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Stakeholder perspectives on hiring teaching-focused faculty at research-intensive universities

Ashley N. Harlow[1], Natascha T. Buswell[2,5]* , Stanley M. Lo[3] and Brian K. Sato[4]

Abstract

Background: Teaching-focused faculty positions have grown in popularity in higher education and provide novel opportunities to transform undergraduate science, technology, engineering, and mathematics (STEM) education. The University of California (UC) system employs a unique teaching-focused faculty position, officially called the Lecturer with Potential Security of Employment (L(P)SOE), with the working title called Professor of Teaching (PoT). The UC PoT position is a tenure-track position with teaching as the primary tenure expectation. We present findings from interviews with stakeholder faculty in STEM departments at three UC campuses to identify reasons for hiring PoT, capture accomplishments of PoT in their departments and disciplinary fields, and identify potential barriers to PoT success.

Results: Overall, this study highlights stakeholder's perspectives on the value of teaching-focused faculty in research-intensive universities. Stakeholders described the goals for hiring Professors of Teaching, which included easing the burden of teaching responsibilities of the departments and adding consistency of instruction. While the stakeholders expressed that PoT were meeting the goals for being hired, they also identified many barriers for PoT being fully integrated and successful. The stakeholders expressed concern about unclear and unfair expectations related to tenure and promotion.

Conclusions: The findings point to a general undervaluing and underappreciation of teaching-focused faculty and suggest that in order for PoT to have a positive impact on STEM higher education, they need more support and inclusion from their colleagues and institutions.

Keywords: Teaching-focused faculty, Research-intensive universities, Undergraduate STEM education

Introduction

Improving science, technology, engineering and mathematics (STEM) higher education is a global concern (Kennedy & Odell, 2014; Marginson et al., 2013) with the United States (U.S.) in particular seeing a number of calls to improve university STEM instruction (Olson & Riordan, 2012; President's Council of Advisors on Science and Technology [PCAST], 2010). U.S. universities face some contextualized issues, including a lack of representation of underrepresented minority students in STEM (Olson & Riordan, 2012; PCAST, 2010) and overcrowding in STEM classrooms despite recent decreases in postsecondary enrollment overall (U.S. Department of Education, 2020). These issues have a global impact, with enrollment of international students in U.S. universities having greatly increased over the past decade (Bastrykin & Vorob'Eva, 2018; Granovsky & Wilson, 2019).

Teaching-focused faculty can potentially address issues of instructional quality (Mitten & Ross, 2018). By hiring teaching-focused faculty, who are by definition focused on teaching both with respect to their teaching responsibility and their understanding of effective

*Correspondence: nbuswell@uci.edu

[5] Henry Samueli School of Engineering, 3232 Engineering Gateway, Irvine, CA 92697, USA
Full list of author information is available at the end of the article

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teaching practices, more inclusive and evidence-based instructional practices may be brought into university classrooms and colleagues. Inclusive and evidence-based instructional practices such as active and collaborative learning have been shown to improve academic outcomes for minoritized students (Freeman et al., 2014) leading to the retention of more STEM graduates as well as more diverse STEM graduates (Cromley et al., 2016).

An example of a teaching-focused faculty position is the Professor of Teaching (PoT), which is officially referred to as the Lecturer with Potential Security of Employment (L(P)SOE) position in the University of California (UC) system. The L(P)SOE is a tenure-track teaching-focused faculty position defined in the UC Academic Personnel Manual (2020) as one whose "primary responsibility is teaching, and teaching-related tasks and secondary responsibility is professional and/or scholarly achievement and activity." The L(P)SOE faculty line comprises 5–10% of tenure-track faculty at the study campuses and has three ranks that parallel the U.S. research-focused professor position, which we define as professors who are evaluated primarily based on the success of their research program. The ranks for the L(P)SOE series consist of pre-tenured—Lecturer with Potential Security of Employment or Assistant Professor of Teaching (analogous to Assistant Professor); tenured—Lecturer with Security of Employment or Associate Professor of Teaching (Associate Professor); and Senior Lecturer or Professor of Teaching (Professor). The tenure criteria comprise the same components that are evaluated for research-focused professors to earn tenure. In the case of PoT, however, there is an increased weight placed on the value of teaching excellence. From prior work, PoT expect to spend on average 65.5% of their time teaching, 18.6% engaged in scholarly activity, and 15.9% performing service work (Harlow et al., 2020).

In this work, for consistency, we will refer to individuals in the L(P)SOE study population across all three ranks as *Professors of Teaching (PoT)*—one of the various official working titles used for L(P)SOE positions at different UC campuses, and when discussing teaching-focused positions more broadly, we will use the term *teaching-focused faculty*. In the findings, however, some of the quotes will include the term L(P)SOE, as this term was the official name at the time of the interviews. Since then, Professor of Teaching or Teaching Professor have become the official working titles for the position. As will be discussed in our findings, there is concern with the use of the term L(P)SOE, and we therefore want to honor the policy change and preference by the faculty in the series to be referred to as Professor of Teaching.

In this study, we focus on the perspectives of those who are responsible for enabling a department to hire PoT or

are directly involved in the hiring process, as one way to increase the number of people in teaching-focused faculty positions at research-intensive institutions is to convince university administrators and research-focused faculty of their value. This study intends to better understand teaching-focused faculty positions in the context of research-intensive universities because the aforementioned issues in STEM education are particularly prevalent in research-intensive universities, where research is prioritized over teaching (Fairweather, 2008). We examine the goals stakeholders have for hiring PoT at three UC campuses, the contributions PoT make to their students and beyond, and departmental contexts for their success. These ideas are examined through the perspective of department chairs or vice-chairs, deans or associate deans, and hiring committee chairs, to whom we refer collectively in this work as *stakeholders*. This paper includes a literature review about teaching practices, research on teaching-focused faculty positions, and discusses the Community of Practice theoretical framework.

Literature review
Instruction in research-intensive universities
Active-learning instructional practices are effective in increasing student learning outcomes, particularly for minoritized students (Freeman et al., 2014). However, structural barriers prevent these practices from being implemented broadly, particularly at research-intensive universities (Anderson et al., 2011; Brownell & Tanner, 2012). First, prioritization of research often leads departments to make pragmatic decisions that may contribute to less effective teaching. These decisions are driven by the lack of influence teaching excellence has on tenure (Cadez et al., 2017). For instance, Milem et al. (2000) identified that over a 20-year period, the time research-focused professors are expected to spend on research is increasing, making their other responsibilities less prioritized. Additionally, research-focused professors' perception that the quality of one's research supersedes the quality of one's teaching in securing tenure has remained constant (Tagg, 2012).

Second, organizational barriers, including increasing enrollments in STEM disciplines and limitations of the traditional large lecture classroom (Falkenheim & Hale, 2015) create logistical issues that hinder implementation of evidence-based teaching practices. Activities such as talking with a neighbor and small group work may be especially difficult in classrooms where seats are bolted in place (Baepler et al., 2014), and talking in class may negatively impact some students who have social anxieties if not implemented inclusively (Cooper & Brownell, 2020).

Third, even when research-focused professors attempt to improve their instructional practices, the means to

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evaluate these modifications are lacking. The reliance on student evaluations to evaluate instructors is problematic due to their focus on characteristics that may be independent of instructional quality (Shevlin et al., 2013) and are known to be negatively biased against professors of color and women (MacLean & Poole, 2010; Merritt, 2008). In addition, faculty lack incentives, and are in some cases disincentivized, to focus their time and attention on implementing evidence-based teaching practices in their classrooms (Sabagh & Saroyan, 2014). And even in cases when faculty are aware of instructional practices that benefit student outcomes, there are numerous barriers that prevent faculty from implementing them efficiently and effectively (Borrego & Henderson, 2014). These factors have contributed to a system where research-focused faculty are disincentivized to improve the quality of their instruction and where a division exists between individuals who focus on teaching and others who focus on research (Geschwind & Broström, 2015).

Teaching-focused faculty positions

A variety of professor positions exist in higher education that focus on teaching or education more broadly. These various positions are gaining traction in the current higher education landscape (Flecknoe et al., 2017). Limited research has identified benefits of teaching-focused faculty positions in research-intensive universities. The most common teaching-focused faculty position is the adjunct faculty, defined as an instructor whose only responsibility is to teach and who has little job security (Sagan & Miller, 2017). In 2015, the American Association of University Professors (2017) found that adjuncts comprised 70% of instructors on all U.S. higher education campuses. Adjuncts are often provided lower salary, fewer professional development opportunities, and less guidance from their departments (Baron-Nixon, 2007). Despite these challenges, students may learn more from adjuncts than from research-focused faculty (Figlio et al., 2015).

Another teaching-focused faculty position is the Science Faculty with Education Specialties (SFES) position. SFES are defined as teaching-focused faculty members in STEM departments who focus on education or engage in education research and are viewed as pedagogical resources in their departments (Bush et al., 2013). Those at research-intensive universities were less likely to have a tenured position and spent most of their time teaching (Bush et al., 2013), and most commonly reported being hired to relieve other faculty from teaching and service burdens (Bush et al., 2017). Those in masters-granting universities were more likely to have science education training and participate in research activities (Bush et al., 2013), and were hired primarily to prepare future K-12

science teachers (Bush et al., 2017). Finally, at primarily undergraduate institutions, SFES described transitioning to the position after they were initially hired; SFES self-reported having significant impacts on improving undergraduate education, influencing their colleagues' instructional practices, modifying curriculum, and supporting teaching assistants (Bush et al., 2016, 2017). However, despite claiming to be satisfied with their jobs, almost 40% were considering finding work elsewhere (Bush et al., 2011).

Teaching-Focused Faculty (TFF), the actual name for a teaching-focused faculty position in Canada, consists of both tenure-track and non-tenure-track faculty positions (Rawn & Fox, 2018). While TFF reported being satisfied and valued, the TFF population varied widely by university and department and lacked standardized job expectations. This discrepancy led many TFF to report a lack of clarity in their role. Integration of TFF into their departments was critical for improving their sense of value for their contributions to the educational missions of their universities.

The focus of this work is on Professors of Teaching, the teaching-focused faculty position found throughout the UC system (Harlow et al., 2020). As described in the "Introduction", this position includes ranks that correspond to the traditional assistant, associate, and full professor ranks. Previous work found that PoT are primarily trained in their respective STEM discipline with a small minority holding formal degrees in education. The majority acquired educational experience through teaching or professional development opportunities. Expectations of time spent on teaching, scholarly activities, and service are aligned across PoT ranks with a majority of their time required to be spent on teaching. However, there were some differences between pre-tenured and tenured PoT, including an increased expectation for pre-tenured PoT to spend time on scholarly activities and an increased likelihood of tenured PoT not having received start-up funds (Harlow et al., 2020).

Theoretical framework

Organizational theorists have considered how higher education structures, such as academic departments, contribute to the culture, identity, and hierarchy of the institution (Bergquist, 1992; Manning, 2017). Academic departments fulfill their own purposes, goals, and operate as mini organizations with their own bureaucratic systems, which contribute to departments being seen as legitimate and respected at the university. We use Wenger's Community of Practice theoretical framework to examine the institutional organizational structures and their impact on teaching-focused faculty embedded in research-intensive institutions.

Wenger (2010) argues that the success of an organization depends on its ability to become a social learning system where individuals form an interconnected community and learn from one another. To create an organization that is adaptable, a Community of Practice that encompasses meaning, practice, community, and identity must be ingrained into the organizational culture (Wenger, 1998). All four components require a culture open-minded to others' thoughts and backgrounds while fostering a willingness to learn and adapt the organizational structure as needed.

These communities of practice result in the creation of natural boundaries, which in faculty settings can be seen as a department insulating itself from others, due to shared experiences unique to that department. For example, a molecular biology department and a mechanical engineering department may have very little to discuss due to differing cultures, responsibilities, and values. Wenger (2010) argues boundaries are good because they are able to create communities with these shared experiences. However, crossing boundaries and expertise can help one incorporate the knowledge and values of other departments, facilitating the evolution of Communities of Practice (Burt, 2004).

In our work, PoT may potentially be serving as departmental brokers, meaning people who are crossing boundaries to different Communities of Practice and extending their pedagogical knowledge to their STEM departments. While possessing a deep understanding of their department's culture, their primary role and expertise is in teaching, potentially resulting in the introduction of evidence-based instructional practices and transformation of the departmental teaching culture. The vast majority of PoT at our study sites have STEM backgrounds and are in STEM departments (Harlow et al., 2020) and thus understand the culture of their departments and disciplines; and they are expected to focus on teaching. These PoT may be more likely than their research-focused colleagues to cross boundaries for education-related matters. Thus, departments may be able to leverage PoT as change agents and bridges to other departments and effective teaching practices.

While there seem to be many benefits in having teaching-focused faculty in STEM departments, the Community of Practice framework also highlights possible concerns. If, for example, the teaching-focused faculty member does not subscribe to all the norms and expectations of the disciplinary community, they may feel like an outsider. Similarly, if they need to look outside their department for like-minded peers, they may be split between two Communities of Practice, with competing norms and expectations.

Research questions

Leveraging the Community of Practice framework, we aim to better understand teaching-focused faculty and their role as potential change agents facilitating the improvement of STEM education. Our specific research questions are as follows:

1. What are stakeholders' goals for hiring Professors of Teaching?
2. From the perspective of the stakeholders, to what extent are the goals for hiring being met?
3. What are the organizational barriers that hinder achievement of these goals?

Methods
Setting and context of the study

The University of California is a large public university system with 10 research-intensive campuses (Carnegie Classification of Institutions of Higher Education, 2020) enrolling over 285,000 undergraduates, of which 27% are underrepresented minorities, 40% are first-generation university students, and 35% are from low-income backgrounds (University of California, 2018). We interviewed stakeholders from the three UC campuses with the largest number of STEM teaching-focused faculty in the Professor of Teaching series. Across the three study campuses, approximately 5–10% of STEM faculty are in the PoT series, with variation depending on the specific departments and campuses. STEM undergraduates and faculty make up more than 50% of students/faculty and make up nearly 100,000 undergraduates across the three study institutions.

Participants and data collection procedures

We interviewed 25 total stakeholders—including six department chairs or vice-chairs, eight deans or associate deans, and 11 hiring committee chairs, in various STEM departments. These individuals were selected due to their role in overseeing, mentoring, or hiring teaching-focused faculty in the PoT series. A group of 37 individuals were identified, and 30 responded with interest to be interviewed. Interviews were conducted with 25 respondents based on availability. Seven interviewees identified as women and 18 as men. Participant disciplines included 14 in Biological Sciences, seven in Physical Sciences, and four in Engineering, which reflects the distribution of teaching-focused faculty in the PoT series on the study campuses. Seven participants were from campus 1 and nine participants each were from campuses 2 and 3.

The interviews were semi-structured and included questions about the hiring decisions (e.g., Why did your

department or school hire [Professors of Teaching]?), the tenure and promotion criteria and experiences for the [Professors of Teaching] (e.g., What are the expectations of your [Professors of Teaching]?, Are they meeting expectations?), the integration of the PoT in their departments and in the university, and the future plans for hiring PoT. The full interview protocol is included in the Appendix. For interview questions, the terms L(P)SOE and Professors of Teaching were adjusted to the working titles at individual campuses of the interview participants to minimize confusion during the interviews. Similarly, in interview excerpts reported in this paper, various working titles unique to individual campuses have been changed to [Professors of Teaching] in square brackets for consistency, except for in the cases of direct quotes where the exact quotation has been preserved.

Interviews were conducted in-person, audio recorded, and lasted between 30 and 90 min. The audio recordings were transcribed verbatim by a third-party service and then cleaned by the research team. The transcripts were then loaded into NVivo (QSR International) for analysis. Data collection was approved by UC Irvine's Institutional Review Board.

Codebook development

To develop the codebook, we used a deductive–inductive thematic analysis approach (Fereday & Muir-Cochrane, 2006), with a combination of a priori codes based on literature (e.g., hiring expectations of teaching-focused faculty (Bush et al., 2017), and organizational barriers such as the lack of influence of teaching on tenure (Cadez et al., 2017), and ones that emerged in our data (e.g., positive comparisons to research-focused professors, unexpected contributions to research). Three researchers independently read and coded three interviews, identifying if the a priori codes were appropriate and suggesting new codes as needed. The researchers met to develop the initial codebook. Next, the initial codebook was used to code the three interviews a second time to generate a revision of the codebook. We finalized the codebook by considering how the codes would be used to answer our research questions and confirmed that the elements of the literature were included. The final codebook is in Table 1. This table also reports the number of interviews that include that code.

Coding procedures

Once our codebook was finalized, we assigned two researchers to independently code each interview. Cohen's Kappa values averaged 0.60 and ranged from 0.40 to 0.78, which is considered a satisfactory level of agreement (Landis & Koch, 1977). The research team met to resolve any disagreements. The prevalence of each code can also be found in Table 1. These numbers additionally demonstrate that the themes were consistent across numerous participants. In our write-up of the results, we indicate which codes represent each finding by including the italicized codes in parentheses. It is important to note that quotations were selected to demonstrate a particular code, but our coding approach permitted statements to be coded with multiple codes.

Results

The results are presented by research question, where we begin by exploring the intended goals stakeholders had when hiring PoT (RQ1). Then we take into consideration whether these goals are met by PoT both in their departments and respective fields (RQ2). Finally, we investigate barriers PoT face while trying to meet their goals (RQ3). As the write-up of our findings is in response to our research questions, some codes in our codebook do not show up here. We wanted to answer our research questions with exemplar quotes and therefore only include the main codes. We included the full codebook for transparency in Table 1. Each quote includes the numeric participant indicator, with the first number representing the campus (1, 2, or 3) and the second two numbers representing the interview number.

Research question 1: what are stakeholders' goals for hiring professors of teaching?

One of the main reasons for hiring teaching-focused faculty into the PoT series identified by stakeholders was to ease the departmental teaching responsibilities with a smaller financial investment compared to hiring a research faculty. Nearly every participant commented on this intended outcome. For example:

> *"[W]e get more teaching done with people that also don't occupy much space... and that is a real concern within biological sciences, because if you bring in a line faculty, it's not just the classes they teach. It's not even the setup [cost], which can be enormously expensive. But it's also that they occupy several thousand square feet of laboratory space (Interview 103)."*

Since PoT are expected to have higher teaching responsibilities, they can cover more classes (*ease the burden)* in a more economical fashion relative to research-focused professors (*comparisons to research-focused professors*).

Most stakeholders identified that PoT brought consistency to the department's teaching mission (*internal impact*). Rather than relying on adjuncts, stakeholders favored the idea of having "faculty who were able to focus more of their time on teaching, [and] also who were expected to think creatively about how we were going to

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Table 1 Final codebook and code frequency for interview data

Code	Sub-code	Description	No. of interviews
Comparisons to research-focused professor series	Neutral or positive	Positive comparison made that paint Professors of Teaching as being equal to the research-focused professors	24
	Negative	Negative comparisons made that paint Professors of Teaching as being unequal to the research-focused professors (Cadez et al., 2017)	14
Teaching culture		When the participant refers to teaching from the department or university perspective (Cox et al., 2011)	24
Ease the burden		Hiring motivation of Professors of Teaching in order to reduce the load of teaching and service for research-focused professors at the department/university level (Bush et al., 2017)	24
Impact	Internal impact	Influences others on campus that may include sharing teaching practices or research results with colleagues on campus	24
	External impact	Influences others externally/beyond campus by sharing teaching practices or research results, for example through conference presentations or by obtaining external grant funding (Bush et al., 2020)	22
Integration	Positive	Professors of Teaching being integrated on campus or in the department	23
	Negative	Professors of Teaching not being integrated on campus or in the department (Cadez et al., 2017)	24
Intended roles	Future	Roles of Professors of Teaching in the future and any future plans to hire additional Professors of Teaching	23
	Historical	Historical roles of Professor of Teaching and any historical hiring considerations, including financial considerations. (Bush et al., 2017)	24
LPSOE name implications		Impacts or associations with the official name of the Professors of Teaching series (formally called LPSOE). (Harlow et al., 2020)	24
Promotion expectations	Percentages	Percentage breakdown of common faculty tasks (teaching, research, and service) such as 60% teaching, 30% research, and 10% service	16
	Research	Relationship between promotion and research being conducted by Professors of Teaching	24
	Teaching	Relationship between promotion and teaching being conducted by Professors of Teaching	25
	Service	Relationship between promotion and service being performed by Professors of Teaching	18
	Unclear/unfair	Promotion expectations being either unclear or unfair for the Professors of Teaching	25
Support	External support	Grant or other financial funding not being provided by the home institution	3
	Internal support (non-start-up)	Grant or other financial funding being provided by the home institution	14
	Internal start-up support	Any financial support given at the beginning of a Professor's of Teaching employment	15
	Lack of financial support	Lack of financial support given at the beginning or throughout a Professor's of Teaching employment. (Harlow et al., 2020)	6
	Mentorship	Non-financial support being provided that takes the form of professional guidance and development	22
	Professional Development	Opportunities for professional development	14
Unexpected contributions		Unexpected benefits and contributions by the Professors of Teaching	13
Value		Complimentary comments said about the Professors of Teaching	25

educate engineers in a better way (Interview 206)." Stakeholders also viewed the PoT as working to improve their colleagues' teaching practices (*internal impact*).

Stakeholders noted that PoT had the potential to contribute to teaching-related service within the department (*ease the burden*). One stakeholder said that they hired PoT to "address specialized teaching needs that our ladder-rank faculty are not well suited to (Interview 305)," and have "somebody who is primarily involved in teaching … [and can] help us with ABET [accreditation] so that, you know, we could take care of two things at once with one of these positions (Interview 208)". Examples of these needs stakeholders described included accreditation, revising laboratory courses, improving student outcomes in large courses, creating

new assessment tools, designing capstone courses, and improving laboratory safety (*internal impact*).

These excerpts highlight that stakeholders identified many benefits (*value*) PoT can provide to a department including providing consistency to a higher number of teaching tasks (as compared with their research-focused faculty peers), taking on service responsibilities, or informing their department about trends in the education research literature.

Research Question 2: from the perspective of the stakeholders, to what extent are the goals for hiring being met?

The stakeholders identified three main goals for hiring PoT: (1) easing the departmental teaching load, (2) bringing consistency to department teaching-related efforts and service, and (3) meeting specialized teaching and service needs. For the majority of stakeholders, they reported feeling these goals were being met, and even exceeding expectations.

For example, in describing how a PoT was easing the teaching load, one stakeholder described that:

"I think before they were hired, we were so much struggling to cover our courses. And having them, now, here and teaching their courses, I feel like that has been really positive; and then, in the more long distance is what we hope, is that they can develop new courses for our students that we just never had the capacity to do, because we were just worried about covering the basics without thinking about being creative. And then again, I think helping all of us be better teachers for our students (Interview 203)."

Another explained that the goal of bringing consistency to the teaching mission of a department was being met, and in addition, the PoT is publishing educational research on a national level. One stakeholder explained:

"[T]hey provide consistency, so we no longer have to try to scrounge up temporary lecturers in order to move forward... I would say the teaching mission they are handling it quite extensively... the research mission - in order for them to contribute to that, we need to be able to recognize that chemical education is a component of our research mission. It is recognized by the American Chemical Society, it is recognized by NSF (Interview 202)."

Finally, numerous stakeholders discussed the contribution of PoT to specialized teaching and service needs, such as accreditation and laboratory experiences being met, and in addition, focusing on the undergraduate

education experience in the department more generally. One stakeholder described:

"[B]esides just the fact that they do a little additional teaching. I think the primary role ... is taking on this aspect of the undergraduate education in general. Because we as faculty tend to focus mostly on our research, on graduate education. We take for granted what happens to the undergraduates... we just teach our classes and move on. But then we realize there is this whole other layer to it, you know? Which involves coming up with assessment tools. I don't think as regular faculty we have time to do that (Interview 208)."

Thus far, we have presented results on the extent to which the stakeholders thought PoT were meeting the expected goals identified. And as they described meeting the expectations, the stakeholders noted numerous instances of PoT contributing in unexpected and surprising ways that went beyond the initial reasons for hiring faculty into the series. As one stakeholder noted:

"I thought it was a crazy idea. Not because I didn't appreciate the LPSOEs who had been in our department for a long time, but I just thought, it's FTEs, we could use research faculty, and I was completely wrong. I think it's transformed some aspects of how we do things in biology in the sense that these are just dedicated people who are thinking about what's the best way to teach (Interview 101)."

This quote emphasizes that stakeholders felt their expectations were met when hiring these PoT. Even when an FTE (full-time equivalent) faculty line was filled by a PoT, departments often benefited from their unexpected contributions. The unexpected contributions included winning large research grants for pedagogical research (also *external impact*), educating colleagues on best practices for teaching (also *internal impact*), and supporting graduate students who were interested in teaching and becoming future faculty members (also *value*).

Stakeholders pointed out that PoT were also serving the role of a professional development expert (*internal impact*), including one who noted:

"She also runs the Teaching Education Series. That's been wonderful... it transformed the whole department's opinion of what teaching was, and how it could be done differently but also more consciously, and we had fantastic seminar speakers...and then post-docs got interested, and I think there's more post-docs and/or graduate students than ever that want to be a teaching professor-type person (Interview 302)."

The positive impact on teaching practices was not only felt by departmental faculty, but also by graduate students, who PoT are working with "to be users of evidence-based teaching practices (Interview 105)" as well (*internal impact, value*). Of course, the physical proximity of a PoT being in the same disciplinary department office may also be the reason for these conversations happening (*internal impact*). The need for inclusive integration of PoT in their departments is discussed in research question 3 below.

Multiple stakeholders were surprised by the value PoT had beyond their departments (*external impact*). One stakeholder described intentionally hiring a PoT for their familiarity with the education research literature but was still surprised by the extent that they could contribute as a researcher (*unexpected contribution*). Another stakeholder commented on an external grant awarded to a PoT:

> "*I think the other epiphany that people have seen is that there is... always very powerful, money speaks, that there's money out there. That you can get million dollars grants. That these people can contribute to the overhead, that these people can improve rankings, that these people can contribute to research grants in a very profound way because foundations like NSF want to see not just your usual, you know, community impact, which can be easily checked off and, um, with usual things, but, that for example center grants, they have significant education components in there (Interview 302).*"

PoT were also contributing to education research fields (*external impact*). One stakeholder explained:

> "*They're contributing enormously to pedagogy research, that's both published in discipline journals, in education journals. They're out giving talks. Not just at the universities, but at conferences, and so that's the contribution to not just use of evidence-based practices, but actually putting in place new evidence-based practices based on their scholarly activity (Interview 106).*"

In addition to making unexpected contributions, all stakeholders noted PoT were considered to be superior teachers (*value*) by themselves as well as by others in the departments more broadly. While PoT were expected to ease the teaching load, they were doing so with exceptional teaching. For example:

> "*It seems to me that overall they do a tremendous job at teaching... What I find is that they're very enthusiastic about engaging with the students, and they really care about the students... Not just the under-*

> *graduates, but also the instructional assistants who are helping the students learn (Interview 303).*"

The statement highlights the faith stakeholders have that PoT are providing superior instruction relative to their research-focused professor colleagues. However, it is important to note that this belief in superior instruction is a belief and not necessarily fact. When one stakeholder was asked why they believed PoT were better instructors, they said:

> "*We are an institution of higher education, so having colleagues whose expertise is in education in the broader sense, understanding how people learn, the research... so it's really important for the mission of a university, and they can significantly contribute to this (Interview 302).*"

These excerpts highlight the variety of levels at which PoT scholarly activities impacted the departments' education mission and their contributions to pedagogical research that extend beyond their departments.

In response to research question 2, we see that the stakeholders commented on the PoT not only meeting the goals identified in research question 1, but also exceeding those expectations in numerous ways. The additional contributions included impacting teaching methods and educational research beyond the department, and teaching exceptionally well.

Research question 3: what are the organizational barriers that hinder achievement of these goals?

A number of issues were identified that potentially limit PoT achieving the goals, both intended and unexpected, identified by the stakeholders. These barriers include items that stakeholders recognized as problems, but also those that we gleaned from the data, which may not have been perceived as issues from the stakeholders' perspectives. The challenges will be described first in terms of the intended goals the stakeholders identified for the PoT, and second in terms of the unexpected.

As described in research question 1 section, the expected goals for the PoT were: (1) easing the departmental teaching load, (2) bringing consistency to department teaching-related efforts and service, and (3) meeting specialized teaching and service needs. In research question 2, we saw that all these goals were being met, and two additional unexpected goals were being met: (1) impact of teaching methods and educational research beyond the department, and (2) teaching exceptionally well.

A major challenge to achieving any of the goals mentioned by all stakeholders was a lack of clarity in regard to tenure requirements (*promotion expectations-unclear/*

unfair). The bulk of the confusion centered on the uncertainty for how one evaluates successful teaching (*promotion expectations-teaching*), which is especially concerning since PoT are by definition supposed to be evaluated for tenure and promotion based mainly on their teaching. One stakeholder noted:

> *"They're expected to be excellent teachers. And we're still figuring out what that means to be an excellent teacher. How we base it. Is it based on student evaluations? Probably initially, yes. But in the long run, I hope that we have better metrics for their evaluation as being excellent teachers (Interview 206)."*

The need for more meaningful evaluation systems is key as universities often rely solely on student evaluations that are biased and may not consistently reflect teaching quality. Another stakeholder highlighted the nonempirical manner teaching is often evaluated when he admitted: "I haven't reviewed all of their teaching records or done a review of their teaching, but I'm assuming it's all excellent (Interview 205)."

In addition to the lack of clarity in evaluating teaching excellence, all but one stakeholder mentioned the uncertainty for how to measure PoT research quality (*promotion expectations-research*). While some sort of scholarly or creative activity is an expectation of PoT, quality and quantity metrics remain unclear. One stakeholder stated:

> *"Research faculty, we know exactly what we have to be doing with our research programs and trying to get those to thrive…For teaching faculty, I think that the pedagogical research component is amorphous and not clear (Interview 102)."*

All stakeholders also recognized this lack of equity in the evaluation process (*promotion expectations-unclear/ unfair*), pointing out that the Committee on Academic Personnel "doesn't have a single teaching faculty (Interview 102)." One stakeholder pointed out: "That gets into a whole discussion about what is the criteria in order to evaluate quality of teaching (Interview 202)." Both comments illustrate that the traditional research-focused professors evaluating PoT may not be the most appropriate for that role.

One issue that arose in the data was the misalignment between the unexpected positive impacts highlighted by our findings in research question 2 and stakeholder comments regarding future hiring of PoT (*intended roles—future*). While acknowledging that PoT contributed in multiple ways beyond a heavy teaching load, many stakeholders reverted to the mentality that the main impetus to hire PoT in the future would be to ease the departmental teaching burden (*ease the burden*), rather than support and promote the additional beneficial contributions PoT

are making. One stakeholder responded to the question of whether the department would hire additional PoT in the future as follows: "I would say no at the moment, because I think we're meeting our teaching expectations (Interview 201)."

Similarly, a number of stakeholders were concerned that hiring additional PoT would negatively impact the perception of their department (*intended roles—future*). One noted:

> *"From the perspective of raising the profile of the department and the ranking of the department, there are some who perceive that these kinds of hires don't necessarily contribute to … the research profile of the department. And our visibility, you know a particular department is visible for doing research that is known nationwide and worldwide, but with people completely engaged with teaching, you know their contributions are not so visible outside the campus. (Interview 208)."*

Another stakeholder said a small contingent of their professors "don't want [our university] to look like a [teaching-focused university] (Interview 102)" with a third stating, "You know, we are a research university, so we don't want teaching professors to dominate our staff (Interview 107)." It is worth noting that in the departments represented by the stakeholders interviewed, PoT make up no more than 10% of the total faculty. However, there is still a concern that these individuals could be perceived as taking over the department.

Another organizational issue that was commonly noted by stakeholders was the lack of integration of PoT within their departments (*negative integration*). A lack of integration in their departments could mean disruption to PoT fulfilling their goals of teaching more and bringing consistency to the curriculum. Many stakeholders commented that PoT were exposed to unwelcoming environments at times. One stakeholder explained a reason for the lack of integration is:

> *"…that they're not doing basic biology research, which is a lot of the focal point for interactions for most of our faculty. Also, their offices are kind of clustered in the teaching laboratory. So … they're not in the same building as most of their colleagues (Interview 305)."*

This lack of integration was also evident as most stakeholders discussed how PoT did not have a formal mentor within the department (*support-mentorship*). One stakeholder stated:

> *"She doesn't have anyone to speak for her. She doesn't have a group. And that, that's gotta be a*

little scary (Interview 106)."

In many cases, stakeholders instead described how PoT have grown to support and seek informal guidance from one another (*support-mentorship*). In fact, creating a supportive network among themselves was one way stakeholders saw PoT feeling integrated on campus (*integration—positive*), despite this, total integration has not occurred. One stakeholder explained: "The teaching professors have a strong community of their own, which is great, but it's definitely a challenge for them to integrate into the rest of the academic culture of the department for many reasons (Interview 305)." Another explained that the voting rights in departments are not always equal between PoT and traditional research-focused professors, explaining that "for me the voting right is a proxy for not having a culture that accepts this faculty position as a faculty position (Interview 302)."

While people in these positions at UC campuses are often referred to as Professors of Teaching or Teaching Professors, the official formal title is Lecturer with (Potential) Security of Employment (L(P)SOE). The official title was identified as a problem by almost all stakeholders interviewed (*LPSOE name implications*). One stakeholder noted "It's a little bit like the scarlet letter... (Interview 104)," which frames the negative perception of these PoT within the department (*negative integration*). This perception of PoT as being second-class citizens possibly extends beyond the UC system due to confusion caused by the title. One stakeholder noted that "no one outside the University of California has any idea what is an SOE. And I think it does hurt them professionally (Interview 107)." Another explained "it keeps the lecturer thing in, which here has a history of being temporary people that aren't considered to be part of the faculty" (Interview 309). Other stakeholders noted that this could impact the success of PoT when applying for external funding or that it could decrease the weight given to letters of recommendation that they author. Confusion caused by the title was also cited as an internal issue, for example, as university officials have misunderstood that PoT were entitled to similar benefits as their research-focused professor colleagues, including housing stipends and sabbaticals (*LPSOE name implications; negative integration*).

From the examples in this section, we see that PoT face numerous barriers to meeting the initial goals the stakeholders identified, as well as meeting the unexpected goals of external impact, educational research, and exemplary teaching. While the stakeholders felt that PoT were meeting their goals, they acknowledged that the climate of their departments and universities may not be supportive or welcoming, and lack clear guidelines for achieving success.

Discussion

In this exploratory study, the stakeholder interview data provide an initial understanding of the impacts of PoT and their anticipated and actual roles within departments. These data allow for researchers and teachers alike to better understand how teaching-focused faculty can contribute to departments. We consider the data through the lens of Wenger's Community of Practice framework.

From the interviews, we saw that PoT were initially hired in order to teach many courses with consistency and at a high quality, which in effect, would ease the departmental teaching burden, similar to the findings in a study conducted by Bush et al. (2017) in which the researchers interviewed Science Faculty with Education Specialties (SEFS) rather than the administrators who hired them. Beyond easing the burden, stakeholders described how PoT are contributing in a multitude of ways, including through contributing specialized teaching and service, as well as in unexpected ways such as publishing discipline-based educational research, using evidence-based instructional practices, encouraging their departmental colleagues to use evidence-based instructional practices, and winning grants to conduct education research and implement programs. From the stakeholders' perspective, PoT are clearly contributing to the teaching mission of the department and their departmental colleagues are open to learning from them, a finding also reported by Bush et al. (2016) in regard to SFES.

PoT also fulfilled a departmental broker role by crossing boundaries to interact with PoT outside of their home department, which can infuse additional pedagogical knowledge or innovative perspectives to their own department (Andrews et al., 2016; Grunspan et al., forthcoming; Wenger, 2010). The concern though is that the more specialized roles that PoT can play may actually separate traditional faculty and PoT into two different Communities of Practice—one research-focused Community of Practice with research-focused professors and one teaching-focused Community of Practice with teaching-focused professors; with the two communities only occasionally overlapping. This misalignment was noted by one of our stakeholder interviewees, who described that the PoT may feel isolated by their STEM department. Unfortunately, two Communities of Practices will not be as effective as a unified community, resulting in decreased opportunities to improve undergraduate education in the department. While discouraging, the lack of successful integration of PoT in their departments should not be surprising, as it aligns with the common

perception at research-intensive universities that teaching is less of a priority relative to research (Fairweather, 2008; Serow, 2000). Even education-focused faculty, in the case of SFES in the California State University system, who conduct disciplinary-based education research may run across the stigma that research on education may be perceived as inferior to disciplinary STEM research (Bush et al., 2020). In the Community of Practice framework, members of the community must be willing to communicate and learn from each other in order to create a more successful organization (Wenger, 2010). While stakeholders perceived integration to be occurring, they simultaneously noted that future hiring of PoT was unlikely as their colleagues did not "want [our university] to look like a [teaching-focused university] (Interview 102)."

Until the department or university is willing to come to terms with the dichotomy of teaching vs. research, issues seen with teaching-focused faculty at research-intensive universities, such as with PoT in the UC system, that include a lack of clarity regarding evaluation of these faculty (Baron-Nixon, 2007; Bush et al., 2013) and the perception of teaching-focused faculty as second-class citizens (Brownell & Tanner, 2012; Bush et al., 2011, 2020), will remain unaddressed. In our particular study context, if teaching is not something that departments value equally to research, then PoT will be less influential in improving undergraduate programs than is potentially possible with high integration and support.

What our findings imply is that change is needed. Change in instructional practices, change in research occurring in STEM departments, and change in how people think about higher education. We believe that PoT have the potential of being change agents in their departments, but as Borrego and Henderson (2014) point out, change in STEM instructional practices cannot be a solitary activity. In addition to individual instructors changing their teaching practices, institutional policies and practices need to accommodate those changes as well, such as adjusting certain universities' prioritization on research only (Cadez et al., 2017; Milem et al., 2000). In STEM fields, most people are unfamiliar with the language and literature of social science findings and as Borrego and Henderson (2014) state: "the relevant literature on change in higher education is not necessarily accessible to those who need to apply it (221)."

In this paper, we investigated a type of teaching-focused faculty position in research-focused institutions. The PoT series at the UC is a tenure-equivalent series with the important distinction that promotion is mainly based on teaching. While the stakeholders we interviewed generally felt that PoT were meeting expectations and even contributing in unexpected ways, there are still numerous organizational and structural barriers preventing PoT from reaching their full potential as change agents in STEM higher education.

Implications and future work

As there are continuous concerns about the quality of STEM higher education (e.g., Olson & Riordan, 2012; President's Council of Advisors on Science and Technology [PCAST], 2010), a potential solution to being able to implement systematic and lasting change in teaching and learning is to hire teaching-focused faculty in STEM departments at research-intensive universities. However, before teaching-focused faculty can act as the change agents we hypothesize they could be, there are numerous institutional barriers that are hindering their success. In order to understand the future possibilities of the position, understanding how different stakeholders conceptualize the position is necessary.

More work is needed to foster shared departmental values regarding the importance of teaching and the integration of teaching-focused faculty within their disciplinary departments. The possible contributions teaching-focused faculty make to their departments and institutions exceed many of the initial reasons for hiring and should be considered in terms of retention and success of faculty in these roles. Future research efforts are needed to collect empirical data on instructional practices to determine whether teaching-focused faculty are more likely to implement evidence-based teaching practices. Additionally, quantitative data are needed to evaluate whether teaching-focused faculty are in fact impacting how their colleagues teach, especially with consideration of the Community of Practice Framework. It would be valuable to determine if and how teaching-focused faculty are spanning disciplinary and departmental boundaries and the support they receive to do so. Finally, analyzing student academic outcome data can help to determine how teaching-focused faculty are contributing to student success.

Conclusion

In response to the call for higher education to increase the quality of teaching, we argue that Professors of Teaching in the L(P)SOE series at the University of California, a type of teaching-focused faculty line, could be a potential model mechanism to facilitate teaching improvement at all research-intensive universities. Stakeholders highlighted that PoT are viewed by research-focused faculty and other stakeholders as outstanding instructors, seen as bridges to the traditional university teaching and learning centers, as teaching resources themselves, and as leaders in sharing and conducting externally funded education research. The data presented in this work lay the foundation for our understanding of teaching-focused

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faculty at research-intensive universities and can serve to guide individuals planning to hire similar faculty at their own universities.

Appendix
Pre-survey questions and interview protocol
Purpose: Interview stakeholders to determine whether expectations of SOE hires (both before hired and after) match with SOE expectations.

Pre survey (use answer choices from survey)

1. How have you been involved in the hiring of SOE faculty?
2. What formal or informal <u>disciplinary</u> training (i.e., biology, chemistry) was expected/preferred for L(P)SOE hires? (check all that apply)
3. What formal or informal training in <u>discipline-based education</u> was expected/preferred for L(P)SOE hires? (check all that apply)
4. What percentage of their time are your SOE faculty expected to spend on teaching, professional development, and service?
5. What are acceptable expectations of L(P)SOE scholarship/professional activities?
6. Are there types of courses (lower division, upper division, lab, etc.) that SOE faculty in your department teach? Why?
7. Are there types of courses that SOE faculty in your department would not likely teach? Why?

Interview questions
Note: at the time of the interviews (Fall 2017), the position was still officially referred to by the L(P)SOE acronym. The official working title became Professors of Teaching in March 2019 (UCI Academic Personnel, 2019).

1. Why did your department/school hire L(P)SOE faculty? What are the expectations for your L(P)SOE faculty? Do you feel that they are meeting them?
2. In relation to your department's/school's goals, what roles do you expect LPSOE to take in the short and long term future.
3. Do you think your department/school will hire more LPSOE faculty? Why or why not?
4. What do you view as the main differences between research and teaching faculty?

5. What are you telling your L(P)SOE that they need to do to be promoted? Do you think your whole department understands that?
6. What are the most challenging aspects of getting promoted for L(P)SOE faculty versus traditional research faculty?
7. Are there specific ways/resources that your department provides to L(P)SOE faculty to aid in their success?
8. Do you feel that the typical research faculty member in your department values the L(P)SOE position? Has this changed in your department over time?
9. How integrated do you feel your L(P)SOE faculty are with the rest of your department faculty? Do you feel that there have been barriers to their integration?
10. What are the benefits of having a LPSOE in your department/school?
11. What do you think are challenges of having a LPSOE in your department/school?
12. Tell us about your department's culture on teaching. Can you provide examples of ways in which your department thinks about teaching and learning?
13. Is there anything else that would you like to say about the L(P)SOE position?

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ANH conducted the interviews, contributed to the analysis, and co-led the development and writing of the manuscript. NTB led the analysis and co-led the development and writing of the manuscript. SML is a co-PI on the grant that funded this work and contributed to the writing of the manuscript. BKS is the PI on the grant and oversaw the project as well as contributed to the data analysis and writing of the manuscript. All authors read and approved the final manuscript.

Author information
ANH is the Assistant Director for Instructional Development at the center for teaching and learning at the University of Georgia.
NTB is an assistant professor of teaching in the department of mechanical and aerospace engineering at the University of California, Irvine.
SML is an Associate Teaching Professor of Cell and Developmental Biology in the Division of Biological Sciences and Affiliate Faculty in the Joint Doctoral Program in Mathematics and Science Education at the University of California, San Diego.
BKS is a Professor of Teaching in Molecular Biology and Biochemistry in the School of Biological Sciences and Associate Dean in the Division of Teaching Excellence and Innovation at the University of California, Irvine.

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Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available due to privacy protection of the participants but are available from the corresponding author on reasonable request.

Declarations

Competing interests

The authors declare that they have no competing interests.

Author details

[1]Center for Teaching and Learning, University of Georgia, Athens, GA 30602, USA. [2]Mechanical and Aerospace Engineering, UC Irvine, Irvine, CA 92697, USA. [3]Division of Biological Sciences and Program in Mathematics and Science Education, UC San Diego, San Diego, CA 92093, USA. [4]Department of Molecular Biology & Biochemistry, UC Irvine, Irvine, CA 92697, USA. [5]Henry Samueli School of Engineering, 3232 Engineering Gateway, Irvine, CA 92697, USA.

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