Enhancing Colorado Data Systems:

Linking Teachers to Preparation Programs

PROJECT REPORT

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Overview

Changes in student achievement as measured by standardized assessments are rapidly becoming a principal element for evaluating teaching quality. This approach is also increasingly being used as a fundamental component when evaluating the efficacy of teacher preparation programs offered at a variety of institutions of higher education (IHEs) (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2009; Goldhaber & Liddle, 2011; Noell & Burns, 2006; Sawchuk, 2012). Recent legislation in Colorado (SB 10-036 and SB 11-245) requires the Department of Higher Education (DHE) to track the outcomes of graduates of teacher preparation programs. Moreover, in April 2012, the U.S. Department of Education's negotiated rule making panel met to discuss newly proposed regulations regarding Title II of the Higher Education Act and the Title IV TEACH grants. A contentious issue in the negotiations was the role student achievement test scores might play in evaluating teacher preparation program effectiveness. Since negotiators did not reach consensus, it is likely the U.S. Department will formally endorse the use of test scores to evaluate preparation programs (a decision is expected in November of 2012; Nelson, 2012). Following April negotiations, several education school leaders wrote letters to the panel expressing their concerns about the process of validly attributing student achievement gains to specific IHEs.

This report attends to both the use of currently available data and the inevitable future use of student achievement scores to evaluate teacher preparation programs. Though the use of student achievement data in this manner is likely to remain a contentious issue, in Colorado such uses seem inevitable in the current policy climate. In addition to student achievement, other outcome-based measures (e.g., teacher performance ratings, persistence in teaching, etc.) will increasingly be used to judge the quality of teacher preparation programs. Accordingly, the focus of the present report is to examine the quality of the underlying data available in Colorado to link teachers to the programs that prepared them to teach. More specifically, we address the following research questions: What process do IHEs use to identify candidates who have officially completed their initial teacher licensure? What process is used to identify candidates who have completed additional endorsements in Culturally and Linguistically Diverse Education (CLD)[1] and/or Special Education (SPED)?

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[1] In the past this has been described simply as "Linguistically Diverse".

Background

In Colorado, the two agencies that oversee teacher preparation—the Colorado Department of Education (CDE) and the Colorado Department of Higher Education (DHE)—respectively gather relevant data regarding who is employed in Colorado (Colorado Department of Education Human Resources [HR] file) and where each individual was prepared to teach in Colorado (Student Unit Record Data System [SURDS] Educator Preparation File). The two agencies work together to generate data that links teachers in public schools with the institutions that prepared them to teach. The accuracy of these links using historic data, which are the focus of this study, will depend primarily upon two factors. First, recording errors may occur at IHEs due to human error. Second, many of Colorado's K-12 teachers have attended more than one IHE during their academic careers, so it is sometimes not clear which IHE prepared the teacher for initial licensure. Furthermore, teachers may well attend one IHE when obtaining their initial licenses, but attend another to obtain an added endorsement. Both of these factors complicate the process of establishing historical links between practicing teachers and IHEs. Obviously, if a teacher is linked to the wrong IHE, this will threaten the validity of any inferences made about program effectiveness.

In Colorado there are 18 unique IHEs where a teacher candidate can either become certified to teach in a K-12 public school or receive an additional specialized endorsement. These IHEs are listed in Table 1 and displayed graphically as a function of their location in Colorado in Figures 1-2. While upholding state standards and licensure regulations, each approved program has autonomy to organize the length of program, curriculum, field experiences, and demonstrations of proficiency. Most of the 18 IHEs included in this study have complex program structures. For example, some institutions may offer programs that serve undergraduate, post-baccalaureate, and/or master's students. Some programs combine licensure with an academic degree (e.g., BA or MA), while others do not lead to an academic degree (e.g., post-baccalaureate certificate programs). Programs may lead to more than one license/endorsement. For example, one university may combine an initial license in elementary education and special education, while another university offers special education as an added endorsement embedded in a master's degree program. Finally, it is important to note that not all individuals who complete an
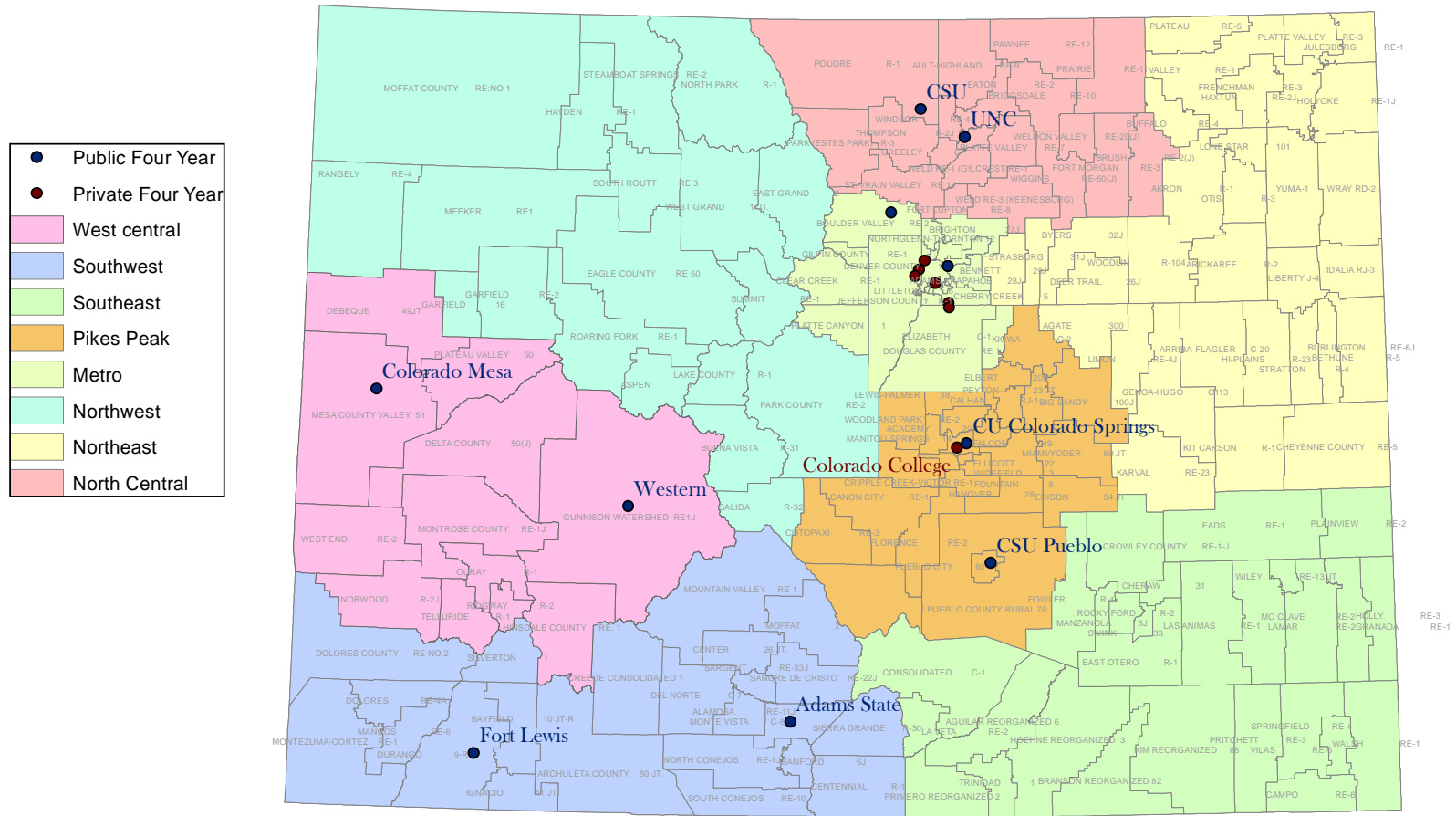
approved program apply to the CDE for an initial license or added endorsement, and not all who receive a license/endorsement from CDE secure a teaching position in a Colorado public school.

Table 1. Colorado Institutes of Higher Education that Grant Teacher Initial Licensure 2004-2010

Full Institution Name	Abbreviation for this Report
Adams State College	Adams State
Colorado Christian University	Colorado Christian
Colorado College	Colorado College
Colorado Mesa University	Colorado Mesa
Colorado State University	CSU
Colorado State University-Pueblo	CSU Pueblo
Fort Lewis College	Fort Lewis
Jones International University	Jones
Metropolitan State College of Denver	Metro
Regis University	Regis
Rocky Mountain College of Art and Design	Rocky
University of Colorado Boulder	CU Boulder
University of Colorado Colorado Springs	CU Colorado Springs
University of Colorado Denver	CU Denver
University of Denver	DU
University of Northern Colorado	UNC
University of Phoenix	Phoenix
Western State College	Western

Note: Some IHEs maintain essentially separate records for programs that are oriented toward undergraduate and postgraduate students. In this report these programs are not disaggregated in the descriptive statistics that are presented. These are available by request.

Figure 1: School Districts, Regions, and IHEs

Legend:
- Public Four Year
- Private Four Year
- West central
- Southwest
- Southeast
- Pikes Peak
- Metro
- Northwest
- Northeast
- North Central

*Note: Figure 2 displays the Public and Private University names for the Metro Region.

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Figure 2: Metro Region
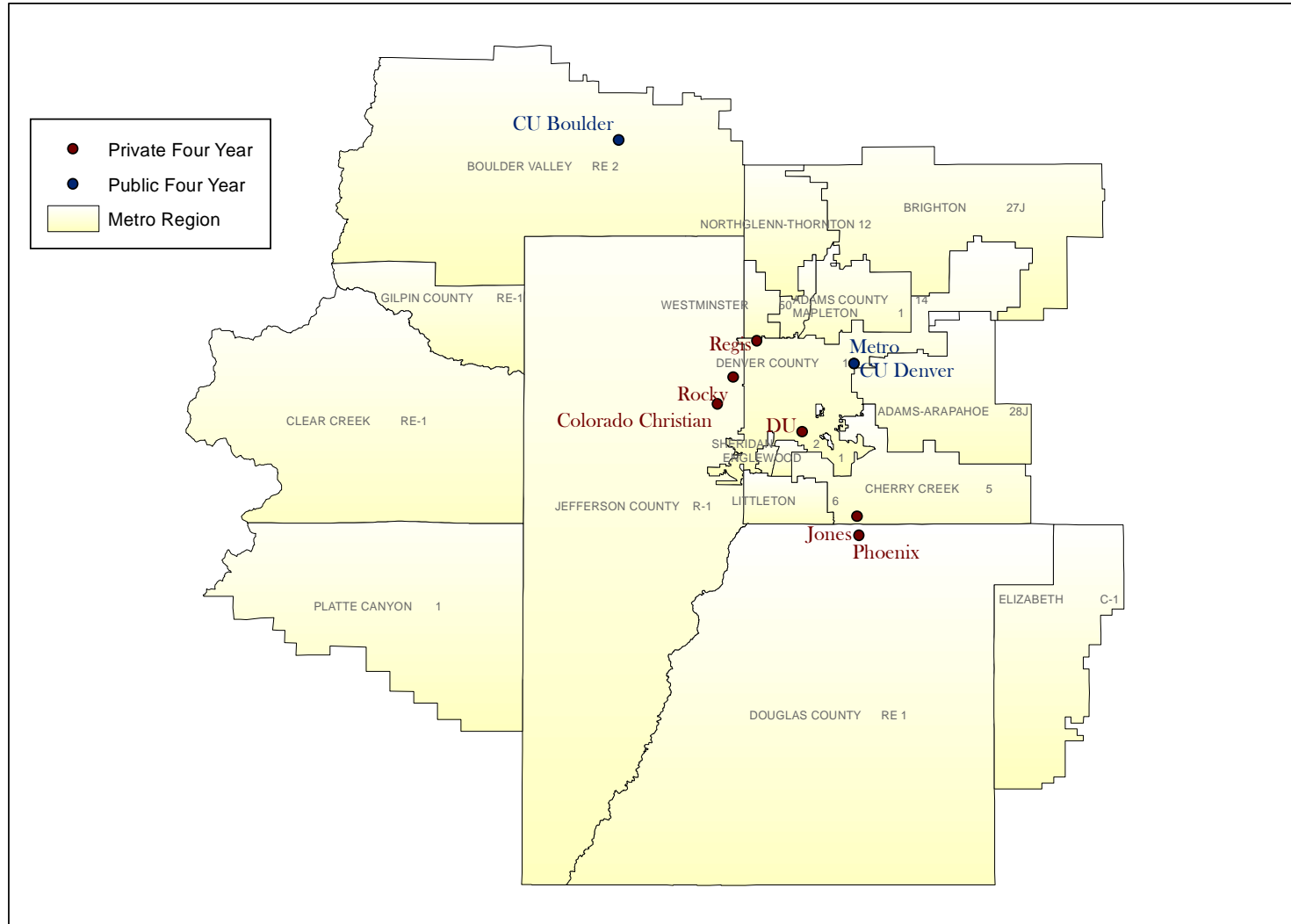
Data validation is central to this project, taken on collaboratively by researchers from University of Colorado Boulder, University of Colorado Denver, and University of Northern Colorado. The data in question were provided by the DHE and contain HR information for all Colorado public school teachers employed during the 2010-11 school year, as well as preparation information for all teachers who were enrolled in a teacher preparation program at a Colorado IHE between 2004-2010. To prepare the data file, the DHE used social security numbers to link HR data provided by CDE with teacher preparation information collected annually by DHE as part of the SURDS data collection. We note two features of the Educator Preparation SURDS file between 2004-2010 that affect this study's sample and methods. First, while most IHEs did report social security numbers for most years in their SURDS file, several IHEs failed to report them for a small percentage (between $1\% - 11\%$) of teacher candidates in particular years. In addition, there were several years where some institutions did not provide any student social security numbers to DHE. Second, from 2004-2010 institutions reported only an individual's *enrollment status* in educator preparation programs; however, in 2011, institutions also began to report *completer status*.

Social security numbers are now required for all SURDS reports, and starting in 2011 DHE began collecting completer information directly as part of SURDS. These two changes will dramatically improve the quantity and quality of the completer data. Going forward, this completer status variable should make it easier to establish valid links between IHEs and practicing teachers. But this assumes some degree of uniformity in the processes used across IHEs to make this designation, and the extent to which there is variability in these processes is something we investigate in this report. Beyond this, the data validation we discuss refers to the validity of the links we established between teachers and IHEs using 2004-2010 data, before the completer status variable was officially put in place.

There were a total of 47,594 unique licensed teachers in the HR data for 2010-11. Of these, 6,704 (14%) teachers were also listed in SURDS 2004-10 educator preparation files. That is, 6,704 teachers are enrolled in a traditional educator preparation program through one of the 18 IHEs in Colorado between 2004 and 2010. This subset of teachers serves as the focal sample for this report. We exclude from our analysis all Colorado teachers who received their teacher preparation before 2004, received it through an alternative preparation program/route, or received

it in a different state. No detailed preparation information is available for this larger subset of Colorado teachers.

Methods

Because the SURDS Educator Preparation dataset only reports enrollment and not completion prior to 2011, it is not clear from this data alone which IHE prepared current teachers for initial licensure and, where applicable, additional SPED or CLD endorsements. To investigate this more carefully, we generated rosters linking teachers with every IHE to which they had any listed affiliation between 2004-2010. Thus, teachers with multiple affiliations during the observation window were included in multiple rosters. Representatives from each IHE then verified initial program completers from this list of former program enrollees.

To demonstrate how we generated the rosters that were sent to IHEs for verification, it is helpful to understand what the original data set looked like. Table 2 contains a hypothetical data excerpt for a single fictitious teacher employed by a Colorado public school in December, 2010. For each year a teacher attended a Colorado IHE from 2004-2010, s/he appeared in a new row in the original dataset, as illustrated in Table 2 below:

Table 2. Hypothetical DHE Data Excerpt

STAFFID			EDUCPREP	
SCHOOL_YEAR	STAFF_EDID (Teacher ID)	ORGANIZATION_CODE (School District)	ReportYear	InstitutionCode (IHE Code)
20102011	123456789	910	2004	519
20102011	123456789	910	2008	518
20102011	123456789	910	2009	518
20102011	123456789	910	2010	518

The variables from the HR data file are those below the "STAFF FILE" heading (SCHOOL_YEAR, STAFF_EDID, ORGANIZATION_CODE); the variables merged in from SURDS are those below the "EDUCPREP" heading ("ReportYear", "InstitutionCode"). For this teacher (STAFF_EDID = 123456789), the values for all HR variables are identical in all rows because this information is based only on the most recent year (2010-2011) in which the teacher

was employed at a K-12 school. However, data from the two SURDS columns are not identical because this teacher attended two different IHEs between 2004-2010 (IHE 519 in 2004, and IHE 518 from 2008-2010).

To obtain verified rosters of IHE program completers for the period before completers were explicitly reported in SURDS in 2011, our research team established relationships with the institutional review personnel at each Colorado IHE. Ian Macgillivray, Assistant Deputy Director for Academic Affairs at DHE, e-mailed a letter to all IHEs describing the project and requesting that personnel assist us in verifying the affiliation and completion status of Colorado teachers in the DHE dataset. Following the distribution of this letter, members of our research team contacted the respective personnel at each IHE to further discuss the project and answer any questions. After these calls, we chose a subset of relevant variables from the dataset portrayed in Table 2 to include in the files sent to the IHEs. All educator preparation fields from SURDS were retained so that IHEs could access all of the original variables that they originally reported. To further simplify the verification process, we only included one row per teacher, even if the teacher appeared multiple times in the SURDS data between 2004 and 2010.

To indicate the span of years that a teacher appeared in the original data set, we added the variables "Initial Report Year", "Initial Report Term", "Final Report Year", and "Final Report Term". These variables made it easier for review staff to identify the year span in which a teacher was likely to have attended the institution.

We provided institutional review staff from each IHE with the same detailed directions in regard to how the verification process was to proceed (see Appendix A). The IHEs were asked to provide us with the following information for each teacher listed in their IHE-specific rosters:

- Did the teacher receive their initial licensure from this IHE? (Yes/No)
- In what year was initial licensure conferred? (Year)
- In what teaching area was the license conferred? (Options provided via dropdown menu)
- Did the teacher receive an additional endorsement for working in Special Education? (Yes/No)
- In what year was the additional endorsement conferred? (Year)

- Did the teacher receive an additional endorsement for working with Culturally and Linguistically Diverse students? (Yes/No)
- In what year was the additional endorsement conferred? (Year)

The data used in the verification process included sensitive information about practicing teachers and therefore necessitated safe file transfer protocols. To this end we used a secure server provided by the University of Northern Colorado for e-mail exchange with the various IHEs. After we received completed verification files from the respective IHEs, the files were merged into a single data file with validated links between teachers and the IHEs that prepared them for licensure.

Institutions that did not report social security numbers in any of their 2004-2010 Educator Preparation SURDS file submissions had had fewer years of data to work with when verifying their completers. Additionally, several IHEs switched institutional data systems between 2004 and 2010 and could only verify completer data available under their newest system. Both scenarios reduced the number of years of verifiable data, particularly the earliest years, making the resulting sample of verified completers younger and less experienced than it would have been had every institutions been able to verify all seven years of SURDS data.

Teachers were considered correctly attributed to a preparation program if they were verified as initial licensure program completers by the program itself; similarly, completers of added endorsements were only attributed to an IHE if they were identified as both an initial licensure completer *and* an added endorsement completer by the program. No attempt was made to identify individuals who may have completed an added endorsement in one program after having earned their initial licensure from another. We used the subsequently verified data file to investigate research questions about the demographics, placement rates, etc. of practicing teachers who received their certification between 2004 and 2010. The results from this investigation are described in a companion report, *An Initial Exploration of Colorado-Trained Teachers: Providing Context for Outcomes-Based Teacher Preparation Program Evaluation*.

After the data verification stage was complete, we once again contacted institutional review personnel to better understand the processes by which each institution identified, tracked, and reported program completers. We also gathered information regarding the specific requirements tracked, personnel involved in these processes, where data was housed at the

institution, and internal auditing procedures used at each institution to ensure accuracy of the reported information. After these conversations, we submitted our written summaries of the processes back to the staff members to ensure the accuracy of our description prior to including them in this report.

Requirements and Criteria IHEs Use to Determine Completer Status

In this report we emphasize the "completer logic" as it pertains to *initial* teacher certification because the impact of an educator prep program is likely to be greatest- and most readily identifiable- when teachers first enter the field. While programs leading to added endorsements likely enhance a teacher's knowledge and teaching practice, once an individual is working in a school setting, it becomes very difficult to isolate teacher learning that occurs as a result of a prep program from that associated with induction, mentoring, and other on-the-job training.

Determining Completer Status for Initial Licensure

Starting in 2011, DHE added the field "Institutional Recommendation for Licensure" to designate "completer" status in the SURDS Education Preparation file. An individual is defined as a completer if an answer of yes can be given to "did the candidate complete the endorsement program and was the candidate eligible to receive an institutional recommendation for licensure" (https://surds.colorado.gov/Documentation/Teacher/FieldDefinitions.asp). Appendix B provides Colorado Department of Education definitions for licensure and added endorsement requirements. The most common requirements to identify program completers in an initial licensure program are

      (1) passing grades in required courses,

      (2) passing score on the licensure exam,

      (3) successful completion of student teaching, and

      (4) graduation status--bachelor's degree earned.

Generally, requirements are satisfied as a candidate progresses through program checkpoints. Depending on the audience and/or structure of a program, the same requirement may be fulfilled

at a different checkpoint in a program. For example, passing the PRAXIS/PLACE licensure exam may be an admission requirement in a program serving master's candidates, while it is a requirement to enter student teaching in a program serving undergraduates.

Specific course requirements vary by teacher preparation program; in many cases a course grade reflects successful completion of performance-based assessments, evaluations of dispositions, and/or evaluations of clinically-based practice. Depending on a program's structure, a passing score on a licensure exam may be verified either upon admission, prior to student teaching, or prior to completion of the CDE Verification of Completion form (informally referred to as an institutional recommendation). The successful culmination of student teaching typically involves successfully completing a portfolio or extended performance assessment (e.g., Teacher Work Sample or Teacher Performance Assessment) and meeting performance expectations in classroom practice. In sum, satisfying any one requirement often involves multiple performances or steps; thus, monitoring progress towards completion at any IHE demands attention to detail and a systematic organizational process.

Determining Completer Status for Added Endorsements

Teachers seeking to add an endorsement area to their Colorado teaching licenses may do so through completion of a state-approved program offered by an IHE or by applying directly to the Colorado Department of Education. This report focuses on completer logic employed in approved IHEs for initial license-completers with the following two added endorsements: Culturally & Linguistically Diverse Education (CLD) and Special Education Generalist (SPED). The licensure requirements for added endorsements are

(1) passing grades in required courses, and

(2) a passing score on the licensure exam.

Program structures for these added endorsements vary. At some IHEs the requirements are part of a master's degree, at others they are coupled with an initial licensure program (e.g., Elementary Education & Special Education), while in others they are part of a non-degree certificate program. The variation in program structures leads to variation in completer logic. Programs that combine initial licensure with an added endorsement often monitor complex course requirements. For example, one institution requires passing an additional special education

internship course along with successful student teaching. For this program to accurately identify completers of this endorsement as an added to initial licensure, the query to the Registrar's office must be precise to ensure accurate grade reports are generated. The number of students seeking any one added endorsement pales in comparison to the number seeking initial licensure, and requirements for each added endorsement are unique. For example, within one IHE the requirements for seeking the SPED added endorsement differ from those seeking the CLD added endorsement.

Figure 3. Common Data Management Practices for Initial Licensure

Requirements for Initial Licensure	Who Typically Tracks at IHE	Common Check Points (vary for BA, post-bacc, and MA)	Data Storage Location
Passing grades in required courses	• Support staff • Advisor • Registrar	• Each semester • Formal check Prior to Student Teaching	• Student's permanent file • Individual spreadsheets • Degree Audit • Unit-Level database(s) • Student Info System
Passing score on the licensure exam	• Support staff • Admission Officer • Advisor • Director Student Teaching	• Admission • Prior Student Teaching	• Course/Program Checklists • Individual Spreadsheets • Degree Audit • Unit-Level database(s) • Student Info System
Passing grade student teaching or capstone courses	• Advisor • Director Student Teaching • Registrar	• Post Student Teaching • Verified prior sign CDE Institutional Recommendation	• Degree Audit • Unit-Level database(s) • Student Info System
Bachelor's degree	• Advisor • Registrar	• Verified prior sign CDE Institutional Recommendation • Admission for Post-Bac & MA	• Student Info System

SURDS Educator Preparation File	• Director
	• Advisor
	• Registrar
	• Institutional Research
		• Final check to verify
		  o grades in required courses
		  o licensure exam score
		  o BA degree
			• Unit-Level Database(s)
			• Institutional Research

Internal Checks Used to Verify Completer Status at IHEs

In tracking requirements for initial teacher licensure at nearly every institution, and particularly institutions preparing larger numbers or offering multiple programs, several individuals are involved in tracking whether the requirements described above are satisfied. Figure 3 illustrates that the different individuals involved at each institution might include any or all of the following roles: admissions coordinator, placement or student teaching director, academic advisor or licensing officer, unit assessment coordinator, campus registrar, campus institutional research office.

Tracking Course Requirements

Audits of student progress toward completion of required coursework can be conducted as often as each semester and minimally at key junctures (see first row in Figure 3). For example, many programs described formal checkpoints in the program (e.g., pre-student teaching) when an advisor and candidate meet to ensure all program requirements to that point are satisfied. Some common checkpoints are listed in the second column of Figure 3, but the specifics will differ depending on the institution and whether the program is designed for undergraduate, post-baccalaureate, or graduate students. Institutions use either locally generated, manual processes (e.g., program of studies check list form that is reviewed and updated by hand or electronically each term) or more automated degree-audit systems. Because some course requirements may be met through a number of courses that may be periodically revised, it can be difficult (and error-prone) to maintain all possible course-taking options in an automated system. As a result, degree audit reports may require manual audits and overrides in order to accurately track course requirements. Moreover, a small number of candidates may be legitimately allowed to continue in a program, even when some requirements are *not* met at a particular checkpoints; thus, institutions need to have mechanisms to double-check requirements have been met at the conclusion of a program.

Tracking PLACE/PRAXIS Licensure Exam Scores

For initial educator preparation programs, the PLACE/PRAXIS licensure exam is typically completed upon admission or prior to student teaching (see second row of Figure 3). Unlike recording of ACT/SAT or GRE scores, few institutions record PLACE/PRAXIS scores in their campus student information system and instead record scores in locally maintained databases or spreadsheets. The format in which these licensure exam scores and pass rate information are stored dictates how easily this information can be used and may also affect accuracy. For example, if the licensure exam scores are translated into a "pass/not passed" categorization that is hand-entered into a tracking system, they are more vulnerable to inaccuracies than if data files from licensure testing companies are loaded directly into a student information system. Those involved in verifying that teacher candidates have passed the PLACE/PRAXIS exam include admissions coordinators, advisors, directors of student teaching, and (for small programs) program directors.

Tracking Whether Candidates Have Passed Student Teaching or a Capstone Course

Programs typically have a capstone course and/or assessment that individuals must pass in order to be recommended for licensure (see third row in Figure 3). Most institutions store this data as a grade in the campus student information system, where the grade reflects successful completion of all assessments and clinical performances. People involved in verifying passing student teaching typically include the Advisor, Director of Clinical Experiences, or Program Director. Most institutions have systems in place to verify a passing grade as part of the process to identify completers.

Tracking Degree Status

The fourth row in Figure 3 describes processes IHEs use to track degree status. A complicating factor related to this field is that post-baccalaureate initial licensure programs are not degree-seeking, so earning a BA is not a necessary condition for being a completer in these

programs. For degree-seeking programs, degree status is typically recorded in the campus information system, and may also be recorded in local spreadsheets or unit-level databases. Advisors or directors typically verify degrees by checking individual transcripts or by checking degree reports generated by the Registrar's office or Institutional Research. In general, this is a straightforward requirement to verify, and most institutions have checks in place to verify undergraduates completing a licensure program in the same term as their bachelor's degree did in fact complete the degree.

Data Storage

The data tracked for initial teacher licensure requirements is often sufficiently unique that there is not an appropriate or designated field in the campus student information system. The final column in Figure 3 describes the storage locations we found that IHEs use to maintain the data that, when combined, determine completer status. Data are often stored in multiple data files or warehouses. Files may be in any of the following formats/locations:

- *Individually-developed*. Uniquely-created and locally-owned (e.g., excel spreadsheets on individual desktops), checklists that are manually completed and filed in individual candidate's permanent file.
- *Unit-developed*. Shared data bases that are proprietary and/or designed to generate reports for accreditation (e.g., FileMaker Pro, Access data bases, or LiveText or TaskStream) .
- *Campus-developed*. Student information system, degree audit systems, visual image storage systems (e.g., for transcripts, licensure exam reports).

Ensuring Standard Processes for Reporting the SURDS Educator Preparation File Completer Variable

Our interviews with IHE staff revealed a range of practices regarding tracking and reporting completion of licensure requirements. The creation of a "licensure recommendation field" in the SURDS Educator Preparation file submitted by institutions to the DHE is an opportunity for IHE's to evaluate their business practices for reporting program completers.

Across the 18 IHE's, we found consistency in *which* requirements are tracked to determine whether someone has completed an initial teacher preparation program (complete course requirements, pass licensure exam, pass student teaching, hold bachelor's degree). Where we found variation was in how requirements are operationalized (e.g., course requirements differed), the order in which some requirements are satisfied (e.g., upon admission or at different check points), and how data is stored in the campus student information system. With regard to the latter, we found that institutions employ a number of databases to track progress toward completion of licensure program requirements. Some of these databases are locally-owned and idiosyncratic (e.g., spreadsheets), others are unit-level data bases that have pre-defined fields or well-defined text for open notation fields, and some are campus-level data bases. Few institutions currently (as of 2012) have a unique field in their campus data system to identify a program completer. Those institutions that do have completer field(s) are typically able to generate "completer" reports efficiently. More importantly, this data is stored in a secure and permanent way; thus, when a campus transitions to a new student information system, efforts are often made to maintain data fields and convert data to a new information system. This makes it easier to ensure that longitudinal institutional reporting is done accurately. In addition, few institutions currently store PLACE/PRAXIS licensure exam scores in the campus student information system (in contrast, for example, to storage of SAT, ACT, or GRE scores).

Several institutions shared difficulties encountered as they retroactively identified program completers. In particular, some programs relied on local databases and tracked manually meeting licensure requirements. Local databases, often maintained by a faculty advisor in a small program, often mean data is entered and maintained by someone who knows every individual. However, this practice is problematic because data may be lost (e.g., if not backed up properly), data entry may not be standardized, and there are seldom audits in place to ensure incorrect values are not entered. Some programs noted that their campuses recently adopted new student information systems. Major data system transitions are opportunities to add new variables or clarify data entry but also pose challenges as "old" practices may not be possible in the new system and data conversion must be monitored to ensure critical data is not lost. Some essential data was stored in notation fields, rather than in fields that allow for standardized data entry. For example, some institutions stored information about passing licensure exams in a

notation field in a degree audit system. It is difficult to pull meaningful reports from notation fields.

How Well Can Teacher to IHE Links from 2004-10 be Imputed from SURDS Data?

As noted previously, SURDS data between 2004 and 2010 do not link teachers back to the IHEs where they received their initial certification or an added endorsement. For this project, all 18 Colorado IHEs retroactively identified completers of their teacher education programs and the imputation analyses described in this section did not affect how data were provided to Colorado IHEs for verification. However, in generalizing this process to other states, it is important to consider a situation in which an IHE is unable to retroactively identify completers of its teacher education program. Could this be closely approximated using the variables that were in SURDS and HR files prior to 2011?

To answer this question we calculated "error rates" for each institution by comparing their verified links to teachers (i.e., the truth) with a link we imputed from the available SURDS data. That is, we used the available data to make educated guesses about which teachers "belonged to" which prep programs. The imputation process proceeded as follows:

1. Teachers were initially attributed to an IHE's program if they had only attended a single IHE at any time during the 2004-10 window[2].

   a. The vast majority of the 14,079 teachers we found in the SURDS data were affiliated with only one IHE (94 %), with 860 (6 %) affiliated with two and 6 (less than one percent) affiliated with more than two preparation programs.

   b. This rule does not limit our sample to those with a BA from the IHE because many teacher education programs have non-degree-seeking post-baccalaureate programs.

2. If a teacher was affiliated with two teacher preparation programs and a BA or MA degree was earned at just one of them, the teacher was attributed to the degree-awarding institution.

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[2] Note that even if the IHEs report their SURDS data precisely, attribution error can still occur in these cases because we only have a subset of historic data. If an educator was prepared for their initial license prior to 2004 and attended a different IHE for a graduate or added endorsement program, we would falsely attribute them to the IHE in which they appeared during our observation window.

3. If a teacher was affiliated with two teacher prep programs and a teacher earned a BA at one institution and an MA at another, the teacher was attributed to the BA-awarding institution.

4. If a teacher was affiliated with more than two teacher preparation programs, no attribution was made.

Figure 4. Imputation Error Rates Venn Diagram
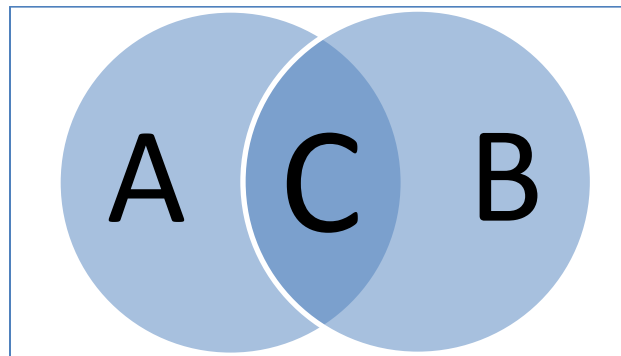
The error rates for any given IHE's imputed completers can be represented using a Venn Diagram in which the circle on the left ("A") represents the <u>true</u> number of IHE completers present in the SURDS dataset, and the circle on the right ("B") represents the number of <u>imputed</u> completers based on the above logic. The area of overlap between the true number of completers and the estimated number of completers is represented by C. For any given IHE and completer estimation approach there are two numbers of interest:

- False Negative Error Rate (verified IHE program completers from the IHE that were not correctly imputed): $\frac{A-C}{A} * 100$

- False Positive Error Rate (imputed completers from the SURDS data that were not, in fact, verified IHE program completers): $\frac{B-C}{B} * 100$

Note that these two error rates will not necessarily converge because A and B are not necessarily the same size (though they have been drawn this way in the figure). If B > A then it is possible for the false negative error rate to be 0, but the false positive rate would still be > 0. The opposite would be the case if A > B.

Our results by IHE, presented in Table 3, indicates that the imputation process described above will produce many more false positives than false negatives, with particularly large false positive rates at institutions that serve large numbers of in-service teachers seeking added endorsements and post-bachelor's degree licensure only students (e.g. UNC, Phoenix, UCD). False positives ranged from 0 to 62 percent with a weighted mean of 31 percent. The most precise imputation occurred in very small programs. When an alternative imputation approach was employed that restricted completers to only those who had received a BA or MA from the IHE, this led to large numbers of unattributed students and consequently large false negatives. Institutions with limited years of verifiable data were generally subject to larger error rates. The error rates above are provided to give other researchers an idea of the measurement error that may be present in a situation in which teacher to IHE links need to be imputed from state-level data. It should be clear that such an approach would lead to very unreliable links, which would in turn undermine their use for subsequent program evaluation efforts.

Table 3. Error Rates from Imputing Teacher to IHE Links

	True Completers (A)	Imputed Completers (B)	Overlap (C)	False Negative Error Rate % (A-C)/A	False Positive Error Rate % (B-C)/B
Adams State	354	450	354	0	21
Colorado Christian	194	207	183	6	12
Colorado College	28	28	28	0	0
Colorado Mesa	429	425	421	2	1
CSU	508	646	504	1	22
CSU Pueblo	326	378	317	3	16
Fort Lewis College	146	145	142	3	2
Jones International	23	44	23	0	48
Metro	1198	1601	1152	4	28
Regis	621	797	605	3	24
Rocky	12	11	11	8	0
UC Boulder	589	784	584	1	26
UC Colorado Springs	63	74	63	0	15
UC Denver	664	1744	660	1	62
University of Denver	143	187	140	2	25
UNC	862	1635	862	0	47
Phoenix	456	1104	447	2	60
Western	88	107	86	2	20

Recommendations

Beginning in the 2011-2012 school year, DHE required IHEs to identify completers of initial licensure programs within SURDS data reporting. This new SURDS variable eliminates the need for any further projects such as the one presented here because the state will keep record of all teacher preparation program completers across the state. However, future validation studies

may be necessary to determine the reliability of the reported data given the challenges IHEs are facing in reporting accurate completer information, especially if the state decides to collect more information about added endorsements. In the meantime, more standardized practices across Colorado IHEs will further increase the validity of the SURDS completer variable and any subsequent teacher preparation program evaluations conducted with the data.

We offer the following recommendations to ensure the accurate reporting of program completers in the SURDS Education Preparation file.

1) We encourage institutions to migrate completer information from individually- and unit-stored data systems into campus-level student information systems. Institutions may derive benefit from a unique field in their campus student information system that records/stores completer status. Institutions that offer both initial and added endorsements may wish to have a mechanism to record one individual completing more than one licensure/endorsement program.

2) Institutions should engage in careful discussions about how they will define and operationalize a program "completer" when initial licensure also includes an added endorsement. While verification of completion is relatively standardized for initial licenses, the requirements for added endorsements can vary across IHEs.

3) Given the importance of licensure exams in verifying eligibility to be recommended for licensure, institutions may benefit from a defined field in their campus student information system that records licensure exam scores. A defined field allows for more standardized data entry and/or merging of secure data files from the testing company with the campus student information system.

4) Institutions should ensure collaboration and cross-checking among those individuals who prepare the SURDS Educator Preparation File and those engaged in the direct work of monitoring and verifying licensure requirements are met as students progress through program checkpoints to ensure accuracy of SURDS data file submissions.

The new completer SURDS variable establishes the ability to trace student achievement to the in-state preparation programs completed by their teachers. This new variable moves Colorado one step closer to using outcomes-based accountability as a method of examining the success of teacher preparation programs (per SB 10-036 and SB 11-245). However, it will take

time to develop a sufficient sample sizes to identify trends in teacher demographics and placement as well as student demographic and achievement data. The data set used in this report provides the state with longitudinal completer data and a baseline with which to begin making comparisons among Colorado IHEs.

References

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Appendix A: Verification Process Directions

Dear IHE Representative,

Thank you for taking the time to help us verify the DHE data for your institution. Shortly you will receive an email with a link to the file we have regarding Colorado teachers from the 2010-2011 school year who were reported as associated with your institution in SURDS from 2004-2011.

Within each row in the file are the fields "InitialReportTerm", "InitialReportYear", "FinalReportTerm", and "FinalReportYear". These fields were created to give you a general idea of when the student was reported in SURDS at your institution and simplify the file to one row per student. In addition to these fields, all other SURDS fields are included to help with the verification process.

The verification file is being supplied to you in an Excel format with dropdown boxes for each field we request you complete. If you intend to utilize the drop-down options in the Excel file as it was sent to you, please follow the directions on Page 2. If you intend to convert this file to another format for use with another program to complete the fields, please use the directions on Page 3 so that the coding is consistent across all files.

We ask that if at all possible you return this completed file by March 5, 2012. When you are ready to return the file, please follow the directions on Page 4 of this document.

If you have any questions regarding any of the fields in this file or the process of verifying this data, please contact the representative below who has been in contact with you.

Thank you for your assistance in this project,

Jessica Alzen
Carolyn Haug
Kristin Klopfenstein
Prerna Varma

Directions for using Excel File DropDowns

Initial Licensure/Column AA:
- 1: if the student completed an initial license preparation program at your IHE from 2004-2010. Move to column **AB**.
- 0: if the student did not complete an initial license preparation program at your IHE from 2004-2010. Move to the next row.
- NOTE: If the student did not complete an initial license at your institution, we are not collecting data for him/her regarding added endorsements in SPED or CLD.

Licensure Year/Column AB:
- Select the appropriate year the student completed the initial license preparation at your IHE. Move to column **AC**.

Licensure Area/Column AC:
- Select the area in which the student completed an initial license preparation program at your IHE.
- If the initial area is not listed, choose "Other".
- If the student completed **initial** license preparation programs in more than one area, and one of those areas was SPED, choose "Dual in SPED & Other"
- If the student completed **initial** license preparation programs in more than one area, and only one of the areas is explicitly in the list, choose that area
- If the student completed **initial** license preparation programs in more than one area, and both areas are on the list, choose the area in which your institution prepares the most students.
- If the student completed **initial** license preparation programs in more than one area, and neither area is explicitly listed, choose "Other".
- Move to column **AD**

SPED Added/Column AD:
- 1: if the student completed an Added in SPED at your IHE from 2004-2011. Move to column **AE**.
- 0: if the student did not complete an Added in SPED at your IHE from 2004-2011. Move to column **AF**.

SPED Year/Column AE:
- Select the appropriate year the student completed the SPED Added at your IHE. Move to column **AF**.

CLD Added/Column AF:
- 1: if the student completed an Added in CLD at your IHE from 2004-2011. Move to column **AG**.
- 0: if the student did not complete an Added in CLD at your IHE from 2004-2011. Move to the next row.

CLD Year/Column AG:
- Select the appropriate year the student completed the CLD Added at your IHE. Move to the next unique student ID row.

Directions for using Alternate File Formats

Verification File Coding Key

Initial Licensure/Column AA; SPED Added/Column AD; CLD Added/Column AF:
- 1: if the student completed the specified license preparation program at your IHE from 2004-2010.
- 0: if the student did not complete the specified license preparation program at your IHE from 2004-2010. Move to the next row.
- NOTE: If the student did not complete an initial license at your institution, we are not collecting data for him/her regarding added endorsements in SPED or CLD.

Licensure Year/Column AB ; SPED Year /Column AE; CLD Year /Column AG:

    2004
    2005
    2006
    2007
    2008
    2009
    2010
    2011

Licensure Area/Column AC:
- 1=Early Childhood
- 2=Early Childhood Special Education
- 3=Elementary Education
- 4=English
- 5=Math
- 6=Science
- 7=Social Studies
- 8=Special Education Generalist
- 9= Dual in SPED and Other
- 10=Other
- If the student completed **initial** license preparation programs in more than one area, and one of those areas is SPED, choose "Dual in SPED & Other"
- If the student completed **initial** license preparation programs in more than one area, and only one of the areas is explicitly in the list, choose that area
- If the student completed **initial** license preparation programs in more than one area, and both areas are on the list, choose the area in which your institution prepares the most students.
- If the student completed **initial** license preparation programs in more than one area, and neither area is explicitly listed, choose "Other".

Directions for Securely Returning Your File

After completing the verification process, SAVE and RENAME the file

Return to the secure transfer link in the original email from which you received the file

When the new screen pops up, go to top right corner, click "upload".

Browse to the RENAMED file and click "start upload" below the browse box.

The new file should appear next to the original data file after the upload completes.

Select the RENAMED file and click on "email"

In the "To:" box, type Kristin.klopfenstein@unco.edu

Click the send box on bottom right.

If you have trouble emailing the notification after the upload, you can just email through normal channels to tell Kristin the file has been uploaded.

Each person will have access to their folder through the email link until their assigned expiration date.

Appendix B: Colorado Department of Education Requirements for Initial Licenses and Added Endorsements

Becoming a Licensed Teacher in Colorado

To obtain an initial license to teach in a K-12 public school in Colorado, any teacher candidate must meet the following requirements:

- A bachelor's or higher degree from regionally accredited college/university institution,
- Successful completion of a state approved teacher preparation program at a regionally accredited institution of higher education or state approved alternative teacher preparation program, and
- Demonstration of Professional (content) competency for Elementary, Early Childhood Education, K-12, and Secondary applicants (demonstrated through passage of licensure content exams and completion of course credit)

    (Retrieved from http://www.cde.state.co.us/cdeprof/Licensure_tch_approved.asp on May 18, 2012).

Adding a Second Endorsement in Colorado

Educators seeking to add a second or subsequent endorsement area to their Colorado licenses may do so through completion of a state-approved program offered by an institution of higher education/approved program OR by applying to the Colorado Department of Education directly to review academic preparation, experience, or an assessment.

For those who complete a state-approved program, the college or university provides advisement concerning specific requirements for the new endorsement. The applicant must successfully complete the PLACE® content area assessment in the endorsement being sought or one of the following SBE approved PRAXIS II content area assessments. Upon completion of the program, the institution provides a recommendation to the Department of Education for the added endorsement.

(Retrieved from http://www.cde.state.co.us/cdeprof/Licensure_addendorsment_info.asp on May 18, 2012).