaviors such as "Combine ideas from different courses when completing assignments" (4 = *Very important*, 3 = *Important*, 2 = *Somewhat important*, 1 = *Not important*). The collaborative learning scale contained four items asking faculty how much they encourage students to learn with their peers, such as "Ask other students for help understanding course material" (4 = *Very much*, 3 = *Quite a bit*, 2 = *Some*, 1 = *Very little*). The EFA results supported a four-factor solution with all items loading onto their expected factors (range 0.33–0.91). Consistent with FSSE reporting standards to aid interpretations, these scales were transformed such that scores ranged from zero to 60 with higher numbers representing better teaching practices.

3. Results

3.1. Rationale for Analysis

All scales showed acceptable Cronbach's alpha reliability levels (i.e., adequate > 0.70, good > 0.80; Warner, 2013) and sufficiently normal distributions (i.e., skewness less than 2.3, Lei & Lomax, 2005; kurtosis less than 7.0, Byrne, 2010). Latent variable analyses utilized AMOS version 24 with maximum likelihood estimation. Confirmatory factor analyses first evaluated the quality of the measurement model (i.e., the strength of the relations of the observed/measured variables to the latent/unmeasured variables) and the correlations among latent variables. Structural equation models then assessed structural regression paths between latent variables; specifically, the basic needs, motivation, and teaching outcomes. Finally, ANOVAs tested mean differences by institution type, which were supplemented by multi-group analyses comparing the model regression paths by institution type, testing first for measurement invariance and then for structural invariance. Criteria used to assess the model goodness of fit included: chi-square (χ^2), the comparative fit index and Tucker Lewis Index (CFI and TLI > 0.95 indicates a well-fitting model, < 0.90 requires respecification; Bentler, 1990; Hu & Bentler, 1999), and the root mean square error of approximation (RMSEA < 0.08 indicates an acceptable-fitting model, Browne & Cudeck, 1993; < 0.10 MacCallum, Browne, & Sugawara, 1996).

3.2. Measurement Model

Confirmatory factor analyses (CFA) including all study latent variables showed a goodness of fit that had room for improvement, $\chi^2(989) = 4389.16$, $p < .001$, CFI = 0.89, TLI = 0.88, RMSEA = 0.05. Two items were dropped due to weak loadings, which included higher-order learning item 1 ("Applying facts, theories, or methods to practical problems or new situations") and collaborative learning item 4 ("Work with other students on course projects or assignments."). We parceled items within the autonomous motivation, instructional clarity, as well as reflective and integrative learning scales to reduce model complexity, which is acceptable because EFAs confirmed each scale's unidimensionality (Little, Cunningham, & Shahar, 2002). Finally, modification indexes suggested correlating the error terms of competence items 1 and 2 as well as the error terms of relatedness items 3 and 4, which was understandable based on common words across items. The final measurement model had an improved goodness of fit, $\chi^2(448) = 1584.75$, $p < .001$, CFI = 0.95, TLI = 0.94, RMSEA = 0.04.

Correlations among the latent variables specified in the CFA are in Table 3. The basic needs to autonomy, competence, and relatedness had strong positive intercorrelations. In support of SDT, the largest positive correlations of the basic needs of autonomy, competence, and relatedness were with autonomous motivation. The basic needs positively correlated to a lesser extent with introjected motivation, but did not significantly correlate with external motivation. Also notable was the simplex pattern of correlations among the motivation types found in other studies (Guay et al., 2015), as evidenced by theoretically closer motivations with larger correlations (e.g., introjected and external) whereas theoretically distant motivations had weaker correlations (e.g.,

Table 3
Correlations among latent variables.

	1	2	3	4	5	6	7	8	9	10
1. Autonomy	–									
2. Competence	0.80*	–								
3. Relatedness	0.80*	0.63*	–							
4. Autonomous motivation	0.56*	0.49*	0.50*	–						
5. Introjected motivation	0.20*	0.15*	0.18*	0.35*	–					
6. External motivation	0.56*	−0.20	−0.05	0.00	0.42*	–				
7. Instructional clarity	0.34*	0.48*	0.30*	0.40*	0.24*	0.09	–			
8. Higher-order learning	0.21*	0.18*	0.17*	0.28*	0.19*	0.00	0.42*	–		
9. Reflective & integrative	0.18*	0.15*	0.18*	0.24*	0.16*	−0.01	0.41*	0.66*	–	
10. Collaborative learning	0.11*	0.12*	0.12*	0.18*	0.14*	0.05	0.31*	0.17*	0.10*	–

* $p < .001$.

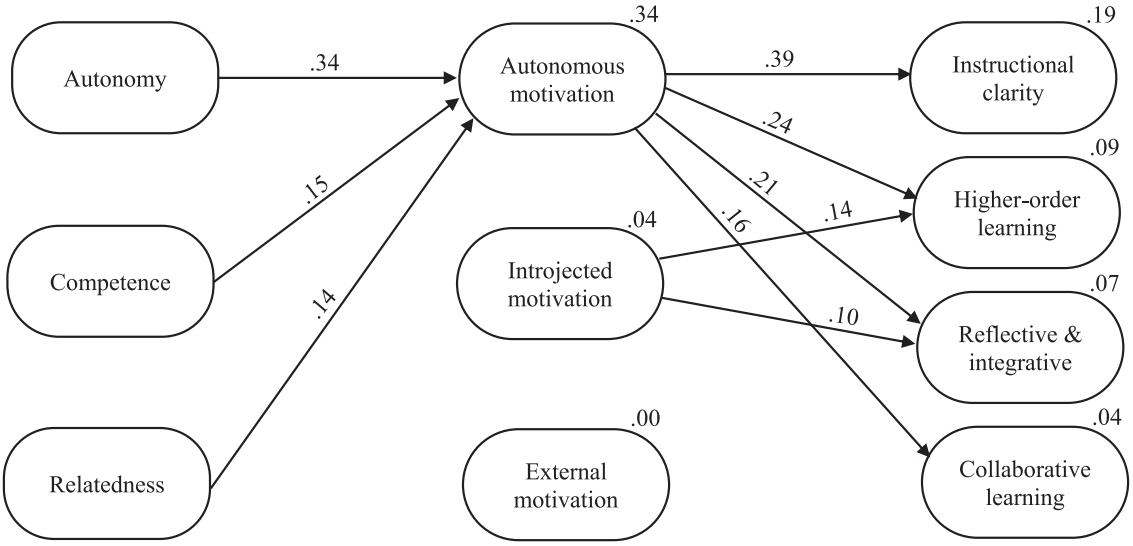

Fig. 2. Structural equation model for all faculty. Only significant paths at p < .05 shown, with parameters on top of lines. Latent variable R-squares above upper right corner of respective latent variables.

autonomous and external). Autonomous motivation had the largest positive correlations with the four teaching outcomes, while introjected had smaller positive correlations. External motivation had the weakest correlations with teaching outcomes, many of which were non-significant.

3.3. Structural Model

In the structural model, regression paths were specified from the basic need latent variables (autonomy, competence, relatedness) directly to the three motivation variables (autonomous, introjected, external), which in turn predicted the four teaching outcome variables (effective practices, higher-order learning, reflective and integrative learning, collaborative learning). Correlated were the motivation latent variable residuals, as were the residuals of the teaching outcome latent variables. The model fit the data, $\chi^2(460) = 1699.64$, $p < .001$, CFI = 0.95, TLI = 0.94, RMSEA = 0.04 (see Fig. 2).

All three basic psychological needs had positive significant predictive effects on autonomous motivation (34% variance explained), with autonomy having the largest effect. The basic needs did not significantly predict introjected or external motivation. Autonomous motivation had significant positive predictive effects on all four teaching outcomes, which from largest to smallest were effective teaching practices, higher-order learning, reflective and integrative learning, and collaborative learning. Introjected motivation also significantly related to higher-order learning, as well as reflective and integrated learning, although to a smaller extent than autonomous motivation. After accounting for the other motivation types, external motivation did not significantly relate to any of the teaching outcomes.

We next tested if the effects of the basic needs on teaching outcomes were mediated by autonomous motivation using Sobel tests (Preacher & Leonardelli, 2001).[2] Introjected and external motivation were not tested as mediators because they were not significantly predicted by the basic needs. Indeed, all mediational effects were significant from the basic needs of autonomy, competence, and relatedness to teaching outcomes through autonomous motivation. The results of the overall model provide clear support for SDT as an applicable framework to understand faculty motivation for teaching.

3.4. Multi-group Models

The final set of analyses tested if faculty members at Doctoral, Master's, and Bachelor's colleges/universities report different levels of motivation, and if differences exist in the predictors and outcomes of motivation among professors based on institution type. Using SPSS, ANOVAs tested for mean differences in all motivation study variables based on institution type, with significant differences probed using Tukey post-hoc comparisons. The results revealed faculty at doctoral institutions reported slightly higher autonomy, competence, and relatedness than faculty at Master's and Bachelor's institutions (see Table 4). Faculty working at doctoral institutions also reported slightly more external motivation than faculty from Master's institutions (no difference with faculty from Bachelor's institutions). The size of these statistically significant effects were small with Cohen's *d*s ranging from 0.25 to 0.16 (0.20 considered a small effect; Cohen, 1988), indicating only minor differences among faculty from different types of institutions. There were no statistically significant differences among faculty from Doctoral, Master's, or Bachelor's institutions on autonomous or introjected motivation.[3] This is an important finding as autonomous motivation had the largest and most adaptive relationships with positive teaching outcomes in the SEM, yet there was no differences in mean levels across institution type.

To test for measurement differences due to institution type, we first estimated a model in which Doctoral, Master's, and Bachelor's faculty members were analyzed as separate groups with all paths freely estimated (see Fig. 3). The results showed this configural model to fit the data with roughly equivalent factor structure across the groups, $\chi^2(1380) = 2770.35$, $p < .001$, CFI = 0.94, RMSEA = 0.03; thus, this model served as the baseline comparison for all further analyses. We then tested metric invariance by constraining the factor loadings of all latent variables, as well as measurement error covariances, to be equal across the three groups. This model also showed sufficient fit to the data, $\chi^2(1430) = 2835.54$, $p < .001$, CFI = 0.94, RMSEA = 0.03, and was deemed to be metric invariant based on non-significant change compared to the configural model, $\Delta\chi^2(50) = 65.20$, $p = .07$, ΔCFI = 0.000. The results indicate that faculty across these three institution types measure similarly using these scales.

To test for structural differences due to institution type, we first tested for differences in the basic need variables of autonomy,

[2] Sobel tests for mediational tests were used because AMOS will not allow bootstrapping with missing data.

[3] Neither intrinsic nor identified was significant when tested individually.

Table 4
Tests for motivation differences based on institution type.

	M(SD)			*F*	*p*	Cohen's *d*
	Bachelor's	Master's	Doctoral			
Basic Needs						
Autonomy	48.72(10.24)[b]	49.36(9.93)[b]	51.57(9.11)[a]	12.16	0.000	0.25
Competence	52.60(8.91)[b]	52.79(8.59)[b]	54.10(8.18)[a]	4.95	0.007	0.16
Relatedness	45.54(12.32)[b]	45.37(12.77)[b]	47.70(12.33)[a]	6.21	0.002	0.18
Motivation						
Autonomous	51.69(10.06)	51.84(9.61)	52.56(9.10)	1.36	0.258	0.06
Introjected	17.15(17.66)	14.91(17.53)	16.70(17.02)	1.91	0.080	0.11
External	33.37(20.26)[b]	32.01(20.70)[b]	35.81(21.11)[a]	5.61	0.006	0.17

Note. ANOVA between groups degrees of freedom were 2 and within-groups ranged from 1632 to 1564 (variable based on missing data). Differences in significant ANOVA follow-up pairwise comparisons using Tukey HSD adjustment indicated by differences in subscripts across row group means.

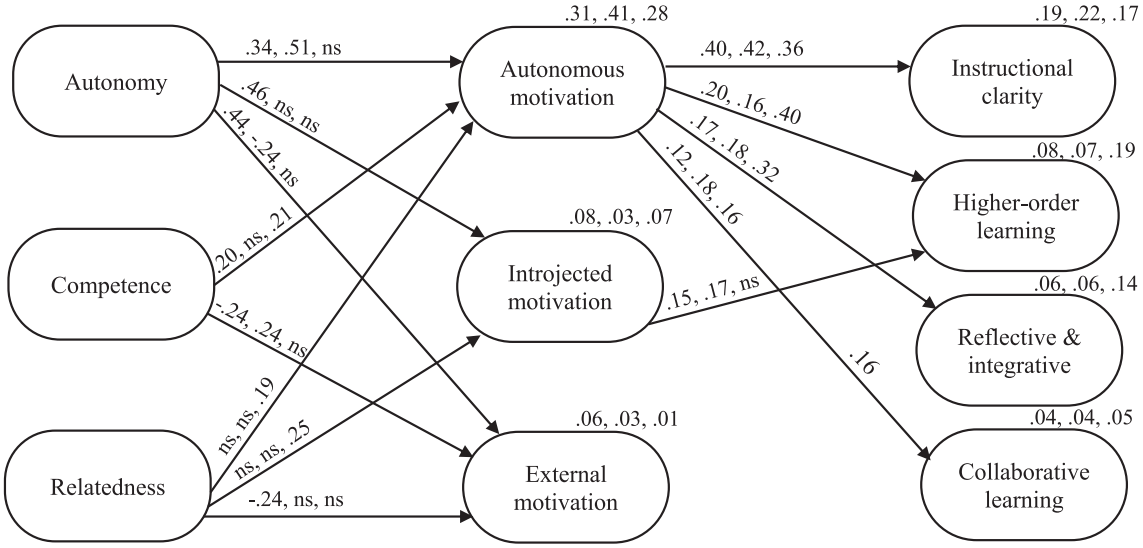

Fig. 3. Structural equation model by institution type. Only significant paths with at least one significant effect at p < .05 are shown. Parameters shown on top of respective paths are listed for faculty from institution types in the following order: Doctoral, Master's, Bachelor's. Non-significant paths indicated with "ns". Latent variable R-squares above upper right corner of respective latent variables.

competence, and relatedness predicting motivation of autonomous, introjected, and external by constraining these regression paths. This model also showed sufficient fit to the data, $\chi^2(1448) = 2861.14$, $p < .001$, CFI = 0.94, RMSEA = 0.02; however, was significantly different than the configural model based on the chi-square test, $\Delta\chi^2(68) = 90.80$, $p = .03$, ΔCFI = 0.001. The source of the variance was identified by systematically freeing paths that were observed to be the largest changes across the groups (based on the configural model) until the structural model no longer was different then the configural model, $\chi^2(1442) = 2849.27$, $p < .001$, CFI = 0.94, RMSEA = 0.02; $\Delta\chi^2(62) = 78.92$, $p = .07$, ΔCFI = 0.001. Three paths were significantly different across groups. First, whereas a large positive path from autonomy to introjected motivation was found for faculty at doctoral institutions (β = 0.46, $p < .01$), the relationships were non-existent among faculty at Master's (β = −0.05) and Bachelor's institutions (β = 0.04). Second, the path from autonomy to external motivation was again positive among faculty at doctoral universities (β = 0.44, $p < .01$), but a negative path was observed among faculty at Master's institutions (β = −0.24) and a near zero path at Bachelor's institutions (β = −0.05). Taken together, these group differences suggest that doctoral faculty who feel autonomous may endorse more controlled motivation for their teaching, perhaps in order to balance their motivational resources in favor of their higher research workload. Third, the path from competence to external motivation was negative for faculty at Doctoral universities (β = −0.24, $p < .05$), but was different among faculty at Master's (β = 0.24) and Bachelor's (β = −0.07) institutions.

Note that these significant differences in the predictors of motivation all related to extrinsic motivations that ultimately had less impact on teaching outcomes. In terms of predictors of autonomous motivation across the institution types, SDT was supported among all faculty groups with a few slight differences in emphasis. Faculty at doctoral universities autonomous motivation was significantly predicted by autonomy (β = 0.30) and competence (β = 0.20). Faculty at Master's universities autonomous motivation was strongly predicted only by autonomy (β = 0.51). Finally, faculty at Bachelor's universities autonomous motivation was most strongly predicted by competence (β = 0.21, $p = .053$), relatedness (β = 0.19, $p = .056$), and autonomy the least (β = 0.18, $p = .21$).

Finally, we tested for structural differences due to institution type in motivation predicting teaching outcomes. This was done by constraining the regression paths from the motivation types of autonomous, introjected, and external to the four teaching outcomes of effective practices, higher-order learning, reflective and integrative

learning, and collaborative learning. This model also showed sufficient fit to the data, $\chi^2(1454) = 2855.23$, $p < .001$, CFI = 0.94, RMSEA = 0.02, and the chi-square test showed the paths were not significantly different than the configural model, $\Delta\chi^2(74) = 84.88$, $p = .18$, ΔCFI = 0.000. Indeed, among faculty at every institution type, autonomous motivation was a significant positive predictor of all four positive teaching behaviors. Alternatively, introjected motivation was a significant positive predictor of higher-order learning among faculty at doctoral and Master's institutions, and external motivation was not a significant predictor of any teaching behaviors at any institution type.

4. Discussion

Researchers and practitioners have consistently theorized, found empirical support for, and disseminated a number of teaching best practices as effective in higher education (BrckaLorenz et al., 2012; Chickering & Gamson, 1987; McKeachie, 2007; Pascarella & Terenzini, 1991, 2005), yet instances of low quality teaching in university remain a common criticism (Serow et al., 1999; Wilkesmann & Schmid, 2014). The purpose of the current study was to test a model of faculty members' motivation for teaching as an important predictor of best practices, and additionally to explore if higher education institution type moderates these effects. The results strongly supported the self-determination theory (Ryan & Deci, 2017) based model and contribute to the empirical literature, but also have implications for faculty development officers and administrators seeking to boost instructor effectiveness.

Support for the first component of the model came when faculty satisfaction of the basic psychological needs of autonomy, competence, and relatedness during teaching predicted greater autonomous motivation, such as for the intrinsic enjoyment or the identified importance of the teaching. Alternatively, satisfaction of these needs did not relate to controlled motivation for teaching, such as based on external rewards or introjected guilt. These results provide strong support for SDT's assertion that optimal motivation emanates when these three needs are satisfied (Ryan & Deci, 2017), which replicates previous empirical studies (Stupnisky et al., 2017). Indeed, Wilkesmann and Schmid (2014) found introducing rewards did not optimally enhance faculty motivation for teaching, instead they suggested creating autonomy supportive environments.

The next supported component of the model was when autonomous motivation was a positive significant predictor of teaching best practices, whereas the two types of controlled motivation were not significant predictors. Indeed, finding teaching enjoyable and important led faculty to report increased utilization of all four teaching best practices analyzed in the current study: instructional clarity, higher-order learning, reflective and integrative learning, and collaborative learning. These findings support SDT assertion that the type of motivation is critical in predicting outcomes (Deci & Ryan, 2008; Howard et al., 2016), which has also been found in past empirical research on faculty teaching (Bouwma-Gearhart, 2012; Stupnisky et al., 2017).

Taken together, these results suggest efforts to improve the utilization of teaching best practices should focus on facilitating autonomous motivation for teaching. We recognize that some faculty may never be intrinsically motivated to teach (i.e., teaching because of inherent enjoyment), yet the models showed identified motivation for teaching (i.e., teaching because of believed importance) were equally effective in predicting teaching best practices among faculty, which may be a more reachable goal for faculty development. Strategies to optimize faculty motivation for teaching may include providing faculty choice in course selection as well as teaching content and style, professional development workshops and adequate preparation time to bolster teaching competency, and finally facilitating faculty connections with their students and colleagues to improve relatedness. These changes are likely to lead to faculty viewing teaching as more enjoyable and important, which will lead to a desire to improve their practices via utilizing the best techniques to help their students learn. Su and Reeve's (2011) meta-analysis shows SDT-based intervention programs designed to foster autonomy supportive environments were effective in creating change among K-12 teachers, parents, and professionals in various businesses, yet contained no studies examining university faculty. Similarly, Feldman and Paulsen (1999) proposed that teaching excellence is fostered through creating a "supportive teaching culture" marked by informative feedback from colleagues, chairs, and students to provide opportunities to learn and stimulate improved instruction.

When the models compared faculty across institution types as a potential moderator of the above effects, a critical finding was that faculty in Doctoral, Master's, and Bachelor's universities autonomous motivation significantly positively predicted all four teaching best practices. This finding again provides support for SDT (Ryan & Deci, 2017) that proclaims autonomous motivation is optimal across all situations. Another important finding was that there were small or very small mean level differences in faculty motivation across institution type. Although faculty at doctoral universities were found to report slightly greater satisfaction of autonomy, competence, and relatedness, as well as more external motivation, faculty reported the same levels of autonomous motivation. Taken together, the findings contradict some assertions that faculty at research-intensive Doctoral and Master's institutions are less or detrimentally motivated to teach (Serow et al., 1999).

An unexpected finding was that the strongest predictors of faculty motivation for teaching were different across institution types. Whereas SDT would suggest that autonomous motivation is fostered by the satisfaction of all three basic needs, the results showed autonomous motivation among Doctoral and Master's faculty was predicted by autonomy and competence, whereas autonomous motivation for Bachelor's faculty was predicted by competence and relatedness. Most surprising was that among faculty at Doctoral institutions, autonomy positively related to introjected and external motivation. This finding may be explained by many faculty at doctoral institutions being socialized to value research over teaching while in graduate school (Finkelstein, 1984), focusing on research to gain rewards from their institutional that are less connected to teaching (e.g., tenure, promotion; Stephan & Levin, 1992), and in turn allocating more time to research than teaching (Eagan et al., 2014). Nevertheless, the impact of these results for Doctoral faculty is qualified by two additional effects: (1) competency and relatedness negatively predicting external motivation, which again shows that satisfying the basic needs fosters autonomous motivation; and (2) introjected and external motivation were not significant predictors of teaching best practices, meaning these motivation types are less consequential than autonomous.

Another difference across institution type was that faculty motivation for teaching at Bachelor's universities was more strongly predicted by relatedness than autonomy. Faculty at Bachelor's universities may tend to have less autonomy in their curriculum as these smaller institutions typically offer a smaller range of courses, thus may rely on strong connections with students and colleagues to generate their autonomous motivation. Faculty at Bachelor's institutions are also less focused on research as often not a contractual priority, yet are likely in their position with others who similarly highly value students and teaching. These unexpected findings regarding the differentiation of key motivation predictors across institution types is an important area for future research.

4.1. Strengths, Limitations, and Future Directions

The current study bolstered the literature by testing a conceptual model rooted in the established motivation framework of self-

determination theory (Ryan & Deci, 2017). Unique was the examination of multiple motivation types, beyond intrinsic motivation, to predict teaching best practices that are reflective of student learning. The large, national sample of faculty from a variety of disciplines allowed greater generalizations of the findings to the larger body of university faculty in the United States. The large sample furthermore allowed for comparisons of the hypothesized effects across institution types. Finally, the study utilized established multi-item survey measures with good reliability analyzed with SEM to account for measurement error and provide greater confidence in the findings.

Nevertheless, researchers and practitioners should consider the following limitations of the current study when interpreting the findings. First, institutions self-selected participation and selected their own samples that may reduce generalizability. This accounts for the overrepresentation of full-time faculty in the study. Any interpretations of these results with respect to part-time faculty should be made with caution. Second, the motivation variables were measured with an extra set of items near the end of the survey, so perhaps only the most "motivated" faculty who completed the full survey responded to the motivation questions. Third, the current study was cross-sectional, thus mediation results need further testing. Each of these limitations can be remedied by further research focused on faculty motivation for teaching, as well as for research, which utilizes large-scale randomly selected institutions participating in longitudinal data collections. Although this study focused on institution type, additional variables may play a role in faculty teaching motivation that researchers should explore in future studies, such as gender, race/ethnicity identification, sexual orientation, career stage, and disciplinary appointment. The current results provide good evidence that motivation is an important component in faculty teaching best practices that deserves further study.

Appendix A. Study Scales with Measurement Models' Latent Variable Factor Loadings

Basic psychological needs

Name	*Autonomy*	Initial loading	Final loading
Aut1	I have a sense of freedom to make my own choices	0.46	0.46
Aut2	My decisions reflect what I really want	0.78	0.78
Aut3	My choices express who I really am as a teacher	0.76	0.76
Aut4	I do what really interests me	0.68	0.69
	Competence		
Comp1	I have confidence in my ability to do things well	0.78	0.69
Comp2	I am capable at what I do	0.78	0.69
Comp3	I can competently achieve my goals	0.68	0.73
Comp4	I can successfully complete difficult tasks	0.70	0.72
	Relatedness		
Rel1	The people I care about (students, colleagues, etc.) also care about me	0.81	0.82
Rel2	I am supported by the people whom I care about (students, colleagues, etc.)	0.79	0.81
Rel3	I am close with people who are important to me (students, colleagues, etc.)	0.80	0.77
Rel4	I experience warm feelings with the people I spend time with (students, colleagues, etc.)	0.77	0.73

Motivation

Name	*Autonomous (intrinsic) motivation*	Initial loading	Final loading
Auton1	It is pleasant to teach	0.73	0.86
Auton2	I find teaching interesting	0.80	0.86
Auton3	I like teaching	0.79	0.85
	Autonomous (identified) motivation		
Auton4	It is important for me to teach	0.63	0.85
Auton5	Teaching allows me to attain work objectives that I consider important	0.57	0.61
Auton6	Teaching is important for the academic success of my students	0.43	0.61
	Introjected motivation		
Introject1	If I don't teach I will feel bad	0.75	0.75
Introject2	I would feel guilty not teaching	0.84	0.84
Introject3	I do not want to feel bad if I do not teach	0.68	0.68
	External motivation		
External1	My work demands that I teach	0.78	0.78
External2	Because my university/college obliges me to teach	0.86	0.86
External3	Because I am paid to teach	0.63	0.63

Teaching best practices

Name	*Instructional clarity*	Initial loading	Final loading
Effective1	Clearly explain course goals and requirements	0.59	0.61
Effective2	Teach course sessions in an organized way	0.50	0.61
Effective3	Use examples or illustrations to explain difficult points	0.43	0.61
Effective4	Use a variety of teaching techniques to accommodate diversity in student learning styles	0.60	0.73
Effective5	Review and summarize material for students	0.59	0.73
Effective6	Provide standards for satisfactory completion of assignments (rubrics, detailed outlines, etc.)	0.60	0.69
Effective7	Provide feedback to students on drafts or works in progress	0.56	0.69
Effective8	Provide prompt and detailed feedback on tests or completed assignments	0.45	0.69
	Higher-order learning		
HighOrder1	Applying facts, theories, or methods to practical problems or new situations	0.37	–
HighOrder2	Analyzing an idea, experience, or line of reasoning in depth by examining its parts	0.69	0.65
HighOrder3	Evaluating a point of view, decision, or information source	0.80	0.82
HighOrder4	Forming a new idea or understanding from various pieces of information	0.73	0.72
	Reflective & integrative learning		
RefInt1	Combine ideas from different courses when completing assignments	0.43	0.73
RefInt2	Connect his or her learning to societal problems or issues	0.75	0.73
RefInt3	Include diverse perspectives (political, religious, racial, gender, etc.) in course discussions or assignments	0.83	0.90
RefInt4	Examine the strengths and weaknesses of his or her own views on a topic or issue	0.81	0.90
RefInt5	Try to better understand someone else's views by imagining how an issue looks from his or her perspective	0.87	0.86
RefInt6	Learn something that changes the way he or she understands an issue or concept	0.61	0.86
RefInt7	Connect ideas from your course to his or her prior experiences and knowledge	0.54	0.86
	Collaborative learning		
Collab1	Ask other students for help understanding course material	0.86	0.86
Collab2	Explain course material to other students	0.89	0.90
Collab3	Prepare for exams by discussing or working through course material with other students	0.68	0.67
Collab4	Work with other students on course projects of assignments	0.53	–

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