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ORIGINAL ARTICLE

The Impact of a Policy Designed to Promote Systemic Change Related to Promotion and Tenure Decisions in STEM

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ABSTRACT

This research study focused on understanding changes that were taking place in Promotion and Tenure (P and T) practices in eight selected institutions of higher education in the state of Georgia and examined factors, if any, that were acting as a catalyst for change. The research team used both quantitative and qualitative analyses of the P and T dossier reviews. The study did broaden our understanding of important and complex issues in higher education. The results have implications for higher education faculty and administrators as they contemplate tenure and promotion decisions and policies, and complete future research studies.

KEY WORDS: Culture and change; institutional culture; policy; promotion and tenure; STEM faculty; systemic change

INTRODUCTION

The effectiveness of teaching practices in college science, technology, engineering, and mathematics (STEM) courses appears to be a contributing factor to the attrition of undergraduate students from STEM fields. Several national organizations, numerous reports, and a significant body of research have all pointed to the impact of quality of teaching on the retention of individuals in STEM majors (e.g., Association of American Universities, 2011; National Research Council, 2003; National Science Foundation, 2018). These varied sources have all advocated for fundamental changes in the teaching and learning of STEM, suggesting that education reform in this area of higher education is long overdue. College faculty have had a long history of grassroots involvement in educational reform efforts such as alignment and evaluation of courses and curricula, participating in learning communities, the development and delivery of workshops, and faculty institutes (Wiseman and Knight, 2003). Despite these efforts, there is a sense that little systemic reform has actually occurred (Shadle et al., 2017). As Rice (2006) emphasized, the additive or incremental process to reform is no longer sufficient. Rice stipulated that a more transformative way of thinking about STEM teaching and learning is needed.

Many institutions of higher education (IHE) have acknowledged an impetus for profoundly reforming undergraduate STEM teaching and learning practices. It is evident that IHEs, especially Doctoral Universities with the highest research activities (R1)[1], have taken STEM education more seriously than they ever had in the past. They have provided substantial disbursements of time and money on research and faculty development to improve STEM education and pedagogical practices of college faculty. While these efforts to provide resources and support for changes in STEM teaching practices are valuable, they need to be combined with clear changes in policy within the universities that prioritize pedagogical improvements/quality before these practices will become widely accepted and sustainable (Ellett et al., 2012; 2015). Specifically, universities need to communicate to faculty that efforts by faculty to improve their pedagogical practices and engage in scholarship related to this are viewed as being just as valuable as efforts related to service and, particularly, research (Vithal et al., 2013).

Despite the possibilities for productive change outlined in the preceding paragraph, it is likely that more systemic reform in STEM teaching and learning practices will not happen unless universities incorporate the push for changes not just in the rhetoric of their leaders, but in the expectations communicated to faculty members. University faculty would be incentivized to devote the time and effort needed to reformulate their approaches to STEM teaching and learning if tenure and

1 According to the Carnegie Classification (Indiana University Center for Postsecondary Research, n.d), Doctoral Universities offer a full range of baccalaureate programs, graduating at least 20 doctorates per year. R1 refers to Doctoral Universities with highest research activity.

promotion guidelines made explicit how such reformulations would be valued. This article examines the extent to which visible evidence of emphasizing best teaching approaches and attempts by faculty to learn about and implement those approaches appeared in the promotion and tenure (P and T) review documentation associated with STEM-focused faculty. Specifically, the research question is: To what extent do faculty P and T decisions recognize and reward science and mathematics faculty for focusing their efforts on scholarly teaching (ST), the Scholarship of Teaching and Learning (SoTL), and the Scholarship of Engagement (SoE)?

LITERATURE REVIEW

Change in Practice

Research on change strongly supports the notion that innovations will not be implemented in institutions simply because the change makes sense and meets the specified needs of individuals or the organization (Fullan, 1991). Thus, endeavors toward reforming undergraduate STEM education have been met with only modest success (Handelsman et al., 2004). A mediating factor, especially, at research-intensive/extensive universities, is the culture, which often engenders a resistance to shifting from traditional pedagogical practices towards reform-based, student-centered practices (e.g., Brown et al., 2006; Demir et al., 2012). It is unreasonable to assume that college faculty will spontaneously and unexpectedly change their deep-seated beliefs about pedagogical practices. Research on teacher change, largely with K-12 teachers, has emphasized that the teacher as a decision-maker, problem solver, and person of values and beliefs strongly influences practice (e.g., Kagan, 1990). Since reform in practice depends on teachers, the reform of pedagogical practices requires a great deal of learning on the part of teachers and is difficult to accomplish without support and guidance (Ball and Cohen, 1999).

Boyer (1990) argued that systematic change in teaching and learning practices at the collegiate level is dependent on the reconsideration of the meaning that IHEs attribute to teaching and learning and scholarship. Boyer claimed that teaching and learning should be regarded as a scholarship that is a part of the larger whole of academic work and proposed a model of that scholarship. Boyer's model advocates for the expansion of the traditional definition of scholarship and research into four types of overlapping areas of scholarship: discovery, integration, application, and teaching and learning. The SoTL resulted, in part, out of a need to rebalance the triadic task of large academic institutions that have traditionally accentuated research over teaching and service (Walker et al., 2008). The SoTL differs from ST as it goes beyond ST and is informed by how students learn and how pedagogical practices influence the process of learning. The SoTL "results in a formal, peer-reviewed communication in appropriate media or venues, which then becomes part of the knowledge base of teaching and learning in higher education" (Richlin and Cox, 2004, p. 127). Boyer (1996) revised the definition of scholarship to include SoE - encompassing university and community collaboration through service-learning activities - and underlined the role of IHEs in the community to work towards addressing national problems, for example, social, ethical, and civic problems. Boyer (1996) described the SoE as a form of scholarship, "connecting the rich resources of the university to our most pressing social, civic, and ethical problems, to our children, to our schools, to our teachers, and to our cities" (pp. 19-20). Given Boyer's recognition of the need to expand the areas of scholarship, we will be considering all three in this paper: Scholarship of (1) Teaching (ST), (2) Teaching and Learning (SoTL), and (3) Engagement (SoE).

The importance of improving ST/SoTL/SoE and creating innovative solutions to enduring teaching and learning problems in higher education is increasingly being recognized. Many IHEs in the United States have responded to this situation by instituting partnerships among IHEs and K-12 schools that go well beyond symbolic affiliation, not only at the institutional level, but also at the state and national levels (e.g., Kutal et al., 2009; O'Meara, and Rice, 2005; Postareff et al., 2008). Several states (e.g., Georgia, Ohio, South Carolina, Tennessee) and some IHEs (e.g., Florida Atlantic University; North Carolina State University; Michigan State University; Portland State University; University of Illinois at Chicago) have developed and implemented such policies and programs to improve the ST/SoTL/SoE (e.g., Colbeck, 2002; Ellett et al., 2015; Fairweather and Beach, 2002; Walker et al., 2008). National development efforts such as the National Science Foundation (NSF)'s Math and Science Partnership program (MSP) also become a catalyst for K-16 partnerships and improving ST/SoTL/SoE. MSP programs facilitated college faculty's engagement with community members to address daily-life problems. As a result of MSPs, more STEM faculty members at 2 and 4-year IHEs became involved in the ST/SoTL/SoE and research related to K–16 teaching and learning (Zhang et al., 2010). Yet, as Zhang et al. reported, these partnerships are easy to extol but difficult to achieve and sustain.

There is a difference in the priorities that different types of IHEs place on faculty roles and responsibilities in the threefold mission of teaching, scholarship, and service. This emphasis varies significantly on the IHE's missions and faculty rank of the professoriate (Green, 2008). Reputation and success in large research IHEs largely exist in the research efforts of the faculty at those institutions (Green, 2008; Scott, 2006). Good teaching may be expected on those campuses, but it is hardly privileged. Thus, cultivating ST/SoTL/SoE at a collegial level, especially in research-intensive and/or extensive IHEs, has not been a trivial effort as priorities and roles discourage practices of risk-taking and inquiry that are necessary to reform (Cohen, 1988; McDuffie and Graeber, 2003). A significant barrier to engaging faculty in ST/SoTL/SoE, especially for junior faculty members, is the traditional institutional reward structure that undervalues service and teaching relative to research (Braxton et al., 2002; Chalmers, 2011; Gelmon and Agre-Kippenhan, 2002; Kreber, 2000). Thus, particularly at research-oriented

universities, faculty must negotiate the differential emphasis placed on the practices of teaching and research.

P and T in IHE

In most IHEs, especially research-oriented ones, P and T are manifestly driven by research. As Zlotkowski (1996) suggested, it is unlikely that *systemic* change will occur unless there is congruence between the values held by faculty and the priorities of P and T. Systemic change "recognizes the interrelationships and interdependencies among the parts of the educational system, with the consequence that desired changes in one part of the system are accompanied by changes in other parts that are necessary to support those desired changes" (Jenlink et al., 1996, p. 22). Bates (2010) suggested that leadership teams in IHE should require evidence of competence in college teaching (as well as research) as a prerequisite of tenure. Otherwise, as Bates asserted, no research university will willingly go this route. Ehlers and Schneckenber (2010) projected that the changes in higher education need three pillars to rest on (a) strategies for change: in will, IHE have to engage in a more strategic progression of change; (b) competence for change: IHE have to develop the capabilities of their professionals such as adopting new forms of incentive systems to develop new ways of living and working, teaching, and researching; and (c) Quality and innovation as a basis for change: by empowering stakeholders to participate in defining and implementing values into professional and reflected practice. Ultimately, sustainable changes in IHEs require changes in organizational culture and faculty incentive and reward structures, particularly at the departmental level (Ellett et al., 2015; Weiman et al., 2010).

Despite state and institutional policies to promote the SoTL, researchers noticed that the value of research productivity in faculty rewards remained high as faculty increased their time allocated to research across all types of IHE, while time dedicated to teaching and service has decreased (e.g., Colbeck, 2002; Fairweather and Beach, 2002; Gray et al., 1996; Green, 2008; Hattie and Marsh, 1996; O'Meara, 2002, 2005; Walker et al., 2008). These researchers found little evidence that those policies have improved faculty's SoTL directly or even indirectly. According to Boyer's 1990 study of more than 5,000 faculty members, the majority of faculty stated that the quality of their teaching, not their publishing performance in pure research, should be the most important criteria for promotion. However, their perceptions of the institutions within which they worked, indicated that pure research in their particular fields was a more imperative factor in decisions made in regard to tenure. Walker et al. (2008) stated that therein lies the SoTL paradox: Faculty emphasize the quality of teaching, while their institutions focus on the quality of their research. In a study that qualitatively analyzed 62 P and T guidelines and specifications from different types of IHEs by Hardré and Cox (2009), research was identified as the primary criterion for P and T. Similar tendencies have been noted outside of the United States as well: For example, in a summary of the P and T documents of 44 universities in Canada, Gravestock and Greenleaf (2008) found that there was only one university that unambiguously used Boyer's model of SoTL in their tenure and promotion guidelines.

Research on change and reform implies that adjustments to P and T with any hope of reforming teaching must center on the cultural norms, values, beliefs, and inner workings of IHE, so their members view their roles in new ways reflecting reform and desired changes (e.g., Bergquist, 1992; Ellett et al., 2015). Thus, as P and T guidelines are revised to reflect SoTL, they need to include elements that can address and revise existing cultural norms. Rice (1996) stated that the expanded definition of SoTL will struggle to survive if the status quo in higher education remains the same. O'Meara (2002) stated that faculty struggles with P and T are attributed to ambiguous and often incongruous criteria. Secret et al. (2010)'s work support O'Meara's findings. After examining a number of P and T guidelines of colleges and schools in different IHE, Secret et al. observed misunderstandings about what SoTL entails in the guidelines as they classified some examples of activities as both Teaching and Research.

While institutional culture, norms, reward structures, and policies are important facilitators of institutional change, the roles of stakeholders in facilitating reform are also equally important. A large amount of literature has reviewed stakeholders' roles, inquiring how department chairs, deans, faculty, student affairs officers, and presidents help with planning and promoting change in their institutions (e.g., Alshare et al., 2007; Bates, 2010; Gray et al., 1996; Wolverton et al., 1998). Senge (1990) claimed that both faculty and administrative leaders are "prisoners of their own thinking" (p. 27) since they are not fully competent to make P and T decisions based on the definition of SoTL existing in P and T guidelines. Senge articulated that both parties embrace values about faculty roles, scholarship, and institutional identity that refute the values foundational to the new reward structure. In their study, Gray et al. (1996) surveyed 50,000 faculty, chairs, deans, and administrators at large research universities. Their study showed that teaching and research were not equally measured, and research was found to be more valued than teaching. Alshare et al.'s (2007) study, which specifically dealt with deans' decisions on P and T for business faculty at both teaching and research colleges, detected substantial differences in the assigned weights for research, teaching, and service activities. Deans at teaching schools, on average, assigned the following weights to promotion decisions, "47%, 43%, and 10% to teaching, scholarly, and service activities and assigned 48%, 42%, and 10% for tenure decisions" (p. 61). On the other hand, deans at research institutions assigned, "57%, 32%, and 11% to scholarly, teaching, and service activities for promotion decisions, and assigned 59%, 33%, and 8% for tenure decisions" (p. 61).

Inconsistencies between IHE rhetoric and the realities of reward structures and the emphasis on research to the detriment of teaching and service in P and T decisions have been recognized as major sources of stress and dissatisfaction

of SoTL (Gmelch et al., 1986; Tierney and Bensimon, 1996). Focusing on the power of and roles of faculty, Gess-Newsome et al. (2003) claimed that to stimulate and maintain fundamental change in faculty's commitment, specific and concentrated attention must be given to the personal practical theories of the faculty involved. Gonzalez and Padilla's (1999) study on faculty commitment and engagement in institutional reform substantiates claims made by Zlotkowski (1996) and Gess-Newsome et al. (2003) and Gonzalez and Padilla (1999) stated that when individual and institutional values are congruent and faculty members have high expectation about the possibility of the educational reform, they are eager to engage in the process of the proposed change. When either factor is weak, faculty may reduce their participation or disengage completely. Yet, positive and negative faculty attitudes toward change could also be associated with other factors such as gender, academic appointment, race, student achievement, and age. Clarke et al. (1996), for example, while observing faculty's receptivity and resistance to change, found that older faculty were more likely than younger faculty to be resistant to change; full professors were less likely to be receptive to change than assistant professors; and female respondents were more likely to be receptive to change than their male counterparts.

Ellett et al. (2015) asserted that changes in the culture of higher education require the liberation of creative resources that are currently bound in institutional hierarchies that are consistently too large and obstinate. McDuffie and Graeber (2003) supported those arguments and suggested that a successful reform aimed at improving the quality of SoTL at the higher education level must involve a change in the institutional norms and policies that govern the priorities given to teaching. It is necessary for administrators to: understand reform-based approaches to teaching; have the ability to advocate for and support institutional change; and promote a collaborative and supportive teaching community (Ellett et al., 2012, 2015; Brown and Smith, 1997; Eib and Miller, 2006; Erklenz-Watts et al., 2006). Related to these preceding points, this study is designed to add to the literature on the relationship between SoTL and P and T by examining an effort to support changes in STEM teaching and learning through informing promotion-and-tenure decision-makers about the importance of emphasizing effective pedagogy in both policy and practice associated with P and T.

Context of the Study

In response to the issues pertaining to college faculty's scholarly engagement in different types of scholarships described above, the University System of Georgia Board of Regents (USG-BOR) received a $34.6 million NSF grant between 2003-2010 called the Partnership for Reform in Science and Mathematics (PRISM). PRISM was a comprehensive statewide research and development project that sought to: increase achievement by students in P-12 grade levels in science and mathematics to improve their readiness for careers in STEM; increase the responsiveness of higher-education faculty in science and mathematics to the needs of K-12 schools; and close the achievement gaps among various demographic groups through partnerships at the university and P-12 level. PRISM involved four regions of the state, including 15 school districts and seven USG institutions.

Subsequently, the USG-BOR adopted a major policy change in 2006 labeled as Work in the Schools Policy (WISP). Later, USG-BOR changed the name of the policy to Enhancing Teaching and Learning in K-12 Schools and University System of Georgia (USG) Institutions to clarify misunderstanding associated with the name. The policy applies to all 26 USG institutions (see section 8.3.15 in USG Board of Regents Policy Manual, n.d) (henceforth we refer to the policy as ETLP). This policy specifically advocates rewarding faculty for working with K-12 schools (SoE), for improving their own teaching (ST), and for contributing scholarships that improves student performance in USG institutions (SoTL). The policy calls for administrations at IHEs in the University System of Georgia to advocate for faculty participation in ST/SoTL/SoE in K-16, including teacher preparation, through decisions in P and T, pre-tenure and post-tenure review, annual review and merit pay, workload, recognition, allocation of resources, and other rewards. The policy sets the tone and expectations for USG institutions. Participation in teacher preparation and in K-16 schools and in improving teaching and learning in USG institutions may include documented efforts of these faculty in (a) improving their own teaching; (b) so as to model effective teaching practices in courses taken by prospective teachers; (c) in ways that enhance student learning in their courses; and (d) collaborating with public schools to strengthen teaching quality and to increase student learning; and I contributing scholarship that promotes and improves student learning and achievement in K-12 and in the university; and in other colleges and universities or their discipline.

The ETLP on faculty work in K-16 schools includes definitions and sample cases of SoE, ST, and SoTL in the Website version of the USG-BOR's Academic Affairs Handbook. Since its adoption in 2006, the policy and the associated guidelines for implementation of this policy have provided a clear signal that teaching scholarship is valued and should be appropriately rewarded.

Some higher education faculty members involved in PRISM modified their courses to be standards-based and/or inquiry-based using PRISM resources, such as mini-grants, faculty development workshops, or learning communities. Faculty members have studied the effects of the changes in their courses on student attitudes and success rates. There is preliminary evidence that faculty engagement in this SoTL in STEM introductory courses increases student success. Progress, at least in the four PRISM IHE, was being made.

However, a frequently voiced concern among faculty in all of the PRISM universities was whether the work promulgated by the policy would be favorably considered in the P and T process. This concern was not so much with the language of the policy, but rather with the existing beliefs, norms, and

values of those (faculty and administrators) making these important personnel decisions. Accordingly, developing and sustaining cultural norms that reward faculty for work in K-12 schools and scholarship, and making these norms visible within the organization, are important issues that were addressed to a varying degree in PRISM institutions. Since the ETLP's adoption in 2006, attempts have been made to educate the administrators and faculty in PRISM institutions. Efforts were made to encourage science and mathematics departments to reevaluate their faculty roles and reward structure, to engage in discussions about faculty attitudes in participating in educational reform efforts, to work in K-12 schools, and to possibly expand the definition of scholarship using the ETLP.

Purpose of the Study

Understanding the cultural norms, values, and beliefs embedded in the context of higher education that influence P and T is important because these dynamics play a critical role in determining what kinds of faculty work are valued and considered meritorious. Thus, this research was an attempt to understand the influence of the newly developed policy, ETLP, on the P and T practices in eight selected IHE in the state of Georgia. The specific research question that drove the study was, To what extent do faculty P and T decisions recognize and reward science and mathematics faculty for focusing their efforts on ST, the SoTL, and the SoE?

METHODS

We used a qualitative, holistic single-case study approach (Yin, 2013) to study changes that were taking place in P and T practices in eight selected institutions of IHE in Georgia. The case study includes frequency analysis of the qualitative data to show tendencies and patterns in the P and T practices in this single system of IHE in Georgia. The case study method allowed us to achieve detailed insights while retaining a comprehensive perspective on the P and T practices in eight selected IHEs within their particular institutional contexts.

Participants/Data Sources

This study took place several years after the ETLP was in place. Eight IHE in Georgia were included in this study. Each of the eight IHEs was placed into one of four categories or levels according to the amount of involvement in PRISM Phase I and the STEM Initiative. Although the ETLP is a USG policy and affects all 26 IHEs in Georgia, PRISM and the STEM Initiative promoted the policy in goals and activities and the IHEs that participated in PRISM/STEM also promoted awareness of the policy. It was assumed faculty in IHEs that participated with PRISM and/or the STEM Initiative would have a greater awareness of the policy and, therefore, review of P and T dossiers would document over time significant involvement in the scholarship of educational reforms that the policy advocates. Note that these levels did not consider the Carnegie classification of the IHEs (Indiana University Center for Postsecondary Research, n.d.), but rather the extent of involvement in the two initiatives.

The eight USG institutions represented four levels of engagement in PRISM and STEM activities: (a) Level I institutions were part of initial PRISM activities, PRISM Phase II and the USG STEM initiative; (b) Level II institutions were part of initial PRISM initiatives, but are not a lead partner in Phase II of PRISM; (c) Level III institutions were not part of PRISM Phase I but are a part of the USG STEM Initiative; and (d) Level IV institutions were not part of PRISM or the USG STEM Initiative.

Dossiers from all mathematics and science faculty who completed the P and T process in the eight IHEs were included in the study. Up to five dossiers were randomly selected for each of three consecutive academic years. The sampling procedure was determined based on the available number of P and T dossiers for that particular year and institution. If fewer than five dossiers were available for a particular year, all of the dossiers were reviewed.

A Faculty P and T Dossier Review and Assessment Procedures Manual was designed by the research team to collect the data (a copy of the manual is available upon request). The instrument was designed in two parts: (a) a guideline for providing an overview of the task that was emailed in a request to recruit reviewers and (b) a blank dossier review form for gathering summary data. Top priority in the design phase was given to procedures that would ensure that the data requested and returned would be anonymous and no faculty member would be identified. A secondary developmental concern was that the manual be inclusive for training purposes and that the form would be simple and quick to complete. The purpose of the manual and accompanying form was to capture evidence of whether ST, SoTL or SoE were addressed, valued, and considered positively in the P and T decision-making process.

This manual provided what the reviewer needed to write summaries of evidence addressed in the study: (a) an overview of the goals of the research and the task, definitions for ST, SoTL, and SoE); b) guidance on which P and T dossiers to be reviewed (e.g., arts and sciences in science and mathematics disciplines); (c) procedures for randomly selecting then reviewing the dossiers; (d) a list of possible documents in each dossier that should be reviewed for standardized sources of evidence; (e) exploratory questions that reviewers could use to guide their efforts in data collection pertinent to the research— a five-point rating scale used to make a summative judgment about the inclusiveness and clarity of the ST, SoTL and SoE evidence supporting the P and T decision; and (f) a sample of a completed dossier review form. The draft manual and accompanying dossier review form were piloted with actual P and T dossiers by one provost and one associate dean of arts and sciences, and in the spring of Year 1, subsequently the research team revised the manual for clarity.

Data Collection

A high-level administrator with a position that allowed him/her to have access to P and T dossiers was needed for the study. Therefore, a chief academic officer, typically a dean or associate dean of arts and sciences, was invited to become a reviewer for the study at each of the eight IHEs. These eight administrators were sent email invitations to participate and a copy of the Faculty Tenure and Promotion Dossier Review and Assessment Procedures Manual provided a sample summary for their information.

Administrators were asked to identify all science and mathematics faculty dossiers for the three consecutive academic years (Year 1, Year 2, and Year 3), sequentially number them, and send the requested number of dossiers to the research team. A website that allowed the generation of a random sequence of numbers was used (http://www.random.org/sequences/) to select research participants. The sequence for each year was sent to the administrator and the appropriate numbered dossiers were reviewed using the P and T Dossier Review Forms provided by the research team. If the administrator determined that fewer than five dossiers were available, then that information was reported to the research team and random sampling procedures were not used. The administrator then reviewed all available dossiers using the P and T Dossier Review Forms.

The review of each dossier by the IHE administrator for each of the requested years yielded a summary rating for each dossier using the five-point rating scale and written comments describing the kinds and sources of evidence supporting (or not supporting) the P and T decision. It was stated in two places in the manual that all information included in the dossier review and submitted by the reviewer be anonymous and that no individual faculty member be identified. The research team assured confidentiality, consistent with institutional IRB requirements. Comments in the completed Dossier Review Forms were either copied directly from a portion of the dossier or written as a summary by the IHE administrator. Completed P and T Dossier Review Forms were e-mailed back to the research team. Information from each completed form was copied and pasted and entered in an Excel file by year and institution. Files were stored on a computer and printed out on paper.

Data Analysis

The research team used both qualitative and frequency analyses of the P and T dossier reviews to assess the extent to which: a) differences among the four Levels of IHEs in the emphasis given to ST, SoTL, and SoE could be identified; b) the emphasis given to ST, SoTL, and SoE vary by faculty rank; and c) the emphasis given to ST, SoTL, and SoE vary by subject area (e.g., mathematics and science).

Content analysis and frequency counts were used to identify possible patterns or themes in the summaries of the reviewed P and T dossiers (Patton, 2002). The research team first reviewed the official USG ETLP and accompanying definitions and cases. Next, the team carefully considered the set of guidelines and the definitions in the Faculty P and T Dossier Review and Assessment Procedures Manual they had developed and the IHE administrators had used to collect the data from the dossiers. Each summary from the submitted Dossier Review Forms was searched for phrases and terms in the text for words or themes related to the ETLP, and its accompanying definitions and cases. Phrases that were consistent with the definition of the policy were then classified with a particular form of reform scholarship and assigned a code: ST, SoTL, or SoE to only 15 dossiers per institution, no responses were identified by institution to avoid breaching confidentiality agreements with participants. In addition, the team decided not to include any descriptive reviewer quotations in this report, again to avoid breaking confidentiality. Many summaries were written in sufficient detail for readers to potentially be able to identify faculty whose files were reviewed by administrators. Instead of exact quotations, paraphrases were developed that provided the essence of the data to protect dossiers and universities' identities. Example phrases that were categorized as reform scholarship included (paraphrased from summaries): (a) The candidate received a teaching award and has published X articles in science education peer-reviewed journals – SoTL; (b) The candidate was awarded an educational grant researching and working with K-12 teachers – SoE; (c) The candidate tested new instructional delivery methods and contributed to several conference presentations in [science] education – SoTL; and (d) The candidate developed his/her own formative assessment instrument for use in improving student learning in his/her classes – ST. Appendix A presents an example of raw data coded under each category.

When portions of several summaries were deemed to be lacking in enough detail to determine a category of ST, SoTL, or SoE, a code of "too vague to understand" was created. Several summaries included multiple incidents of different types of reform scholarship. Once all of the summaries had been coded, arithmetical counts (frequency counts) were utilized to determine the cumulative number of incidents by codes, number of specific codes by Level and institution, and number of specific codes by year, by gender, and by faculty rank.

There were several instances in which reviewers submitted summaries that stated there was evidence of ST, SoTL, or SoE when the evidence did not meet the working definitions provided to every reviewer in the manual. Since specific definitions of ST, SoTL, or SoE were provided, the research team used its own judgment as to whether the evidence was counted as scholarship or not. An example of a piece of information considered by one reviewer to be ST was "[the candidate] demonstrated teaching innovation through the development of four new courses." Given the small amount of information provided, there was not enough evidence present to explain how the faculty member made explicit the testing and trying to improve instruction and student learning that is

explicit in the definition of ST. The researchers deduced that in this example, no evidence of ST could be determined, and no code was assigned.

Seven administrators responded positively to the email invitation request to be a reviewer. One administrator never replied to the request, even after repeated follow-up invitations for participation. Two administrators agreed to participate but did not submit any of the P and T Dossier Review Forms, again, after repeated follow-up. Five out of the eight administrators completed the task. A total of three deans and two associate deans of Arts and Sciences participated in the study. An analysis of the participation by Levels is listed as follows: Level I – One Higher Education Institution participated; Level II – Two IHEs participated; Level III – Two IHEs participated; and Level IV – No IHE participation. Since only five IHEs were represented in the final study and there were gaps in participation at two of the Levels that described the participation in PRISM and/or STEM, no comparisons among Levels could be made. The results reported here are based on the responses from the five participating IHEs as a whole.

Across the five participating IHEs, administrators reviewed a total of 64 dossiers and completed a dossier review form for each. Of the number of dossier review forms completed and returned, 17 dossiers were those of female faculty and 47 were from male faculty members. Forty-three of the dossiers were from the science faculty and 21 were from mathematics. One lecturer, 34 assistant professors, and 29 associate professors comprised the total number of P and T dossiers across IHEs (Table 1).

FINDINGS

This study was designed to identify what evidence, if any, there was that P and T practices in eight selected IHE in Georgia aligned with policy designed to change those practices (ETLP). It also is concerned with what factors, if any, were acting as catalysts for changes. In addition, the extent of involvement in ST; the SoTL, SoTL; and the SoE, was examined. We will present both qualitative and frequency data to illustrate key insights.

Insights from Analysis of Citing of ST/SoTL/SoE in Dossier Reviews

Seventeen of the dossier review forms or approximately 1/4th of returned dossier review forms described faculty activity applicable to the ELTP, and these dossier reviews comprise the basis of the analysis below. The 17 faculty members represented in the final sample were at different stages of faculty ranking in the P and T process as shown in Table 2. A total of 10 Assistant Professors and 7 Associate Professors showed evidence in the dossier review summaries of working in some form of reform activities. More science faculty (n = 15) were involved in reform activities than math faculty (n = 2). Frequency counts were used to total the evidence of reform activities by the faculty's primary content area. Multiple counts were included in the number of incidents, allowing faculty to demonstrate evidence of more than one category of reform activities. The number of counts of reform activities was not proportional to the number of science and mathematics faculty dossiers (43 and 21, respectively), as the number of counts of reform activities was much higher for science faculty (n = 19) than mathematics faculty (n = 3).

Extent of Involvement

Five institutions participated out of the eight selected for the study. Of the total number of dossier review forms returned (63), 46 P and T dossier review forms (73%) did not describe SoE, ST, or SoTL as part of the decision because the entire summary dealt with the faculty's work related to research in the discipline, teaching, and/or service/outreach. These summaries were set aside and not included in further analysis.

Seventeen of the dossier review forms or approximately 1/4th of returned dosser review forms were determined to describe faculty activity applicable to the Faculty WISP (ETLP). In those 17 dossier review summaries, evidence was assigned a code of ST, SoTL, or SoE. Sixteen of the summaries indicated evidence of ST, SoTL, or SoE was considered positively in the decision-making process. Examples (paraphrased) include the example of ST - The candidate has demonstrated positive evidence of ST through the implementation of peer-tutorial programs to inform student learning in the candidate's classes. This evidence was considered strong and convincing evidence

Table 1:Break Down of Science And Mathematics Faculty Dossier By Levels of Engagement, Disciplines, Gender, And Ranks

Discipline	Academic Rank	LEVELS																											
		LEVEL 1						LEVEL 2												LEVEL 3									
		Institution 1A						Institution 2A						Institution 2B						Institution 3A				Institution 3B					
		Year 1		Year 2		Year 3		Year 1		Year 2		Year 3		Year 1		Year 2		Year 3		Year 1		Year 2		Year 3		Year 1		Year 2		Year 3	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Science	Assistant	2	1	1		3		1		1			1		1		2	2						1		2		2	1	1	
	Associate		2	3							2	1		3		1	1						1		3			1	1	1
	Instructor																			1											
Mathematics	Assistant			1				1			2	1	1	1		1		2				1							1		
	Associate					2		3				1						1										1		1		

M- Male; F- Female

Table 2:Instances of Citing of ST/SoTL/SoE in Science & Math Faculty Dossier Reviews

Discipline	Academic Rank	LEVELS																											
		LEVEL 1						LEVEL 2												LEVEL 3									
		Institution 1A						Institution 2A						Institution 2B						Institution 3A						Institution 3B			
		Year 1		Year 2		Year 3		Year 1		Year 2		Year 3		Year 1		Year 2		Year 3		Year 1		Year 2		Year 3		Year 1		Year 2		Year 3	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Science	Assistant														1		2	2								1		1	1		
	Associate			1							1			2			1												1		1
Mathematics	Assistant													1				1													
	Associate																														

M- Male; F- Female

of ST in the promotion decision. Example of SoTL - The candidate has demonstrated positive evidence of the SoTL through the testing of alternative instruction that resulted in several [science] education conference presentations. This evidence was considered favorably as evidence of SoTL in the promotion decision. Example of SoE - The candidate has demonstrated positive evidence of the SoE by becoming a recipient of an educational research grant from PRISM, and working with K-12 teachers to improve the quality of content knowledge of students.

Key Findings

The most intriguing finding from the analysis presented in Table 2 can be understood by comparing the frequencies for Institution 1A, Institution 2B, and Institution 3B. Institution 1A, which showed the highest level of engagement in the PRISM project (Level I), surprisingly had only one instance of ST/SoTL/SoE being cited in the dossier review process. Conversely, Institution 3B had the second-highest number of instances of ST/SoTL/SoE being cited, despite the fact that it was in the lowest engagement category for the PRISM project (Level III). A possible explanation lies in the fact that Institution 1A has historically been a research-intensive (R1) university, whereas Institution 3B has historically been a teaching-focused university. This suggests that even a high level of engagement in a project of the nature of PRISM cannot, in and of itself, overcome the established culture of scholarly expectations at a university. Interestingly, Institution 2B had the highest number of instances of ST/SoTL/SoE being cited and it is a research-intensive (R1) university. A possible explanation for this is that the person leading the PRISM effort at that university was at the highest level of administration (Provost) and communicated very clearly to all faculty within the university an emphasis on enacting policies set forth in the ELTP as facilitated by PRISM. We will consider further the significance of this key finding in the Discussion section.

Trend in Faculty Involvement over Time

Table 3 shows the total number of accounts of ST, SoTL, and SoE that were cited positively in the P and T decision-making process, with multiple incidents counted per candidate over time to discern patterns that may indicate changes in culture. In the 17 dossiers that described reform scholarship related to the policy, 22 accounts were described as positively considered in the P and T process. As can be seen from the table, there was a significant increase from year 1 to year 2, but then an even more significant decrease from year 2 to year 3. This would indicate that the effort to include more emphasis on SoE/ST/SoTL in P and T decisions was not necessarily producing changes that would be sustained beyond the life of the project.

Of the 17 dossier review summaries that described reform scholarship; there was no indication that the inclusion of faculty work in ST, SoTL, or SoE played a negative role in the decision-making process. One faculty member was denied P and T due to reasons other than work in ST, SoTL, or SoE; however, comments were favorable concerning work related to scholarship. In one dossier review the information provided hints of activity that might have been labeled ST, SoTL, or SoE. However, there was not enough evidence present to identify the category of reform scholarship. This case was designated too vague to understand. Due to the nature of the survey, the research team was unable to contact the administrator to clarify or provide additional details on which to judge this case.

A Deeper Consideration of the Language

Of course, the full impact of a statement is not just what is said, but how it is said. Language clearly embeds our beliefs in the particular phrasing of words that we use to express an idea. That phrasing can create sometimes nuanced and sometimes significant differences when different individuals communicate the same basic idea. In relation to the extent to which the individuals evaluating the P and T of faculty within the data set recognized the importance of reform-based teaching and ST/SoTL/SoE, consider the differences in these two statements: First, "Dr. XXXX has been a leader in efforts to improve student learning through alternate delivery methods" Second, "The materials in his dossier and the comments of the Department P and T Committee and the Department Chair show that he has incorporated active learning, critical thinking, and writing into his courses" (Dean's letter from Level III, Institution 3B). Both statements suggest that the faculty member whose dossier is under review made attempts to use new/reform-based approaches to STEM teaching in their courses. However, the first refers to those approaches as "alternative delivery methods," while the second frames them

Table 3:Total Number of SoE, ST, and SoTL Cited Positively in the Promotion Decision over Time*

	Year 1	Year 2	Year 3	Total
SoE	1	0	0	1
ST	4	6	2	13
SoTL	1	6	1	8
Total	6	12	3	22

* Multiple evidence counted per candidate

as those that support "active learning, critical thinking, and writing." In the first statement, "alternative delivery methods" does not specifically identify these approaches, and therefore does not make clear to others who might be influenced by this review what these approaches might be. Further, it does not fully elevate these approaches as being better than more traditional approaches like lecturing – they are simply treated as alternatives to those traditional approaches that may, under certain circumstances, produce improved student performance. The second one specifies the approaches (active learning and critical thinking) and therefore fully distinguishes them from traditional lecture approaches. This makes the differences – and potential impact on student learning – much more salient.

Another statement in which the specific framing chosen may be of significance appears below. One of the P and T reviewers, when discussing the SoTL of a faculty member under review, noted:

In his/her education research program, s/he published four papers in peer-reviewed journals and made 15 presentations of his/her work. S/he attracted external funding in this area, as a PI on three grants from the state of Georgia, as a co-PI on an NIH educational research grant, and a co-PI on a Howard Hughes Medical Institute for enhancing undergraduate educational research. (Dean's Letter from Level II, Institution 2B)

The discussion of the faculty member's pedagogical efforts focused much more on the publications, presentations, and funding successes than the actual teaching and the impact on student learning. It seems that in this case at least, even when discussing the teaching activities of the faculty member, references to scholarship were added as a form of validation for what made the teaching activities productive. This "coupling" of the examination of the teaching efforts of a faculty member with that faculty member's scholarship may lead to the view that the teaching efforts in and of themselves are not the important metric; it is only what the teaching effort nets in other areas – particularly scholarship – that make them of significance.

DISCUSSION, CONCLUSION, AND IMPLICATIONS

This study examined whether sustained involvement of science and mathematics faculty in reform initiatives (PRISM and/or STEM) and the presence of a new system-wide policy advocating the ST, the SoTL, and the SoE would result in increased evidence of these types of reform pedagogies in P and T reviews. Despite the official recognition of reform pedagogy attributed to the ETLP, the data indicates limited impact on the P and T practices at the set of institutions that were involved in the PRISM project. Considered from the broadest brush stroke, the fact that 73% of the P and T dossiers submitted for this study did not describe ST, SoTL, or SoE as part of the decision is a strong piece of evidence to support this claim.

Adopting a reward structure at the state system level does not necessarily lead to changes in institution or departmental policies, as shown in the evidence found in P and T dossier reviews in five IHE in Georgia. Taking all of the submitted dossier review summaries as a whole, no pattern of increased higher education faculty involvement in reform scholarship was found across the three consecutive academic years. Contrary to many studies in the literature, more assistant professors participated in reform scholarship than associate professors, but the sample is too small to make any definitive conclusions in this regard. The sample of P and T dossiers came from science and mathematics departments in colleges of arts and sciences, not education. Therefore, it was encouraging to see that evidence of reform scholarship found in P and T dossiers was positively counted toward faculty P and T, albeit in limited cases. Approximately one-fourth of the dossiers reviewed had positive indications that reform scholarship was being rewarded. It was also encouraging that several administrators agreed to participate in the study to contribute to the effort of discovering whether reform scholarship was being rewarded at their institutions. It demonstrated an interest and an incremental change in awareness of the policy and its advocacy of reform scholarship at the administrator level of higher education.

One of the most significant findings was that an institution (1A in Table 2) that had the highest level (I) of engagement in the PRISM project had one of the lowest counts of mention of ST/SoTL/SoE in its dossiers and that, conversely, an institution (3B) that had the lowest level (III) of engagement had one of the highest counts. The most plausible explanation for this is that Institution 1A is a research-intensive university and Institution 3B is a teaching-focused university. This suggests that there are significant barriers to overcoming the ingrained culture of professional expectations in institutes of higher education and that even a state-wide policy and a well-funded project like PRISM may not be able to surmount those barriers. One possible solution to this challenge is represented by the outlier institution: 2B is a research-intensive university, had a medium level of engagement, but still had the highest counts of positive mention of ST/SoTL/SoE in its dossier reviews. While there may be several factors at work in producing this desirable outcome, one that was most apparent to the research team was the fact that the institutional leader of the PRISM effort at this university worked at the highest level of administration (Provost) and was persistent and consistent in messaging about the importance of valuing the principles set forth in the ELTP. The organizational change literature recognizes the importance

of this (Ellett et al., 2015) and the mechanisms - for example positive emotions, engagement, relationships, meaning, and achievement - by which this phenomenon occurs (Slavin et al., 2012). Slavin et al., for example, in highlighting the role of achievement in these mechanisms, stated that an institution needs to promote a culture of innovation and advancement while reducing barriers to individual initiative. Slavin et al. (2012) further emphasized the importance of aligning incentives with institutional mission and values and celebrating and rewarding successes in achieving institutional missions and goals, a mechanism that was in place in the context examined in this study.

One interesting finding was that an overwhelming number of science faculty versus mathematics faculty were involved in activities designed to improve science and mathematics teaching and learning in K-16 schools. It is not clear, however, whether the creation of the policy impacted their work or whether they participated in the work for other reasons. Future research would benefit from exploring further any disciplinary differences in attention to ST/SoTL/SoE to understand whether there are additional disciplinary barriers to shifting P and T expectations, or, conversely, whether certain disciplines may be more amenable to such shifts.

To cultivate the scholarship of any kind on a campus, especially in a research-focused institution, a cultural refinement needs to ensue, during which time actions by campus leaders, change agents and facilitators lay the groundwork for, and effect, institutional change. It is evident that much work needs to be done to further publicize the policy in USG's IHE. At the heart of this study, confusion reigned at the institution and departmental levels: knowledge of the policy, understanding the policy, and understanding the definitions of ST, SoTL, and the SoE. All administrators who participated in the study seemed to be aware of the ETLP. It is not clear, however, whether those administrators who did not participate in the study were aware of or understood the policy. That may have been one barrier to their participation that the research team did not anticipate. The participating administrators were provided a common set of definitions of ST, SoTL, and SoE in the Faculty P and T Dossier Review and Assessment Procedures Manual. Several of the administrators did not seem to be aware of the differences between ST and SoTL, and confused SoE with service/outreach to the community. It was necessary to have the research team identify and code the evidence presented in the dossier review forms. Evidence of clear and sustainable change may have been absent because of the lack of a common understanding of the definitions of ST, SoTL, and SoE. In addiion, departmental P and T committees seemed to be unaware of the nuances of the three types of scholarship in the study. Comments that were cut and pasted directly from dossiers (withholding names for anonymity) indicated that faculty writing as the representatives of P and T committees also did not understand the definitions of ST, SoTL, and SoE, many times mischaracterizing an activity as one form of scholarship when in reality it was another form of scholarship.

The way the ideas are defined and communicated has another aspect to it. We presented two cases where a deeper dive into the language used made visible some perhaps nuanced or perhaps significant aspects of the way ST/SoTL/SoE were discussed. In one case, we compared two statements, both illustrating positive recognition of a faculty member's work in this area, but with one using the vague language of "alternative delivery methods" and the other using more specific language related to use of "critical thinking" and related strategies. We don't have evidence of the true impact of these word choices, but one can imagine that the latter clearly raises the status of these approaches above more traditional strategies, whereas the former just treats them as another option. It may be politically expedient for a P and T reviewer to use more neutral language so as not to offend those who still favor traditional approaches (e.g., lecturing), but it is also inhibitory to encouraging real change toward reform-based practices.

The second case involved a situation where comments favorable to a faculty member's efforts in the realm of ST/SoTL/SoE were coupled with statements regarding how this translated into increased presentations, publications, and external funding. Again, we cannot be sure of the real impact of linking ST/SoTL/SoE to what it produces in terms of research and grant output, but one can imagine that it would lessen the sense that ST/SoTL/SoE have been elevated to an equal status with those other areas of P and T expectations. Future studies should undertake a detailed discourse analysis of the language used – not just in the reviews themselves but in the messaging around shifts toward emphasizing ST/SoTL/SoE – to further understand how the words chosen affect faculty and administrator perceptions. It would be especially helpful if that work employed techniques of critical discourse analysis (Fairclough, 2013; Van Dijk, 2015) to consider how power and position feed into what is said and the impact that language has on change.

The data collection process was designed to provide as much information as possible while still being efficient, so as not to add burdensome paperwork to already busy administrators. Administrators were provided with the manual and requested to review it before collecting the data and writing short summaries. The data collection process may have been more reliable and less prone to error if more formal training had been provided to standardize the process using the manual.

While there is some evidence that several faculty were being rewarded in the P and T process for reform scholarship, more study needs to be done to determine the extent to which faculty P and T decisions recognize and reward this work. P and T policies at the institution and departmental level did not discourage this work, but the official University System of Georgia's ETLP was still too new and not well understood to have had an impact on the culture of the IHE that participated in this study. The broader literature base on change and change processes is consistent with the findings of the study reported here. For example, though the sample size for the study was

relatively small and the data analysis procedures were rather unique, the study did broaden our understanding of important and complex issues in higher education. The results also have implications for higher education faculty and administrators as they contemplate P and T decisions and policies, and complete future research studies.

Limitations

The study provides a robust foundation for examining the impact of a large-scale project on the P and T policies of IHE to more strongly value pedagogical innovation. There are significant opportunities for others to build on this study by considering a few limitations that were encountered. First, we were limited in the number of higher-education administrators contributing data about the P and T decision-making process and we were also limited in the length of time through which data was collected. Having more decision-makers contribute data and collecting data over a longer period would have increased our understanding of the extent to which the impacts were systemic and sustained. Further, gathering complementary forms of data from other sources would have provided us a more detailed picture. For instance, there would have been value in interviewing both faculty who were going up for P and T or just completed the process to gain their perspective on the extent to which pedagogical innovations were valued and considered. This could have been further supplemented by interviews with administrators to have them describe the thought processes underlying their decision-making. Finally, gathering data from a broader set of higher education institutions within the Board of Regents would have allowed us to better determine if some of the patterns in the data were truly representative of the way that the policy was impacting the P and T approach within this state system.

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APPENDIX

Appendix A: Excerpts from deans' letters demonstrating each code

Participants	Institutions	Additional info	Data sample	Scholarship code
#4	Level II* Institution 2B	Promotion, Physics, Summative Rating 5	The materials in his dossier and the comments of the Department P and T Committee and the Department Chair show that he has incorporated active learning, critical thinking, and writing into his courses… The candidate obtained three consecutive educational outreach grants from PRISM, and has also instructed K-12 science teachers through the College of Education's TEEMS program. There is strong and convincing Scholarly Teaching	ST
#9	Level II Institution 2A	Promotion, Chemistry, Summative Rating 5	Recipient of the Regent's Scholarship of Teaching and Learning Award including induction into the Regent's Hall of Fame by the University System of Georgia in part for her work with POGIL. During the time since the last review, she has published five articles (four in peer reviewed journals) coupling the fields of chemical education and biochemistry… She is a co-author of a textbook in the area of allied health chemistry that is in production and has already been adopted by several universities for classes starting in January 2010. This is a major contribution to the Scholarship of Integration. Many SoTL conference presentations	SoTL
#1	Level III Institution 3B	P and T, Chemistry, Summative Rating 5	Dr. XXXX has been a leader in efforts to improve student learning through alternate delivery methods and peer tutorial opportunities. Dr. XXXX has become a virtual dynamo of service activities. He has served on two university committees, on faculty search committees and was the co-director of the Science Olympiad. He has become actively involved in and supportive of efforts developed by the MASST council and provided professional expertise through his contributions to the Early College Program. His service to the community in the area of chemical education has been extensive and I make particular note of his participation in the Future Teachers Academy	SoE

*See page 13 of the manuscript for the levels of engagement in PRISM and STEM activities. TEEMS: Teacher Education in English, ESOL, Mathematics, Middle Childhood Education, Social Studies, and Science, POGIL: Process Oriented Guided Inquiry Learning, ST: Scholarly Teaching, SoTL: The Scholarship of Teaching and Learning, SoE: The Scholarship of Engagement, PRISM: Partnership for Reform in Science and Mathematics, STEM: Science, Technology, Engineering, and Mathematics