

What Do All These Numbers Mean? Data Visualization as an Innovative Methodology to Make Program Decisions

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Background: There is a lack of consistent, comprehensible data collection and analysis methods for evaluating teacher preparation program's coverage of required standards for accreditation. Of particular concern is the adequate coverage of standards and competencies that address the teaching of English learners and teachers of students from culturally and linguistically diverse backgrounds.

Purpose: To graphically convey the findings of a faculty survey regarding English learner and multicultural content in teacher preparation coursework in order to inform them of inadequate coverage (and saturation) of those particular teaching standards and competencies.

Setting: A small teacher preparation program in a Northern California public university that prepares elementary school teachers and special education teachers.

Intervention: 10 full and part-time faculty members in a teacher preparation program that prepares elementary and special education teachers.

Research Design: Congruency study, in which raw data from faculty survey responses were compared with rated program responses to teacher preparation standards by means of a relational database with graphing output capabilities.

Data Collection: A survey instrument was designed and administered to all faculty members in the program.

Findings: The resulting radar maps and other graphic outputs allowed faculty to clearly see where their course content aligned with the program accreditation response and where more coverage of that particular competency was necessary.

Conclusions: The use of relational databases was a highly effective method for helping one teacher preparation program to visualize their progress towards meeting standards for teacher preparation in the area of student diversity and the teaching of English learners.

Keywords: *data visualization, program evaluation, teacher development*

In spring of 2006, the California Commission on Teacher Credentialing (CTC), the state board charged with overseeing the quality and accreditation of teacher preparation programs, issued a policy statement requiring all education specialist preparation¹ programs in California to respond to teacher quality standards pertaining to teaching English learners (CTC, 2006). All accredited special education teacher preparation programs in California were required to submit responses to these standards in order to comply with a state law requiring that pedagogy specific to teaching English learners be embedded in all teacher preparation pathways. California State University, Chico (CSUC), submitted its response to these standards in May of 2006. Subsequently, all education specialist pathways at CSUC were approved by the Commission and deemed as having course content equivalent to a CLAD² Authorization.

In the following spring, the credential programs and service credential programs at California State University, Chico received accreditation visits from both the National Council for Accreditation of Teacher Education (NCATE) and the California Commission on Teacher Credentialing (CTC). All seventeen credential programs at CSUC were being reviewed as part of this institutional accreditation. This merged CTC-NCATE accreditation visit included a review of CSUC's implementation of standards

pertaining to the teaching of English learners and students from culturally and linguistically diverse (CLD) backgrounds.

After the merged NCATE and CTC accreditation visit in spring of 2007, in which CSUC received full state and national accreditation, the special education programs within the School of Education determined that its improvement goals for the next two years would focus on the efficacy of its pathways for preparing teachers for culturally and linguistically diverse (CDL) student populations. This improvement goal was due in part to feedback from the accreditation teams. To this end, the special education program undertook a self-study those aspects of their program that prepared their teachers to teach English learners. As part of this self-study process, the faculty in the special education program at CSUC decided to study the congruence between its course syllabi and its response to CTC and NCATE Standards which address content and pedagogy for teaching English learners and students from culturally diverse backgrounds.

Literature Review

California serves the most culturally and linguistically diverse student population in the United States. Moreover, one in four children attending California public schools is an English learner (CDE, 2009). By definition, an English learner is "...a K-12 student who, based on objective assessment, has not developed listening, speaking, reading, and writing proficiencies in English sufficient for participation in the regular school program." (CDE, 2006).

Because a significant percentage of students come to school with little

¹ "Education specialist" is the term used for special education teachers in California.

² "Crosscultural, Language, and Academic Development Certificate," a state-issued authorization for teaching English learners in English-only classrooms. The name of this authorization has since been changed to simply "English Learner Authorization."

knowledge of English, pedagogical knowledge in second language acquisition has become a critical skill for nearly all teachers in California public schools. This need is expressed in the dismal outcomes that have come to typify English learners. One of the consequences of poor instruction for students from culturally and linguistically diverse backgrounds is that these students have been identified and placed in special education programs in greater numbers than would be expected (Donovan & Cross, 2002; Zhang & Katsiyannis, 2002). Furthermore, research has documented that English learners are particularly at greater risk for being over-identified for special education and that the overwhelming majority of these students were referred and placed in high incidence categories (Gándara, Rumberger, Maxwell-Jolly, & Callahan, 2003). Teacher knowledge and pedagogical skills have been shown to be critical factors in the academic success of English learners (Gay, 2000; Hollins & Torres Guzman, 2005). These, in turn, are thought to be successful deterrents in the over-identification of English learners and culturally diverse students for special education services (Gándara & Rumberger, 2002; Zeichner, 1992).

State and National Policy Contexts: New Standards for Teaching Diverse Learners

The Commission on Teacher Credentialing (CTC) acknowledged the need for education specialists to be adequately prepared to teach English learners and students from culturally and linguistically diverse (CDL) backgrounds. Consequently, CTC enacted a policy requiring education specialist teacher preparation programs to include

pedagogy for teaching English learners (ELs) as part of their requirements (CTC, 2006).

National trends have also placed increased importance on preparing teachers who can successfully teach culturally and linguistically diverse learners. This increased importance has been the result of the following influences: (1) influx of culturally and linguistically diverse (CLD) students into states that have not been traditional destinations of non-English speaking immigrants (Passel, 2004; Singer & Wilson, 2007), (2) inclusion of English learners in "Adequate Yearly Progress" requirements under the No Child Left Behind Act, and (3) national standards for teacher preparation and institutional accreditation requiring greater accountability for the preparation of new teachers for CDL students (NCATE, 2008). The reauthorization of Individuals with Disabilities Education Act (2004) further outlines the importance of identifying and serving special needs students from culturally and linguistically diverse backgrounds.

The National Council for Accreditation of Teacher Education (NCATE) is an accrediting body that reviews and accredits teacher preparation programs throughout the United States. In some states, the NCATE process is required in order for a teacher preparation program to recommend its teacher candidates for state certification or licensure. NCATE accreditation is a voluntary process among California institutions that sponsor teacher preparation programs, since the California Commission on Teacher Credentialing (CTC) makes the final decision regarding an institutional and program's ability to recommend its candidates and interns for state teaching credentials and authorizations. The NCATE Unit Accreditation Standards

have placed increased emphasis upon preparing candidates to teach students from diversity. Unit Standard 4 is dedicated to promoting excellence among teacher preparation programs in preparing teachers of culturally and linguistically diverse learners. This standard defines diversity as “students with exceptionalities and of different ethnic, racial, gender, sexual orientation, language, religious, socioeconomic, and regional/geographic origins” (NCATE, 2008, p. 12).

For both CTC and NCATE accreditation, sponsoring institutions must prepare a written response to each accrediting agency’s adopted teacher preparation standards. These responses include a written narrative describing how the standards will be met. Since the language of teacher preparation standards requires accredited institutions to provide candidates with “multiple, systematic opportunities to demonstrate knowledge and application of pedagogical theories, principles, and practices” for teaching English learners (CTC, 2009, p. 28), the responding institution often includes a matrix in its narrative to show which combination of required courses will address a particular standard. Supporting documentation is often included with the institutional response, including, but not limited to: course syllabi, faculty vita, and samples of required course readings or key assignments.

As part of its accreditation process, NCATE requires the institutions to use information technologies to conduct on-going assessments and collect and analyze data from multiple sources to

...examine the (1) alignment of instruction and curriculum with professional, state, and institutional standards; (2) efficacy of courses, field experiences, and programs, and (3) candidates’ attainment of content

knowledge and demonstration of teaching that leads to student learning or other work that supports student learning (NCATE, 2008, p. 27).

To this end, NCATE encourages institutions to use accreditation data for self-study as part of the on-going cycle of reflection and self-improvement.

Self-Study Methodologies Among Teacher Preparation Programs

Self-study research is commonly conducted by teacher preparation faculty to monitor the quality and efficacy of program coursework and field experiences (Clift & Brady, 2005). With its origins firmly rooted in medicine and therapy disciplines (Harter, Japp, & Beck, 2005; Teno & Banaschewski, 2002), has become an established method of research on teacher practices and pedagogy and can employ qualitative or quantitative data collection and analysis methodologies (Hamilton & Pinnegar, 1998; Kosnick, Beck, Freese, and Samaras, 2006; Zeichner, 2007). However, Cochran-Smith and Zeichner (2005) found a tremendous variation in the design of published teacher preparation self-studies, with methodological weaknesses evident in both the quantitative and qualitative research in this area. Such variance and methodological issues, Cochran-Smith and Zeichner concluded, affect the ability to generalize these data across institutions and settings.

Case study was one of the more frequently methodologies used in self-studies to investigate the impacts of teacher preparation coursework and field experiences. Such studies typically use qualitative methods to monitor changes in

candidates' perceptions and teaching practices over the course of a teacher preparation program. While these methods provide rich descriptions of individual teachers, the outcomes of these types of studies are often difficult to generalize across other settings and programs. Additionally, there are very few published case studies on teacher education experiences that have investigated the long-term impacts of teacher preparation experiences on the teachers or their K-12 students (Cochran-Smith & Zeichner, 2005).

Surveys are by far the most common quantitative data collection procedures used to determine the efficacy of teacher preparation programs. However, most survey data published in teacher preparation research relies upon self-reports of university faculty and/or teacher candidates, and is therefore subject to problems with validity and reliability (Cochran-Smith & Zeichner, 2005). Additionally, many teacher education departments combine survey data with qualitative data (e.g., analysis of interview responses or focus groups), due to the small numbers of teaching faculty and candidates in their self-studies (Marquez-Zenkov, 2005; Selvester, Summers, & Williams, 2006).

In their review of the research on special education teacher preparation programs, Trent, Kea, and Oh (2005) concluded that lack of consistency of data collection procedures, plus very small numbers of faculty and candidate responses, made studies that focused on the adequacy of programs to prepare special education teacher for diverse learners difficult to quantify and compare across studies. Hollins & Guzman (2005) concur, arguing for a systematic data collection, storage, and retrieval system that would allow for more straight-

forward comparisons of these studies of teacher preparation research across settings.

In a summary of California policies concerning the preparation of teachers of English learners, Merino (2007) points out that there is a great deal of variability among teacher preparation programs in the implementation of standards that address teaching English learners and competencies related to language and culture. Merino concludes that simply requiring teacher preparation programs to address standards for teaching English learners does not ensure that new teachers have sufficient preparation for teaching diverse learners:

The principal challenges of the Standards/Competency Tradition include: insufficient resources to implement, monitor, and investigate the impact of these standards and competencies; the need for valid and reliable measures to assess teaching performance; and the lack of flexibility to investigate practices that are responsive to local needs.

In order to monitor the impacts and implementation of required teaching standards as Merino suggests, a body of research is needed in which there are consistent data collection and analysis methods across studies.

A Case for Data Visualization

Technology has increased the need for researchers and other professionals to process and assimilate larger and larger amounts of language-based and statistical data within relatively short periods of time. These same technological advances have also availed researchers of sophisticated computer graphics tools that allow for the creation of visual representations of complex data to make

it more comprehensible. Graphic representations of statistical data have been used successfully to represent the findings with clarity, precision, and efficiency. Such graphics serve the purpose of making large data sets coherent and able to be depicted within a small space. (Tufte, 1990, 2001). Graphic representations make complex concepts and research findings more memorable and more meaningful than other methods of representing data (Hearst, 1999).

Raw data can also be incorporated into meaningful graphic representations. Histograms and stem-and-leaf plots, for example, use individual measures or data points to form the visualized distribution of a variable (Tufte, 2001). Similarly, cytogenetic maps (idiograms) are created from differentially stained chromosomes, allowing for visual study of raw data (in this case, an individual's chromosomal pattern) to reveal abnormalities that may predict or underlie inherited diseases (Muradyan et al., 2008).

Data mining is a relatively new method that employs computer and database technology to explore large data sets for pattern detection and to model-building to make these data more comprehensible. Because graphical representations are often the outcomes of these database explorations, data visualization is a closely related concept and is often used in conjunction with data mining techniques. Unlike statistical analysis, in which data are combined to determine overall significance or trends, data mining applies algorithms to the data to focus upon clusters of data points that are of interest. Depending upon the algorithms used, data analysis can detect patterns within the extracted data and produce graphical representations that illustrate these relationships. (Hand, Blunt, Kelly, & Adams, 2000). Because data mining

techniques and data visualization can create a single graphic which maps the relationship between data collected from different sources, it can become a powerful tool for alignment studies. Such data mining techniques have been used in alignment studies of K-12 achievement tests that seek to find, not just whether overall congruency with a content standard was met, but to find out which test items aligned most closely to a particular student content standard (Blank, 2007).

Moreover, data visualization can be an effective tool for mining data sets that consist of raw data or statistically extracted data, making them useable for small and large data sets (Hand, Blunt, Kelly, & Adams, 2000). As with statistical data, larger data sets add generalizability to the results. On the other hand, data mining techniques applied to smaller data sets help members to literally see the answer to the question "how well was the standard covered within this course, or this program?" This visualization is extremely valuable, given that, even for a small faculty such as ours, a survey response matrix can have many cells or data points due to the number of courses taught and the number of teacher competencies and standards that need to be met (see Appendix 1 for an example of a response matrix for a single domain).

As an interactive process, data mining would allow our program faculty to visualize a fine-grained analysis by individual courses, faculty members, by teacher competency domains and even by candidate skills. The need for these fine-grained analyses is because individual coursework had been cited in the institutional response and as such, these courses must have relevant content as indicated in the response to the standard. On the other hand, "multiple systematic

opportunities” is also a key requirement by state and national accrediting agencies, and coverage by other courses also needs to be shown. Therefore, both fine grained (e.g., by course, teacher competency) and course grained (e.g., overall program coverage of a domain) were both desired for our self-study.

Research Questions

The following questions guided the investigation:

1. What is the relationship between the faculty responses and the institutional response to NCATE/CTC standards relative to teacher competencies for teaching English learners and students from diverse backgrounds?
2. What types of data analysis can visually portray a program’s course content with respect to the state teacher preparation standards and NCATE standards for English learners and culturally diverse learners, given the small numbers of faculty involved in the study?
3. How might visual representation of these data affect individual and collective faculty reflections in a self-study undertaken by a special education teacher preparation program?
4. How “portable” are these survey instruments and visual data analysis tools to other accredited institutions in which self-study is being conducted?

Methods

Participants and Setting

The participants for the study consisted of ten faculty members of a public university

program in Northern California within the School of Education. The program prepares both general education and special education teachers. Enrollees in the program may earn general education (multiple or single subject) credentials, mild/moderate education specialist credentials, moderate/severe education specialist credentials, or any combination of these. The program provides pathways for both teacher candidates and teacher interns. Teacher candidates are post-baccalaureate students who are completing coursework and fieldwork experiences prior to earning their Preliminary California Education Specialist Credential. Education Specialist Interns become teachers of record after meeting subject matter competencies and other prerequisites prior to the issuance of their Intern Credentials. While they teach, teacher interns are enrolled in teacher preparation coursework at this institution or another state-accredited internship program. The CTC set up teacher intern pathways to meet teacher shortages in high need areas while insuring that the federal guidelines for highly qualified teacher under No Child Left Behind are still met.

The teaching staff, consisting of both tenure track and adjunct faculty, averaged 10.8 years of experience in teacher preparation at the time of the study. When asked the extent of formal training or coursework in teaching CLD students, 40% responded “some” and 30% responded “a lot” of training had been received.

Design of the Instrument

The aim of the study was to determine (a) the amount of coverage that each of the standards was receiving in actual teacher preparation coursework, and (b) the

degree of alignment, according to self-reports by teaching faculty, between the institutional response to the standards and our program's actual practices. To this end, we set out to design a questionnaire that would unpack the standards for the faculty by asking specific questions about the kinds of experiences and content covered in each course. We also wanted to get beyond considering diversity as a concept narrowly defined as cultural and ethnic variation and include the degree to which candidates are prepared to teach students from varying socioeconomic backgrounds or sexual orientations. While this dimension of diversity was not covered in the state teacher preparation standards in question, these features of student diversity are specifically stated in NCATE Standard 4.

A committee of three faculty members was appointed to assess departmental compliance with the CTC and NCATE standards. Our goal was to obtain accurate data about our degree of compliance with these standards and policies. Additionally, we sought to improve the quality of those components of our teacher preparation program that dealt with pedagogy, appropriate assessment and cultural sensitivity in teaching students from diverse backgrounds. With these goals in mind, we developed a faculty survey instrument that could be used as a self-study and to develop an action plan.

The committee sought to design an instrument that would permit review of the content of each course (readings, activities, class topics, and assignments) with respect to the elements of the standards. Each set of standards and policies gives extensive detail about content in teaching CLD students. We broke each detail into a question for

faculty to use to self-evaluate each course taught by that particular faculty member. Each question required one of five responses that ranged from "This topic is not covered and is not relevant to my course" to "This topic is covered extensively in my course." In all, the survey asks 21 questions across 27 courses. The questions are dichotomous in that the response to one question does not necessarily relate to or impact another question.

Procedures

Teaching faculty was given the option of completing the survey electronically or by hand. Electronic copies of the survey were sent to each faculty member's campus e-mail account in October, 2007. Hard copies were also provided within the same week. Faculty was given a two-week timeline in which to complete and return the survey.

The small sample size made hand tabulation of data a relatively simple task. Out of 18 faculty members who were given the assessment, 16, or 88 % responded.

In order to analyze data from Section B, a matrix was created in which each of required courses were listed by row, while teacher competencies specific to teaching English learners and culturally diverse students were listed in columns. Teacher competencies were grouped by the following domains for ease of interpretation: Domain 1, School Organizations and Policies for English Learners; Domain 2: Pedagogy and Classroom Management for English Learners; and Domain 3 Assessment and Identification of English Learners for Special Education, and Domain 4, Awareness of and Sensitivity Toward Student Diversity. These domains and teacher competencies were directly linked

to CTC-adopted standards for teaching English learners (CTC, 2001) and to the NCATE Unit Standard 4. Individual faculty responses (i.e., raw scores) were mapped onto this matrix, using the rating scale described in the instrument development section. A color coding scheme replaced the rating scale in the matrix, with lower-numbered responses represented by a light shade of green and more advanced and a faculty response indicating more in-depth coverage of a teacher competency denoted by a darker shade of green. This use of color hues is congruent with Tufte's (1990) discussions regarding the use of color to portray increasing or decreasing numeric values. This color-coding made the coverage of teacher competencies more dramatic and obvious for faculty participating in the self-study. Please see Appendix 1 for a sample of color-coded mapping.

Congruency Study

In order to provide a visual graphic to represent the congruence between the proposed plan for implementing standards for teaching English learners and CLD students (in this case, the approved institutional response to relevant state or national standards) and the actual implementation of the standard (i.e., the faculty response to a survey on course content), the EL Committee first had to study the following three documents: 1) the program's response to the CTC Education Specialist Standards (1996); 2) the institutional response to NCATE standards on diversity (2007); and 3) the program's response to the CTC requirements for approved Education Specialist Preparation Programs to include content for teaching English learners (2006/07). Faculty members chosen for this document analysis had

expertise in English learner, bilingual education, and/or CDL students, but were outside the program under study. These experts were instructed to assign ratings to each of the assigned competencies per the institutional or program responses. The ratings and competencies assigned by the expert panel were designed so that these values could be compared to those values provided by the faculty survey responses. These data and the faculty responses were entered into a relational database set up in FileMaker Pro 10®.

Results

The visual representations of raw data for faculty responses, including the gradations of same color in accordance with Likert scale responses, allowed faculty to observe, holistically, the extent to which each domain and teacher competency was covered or not covered. For example, we note that Domain 1: School Organization and Policies for English Learners, is weighted toward an introductory level of coverage. Domain 4: Awareness of and Sensitivity Toward Student Diversity, is self-rated as being more heavily covered. Please see Appendix 1 for an example of these color-coded raw score responses.

By using the relational database feature in FileMaker Pro®, plus a plug-in software that allowed for graphic outputs, we created "radar maps" which showed the parameters of the faculty survey responses relative to those of the institutional response. The authors were then able to create visual representations of both broad (i.e., all courses and all domains) and fine-grained (e.g., specific courses and individual teacher competencies) analyses between faculty reports and institutional responses of

course coverage of domains and competencies relative to teaching English learners and diverse students. Thus the visualized institutional and faculty responses dramatized the different perspectives on the same courses and serve as a crosscheck of both perceptions. In one example of a course-grained analysis, the faculty survey responses regarding the coverage of all teacher competencies related to teaching diverse learners (by domain) is compared with the overall institutional response (see Appendix 2). Increasingly fine-grained examples are provided in Appendices 3 and 4, in which faculty responses to the coverage of teacher competencies within Domain 4 are compared with the institutional response across all courses, then across select courses. Appendix 5, in contrast, compares faculty responses regarding coverage of teacher competencies within Domain 1 with those given in the institutional response.

The color-coding of individual faculty responses by course, coupled with the visual representations of aggregated survey data relative to the institutional response, provided our program with valuable information regarding the extent of coverage of the required teacher candidate competencies. These visualized data promoted discussions among faculty about under-coverage of certain candidate competencies as well as over-teaching of other candidate competencies for teaching diverse learners. In a program where there are many teacher preparation standards that must be addressed, the need to address both extremes was at the heart of these discussions. These data further informed future planning sessions to address the needs of our education specialist candidates and the increasingly diverse classrooms in which they teach.

Based upon the visualized data, the faculty determined that, overall, their coverage of competencies pertaining to English learners needed better coverage. In particular, teacher knowledge and skills related to assessment and identification of English learners for possible special education services were relatively weak areas within the program. Consequently, faculty teaching courses that covered these competencies sought assistance and additional materials to address these shortcomings.

Study Limitations

There were several methodological challenges in this study, including:

1. Small samples size, due to the small size of the department under study;
2. Lack of triangulation of output data (meaning that only faculty responses were used to determine congruence of program standards submissions with program implementation);
3. The need to map three different sets of standards in order to analyze all of the domains of the embedded English learner authorization; and
4. Lack of anonymity of survey responses, due to small size of the program.
5. The wording on one of the Likert scale choices, "This topic is briefly addressed; I would like to cover this in greater depth in future sections " left room for two different interpretations on the part of the faculty surveyed. This wording was amended for future administrations of this instrument.

Implications and Suggestions for Further Study

How did the program faculty respond to the assessment process? In a small department, it is fairly obvious who teaches which courses. Thus, anonymity within the faculty is virtually impossible to maintain. There was some initial reticence to answering the questions. Fortunately, our department has a high level of trust among faculty members. Furthermore, we had just been through a dual CTC and NCATE accreditation process. Thus, faculty were quite used to having their syllabi and course content scrutinized.

How did program faculty interpret the data obtained? We have been able to identify the courses where we need stronger alignment between content and standards. It is also gratifying to see a high degree of requests for faculty training in areas of need.

How do we respond to the interpretations/implications of the data? The data have become a thread of discussion in a multitude of regular meetings that occur among faculty. Recent budget challenges have triggered the search for overlapping or redundant courses. Through the use of data mining and data visualization techniques coupled with other data sources and analyses, our department was able to consider courses for possible consolidation with other courses.

As a result of this research, we feel that the use of relational databases for data mining and data visualization are effective methodologies for self-study as part of our accreditation activities. With this data mining capability, CSU, Chico intends to expand its relational database to include survey data gathered from supervising teachers and current administrators, as

well as student evaluations of teacher preparation coursework. In this way, data from these different stakeholders can be triangulated in order to assess the quality of the teacher preparation program relative to the state and national teacher preparation standards.

Despite the small scope of this self-study, we feel that the methodology used in this study has potential for use by other university programs that prepare teachers. Key to this generalization capability of self-studies would be the shared use of validated survey instruments administered to similar stakeholder groups (e.g., faculty, students, and K-12 administrators). Data visualization tools could also illustrate—by program, institution, or by region—how well teacher competencies within the standards were being addressed over time. Appropriate for use by small and large programs alike, the use of relational databases for data mining and constructing visual graphics may be a powerful tool for self-study and accreditation purposes. Some expertise or training is required in setting up a relational database and using simple programming language to use a plug-in tool to create graphics from a data mining inquiry. On the other hand, the nature of these relational databases allows for almost limitless data mining inquiries. In matrices where there are many cells (i.e., teacher competencies or standards) but relatively few respondents, the graphed results can be quite effective in communicating the needs and goals of both small and large teacher education departments.

Visual data analysis adds value to the discipline of evaluation by making complex sets of data more accessible to an increased number of decision makers. The visual analysis allows more stakeholders

to readily grasp “what the numbers mean.” This facilitates a more democratic decision making process in which more team members can give input and help make informed decisions.

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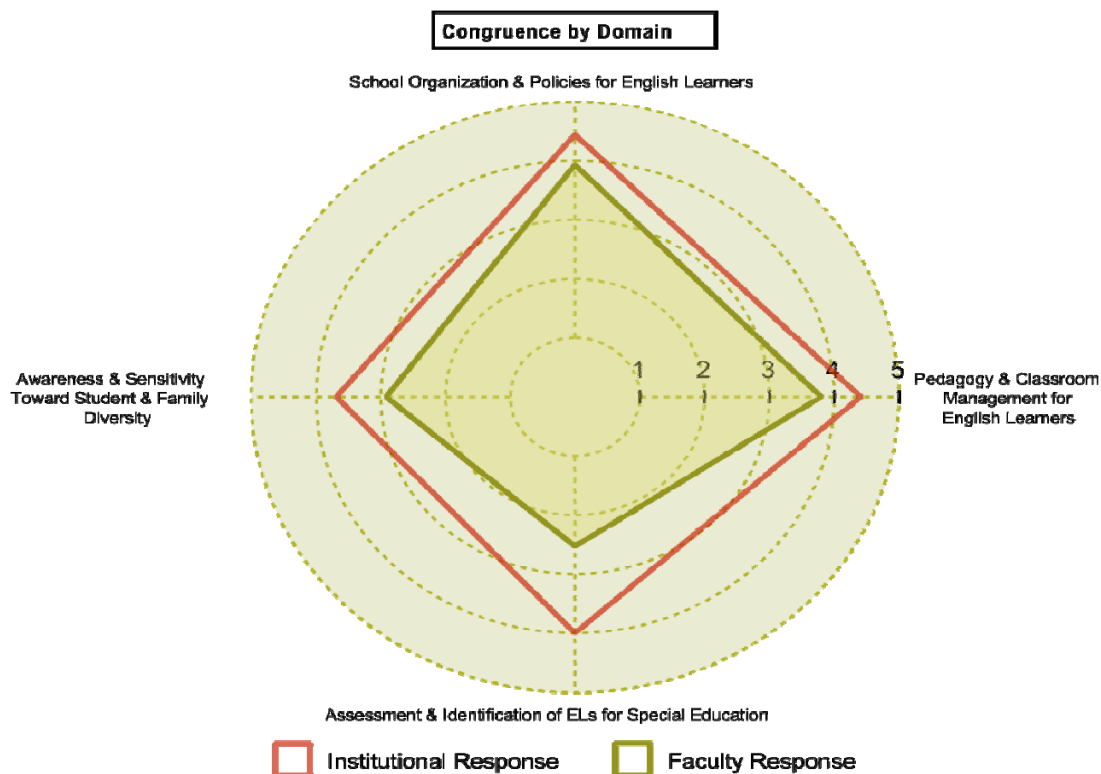
Appendix 1: Sample Color-Coding of Individual Faculty Responses by Course and by Teacher Competency/Domain

Domain 1: School Organization and Policies for English Learners

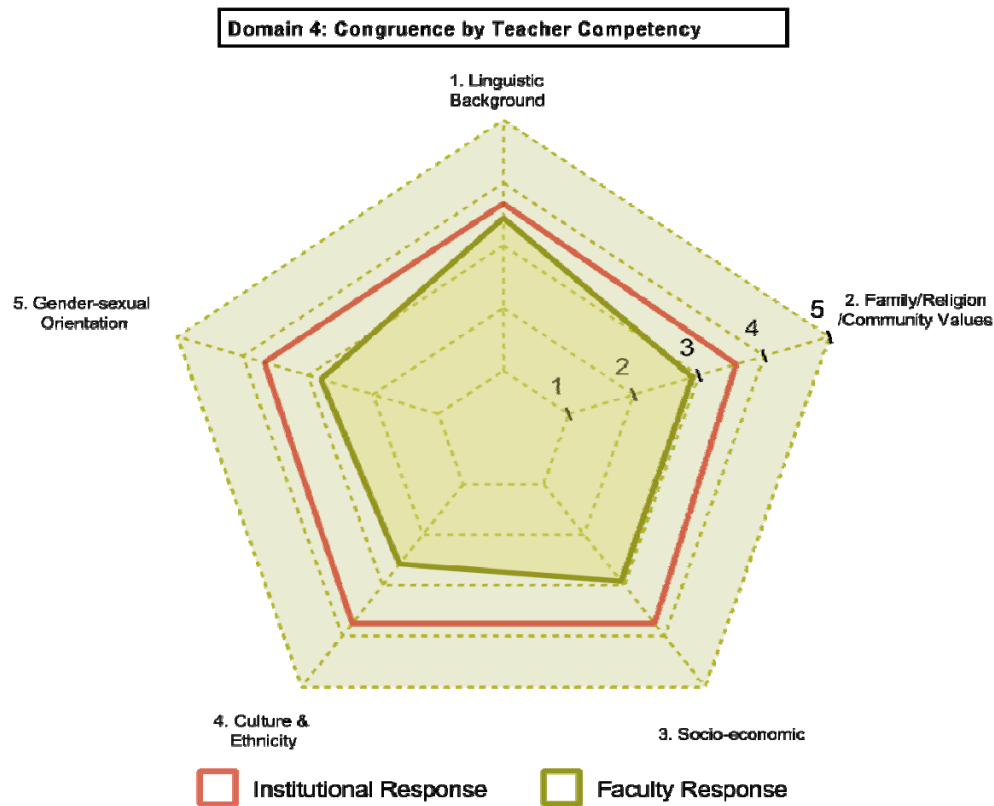
Course #	Question 1: History & policies	Question 2: Immigration/ demographics	Question 3: School-based structures
EDTE XXX			
EDTE XXX			
SPED XXX-1			
SPED XXX-2			
SPED XXX			
SPED XXX			
SPED XXX			
SPED XXX-1			
SPED XXX-2			
SPED XXX-1			
XXX-2			
XXX-3			
XXX-4			
SPED XXX			
SPED XXX			
SPED XXX			
SPED XXX			
SPED XXX			
SPED XXX			
SPED XXX			
SPED XXX			
SPED XXX			
SPED XXX			
SPED XXX			
SPED XXX			
SPED XXX			
SPED XXX-1			
SPED XXX-2			
SPED XXX			
EDTE XXX			

1	2	3	4	5
This topic is not covered and is not relevant to my course	This topic is briefly addressed; I would like to cover this in greater depth in future sections	This topic is covered at an introductory level in this course	This topic is reinforced in this course	This topic is covered in depth in this course

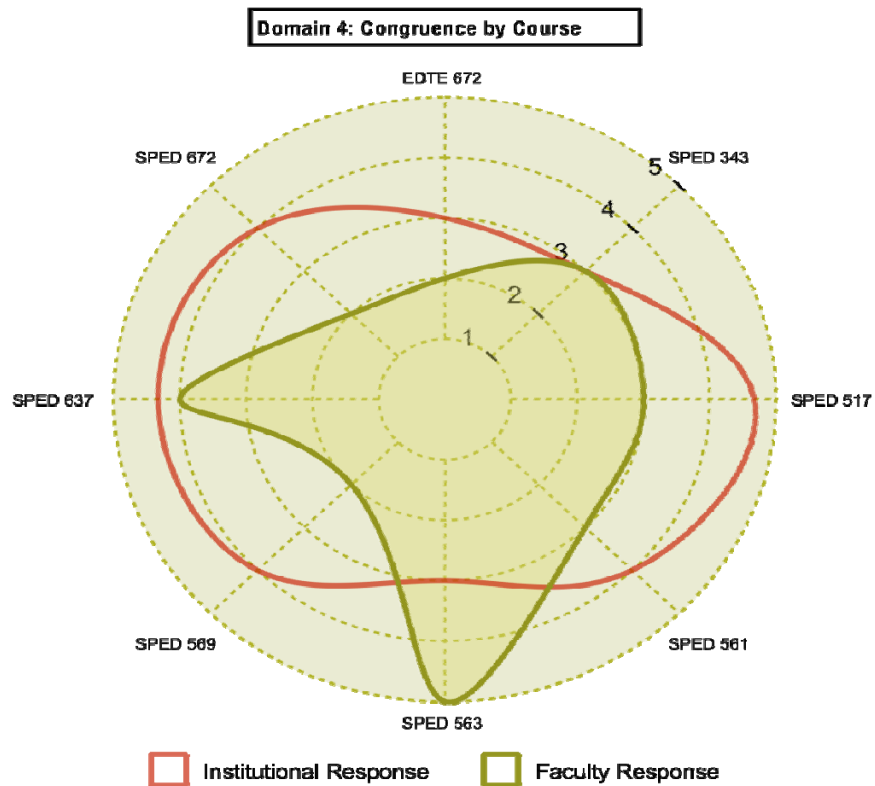
Appendix 2: Congruency of Reported Coverage Between Faculty Responses and the Institutional Response: All Teacher Competencies (by domain) for Teaching Diverse Learners Across All Courses



Appendix 3: Congruency of Reported Coverage Between Faculty Responses and the Institutional Response: Teacher Competencies Within Domain 4 Across All Courses



Appendix 4: Congruency of Reported Coverage Between Faculty Responses and the Institutional Response: Teacher Competencies Within Domain 4 Across Selected Courses



Appendix 5: Congruency of Reported Coverage Between Faculty Responses and the Institutional Response: All Competencies Within Domain 1 Across Selected Courses

