Critical Education

STEM Deserves an F
The role of Foundations of Education in the UTEACH model of teacher preparation

Philip P. Kelly
Boise State University

Abstract

The relative position of the social foundational studies of education (SFE) within the overall curriculum of teacher preparation has been tenuous for decades. Within the last several years, the confluence of three streams of pressure have undermined the inclusion of SFE courses within such curricula. These include, the perceived lack of direct applicability to the tasks of teaching, the rapidly rising costs of higher education, and political disillusionment. This paper explores each of the streams of resistance to SFE courses within teacher preparation. This exploration culminates in an examination of the latest incarnation of SFE-free teacher preparation programs, the UTeach model for preparing in the areas of science, technology, engineering and mathematics (STEM). Only two of the 39 reviewed UTeach replication programs required the inclusion of SFE courses for prospective STEM teachers. The paper concludes with a discussion of importance of including SFE coursework in the preparation of STEM teachers.

Introduction

Within the field of the social foundations of education (SFE), proponents argue that SFE provides the basis upon which teachers can develop into both good technical teachers as well as democratic professionals (Committee on Academic Standards and Accreditation 2013, Gutmann 1999, O'Brien 2000). It is within SFE courses that students are given the space to ponder the big questions and dilemmas within public education. A novice teacher addresses the importance of SFE within teacher education, reporting

> Our foundations course is beneficial because it helps us find where we stand on certain important life issues that we are faced with in the classroom. These kinds of classes have such a big impact that it can sometimes alter our own perceptions of society and the classroom. (Carter 2008, p. 233)

Careful consideration of the purposes of schooling, the societal dynamics within which the act of schooling takes place, and the institutional norms of public education, can greatly inform how teachers develop their classroom practices, as well as how they interact with students, parents and fellow educators. Nevertheless, SFE courses find themselves increasing challenged and often removed from teacher preparation curricula, leaving some scholars to ponder their academic "extinction" (Dunn & Faison 2015; Gabbard & Flint 2013).

The relative position of foundational studies of education (history, philosophy, sociology) within the overall curriculum of teacher preparation has been tenuous for decades. Within the last several years, the confluence of three streams of pressure have undermined the inclusion of SFE courses within such curricula. First, the perceived lack of direct applicability to the tasks of crafting lesson plans and managing classroom behavior raises questions about the necessity of SFE in teacher preparation programs. Second, the rapidly rising costs of higher education, coupled with the increasing time to graduation experienced by those students who do graduate, exert fiscal pressure on institutions of higher education to reduce the time and/or credits necessary to finish degrees. Thus, any "nonessential" courses are ripe for removal from degree programs. Finally, political leaders from both the left and right are disillusioned with teachers, their unions, and their traditional preparation pathways. This is evident in former Secretary of Education Arne Duncan's call for increased regulation of teacher preparation institutions (U.S. Dept. of Education, 2014), as well as the development and implementation of a new accreditation system for colleges of education, Council for the Accreditation of Educator Preparation (CAEP). This paper explores the purpose of SFE courses, as well as each of the streams of resistance to such courses within teacher preparation. This exploration culminates in an examination of the latest incarnation of SFE-free teacher preparation programs, the UTeach (http://www.uteach-institute.org) model for preparing in the areas of science, technology, engineering and mathematics (STEM).

The Purpose(s) of SFE Courses

For the purposes of this paper, I adapt Neumann's (2010) definition of SFE courses as including historical perspectives on education or schooling, combined with either sociological perspectives on current education issues or educational philosophy, or both. By locating our current public school systems and concomitant classrooms within their historical and sociological contexts, prospective teachers are better able to understand "how we got to be this

way," and thus are better able to analyze and respond to issues as they arise in their classrooms and schools. Without such analysis and reflection upon the social context of schooling, pre-service teachers are left to absorb a sanitized version of public education, focused solely on a "technicist-driven curriculum" (Kubow & Blosser, 2014).

According to the Committee on Academic Standards and Accreditation (CASA, 2013) of the American Educational Studies Association (AESA), SFE courses prepare educators to engage in multiple forms of analysis, reflection and action. A sample of the knowledge, skills and dispositions included as critical to teacher preparation include:

1. Understand and apply disciplinary knowledge from the humanities and social sciences to interpreting the meanings of education and schooling in diverse cultural contexts.

2. Understand and apply normative perspectives on education and schooling.

3. Understand and apply critical perspectives on education and schooling.

4. Understand how moral principles related to democratic institutions can inform and direct schooling practice, leadership, and governance.

5. Understand the full significance of diversity in a democratic society and how that bears on instruction, school leadership, and governance.

6. Understand how philosophical and moral commitments affect the process of evaluation at all levels of schooling practice, leadership, and governance.

7. Critically analyze current educational policies and practices at national, state, and local levels and their impacts on teaching, learning, and the assessment of P–16 students. (p. 111)

The skills listed above undergird the ability of public educators within the United States to act as democratic professionals (Gutmann, 1999). As such, teachers assist in developing new generations of democratic citizens while at the same time defending the ideals of our increasingly diverse, pluralistic democratic nation.

The nature of public schooling as well as the quality of democratic deliberation within our society "depends most crucially on the educational role we attribute to teachers" (Gutmann, 1999, p. 76). Teachers, functioning as the earliest interface of the government with our children are called to go beyond merely teaching value-free academic content and skills, they must teach democratic ideals through their daily interactions, being for some students their very embodiment. Gutmann (1999) offers two fundamental principles undergirding her version of democratic professionalism, *nonrepression* and *nondiscrimination*. Democratic teachers may neither repress any student's legitimate conception of the "good life" (nonrepression), nor may they allocate resources, including their own time and attention, in a manner that discriminates against any student or group of students (nondiscrimination)–even if acting as a democratic professional is in opposition of local community norms or majority rule. Teaching in a governmental institution within our democracy "requires that we collectively defend and promote the values of our democracy–such as equality, justice and freedom… (Kerr, Mandzuk, & Raptis, 2011, p. 124).

It is in SFE courses that fledgling teachers are given the opportunity to explore pressing democratic issues as they manifest themselves in public schools. SFE courses ask students to

explore themselves, including their own histories and biases within the context of being charged with educating our nation's increasingly diverse school children. Furthermore, SFE courses demand that beginning teachers "address the question, 'for what purpose(s) do we educate?'" (O'Brien, 2000, p. 24). This is an important step for the development of teachers, for it helps them acknowledge, analyze and begin to understand the multiple social, philosophical and ideological forces within which their future classrooms will be situated. One novice teacher summarizes this point, writing

> (SFE) has a had a profound impact on me… (SFE) has helped me to not only care about my future students but also to be able to advocate for them and myself, plus other teachers. Moreover, (SFE) also shows how to question the motives of politicians, administrators, and superintendents. One should know what is really going on, don't just accept issues at face value. (Carter, 2008, pp. 239-240)

Developing a wider understanding of teaching and schooling can be empowering to novice teachers. As Maxine Greene (1973) wrote four decades ago, if a teacher "can learn to do philosophy, he may liberate himself for understanding and for choosing. He may liberate himself for reflective action" (p. 7). However, Greene's teacher must first have the opportunity to "do philosophy" and/or contemplate public schooling and all that it entails. Unfortunately, the ability of teachers to reflect on democratic purposes of schooling, the educational policies that govern schools and the social context within which schooling happens have been "conspicuously absent" in most policy documents (Neumann, 2010, p. 5).

The First Stream - The Applicability of SFE Courses

SFE courses are challenged from within academia, both within the larger university arena, as well as within the halls of some colleges of education. Arthur Levine, in his report, *Educating School Teachers* (2006) laments the "abyss" between theory and practice within colleges of education (p. 39). While teacher preparation programs vary from one institution to the next, Levine declares "Relativism is the rule" (p. 35). Teacher education is "too often a grab bag of courses, ranging across various subfields of teacher education from methods to the philosophy and history of education" (p. 107). His solution: a teacher preparation program focused solely on practical/technical considerations of the instructional act, as if participating in classroom instruction within our public schools is inherently apolitical and ahistorical. Nowhere in his "Criteria for Excellence" for university-based teacher education programs are the social foundations of education, nor the capacity for teachers to reflect on the historical, sociological or ideological context within which they must teach.

Levine's defining of teacher preparation as a conglomeration of technically-focused classes/experiences, devoid of any foundational analysis, "shuns engaging in normative deliberations about the unequal distribution of political and economic power, inequitable social arrangements, institutional forms of discrimination, social and political conflict" (Dotts, 2016, p. 54). Upon examining 302 U.S. universities four years later, Neuman (2010) found that "nearly half of university-based teacher preparation programs do not require a SFE course" (in Hartlep et al., 2015, p. 139). Further diminishing the ability of new teachers to engage in critical reflection upon the institution of public education is the fact that of the university programs requiring SFE course, approximately half are "taught either by faculty outside the field or adjuncts" (Hardee & McFadden, 2015, p. 33).

A decade after *Educating School Teachers* (2006), the Council for the Accreditation of Educator Preparation (CAEP) still ignores such contexts, continuing to perpetuate a technocratic approach to teacher education (2016). Within CAEP's five main standards, as well as the InTASC standards subsumed under CAEP Standard One, no mention is made of SFE, nor of reflecting on the institution of public schooling within the United States. CAEP's and Levine's treatment of instruction as separate from, or immune to, the social institutions within which it is embedded is laughable. Teaching is an inherently political act, to treat it otherwise is both unwise and contrary to both the professional literature and veteran teachers' wisdom of practice.

In conjunction with such reports, and both fiscal and political pressures, "teacher educators are being called on to train, not educate, prospective teachers" (Liston, Whitcomb, & Borko, 2009, p. 108). Within such a context, practical concerns "trump the larger vision of the purpose or function of education and marginalizes the contributions of the social foundations of education. How to teach is replacing why to teach" (Swain, 2013, p. 122). The resultant evaluation of university courses based on market-based economic utility is further supported by pressures to shorten degrees as a cost-saving measure (Dunn & Faison, 2015; Kubow & Blosser, 2014). Utility here is not used as a synonym for usefulness, but instead refers to the production of measureable products such as test scores, be they teachers' Praxis scores or students' standardized tests. Gone from such use of utility is critical reflection necessary to best advocate for one's students within the social institution public education.

The Second Stream – The Rising Costs of Higher Education

> American higher education is at the breaking point. It is at a critical crossroads, with the very survival of many institutions at stake. The current price structure has become unsustainable for many students and their families, and costs have become problematic for a great many higher educational institutions as well. … It is becoming increasingly clear that without fundamental changes, a college education will soon be out of reach for many more of our citizens. … Something is very wrong when a college education costs as much as many typical middle-class families earn annually. (Bradley, Seidman, & Painchaud, 2012, pp. ix-x)

So begins the preface to *Saving Higher Education*, Bradley, Seidman and Painchaud's (2012) book about how competency-based three-year bachelor's degree programs are the answer to the fiscal woes of colleges, universities and their students. Over the past several years, tuition at public four-year colleges has risen 27% beyond overall inflation (Elliot 2013). Students and their parents are no longer simply accepting annual tuition increases silently. As a result, tuition protests occurred on California campuses in 2009, 2011, 2012, 2014 and 2016 (Wollan & Lewin, 2009, Associated Press 2011, Murphy 2012 , Rooney 2014, Buckley 2016 respectively).

Colleges and universities across the country are under tremendous pressure to reduce the costs incurred by their students. Efforts to reduce costs typically fall into two categories or a combination of both, either reduce the number of credits required for degrees, or accelerate the rate of course completion, thus reducing the time in college. According to the National Center for Education Statistics (1999), the traditional 120 credit bachelor's degree had increased to 132.2 credits by 1992, representing a 10% increase in credits, equal to approximately one additional semester, or an average of 4.6 years to complete (Johnson, 2011). Within such a hostile fiscal environment, colleges and universities are combing through their course catalogs

and degree programs looking for efficiencies. Thus, all courses are called upon to justify their inclusion in program curricula.

Because of this pressure, throughout the 1990's and 2000's universities across the nation reviewed and reduced credits necessary to earn degrees. According to a 2012 national survey of degree requirements, "typical program requirements for bachelor's degrees have declined since 1995" (Johnson et al., p.19). The University of Wisconsin system was early to adopt such reductions, having reduced their average requirements by ten credits between 1994 and 2004 (Wellman, 2008). The state of Florida passed legislation limiting all baccalaureate degrees within the State University System to 120 credit hours. In 2000, Chancellor William Kirwan (2007) led the University System of Maryland through the Effectiveness and Efficiency Initiative, which "established a policy that stipulates 120 credits as the maximum allowable" for most degree programs (p. 45). In the past two decades, this trend has spread throughout institutions of higher education.

Given the practical, "nuts and bolts" focus of the arguments presented earlier, SFE courses are often hard-pressed to successfully defend their inclusion in the credit-reduced versions of teacher preparation degrees (Swain, 2013). Zeichner and Ndimande (2008) highlight this phenomenon, writing that economic realities can result in approaches to teacher education that prepares teachers "at low cost as low-level technicians and civil servants who can obediently follow a scripted curriculum and prescribed teaching methods" (p. 332). As a result, we are now seeing universities' purposes devolve from intellectual engagement to job training to meet the whims of the market. Such an approach can only weaken the ability of teachers to engage in the reflection critical to their capacity as democratic professionals.

Third Stream - Political Disillusionment

Over the last several years, teachers, their unions and teacher preparation programs have increasingly come under political attack as well (Brill, 2010; Fitzpatrick & Spielman, 2016; Tamir, 2009; Whitmire & Rotherham, 2009). While teachers' unions have long been a target for conservative politicians, recently criticism has flowed from both the political left and right. Characterized as impediments to educational reform, the approbation of teachers' unions has tainted the once respected occupation of public school teacher. The training of teachers has also fallen under attack as being ideologically out of touch, lacking in both content and rigor, and having low standards for both entrance and graduation (Labaree, 2004; Levine, 2006). As such, teacher preparation has fallen in the cross-hairs of political reformers. Secretary of Education under President George W. Bush, Rodney Paige decried the state of teacher education programs, writing in his first report to Congress, "The data show that many states mandate a shocking number of education courses to qualify for certification…These burdensome requirements are the Achilles heel of the certification system. They scare off talented individuals *while adding little value*" (emphasis added, quoted in Neumann, 2010 pp. 4,5).

Throughout the nation, alternate certification programs are proliferating as a means to get around the university-based teacher preparation monopoly. Tamir (2009) documents the country's first alternative route to teacher certification (ARTC) program in New Jersey, whose goals included

- Create a state-sponsored program that would recruit individuals with strong subject matter knowledge in the liberal arts and sciences.

- Provide teacher candidates with a 200-hour program that would cover the core issues of teaching (e.g., class management and student learning) during the first year of teaching.

- Circumvent and break the long-standing monopoly of New Jersey's "failing teacher preparation programs." (p. 473)

Within New Jersey's overall effort to reform teacher preparation was a call for the "complete abolition of B.A. degrees in education and a cap of 30 credits" in teacher education programs, with ten credits being in an internship (Tamir, p. 474). As a result, all SFE courses were dropped from teacher preparation curricula, unless the professor had a graduate degree in the *real* discipline (e.g., Ph.D. in Philosophy, instead of Educational Philosophy). Tamir (2009) summarizes New Jersey's efforts, writing:

> According to this view, instead of having teachers from traditional university programs, state officials wanted to create a new type of teacher who would be shielded from the harmful impact of teacher educators' unsubstantiated scientific knowledge and progressive beliefs. Despite the opposition, … the ARTC quickly expanded, preparing 26% of New Jersey's teachers within 6 years of its inception (Klagholz, 2000) and 40% by 2006 (Freistritzer, 2006). (p. 474)

Since the establishment of the first alternate certification program, similar programs have been developed all over the nation, such as Teach for America (http://www.teachforamerica.org) and UTeach-based programs (http://www.uteach-institute.org), the newest major alternative certification programs.

The UTeach Model

Begun in 1997 as a collaborative endeavor between the College of Natural Sciences and College of Education at the University of Texas-Austin, UTeach is now an alternative teacher preparation program for STEM teachers at 43 universities. During the 2015-2016 academic year, UTeach-affiliated universities enrolled approximately 6,280 prospective STEM teachers (institute.uteach.utexas.edu). According to early UTeach Institute estimations, graduates of UTeach programs would teach approximately one million students by 2014 and upwards of five million students by 2020 (Figure 1, UTeach Institute, 2013a, p. 14).
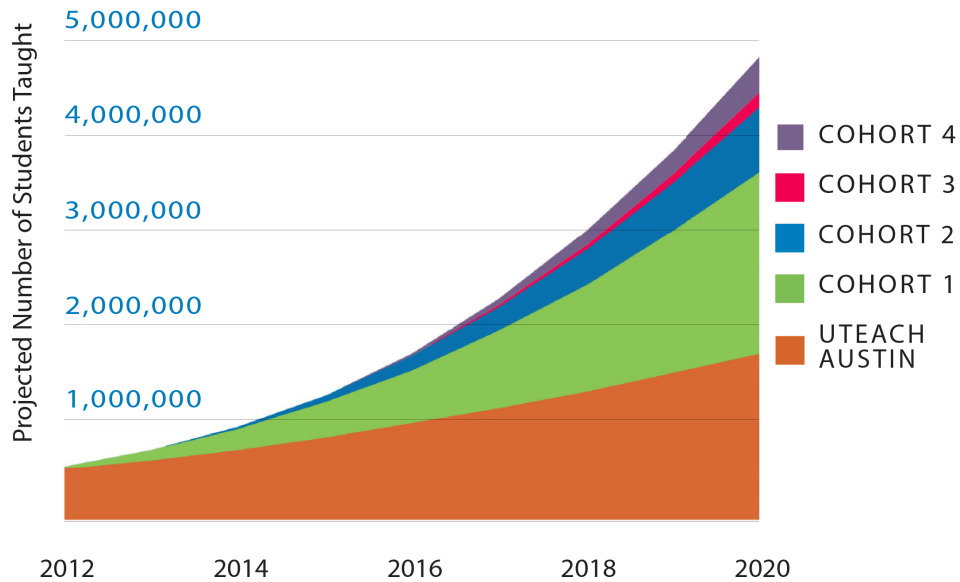
Figure 1: Projected Number of Students taught by UTeach graduates (2013)

These figures have been adjusted downward in the most recently released UTeach data (UTeach Institute, 5/16/2016). Enrollment for 2016 was reduced by half from 1.6 million students to approximately 800,000, with a projection of four million students by 2022 (p. 19).
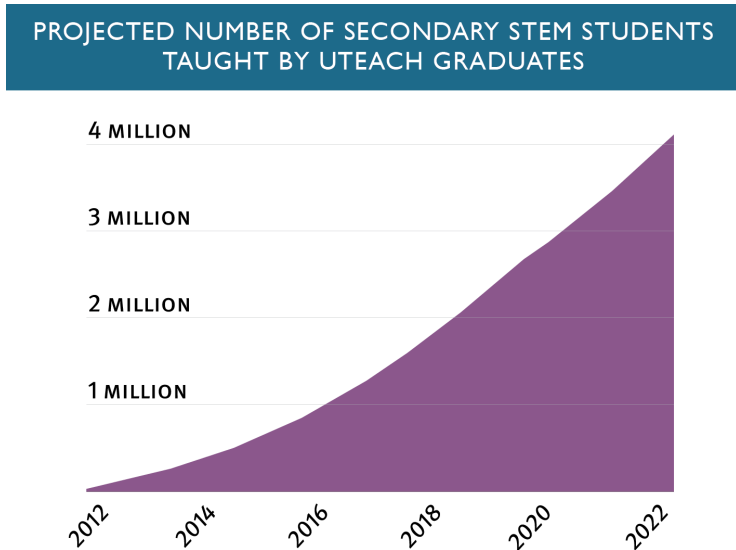

Figure 2: Projected Number of Students taught by UTeach graduates (2016)

According to UTeach literature, the program attracts potential teacher candidates "by eliminating traditional barriers to certification" (Abraham & Stewart, 2015 p. 11). "Eliminating barriers" apparently means streamlining both a bachelor's degree in a subject area (e.g., chemistry, physics, mathematics) with teacher preparation within a four-year degree.

The model UTeach curriculum requires 15 credit hours of class time, two 1-credit hour introductory field-based classes, and a 7-credit apprentice teaching experience in which UTeach students teach half-days for 12 weeks, for a total of 24 credits. (UTeach Institute, 2013b). The 15 credits of class time are comprised of five 3-credit classes, including

- **Knowing and Learning in Mathematics and Science** – This course expands the prospective teacher's understanding of current theories of learning and conceptual development. Students examine their own assumptions about learning. They critically examine the needs of a diverse student population in the classroom.

- **Classroom Interactions** – This course moves from a focus on thinking and learning to a focus on teaching and learning. Prospective teachers are introduced to the way in which curriculum and technology are used in classroom settings to build interrelationships among teachers and students. They are taught how content and pedagogy combine to make effective teaching.

- **Project-Based Instruction** – In this course, students aim to master new technologies for problem-based investigations in math and science classrooms, teaching project-based lessons to middle school students. Students also discuss the use of assessment to improve student learning.

- **Perspectives on Science and Mathematics** – Faculty in History and Philosophy introduce students to the historical, social and philosophical implications of mathematics and science through investigations of five significant episodes in science history.

- **Research Methods** – Students perform four independent inquiries and learn to combine skills from mathematics and science in order to solve research problems. (University of Texas-Austin, 2013)

Nowhere in the UTeach model curriculum are SFE courses in which prospective science and mathematics teachers can consider the social institution of public schooling in which they will work. While Knowing and Learning in Mathematics and Science gives a nod to "a diverse student population," it does so within class focused on learning theory and educational psychology. Perspectives on Science and Mathematics at least gives attention to "the historical, social and philosophical implications" but of science history, not public education. Thus, most students of UTeach-based programs are not granted the space to study, critique and come to understand the social foundations of education.

After reviewing the curricula of 39 of the 43 UTeach replication sites, only two of the 39 universities included SFE courses in their UTeach-based teacher preparation curriculum. Boise State University (2016) includes ED-CIFS 201, *Foundations of Education*, described in their course catalog as

ED-CIFS 201 FOUNDATIONS OF EDUCATION (3-0-3)(F/S)(DLS) - Social, multicultural, philosophical, and historical perspectives in education; current educational issues; and problems of education. Provides a conceptual framework from which students will learn to reflect upon and question American public education. (p. 125)

While the University of Colorado-Boulder (2013) includes EDUC 3013, School and Society, described in their course catalog as

EDUC-3013 (3) SCHOOL AND SOCIETY - Introduces students - both future teachers and those simply interested in education - to pressing issues surrounding education within the United States. The course reveals the complex relationship

between schools and the larger society of which they are a part. Examines issues of diversity and equity from different disciplinary lenses, including history, philosophy, sociology and anthropology. … (Introduces students - both future teachers and those simply interested in education - to pressing issues surrounding education within the United States. The course reveals the complex relationship between schools and the larger society of which they are a part. Examines issues of diversity and equity from different disciplinary lenses, including history, philosophy, sociology and anthropology. Approved for arts and sciences core curriculum: contemporary societies or human diversity.

 http://www.colorado.edu/catalog/2016-17/courses?college=EDUC)

Both of these courses clearly meet the criteria of SFE courses. Within the nation-wide network of UTeach replication sites, Boise State University and University of Colorado-Boulder educate 363 students (151 and 212, respectively) of the 6,280 students registered in similar programs during spring 2016 across all UTeach-affiliated universities, or 5.78% of the total (UTeach Institute, 2016). Thus, 94% of all STEM teachers prepared through UTeach-affiliated programs may lack exposure to the social foundations of education.

Discussion

Curriculum debates, implicitly or explicitly, are always debates about alternative views of society and its future. (Young, M.F.D., 1998, p. 9)

Fundamentally, we must decide on our views of the role of teachers in our society and its future. Are they to be equipped to question the role of a teacher within a classroom? School/district policies? Injustice in schools or society? Educational or governmental leaders? Or are teachers to be prepared within "value-free" technically-focused training programs, built upon a foundation of professed pedagogical neutrality (Simon, 2001)? As I write this in late November 2016, this choice in becoming increasing important to the education and development of our children. The incoming administration is treating science as if it is simply the telling of stories around a campfire, where everyone's opinion is as valid as everyone else's. Now, more than ever, STEM teachers need be prepared to be aware of and question the social context within which they are teaching.

The spread of alternative routes to certification, such as the 43 UTeach replication programs that have graduated 2,676 teachers to date, is only accelerated by the previously mentioned larger pressures within and around teacher education (UTeach Institute, 2016). The rise of neo-liberal economic utilitarianism is relegating SFE courses as "less than" technically focused methods courses which operate free of consideration of the social context within which public schooling operates. As SFE courses are further marginalized within teacher preparation programs, whether alternative or not, the opportunities for prospective teachers to really reflect upon the large social dilemmas that plague public education will continue to diminish. The atrophying of teachers' critical, deliberative skills and interests can only serve the status quo and the supremacy of market-driven reforms within teacher preparation specifically and higher education more generally.

According to standard IV(3) of the Standards for Academic and Professional Instruction in Foundations of Education, Educational Studies and Educational Policy Studies (CASA, 2013),

educators should be committed to critically analyzing their own "values and beliefs in relation to their pedagogical actions by:

> a) investigating and considering (their) own values, beliefs, and teaching practices;
>
> b) examining factors such as race, ethnicity, gender, and social class and how they affect teaching and learning in classrooms as well as in informal and nonformal educational settings. (p. 116)

Without space and time to consider such "non-technical" factors, educators are left without the intellectual, philosophical or reflective resources to advocate effectively for their students and profession within the social institution called public schooling. One of Carter's (2008) novice teachers highlights this function, reporting that her SFE course "empowered (her) to change things that seem unjust. It … also pushed (her) thinking as a teacher to analyze the system and thoroughly understand the agendas" (p. 240). Without this ability to analyze or question the system within which they must live and teach, teachers cannot meet the demands put upon them as democratic professionals. As a result,

> Whether out of lack of knowledge or an absence of agency, educators in turn subject their students to policies and practices they do not support. As a result, a climate of powerlessness is perpetuated as the two principal actors in educational environments (i.e., educators and students) remain as bystanders in policy and practices that influence them. (CASA, p. 117)

Without the grounding provided by SFE courses, educators and their students are left to the mercy of whatever the prevailing winds of policy and culture thrust upon them.

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Author

Philip P. Kelly is Professor of Educational Foundations and Policy in the Department of Curriculum, Instruction & Foundational Studies at Boise State University. His research interests include educational policy, comparative education and democratic theory. For further information about Dr. Kelly, please go to https://works.bepress.com/philip_kelly/.

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