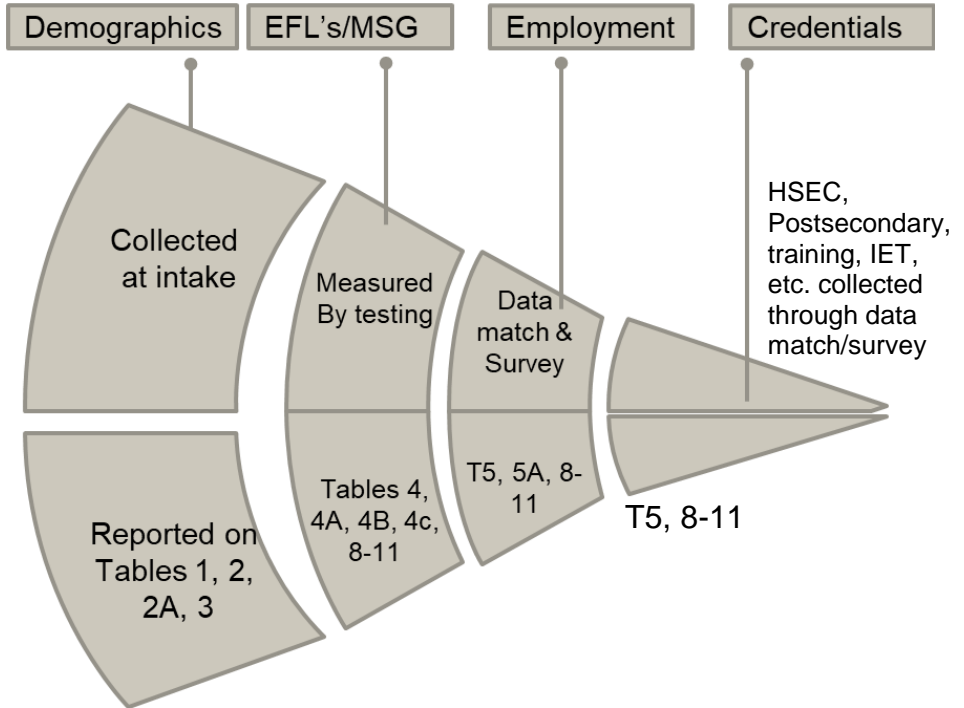


Program Administrative Handbook for Local Directors
Adult Education
Wyoming
Chapter 6: Data, Data, Data

I. Data Collection

Data collection is a requirement of the Workforce Innovations and Opportunities Act. Publically funded programs and agencies have greater accountability in this law and the law requires programs to **demonstrate** their impact.

Data is collected on student demographics and the progress made towards advancing their educational levels, employment, and enrollments in postsecondary/training. These are recorded in a Management Information System (MIS). The vendor we use in Wyoming is LiteracyPro Systems and the software is LACES.



Each year program staff will create staff, student, and class setup in the LACES management information management system. Schedules, locations, and dates should be included.

Once the data is collected on the intake form and entered by each local ABE program provider, the data is aggregated at the state level for reporting to the US Department of Education – Office of Career, Technical, and Adult Education (OCTAE) through various Tables. State data is entered into the National Reporting System (NRS) online database. OCTAE creates a NRS report that is then given to the U.S. Congress. It has both state profiles and aggregated data tables for the national Adult Education program.

It all begins with our AE students entering the AE program to enroll in classes. The quality of the data is initially up to the front line staff that walks the student through the orientation, enrollment, and assessment process. Instructors accurately determining the appropriate post testing times, timely input of scores, recording attendance, and managing the student files to reflect current information on students is a cornerstone to this accountability process. Error checking and updating should happen on a continual basis.

A. Intake Data

When students enter the program, intake staff collect NRS measure data, including demographics such as age, ethnicity, race, barriers to employment, gender, as well as, family information. Contact information is recorded on the intake form which will be used in retention and follow-up activities.

In FY 21/22 the intake form will become [electronic](#) and will be available in both English and Spanish. This new intake form will automatically populated the LACES database with relevant student information needed for reporting purposes.

Note: Please refer to [New Teacher Training Module 4](#) for additional guidance on intake data collected through the intake process.

B. Career Services Data

All students complete a career service course where such things as assessments, career planning, goal setting, participatory learning, brain-based theory is introduced to students. Instructors must compile, record, and submit all completed documentation to the program director/data entry person to record this information into the student's LACES record.

The Career Services course is an introduction to adult education and serves as an orientation to the program where an exchange of information occurs between the student and program staff. This exchange of information occurs so that the student knows what to expect from the program and what the programs expects from the student.

Each local program in Wyoming has designed its own Career Services course to meet the needs of students. This means that each program serves unique populations in their area and the needs of these populations must be taken into consideration. There are several components that should be customized and included in every Career Services course. These were explained in great detail in Chapter Three, but are briefly discussed here as well. In general, the orientation should include program information, HSEC information (when applicable), commitment, and motivation to learn, assessment, learning information, study skills, test taking skills, time management, and additional training opportunities. Collaborating partners may join the orientation session to share information on complimentary programs offered at your location or other local sites. Career counselors from community colleges can also be invited to participate to make students aware of the opportunities available to them.

All students must be officially registered in LACES upon completion of their Career Services course.

Note: Please refer to [New Teacher training Module 3](#) for additional guidance on the orientation and career services course.

C. Assessment Data

Accurate assessment is critical to placement and curriculum design for students. TABE tests are used as assessment tools for all local programs in Wyoming. Students must be assessed with a valid form of one of the required instruments. Standard testing conditions and timing of the tests are essential to accurate results. Programs must follow the guidelines outlined in the [State's Assessment policy](#) when giving all standardized assessments.



Pre-testing	<ul style="list-style-type: none"> • must occur within the first 12 hours of instruction • TABE locator is required • Once an assessment is completed, results must be entered into LACES • Standard testing conditions and timing of the tests are essential to obtaining accurate results
Post-Testing	<ul style="list-style-type: none"> • The length of time between the pre- and post-tests must be long enough to allow the test to measure educational gains according to the test publisher's guidelines. [34 CRF 462.40 (c)(3)(iii)]. • Post-testing should not occur until the student has accrued, at a minimum level, 40 hours of instruction. • Once a post-test is completed, the data must be entered into LACES in a timely manner. • Local programs must closely monitor when a student become eligible for post testing as accurate and valid post-testing are critical components to program performance.
Official Practice Tests	<ul style="list-style-type: none"> • may never be given as placement into an AE program • may never be given within the first 12 hours of instruction. • should not be given until a student has demonstrated a readiness to test (through TABE testing, when possible) • Scores must be entered into LACES before a student commences testing for an HSE certificate
Informal Assessments	<ul style="list-style-type: none"> • are to be used to monitor learning and inform instruction • are not recorded in LACES, but copies should be maintained in student file <p>Note: Additional guidance on assessments is also available in the New Teacher Training module 5.</p>



D. Attendance Data

Attendance



Attendance for each student must be tracked for each class. This information is entered into the data system and allows the agency to evaluate class

participation, appropriateness of class scheduling and staff performance. Hours may be totaled and entered weekly. Non-instructional hours may be tracked by entering them without linking them to a class. All instructional hours must be linked to a class for them to be counted on the National Reporting System tables.

There are two types of attendance hours that must be accurately tracked and recorded for all adult education programs: contact hours and proxy hours.

Contact hours are defined as synchronous time spent instructing the learner. Contact hours include two-way interaction between instructor and learner by face-to-face interaction, telephone, video, teleconference, virtual classrooms, or other online communication where learner and program staff are able to interact and through which learner identity is verifiable.

Proxy hours are defined as asynchronous time a learner spends independently engaged with distance learning activities, such as using an approved distance learning platform or approved instructional tool. Proxy hours can include approved independent instructional activities in a computer lab, activities assigned out of class, or supplemental activities, but must be pre-approved by the State Distance Learning Committee.

Allowable attendance includes time a student is working in the AE center lab or class, in an approved online distance learning program, in virtual/hybrid classrooms settings, or spending time with an instructor in advisory activities. High School Equivalency (HSE) testing time is not included in instructional hours.

Hours accrued through face to face interactions with students are to be verified by student signature or time card methods where the student clocks in/out.

Hours are then entered into the student file on the LACES database.

Hours accrued in a virtual classroom are to be recorded by the instructor and recorded in the student file on the LACES database as either contact hours or proxy hours.

E. The Data Collection & Review Process

Instructors

Each teacher should complete the [Teacher Information sheet](#) and have the information entered into LACES. A copy of the sheet is then sent to the Adult Education State



Program Director. The teacher's staff development information is also recorded by the local program director. All staff who utilize the LACES database must also complete and submit to the State office a copy of the '[Confidentiality Agreement.](#)'

Instructors have a large role in data collection in most programs. They report student attendance or contact time, assess students, report test scores, and sometimes are involved in the goal-setting process. In addition, since instructors have direct contact with students, they are often asked to provide student information that was missing or incorrect at other stages of the data collection process. Ideally, instructors not only help with completing forms, but also have a role in reviewing data and reports.

NOTE: Valid and accurate data collection is part of everyone's responsibility.

F. Maintaining Student Files

Each student enrolled in Adult Education programs of study must have on file with the grantee, a permanent file. At a minimum, the file must contain the following information:



- Intake form
- TABE locator
- Pre/post tests with prescriptive results

- Accommodations documentation (when applicable)
- Appropriate release forms
- HSEC choice of test form
- Any earned credentials/milestones recorded
- Copies of student work
- Enrollments in postsecondary
- Co-enrollments with WIOA core partner programs are noted
- Case & progress notes
- Follow up surveys
- Local program documents
- Official practice test score sheets (when applicable)
- HSEC transcripts (when applicable)
- Age waiver documentation (when applicable)
- State approved Goal sheet
- State approved Referral form
- Career assessments
- Career explorations/career counseling documentation

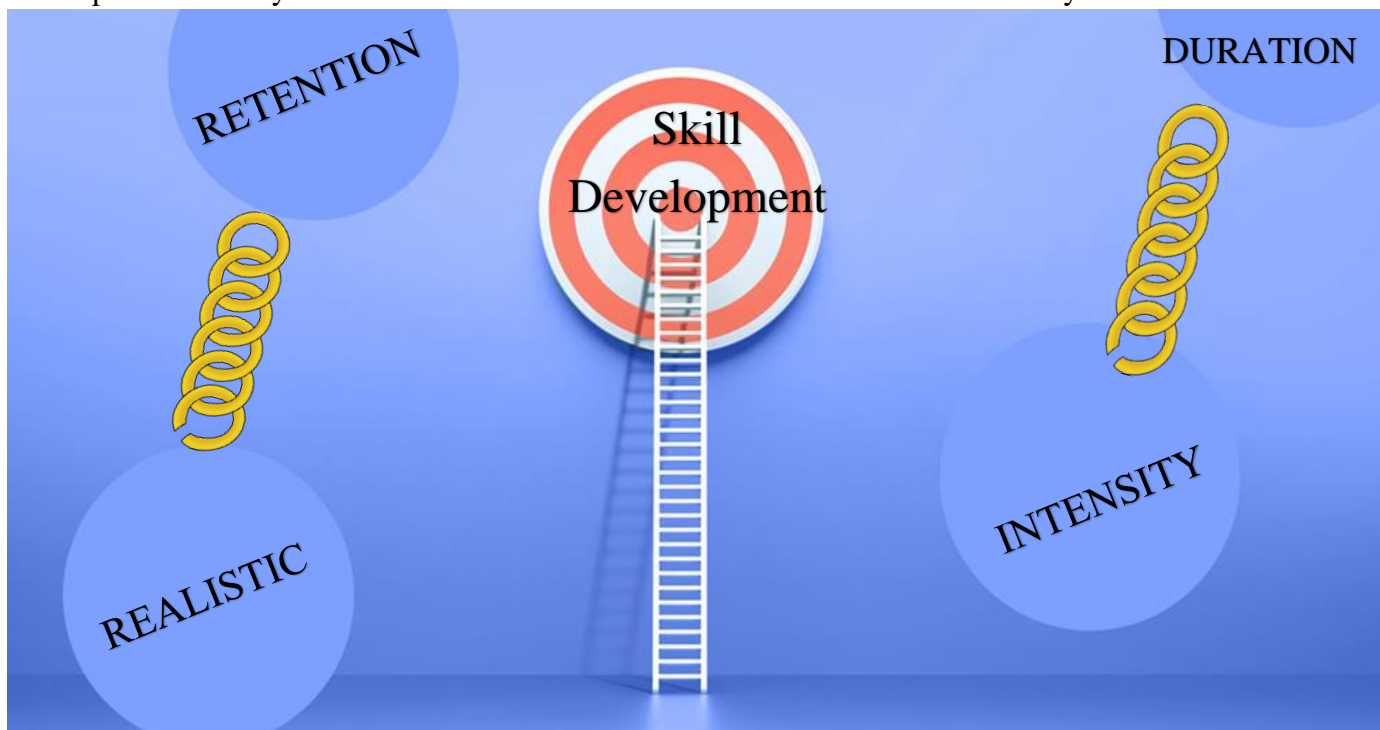


Random selection of student files are reviewed through the monitoring process to ascertain whether the local program maintains this information in hard copy.

Student files are the permanent records of your students' efforts and successes and must be accurately maintained. All students must have a local folder, even those who are considered 'non-fundable students' as information regarding these students is recorded and submitted on NRS Table 2A and local programs must maintain an audit trail on how data was collected/maintained on this special population.

G. Goal Setting

Realistic goals setting with a regular review of the goals has been linked to student retention. As you know the longer you can keep a student in class, the greater the chance of the student's success in passing the HSEC or meeting their goals. The goal is to have students come often enough and remain long enough in the program to develop the necessary skills to be successful outside the classroom. This is intensity and duration.



H. Retention of Student Records



Student files and records are to be retained for three years after the final fiscal data report is submitted at the end of a multi-year grant. The federal guidelines state:

"Programmatic and fiscal records... must be retained for three years. When grant support is continued or renewed, the retention period for each funding period starts on the date the grantee or sub-grantee submits to the awarding agency its single or last expenditure report for that period. If any litigation, claim, negotiation, audit or other action involving the records has been stated before the expiration of the three-year period, the records must be retained until completion of the action and resolution of all issues which arise from it, or until the end of the regular three year period, whichever is later." (34 CFR Part 80.42)

II. Data Entry and the Data Collection System

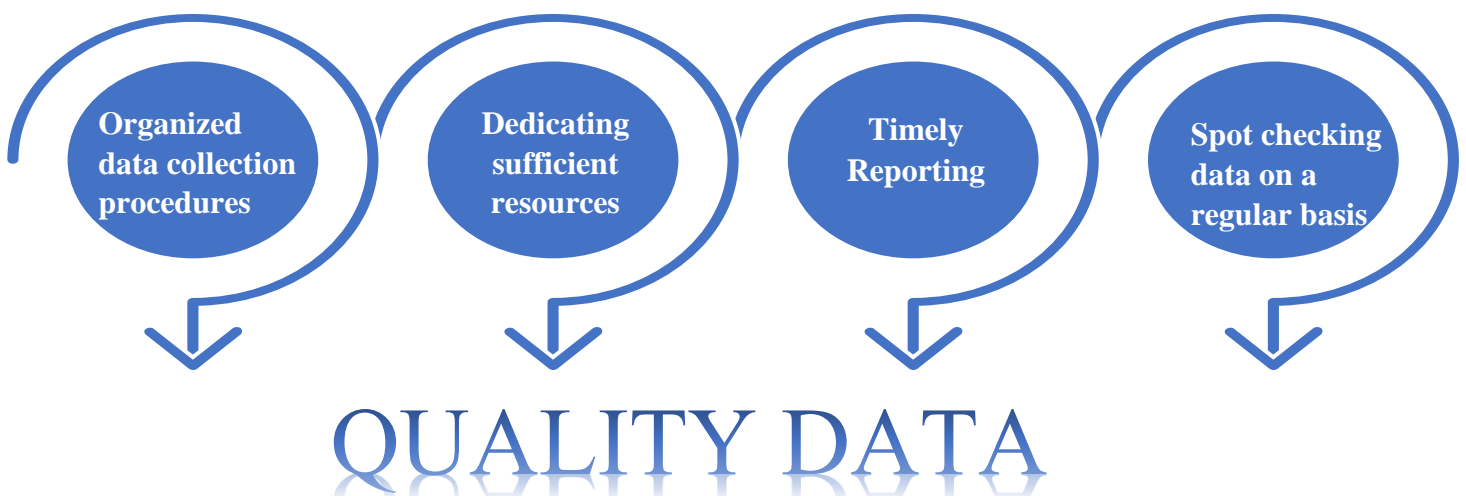


The data collection process results in a high volume of paper (forms, test scores, attendance records, surveys) that clerical staff receives and tracks. Staff must develop an organized system for managing this paper flow. The process includes receiving forms from other staff for checking and correcting. Once error checkers correct forms, program staff then completes the data entry.

One or more staff members must enter information from forms into the program's database (LACES). Data entry may occur at an instructional site, or the program may have a central data entry point to which all sites submit their forms for key entry. Programs must have an individualized student database that is organized to allow the program to examine relationships among student and program variables, attendance, and student outcomes. Once forms are keyed, data entry staff should review error reports promptly and resolve errors and missing data by returning forms to the staff members who collected the problem data. The Dashboard has interactive graphs to help expedite the process but thorough checks must be done at least quarterly.

Data on each student is entered electronically at least once a week. Keep attendance, testing information, and goal attainment up-to-date. The dashboard in the local LACES software is built to inform local programs of achievements and offer support in identifying retention and post-test issues.

During the data collection process, States and local programs can implement four mechanisms to help ensure data quality.



First, data collection *procedures* need to be explicitly organized. Program staff should establish specific, concrete procedures for data collection and data reporting. These procedures should state what is to be

collected, when it is collected, and who is responsible for collecting it. The time when the information should be collected and reported also should be determined. Incorporating these procedures formally into staff job responsibilities enhances the likelihood that staff perform them.

The second critical factor to collecting quality data is devoting sufficient *resources*—time, staff, and money—to data collection. Providing resources shows staff that data collection is a valued and important activity, not something that is done as an afterthought or when there is time. At least one staff member in a program should have explicit responsibility for ensuring that data is collected and reported.

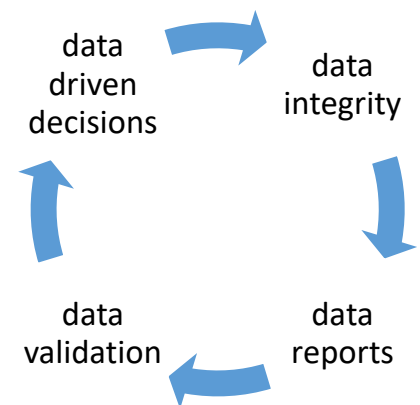
Timely reporting of data according to a fixed, regular schedule is the third factor for promoting data quality. Data should be reported to a central agency, such as the State or district, frequently and at fixed time periods. At the local level, information should be entered into the program’s data system as frequently as possible. For example, attendance should be reported daily or weekly. For reporting to the State, quarterly data submission is required to achieve data quality at the superior level. More frequent reporting or real-time data updates, such as through a Web-based system, are optimal.

If the time lag for reporting data is too long, then the data is not reported completely, as staff have a tendency to put off data reporting until the deadline. The result is a high degree of missing and possibly false data. Another reason for frequent reporting is that errors or problems can be identified and corrected on an ongoing basis. If data is reported infrequently, errors may go unnoticed before it is too late to correct them.

Finally, frequent contact with data collection staff and spot checking their data assists in ensuring quality data. A State or local staff member knowledgeable in reporting and data collection should provide regular, ongoing monitoring of data collection through scheduled contact with local staff. Samples of data collection forms should be examined periodically. To be most effective, monitoring should be proactive and non-punitive and viewed as a form of technical assistance. With this approach, staff are less likely to try to hide problems or cover up mistakes.

A. Programmatic Administrative Reviews

The review process should include a regular opportunity for the program director and other program leaders to review data reports. As the person most responsible, the director may often look at the “big picture,” and bring a different perspective to the data review process. This review may raise further questions about data integrity, requiring another round of data checking and verification among the staff. The program director may share data reports with staff as a means to identify problems, track progress, and receive staff buy-in into the data collection process by demonstrating how data can be used for program management and inform continuous program improvement.



The program director should also utilize the data found in LACES for program evaluation and improvement. LACES is designed to provide NRS performance and local service level data reports that can be used to evaluate state level or program level performance. Reports can be created and utilized by program staff to assist them in managing student files, tracking test needs, and goal/cohort attainment. Program directors or coordinators can monitor classes and make informed decisions concerning scheduling, curriculum, supplemental service needs and improve program operation.

B. State Data System and Reporting

All local program data is dynamically available to the state agency and used for integration into the state data reporting system. The state level database combines the individual program data into a state aggregated report. As part of the data integration process, state staff may identify errors or inconsistencies in local data, initiating another round of data checking, cleaning, and data entry by the local program.

All states send their data to the U.S. Department of Education (ED) annually, using the NRS data tables. ED then creates a national report and submits the report to the U.S. Congress and uses the data in determining state performance incentives. Prior to creating the national report, ED reviews each state's data tables for errors and inconsistencies and asks for corrected data tables from states, as needed. In turn, states may once again need to review local program data to correct data problems and contact local program directors for corrections. Local staff then needs to identify problems and correct errors and resubmit data to the state, which then provides corrected tables to ED.

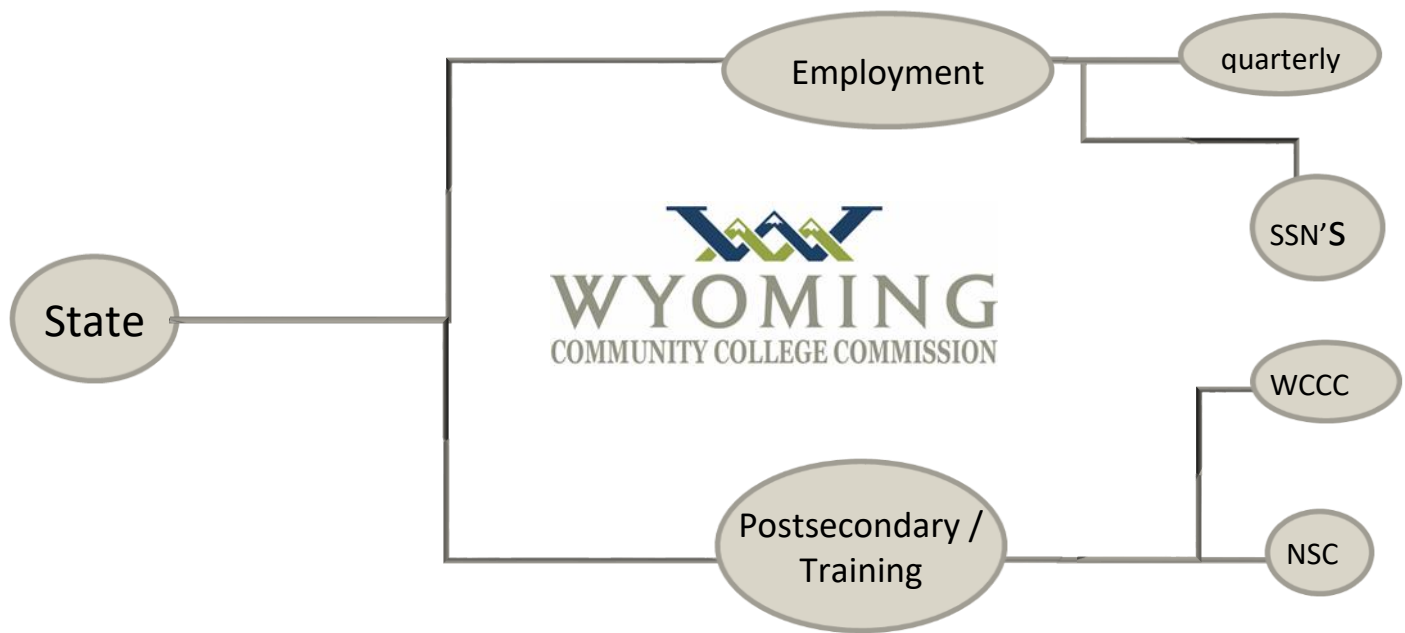
C. Summary

The discussion around the model data collection process identifies two key characteristics central to the success of a good data collection system. First, the process requires many people working together as a team. Each point of the process represents a staff person who has a definite role in data collection. Each person must know his or her job and do it right. Ideally, each staff member will also accept responsibility, as a member of the team, for fulfilling his or her role. The team makes the process work, which includes collecting and recording accurate and timely information, submitting the information to the next staff person in the process, and reviewing and correcting information that is missed or erroneous. The second characteristic of a good data collection process is that it has many checkpoints and feedback loops. There are frequent checks on the data (when forms are first completed, after data entry, prior to report submissions) and several opportunities to improve data integrity. At each checkpoint, there is a staff member who has the responsibility and authority to correct the data. In addition, several different levels of staff (clerical and data entry, teachers, program directors, state and federal) review the data. This review by staff, internal and external to the process, produces quality data. The third concept is in WY the expectation is that all local providers will meet the NRS Measures.


**Information from the National Reporting System

III. Data Matching

The collection of accurate data is critical to not only the success of the local program, but also for the State. Because of this there are multiple ways in which data is collected throughout the year on the post-exit indicators. The State data matches employment records for students who have exited Adult Education programs in Wyoming for the 2nd & 4th quarter after exit. These data matches are typically conducted on a quarterly basis and one comprehensive sweep at the end of the fiscal year on all students who provide a social security number. In addition, the State data matches for credential attainment and enrollments in postsecondary at least two times per year. (December and June). The State does NOT match for high school equivalency as this is a local requirement. The State conducts these data matches through the National Student Clearinghouse (credentials earned anywhere in the USA) and through the Commission's own database. Once this data is collected it is entered into LACES.



Local programs have the responsibility of collecting data for enrollments/completions in postsecondary/training and for the high school equivalency exam. Because this information is critical for reporting purposes, local providers are required to conduct data matches at least three times per year through both the National Student Clearinghouse and through the local community college. Local providers are required to conduct data matches as follows:

Conduct data match through	Schedule of data match
 National Student Clearinghouse	<ul style="list-style-type: none"> -October of each year to capture fall enrollments -February of each year to capture spring enrollments -June of each year to capture summer and/or any late student registrations which have not been picked up by previous data matches.
Wyoming Community Colleges	Because non-credit training/ workforce courses are not tracked through the NSC or through the State’s database system, local programs are required to data match eligible student records at the local community college at least three times per year following the timeline outlined above.

These data matches as well as surveying are required to be completed on students for two consecutive years. Table 4 will capture data on postsecondary/training enrollments for students in the current fiscal year, while Table 5 captures this data on students enrolled in the previous fiscal year.

In cases where the local program did not collect a SSN on student(s), the local program is required to utilize a survey instrument to collect data on the post-exit indicators. This data must be collected utilizing the state approved survey and contact log, found in the Appendix to policy #08112020R. Surveys are also required on individuals who are self-employed, farmers, ranchers, railroad employees, and federal & military employees as these types of occupations do not report earnings through the State UI system and are not able to be data matched.

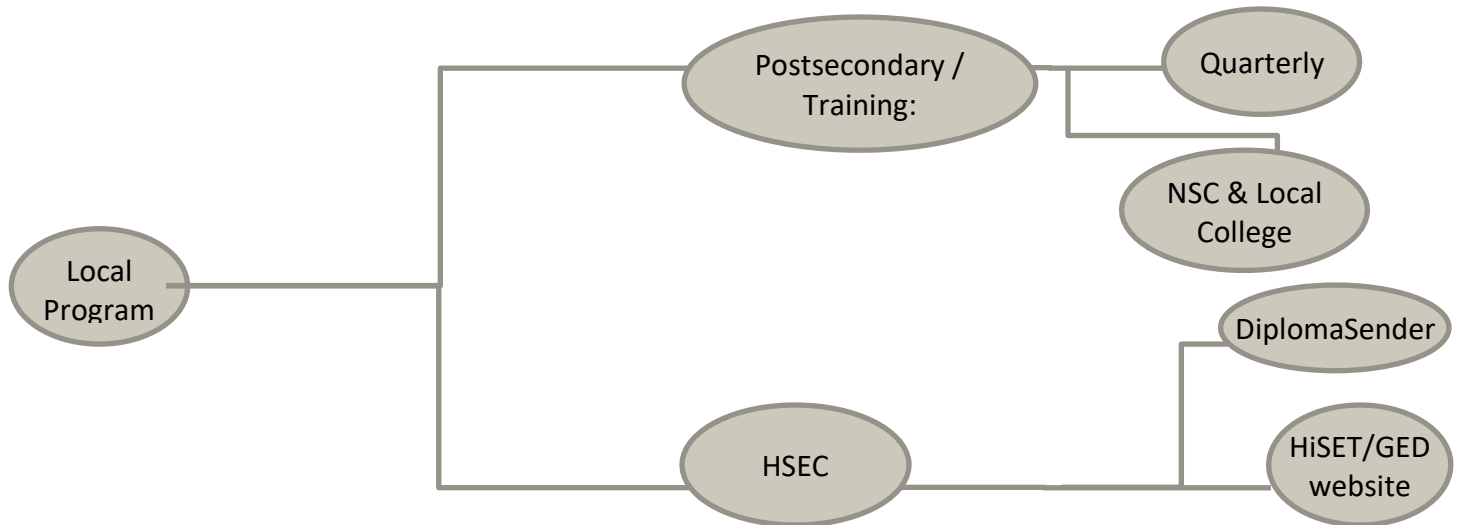
Surveys must be conducted (See Chapter 5) with the appropriate data entered into the LACES databased following the schedule outlined by the NRS found on page two of the aforementioned policy. Local programs

are also required to maintain a Survey Notebook which includes all data collected through a surveying instrument. Additional information on surveying can be found in Chapter 5.

Local providers are required to utilize the DiplomaSender database or the HiSET/GED website to obtain copies of student HSE credentials and of student transcripts. When possible, both of these documents need to be uploaded into the student file on LACES with the appropriate information entered into LACES to reflect HSE credential attainment when earned.

Note: Students who do not provide a SSN at intake will be required to submit this information to register to take a high school equivalency exam. Local programs should record this information upon receipt immediately into the student’s LACES record.

Hard copies of all credentials earned **MUST** be maintained in the local student file.



IV. Required Classes for Accurate Data Reporting

Each provider in Wyoming has its own system for managing and recording how students are accruing hours. However, there are, at present, two required courses that each provider must have: A career service course and an ABE/ASE 9+ class.

A. Career Services

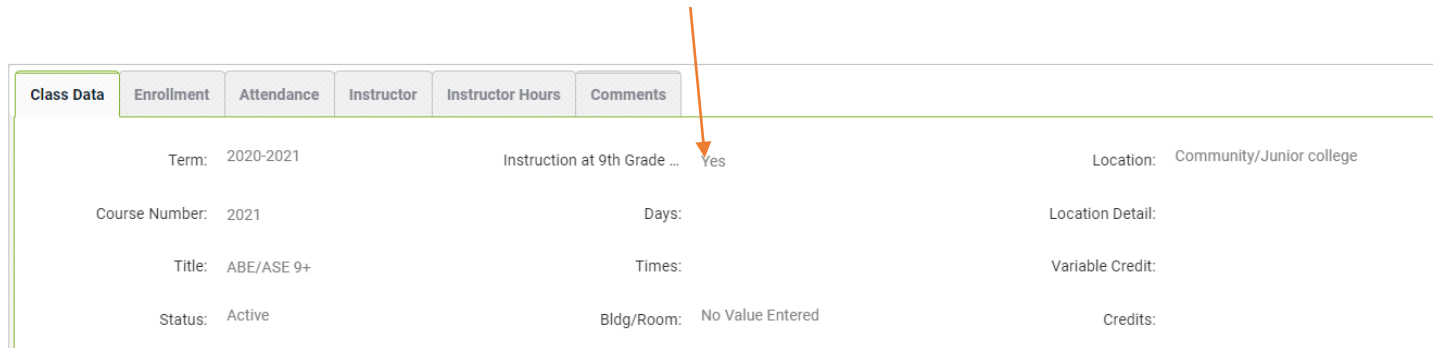
WIOA Sub-section C: clearly articulates that career services are required in the delivery system of WIOA core partners. The legislation provides a clear definition of what these services must include. (please refer to [WY Policy #03092020-Career Services Course/Training Services](#)). Adult Education programs in Wyoming meet this WIOA requirement through the provider’s Career Services course. There are a standardized number of hours which can be recorded for each enrolled participant in this course. As outlined in the aforementioned policy, Wyoming’s providers may award up to 15 hours for completion of the various components of a career services course. Any additional hours are to be tracked through either a Career Pathways or a Classroom Essentials course.

At the end of each fiscal year, the State is required to submit and reconcile the total number of participants and the hours they’ve logged in these course, so it is critical that accurate hours be tracked for each enrolled participant.

B. ABE/ASE 9+

In order for HSEC students to populate to the correct columns/lines on Table 5, it is critical that providers closely monitor student test data to ensure that students are at NRS 5/6 before they begin taking their HSE assessments. Students who are not post tested at NRS 5/6 but have shown a readiness to test through other means must be registered into an ABE/ASE 9+ class before completing their last HSE assessment. This will ensure that Table 5 populates correctly.

When setting this class up on LACES it is critical that the provider clearly denotes that the class provides instruction at the 9+ level. This is done by selecting the appropriate drop-down menu under the Class Tab>Class Data.



The screenshot shows the 'Class Data' tab in the LACES system. The form contains the following fields:

Class Data	Enrollment	Attendance	Instructor	Instructor Hours	Comments
Term:	2020-2021			Instruction at 9th Grade ...	Yes
Course Number:	2021			Days:	Location: Community/Junior college
Title:	ABE/ASE 9+			Times:	Location Detail:
Status:	Active			Bldg/Room: No Value Entered	Variable Credit:
					Credits:

An orange arrow points to the 'Instruction at 9th Grade ...' dropdown menu, which is currently set to 'Yes'.

V. Data Validity

WIOA section 116 requires each State to have ensure the data contained in its reports be valid and reliable. Data validation helps ensure the accuracy of the annual statewide performance reports, safeguards data integrity, and promotes the timely resolution of data anomalies and inaccuracies. The OCTAE guidance on data validity may be found in the [OCTAE Memorandum 19-1](#).

A. Joint Data Validation Framework

Data validation is a series of internal controls or quality assurance techniques established to verify the accuracy, validity, and reliability of data. Establishing a joint data validation framework based on a consistent approach shared by the Departments will ensure that all program data are consistent and accurately reflect the performance of each core program in each State.

The purposes of validation procedures for jointly required performance data are to:

- Verify that the performance data reported by States to the US Departments of Labor and Education are valid, accurate, reliable, and comparable across programs;
- Identify anomalies in the data and resolve issues that may cause inaccurate reporting;
- Outline source documentation required for common data elements; and
- Improve program performance accountability through the results of data validation efforts.

B. Source Documentation for Common Data Elements

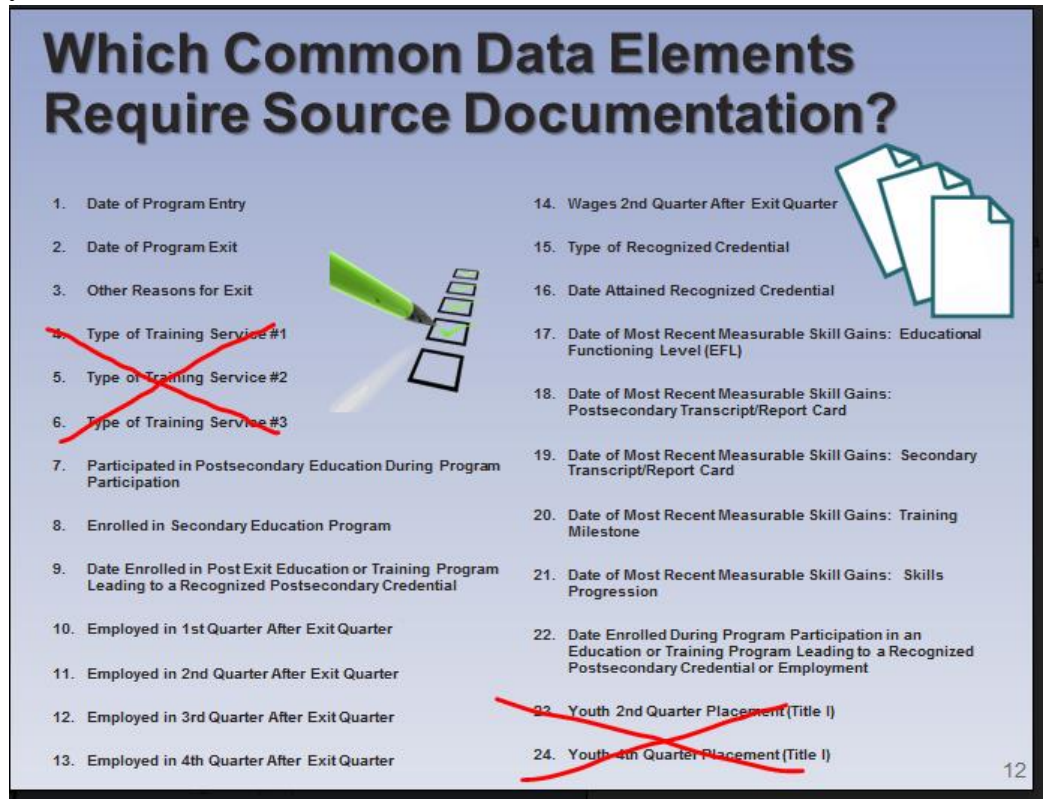
Procedures developed by the States must include regular data element validation through core program monitoring on 24 common data elements. The Departments selected these elements based on their importance to reporting accurate performance outcomes and to ensure data consistency across core programs.

OCTAE sent the list in the box on the following page which encompasses the 19 elements Adult Education must monitor. The common data elements are described along with the allowable types of source documents

programs may use to validate the data.

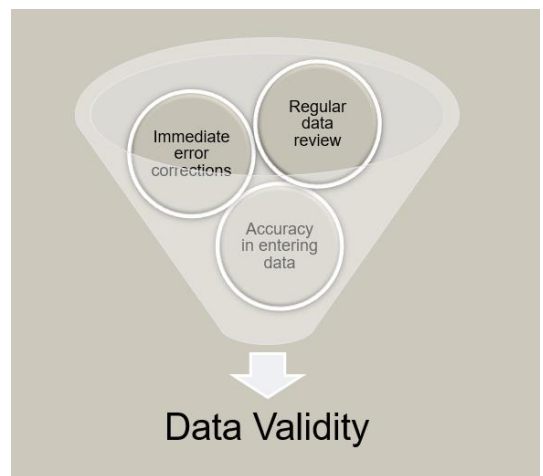
Written procedures for data validation contain a description of the process for identifying and correcting errors or missing data, which may include electronic data checks:

1. Regular data validation training for appropriate program staff (e.g., at least annually);
2. Monitoring protocols, consistent with 2 CFR §200.328, to ensure that program staff are following the written data validation procedures and take appropriate corrective action if those procedures are not being followed;
3. A regular review of program data (e.g., quarterly) for errors, missing data, out-of-range values, and anomalies;
4. Documentation that missing and erroneous data identified during the review process have been corrected; and
5. Regular assessment of the effectiveness of the data validation process (e.g., at least annually) and revisions to that process as needed.



An essential feature of the data collection process must be regular and frequent review of data entered into the data system. The data system has pre-programmed error reports that allow for a review of inconsistent, out-of-range, and missing data. Data entry and clerical staff should regularly review these reports and should return them to teachers, intake workers, and clerical staff to clarify problems and obtain the missing data. Corrections should then be sent to data entry staff so they can enter them into the database.

WIOA legislation requires that each State have policies in place to ensure that data contained in reports is valid and reliable. This is fully explained in [WY Policy #08142020](#). Wyoming utilizes a multi-level approach to data validation as discussed below.



Wyoming's Multi-approach to Data Validation



VI. Instructors & Tracking Professional Development Data

Information on instructors is collected and entered into the LACES database for accurate reporting on NRS Table 7. The collection of pertinent data begins when each instructor completes the State 'Teacher Information' sheet, which is ultimately submitted to the State Educational Agency for Adult Education.

Beginning in FY 21/22, the State requires that all professional development for Adult Education programs in Wyoming be tracked through the LACES database. PD hours are tracked under the 'Staff' tab on LACES and should include the date in which the PD occurred, name of training, and the hours taken to complete the training. This must be tracked for all Adult Education instructors.

Staff Data	Assignments	Hours	Workshop Enrollments	Workshop Attendance	Professional Development	Demographics	History				
view, change		Professional Develo... ▼				ADD	EXPAND ALL	COLLAPSE ALL	EXPORT	Fiscal Year Filter: All Fiscal Years ▼	
Drag a column header and drop it here to group by that column											
<input type="checkbox"/>	Fiscal Year	Date Attended	Name/Type of Professional Development	Hours	Creation Date	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	2020-2021	11/23/2020	Simple K12 Webinars (3)	1.50	11/30/2020	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	2018-2019	10/01/2018	TABE Part II Certification	1.00	10/30/2020	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	2018-2019	09/25/2018	TABE 11/12 Part I Certification	1.00	10/30/2020	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Local programs can monitor all professional development hours through a LACES report entitled ‘Staff Professional Development Hours.’ This report will become a component to the Adult Education End of Year Report beginning in fiscal year 2021/22.

VII. Data Reporting



National Reporting System
for Adult Education

The data collected on all program participants is recorded into LACES and is compiled into 15 tables each year. These are called the NRS tables. All NRS tables, except 2A record participant information on students with 12+ hours.

At the end of each year, the State is required to consolidate and submit data on all non-duplicated student records. These tables are submitted to OCTAE and the NRS for review and the data provided within them form the context for both the provider’s narrative reports and the State’s narrative report to OCTAE. The tables have been revised by OCTAE for WIOA and reviewed and approved by the Federal Office of Management and Budget (OMB) under control number 1830-0027. Copies of each table for all years in which Wyoming has been collecting data is available through the LACES database system.

Several reporting tables allow for separate reporting on special populations for the primary indicators of performance. For example, tables for distance education and correctional education participants provide a picture of how these participants performed on performance measures. There also is a table to report outcomes of participants in integrated education and training (IET) and one optional table for separate reporting of participants in family literacy and integrated English literacy and civics education (IEL/CE) programs. States are encouraged to examine the performance of other target subpopulations separately and must submit separate reports to meet WIOA reporting requirements with additional breakdowns.

Employment measures follow a multiple-year reporting procedure. A time lag in the availability of employment data from the unemployment insurance (UI) database used for data matching requires reporting of students who attended in different program years for second-and fourth-quarter employment measures. In addition to performance tables in the AEFLA information collection 1830-0027, OCTAE requires States to submit a narrative report and financial reports detailing expenditures.

For additional information on the NRS tables and how data is collected for each table, please see [New Director’s training module 4-Measuring Performance](#).

In March 2021, the NRS updated its Technical Assistance Guide which provides extensive technical assistance on data reporting. Electronic copies are available at <https://nrsweb.org/policy-data/nrs-ta-guide> or on the Commission’s website.

VIII. Data Dives

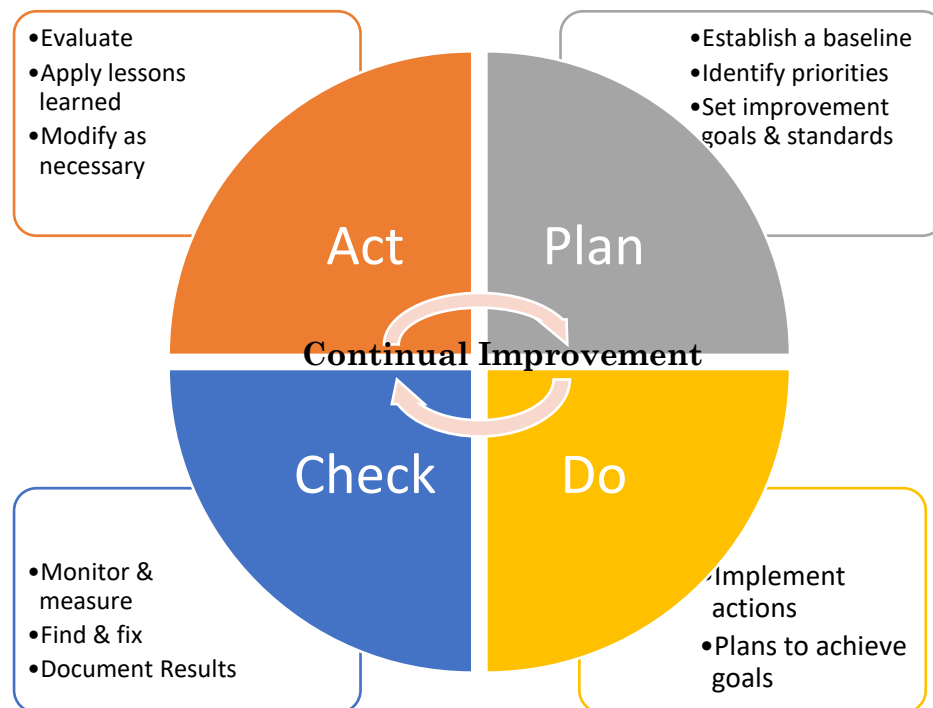
Several years ago, all AE directors underwent training on how to conduct data dives to review program data for various purposes. Data dives assist with the data-informed decision making process that requires a cultural shift from teachers, administrations, and students. The process of data dives includes collecting data, analyzing data, using data to help make decision, and communicating through the use of data.

Local programs should conduct a data dive at least once per quarter to evaluate some aspect of program effectiveness/performance. At the end of each year, a comprehensive review of data must take place as part of a provider’s End of Year Report.

A. Purpose of Data Dives

- Measure students' progress
- Make sure that students don't fall through the cracks
- Measure program effectiveness
- Participate in job-embedded professional development
- Maintain educational focus
- Measure and share teachers' instructional strategy effectiveness
- Guide curriculum development
- Promote accountability
- Show trends
- Measure performance
- Program improvement

The process in which the program administrator reviews the continuous improvement cycle utilizing data to make informed programmatic decisions. The Plan/Do/Check/Act (PDCA) cycle demonstrate one type of a continuous improvement cycle.



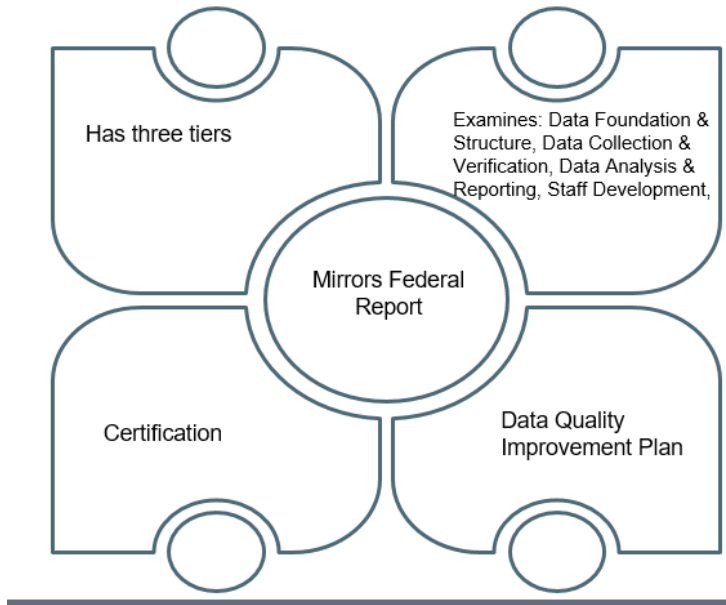
C. Toolkit

In order to help local programs in Wyoming use programmatic data in a useful way, the State has revised the NRS data dive toolkit. This may be found on the Commission's website at: <https://communitycolleges.wy.edu/adult-education/directors/>. Along with this toolkit is a sample report that can be used to communicate programmatic data to relevant stakeholders. A sample copy of this report can be found in Appendix #1 to this chapter.

D. Use of Data for Program Improvement

LACES is designed to provide performance and service level data reports that can be used for evaluation at the state or program level. Reports can be created and used by teachers to assist them in managing student files, tracking test needs and goal attainment. Programs can monitor classes and make informed decisions concerning scheduling, curriculum, supplemental service needs and continuous program improvement.

IX. Data Quality Checklist



To allow the State to assess the quality of NRS data, providers must complete annually the NRS data quality checklist, which defines OCTAE’s standards for data quality. Providers are required to submit this checklist with their annual NRS data submission. The checklist describes State NRS policies and the data collection procedures that local programs within the State follow to collect NRS data. It provides a standardized way for OCTAE to understand and evaluate NRS data quality by defining data quality standards in four areas.

A. *Data Foundation and Structure*

This content area addresses whether the State and local providers have in place the foundation and structures for collecting quality data that meet NRS

guidelines. Standards measure whether there are policies for assessment and follow-up, whether local programs know these policies, and whether the State and local providers conduct validity studies to ensure processes are working to produce accurate and reliable data.

B. *Data Collection and Verification*

This area determines whether the State & local providers collect measures according to NRS guidelines using procedures that are likely to result in high reliability and validity. Standards also address whether data are collected in a timely manner and are systematically checked for errors, and whether the State also has processes for verifying the validity of the data.

C. *Data Analysis and Reporting*

The quality standards in this content area include whether the State and local programs have systems for analyzing and reporting data, including appropriate databases and software. The standards also address whether analyses and reports are produced regularly, are used to check for errors and missing data, meet NRS and State needs, and are useful to State and local staff for program management and improvement.

D. *Staff Development*

The standards under this area address whether the State and local programs have systems for NRS professional development for State and local staff, including whether the State provides training on data collection, measures, assessment, and follow-up procedures. Standards also focus on whether the training is ongoing and continuous, meets the needs of State and local staff, and is designed to improve data quality.

E. *Levels of Data Quality and Quality Improvement*

Within each area there are three levels of data quality that reflect whether the State and local programs have policies and procedures likely to improve the reliability and validity of data. Based on the checklist, OCTAE classifies States’ NRS data procedures into one of these levels each year.

- **Acceptable Quality.** Policies and procedures for implementing the NRS meet the essential requirements for NRS implementation as described in this guide and all related NRS guides on improving NRS data quality.

- **Superior Quality.** Procedures go beyond the minimum to promote higher levels of data validity and reliability through more rigorous definitions, regular oversight of data collection methods, ongoing assistance to local programs on NRS data issues, and procedures for verifying the accuracy of data.
- **Exemplary Quality.** The State and local programs have procedures and systems that promote the highest levels of data validity and reliability, including systems for verifying data accuracy from local programs, systems for monitoring data collection and analyses, and corrective systems to improve data on an ongoing basis. State and local program procedures indicate a focus on continuous improvement of the quality and accuracy of data.

States and local programs have to meet all of the standards within a quality level to be considered at that level. In addition, the scoring is *cumulative*, so that to score at the superior level, a State has to meet all of the standards for that level *and* all standards for the acceptable quality level. To rank at the exemplary level, States have to meet all of the standards for all quality levels.

X. **Data dictionary**



A data dictionary of terms commonly used by Wyoming's Adult Education programs is available on the Commission's [website](#).



Provider Name: ABE Program EXAMPLE

November 8, 2008

This book is our tool to review the progress students within our program are making individually and collectively and to plan how we might facilitate even greater learning. This book looks at three areas: attendance, level completion, and transitions. At the end of each section, we include observations and plans for change. At the end of the book, there is a summary of our plans and how we plan to assess those changes when we update this book six months from now.

Content

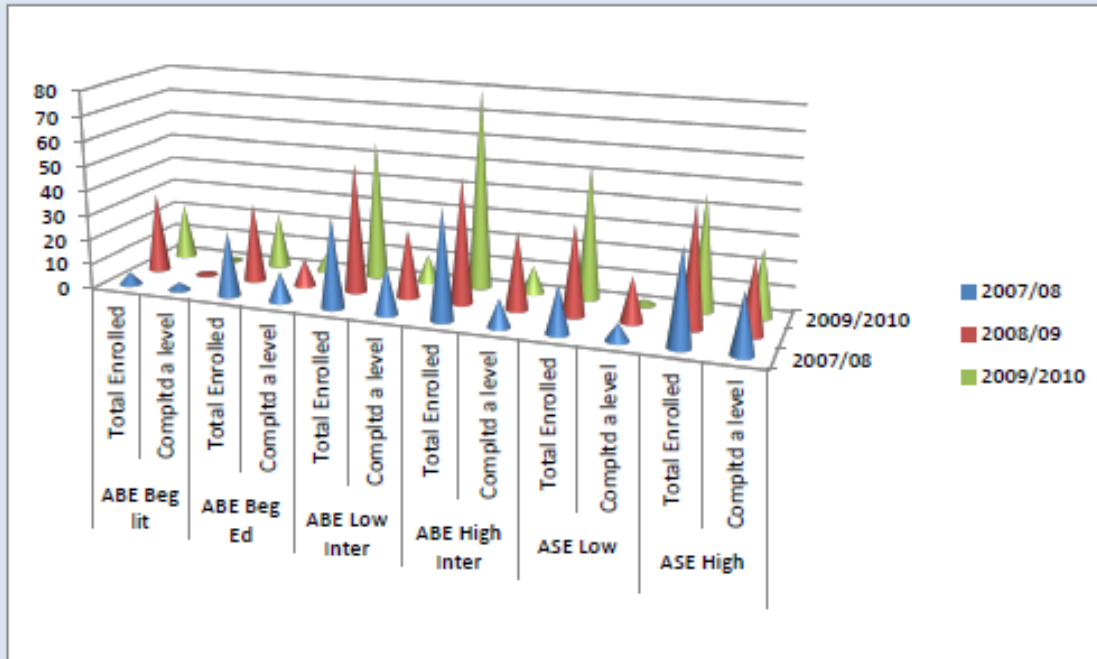
Attendance & Gains 4
Transitions.....9

The image features a blue background with a vertical gradient from dark blue on the left to a lighter blue on the right. Several white, thin-lined rectangular shapes are scattered across the page, some overlapping each other. The text 'Attendance & Gains' is centered in the lower half of the image in a white, bold, sans-serif font.

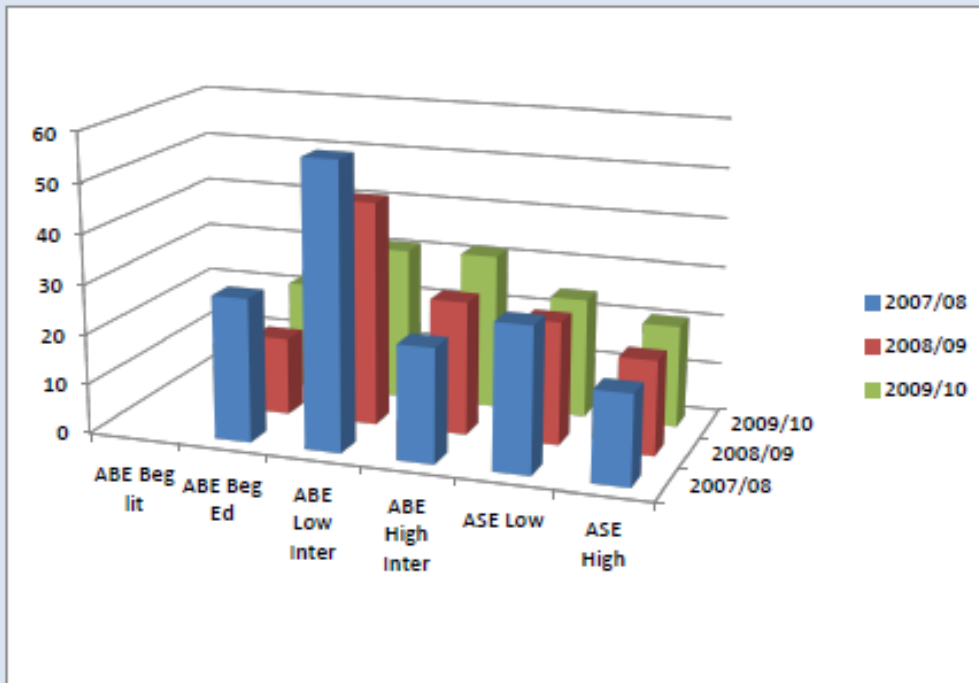
Attendance & Gains

Attendance & Gains

How many students are enrolled at each ABE/ASE level and how many are being post tested?



What is the average number of contact hours that GED completers are requiring at each level?



These graphs show that.....

1. we have a problem in completion rates; especially severe in FY 2009/10
2. the average number of contact hours at each level is remaining fairly consistent over the years, except at the ABE low intermediate level where there is a marked reduction across the years
3. the largest percentage of our GED completers enter our program at high intermediate level and are requiring approximately 20-30 hours before they are able to successfully complete their GED
4. our highest completion rates are at ASE high
5. ASE high students need approximately 20 hours of instruction in order to successfully show academic gain
6. most GED recipients are completing the program after logging 20-30 contact hours

Next steps include...

- finding ways to increase our post test rates

- implement a stepped curriculum where the number of hours a student must log is directly related to their pretest levels

- train instructors

Attendance & Gain Summary and Plan for Changes

[Summarize observations and develop plans for what you will change and what results you expect to see as a result]

Summary of Observations on Attendance & Gain

The most poignant problem that these graphs identify is our difficulties in post testing students. There are many reasons why this has happened, but it is clear that solutions must be put in place to rectify this situation. What was very surprising is the fact that the majority of the students enrolled in our programs across the three fiscal years have been able to successfully complete their GED after 20-30 hours of instruction regardless of what level they may have entered the program at. This may also be indicative of another program difficulty though. Because of the size of our outreach and because communication and reporting of student hours is done primarily through fax, it may suggest that faxes with student hours may not have come through or that instructors are not logging all actual hours that a student spends working at one of our sites. It is entirely possible that the submitted hours only represent hours spent directly with a teacher and does not include those hours a student may have spent at the outreach site working on instructional programming packages.

It was not surprising to find out that the highest percentage of GED completers are those who enter our program at the ASE high level. These students enter our program needing very little instruction and are therefore able to go through the program with very little difficulty.

Plans for What We'll Explore Changing as a Result

We have already put plans in place to increase post test rates. With the help of our outreach coordinators, all students will be required to complete two hours of in-seat hours working on PLATO for every two hours they spend working with a tutor and/or instructor. In addition, we plan to post test approximately 30% of ASE low students after they've completed 30 hours of instruction. Instructors will be required to complete the permission to post test form prior to the assessment being given and must seek the ABE Directors approval. In addition, all ASE high students who satisfactorily complete an OPT after only 12 hours of instruction will be granted permission to GED test.

Instructors have also been given access to LACES so that they may track student's up to date hours by themselves and will not have to wait until the ABE Director informs them that a student has met the requirements for post testing.

All instructors have already attended a two day training session and these new policies have already been put in place.

What Results We Expect to See and When and How We Will Check

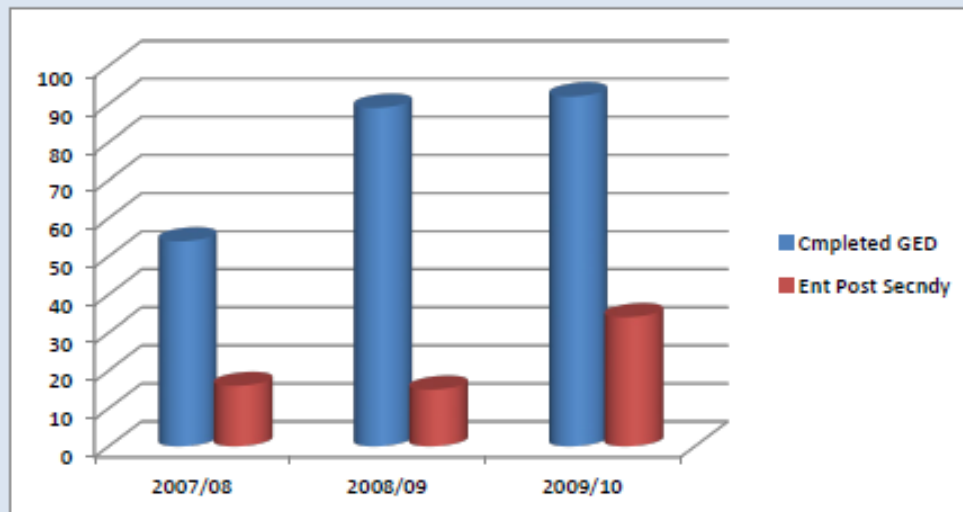
We anticipate an increase in post test rates as well as an increase in the number of students who successfully pass their GED examinations.

Quarterly reports will be run to verify that students who meet the 60/30 hours are being post tested as required. In addition, monthly notices will be sent to instructors informing them of students who need to be post tested.

The image features a blue background with a vertical gradient from dark blue on the left to a lighter blue on the right. Several white, thin-lined rectangular shapes are scattered across the page, some overlapping each other. The word "Transitions" is written in a white, sans-serif font, centered horizontally and positioned in the lower-middle part of the page.

Transitions

How many GED completers are entering post-secondary?



This graph shows that.....

1. one third of our GED graduates are entering college
2. the number of GED graduates is increasing; particularly in 2008/09 where we saw a 45% increase in the number of GED recipients from our program
3. our students have never logged 60 hours of instruction at any level, yet are completing their GED and entering college at increasing rates

Next steps include...

- better prepare our students for entering post secondary education
- better prepare our students for entering the workforce

Outcomes Summary and Plan for Changes

[Summarize observations and develop plans for what you will change and what results you expect to see as a result]

Summary of Observations on Outcomes

This chart clearly depicts that we are seeing an increase in the number of students who are completing their GED examination. A fairly substantial number of these students are entering post secondary education. It is entirely possible that because we are not able to track enrollment at other post secondary education, that the actual number of students entering post secondary is much higher. This clearly indicates that we must prepare our students for both workforce as well as for post secondary.

Plans for What We'll Explore Changing as a Result

The first step in helping our students identify their own skills and interests, we will provide each learner with access to the college funded Kuder program. Instructors and tutors will help students work through the skills, career and interest inventory assessments so that each learner will have a better idea where their own educational paths should lie. These assessments can also be utilized in the level of the classroom to help develop specific writing techniques, for example, for the individual learner.

All students will also be registered on the Wyoming at Work website. This will not only help the student in their quest for employment, but will also help facilitate a data match system once an MOU is signed by the State.

In order to encourage more of our GED recipients to enter college, instructors will personally present scholarships to each GED recipient. Copies of these scholarships will be sent to Torrington and placed in the individual students' file.

GED recipients who accept these scholarships will also be encouraged to enroll in the College's Bridge program.

Once an instructor has identified that a particular learner is post secondary bound, the student will be encouraged to meet higher OPT score requirements. Learners who are planning to enter college will be encouraged to meet a 550 overall average on their OPT before the instructor grants permission to test.

What Results We Expect to See and When and How We Will Check

Although the steps we plan to take this first year are relatively small steps in helping to transition our students to workforce and/or post secondary education, we hope to see an increase in the number of students who enroll in the College. We also hope that through a data match system, we will see a large increase in the number of students who enter the workforce.

Here again, this will be verified through quarterly reports.

Knowing Your Adult Learners: Use Data!

evolution.com/technology/metrics/knowning-your-adult-learners-use-data

September 24, 2015



By collecting and measuring data, institutions can vastly improve their level of service for non-traditional students, creating a positive impact on persistence, completion and lifetime retention.

In [last week's article](#) , I suggested that colleges should consider collecting more data on their adult students at the time of admission. Since the article focused primarily on the needs of undergraduate, part-time adult students, I also recommended appointing a counselor or adviser at the time of admission to use and follow up on this data as a student progresses through their academic career. The purpose of this article is to provide some specific insights into how data can be used to engage adult learners and to help them succeed in achieving their education goals.

Without a doubt, we live in data-driven society. Big data and analytics have become common in business, government, sports, and education. Nate Silver's book, *The Signal and the Noise: Why So Many Predictions Fail-but Some Don't*, was on the *New York Times* best-seller list for much of 2012 and 2013. Silver went into great detail about when data are helpful and when they can be problematic. The essence of Silver's message was that data ("the signals") must be captured on a timely basis and provide pertinent insight into the object(s) of analysis. He also cautions against collecting too much data (the "noises") that are superfluous and distract from the important issues at hand.

Data for Helping Adult Learners Succeed

First, in addition to basic data—demographics, academic transcripts, academic area interest—it is critical to capture data on why an adult learner is enrolling in an academic program at a particular stage of life. Most adult learners have specific goals and objectives when deciding to invest their time and money in a college course or program. Parental or peer pressure is no longer an issue. They likely have genuine job, career, or other professional needs. They may want to take a course or two to enhance already acquired skills or to experiment in a new academic area to which they are not ready to commit. On the other hand, they may have decided they need to complete a degree program either for advancement in their existing field or to enter a new field. Obviously the commitment to complete a degree is far greater than taking a course or two. Knowing an adult learner's goals is important and counseling should be provided that understands and recognizes them. The counselor's focus should be on how the college or university can help this adult to achieve their stated goal(s) rather than trying to sell an entire academic program.

Second, it is important to collect data on what other commitments an adult student has. Most adults have family and work responsibilities. Are they married? Does the spouse or partner work? Do they have children? Are they taking care of aging parents? Do they have a full-time job? These kinds of data can provide insights into an adult student's ability to complete a program of study and the amount of time at his or her disposal. If time is a potential barrier for participating in courses, an astute counselor will advise accordingly and perhaps suggest that the student start slowly rather than enroll in too many courses that will conflict with other commitments.

Third, it is important to know the academic history of an adult applying for an academic program. Frequently, adult undergraduates have had some coursework but not a degree. Data on the student's previous college/university and area of concentration are routinely provided at admissions, but other data on drop-out, stop-out, and incompleteness behavior can provide valuable information on non-cognitive qualities related to persistence and motivation. Also a history of remediation and basic skills (reading, writing, mathematics) needs should be noted by counselors. These data can provide insights into the suitability of the student for particular areas of concentration. For example, students interested in science or technology, concentrations that require a firm grounding in mathematics, should be counseled with skills results and course history in mind.

Concluding Comments

The suggestions above offer commentary on the importance of collecting data beyond what is routinely required on an application. The data are best provided in narrative form if at all possible. Counselors should review these data and schedule an interview(s) and follow-up with the student if there are any concerns. The commitment of the counselor first and foremost must be the best interests of the student and not necessarily the best interests of the college or university. Counselors should not be the marketing agents for an institution nor

should they be rewarded for the number of new students that they admit. In the end, this strategy will pay off in the reputation of the institution and the counselor will be rewarded with the knowledge that they have assisted many students in achieving their academic goals.

Finally, in this age of Big Data, analytics and data-driven processes, attention should be paid to the quality of the data collected rather than the quantity. Herbert Simon, Nobel laureate for economics in 1978, is often quoted as saying “a wealth of information creates a poverty of attention.”

However, when used well, quality, timely data can be critical to good decision making, counseling and advisement. College counselors can use data to gain insights into the lives of their adult students, who combine their studies with other important responsibilities that can make them vulnerable to falling behind academically and in the worst cases forcing them to put aside their education aspirations.

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Simon, H.A. (1971). Designing organizations for an information-rich world in Martin Greenberger (Ed.), *Computers, communication, and the public interest*. Baltimore, MD: The Johns Hopkins Press.



TEACHER EDUCATION & DEVELOPMENT | RESEARCH ARTICLE

Diving into data: Developing the capacity for data literacy in teacher education

Karen Dunlap and Jody S. Piro

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the end of the article

TEACHER EDUCATION & DEVELOPMENT | RESEARCH ARTICLE

Diving into data: Developing the capacity for data literacy in teacher education

Karen Dunlap^{1*} and Jody S. Piro²

Abstract: Educators by definition are now required to utilize a variety of student data to shape the decisions they make and design the lessons they teach. As accountability standards become more stringent and as teachers face increasingly diverse student populations within their classrooms, they often struggle to adequately meet the needs of all learners. Using student data, rationales for instructional decisions become grounded in best practices. Unfortunately, some administrators and teachers lack the confidence and/or training needed to successfully engage with and interpret data results. This may be especially true for early career educators and those just entering the field. Indeed, for novice teachers to be successful in the current accountability culture, they must possess, understand, and effectively utilize data literacy skills, something quite difficult to accomplish without adequate training. The research in this article explored how pre-service educators determined what worked in a data literacy intervention and the potential impact this had on their instructional decision-making process. Implications for instructor professional development are offered for consideration.

Subjects: Action Research & Teacher Research; Assessment & Testing; Classroom Practice; Teachers & Teacher Education; Teaching & Learning

Keywords: data use; data literacy; accountability

1. Introduction

One pedagogical challenge of the twenty-first century is the continually changing data literacy landscape that currently exists in today's society. Data literacy, defined by Mandinach and Gummer

ABOUT THE AUTHORS

The authors' current research agendas have focused on accountability measures for teacher educators and administrators. This current article reflects an ongoing research project aimed at understanding how to implement data literacy in teacher and administrator preparation programs.

PUBLIC INTEREST STATEMENT

In this article, the authors discuss an action research study with teachers who participated in a Data Chat in an assessment class. The purpose of this research was to explore a data literacy intervention embedded in a pre-service teacher education instruction and assessment course from the perspectives of the participants. We studied our own Instructional Intervention to better understand how the participants were experiencing data literacy instruction in a pre-service teacher education course and how their experiences could structure and inform future instructional choices. The results from the qualitative study suggested that pre-service teacher used a data literacy intervention to assist them comprehend and analyze data and to use it for instructional purposes.

(2013), is “the ability to understand and use data effectively to inform decisions ... composed of a specific skill set and knowledge base that enables educators to transform data into information and ultimately into actionable knowledge” (p. 30). It should be noted that novice teachers, from the first day on the job, are held accountable by both campus/district administration and local-/state-mandated requirements for the utilization of multiple data sources in their formulation of decisions about student learning/progress for their own professional evaluations (Coburn & Turner, 2012; Marsh, 2012; Piro, Wiemers, & Shutt, 2011). Despite such data literacy mandates, pre-service teachers often report a lack of confidence/foundational knowledge in data-driven knowledge/skills (DeLuca & Bellara, 2013; Piro & Hutchinson, 2014). Novice educators are expected to use a variety of data sources to determine whether or not certain students need remediation, additional support, and/or enrichment in their quests for specific skill mastery (Dunn, Airola, & Lo, 2013). Therefore, it is incumbent upon teacher preparation programs to provide opportunities for novice teachers to improve data literacy skills before they begin their careers.

The purposes of this research were twofold: (1) to explore how pre-service educators determined what worked in a data literacy intervention and (2) to investigate the implications for our own practice.

2. Pathways to data literacy

Though a comprehensive understanding of interventions which specifically target pre-service teacher data literacy is fairly restricted in the literature, components have been identified which, if utilized, positively impacted either student achievement or teacher disposition toward data usage (Reeves & Honig, 2015). Those components included: (1) cooperative relationships with colleagues (Gambell & Hunter, 2004); (2) the use of a knowledgeable consultant as a resource (Wayman & Jimerson, 2013); (3) the use of step-by-step protocol (Gearhart & Osmundson, 2009); and (4) the close linkage of the intervention with classroom instruction (Marsh, 2012).

2.1. Cooperative relationships

According to Means, Chen, DeBarger, and Padilla (2011), educators expressed a higher confidence level when analyzing data if they were allowed to do so with their colleagues—in effect, if they were permitted to socially construct knowledge. Such practices resulted in the formation of formal and informal learning networks which primarily focused on critical dialogs surrounding effective instruction (Putnam & Borko, 2000; Warren Little, 2002).

In response to the collaborative educational data landscape, teacher preparation programs must turn away from the stereotypical practice of including data instruction in stand-alone coursework assignments and embrace the notion of collaborative data inquiry (Mandinach, Friedman, & Gummer, 2015). Participation in purposeful collaborative inquiry gives pre-service educators a venue by which, through collegial discussions, a better understanding of casual connections between instructional practices and student outcomes may occur (Gallimore, Ermeling, Saunders, & Goldenberg, 2009).

2.2. Knowledgeable resources

An essential criterion for successful data-driven choices is that teachers have adequate skills to correctly interpret the data’s meaning. However, data have stereotypically been a worrisome topic for many pre-service teachers and teacher preparation professionals (Pierce, Chick, & Wander, 2014). Many have low data self-efficacy and express negative feelings about using data, even though abundance resides at their fingertips (German, 2014). A concern is how to increase a pre-service teacher’s confidence level when both collecting and interpreting the message and meaning of data.

To help aid pre-service teachers and professors who have data-angst, research suggests that instructors with professional development in the area, colleagues with specific data expertise, or consultants could provide necessary legitimacy to the process (Marsh & Farrell, 2015). Students need to practice under the guidance of an instructor who is confident in his/her ability to use/interpret the

data involved and has developed a trust and rapport with students to the extent that the students trust the information disseminated will serve an authentic role in future aspirations (Gulamhussein, 2013).

2.3. Step-by-step protocol

Data literate educators generate data-based questions, disaggregate data for answers, and analyze interpretations (Means et al., 2011). Pre-service teachers need to understand that data-driven decisions and subsequent implications for improved instruction do not simply occur by “checking off” the steps in a process. Instead, these new educators need to experience and practice each step until they become routine, creating a smooth transition of skills into professional practice (Costa & Kallick, 2008). Additionally, professors should teach each routine explicitly prior to engaging students in activities which require holistic application/analysis (Bocala & Boudett, 2015). If teachers deal with data on an inconsistent basis, the “provision of timely and efficient access to reminders of basic concepts” (Pierce et al., 2014, p. 295) is lost, thereby hindering the development of true data/assessment literacy.

2.4. Linkages to classroom instruction

Linking data results to instruction is critical to effective teaching and learning. Educators must do better than simply guess a student’s academic need. To understand their students, teachers must rely on data collected in order to utilize appropriate instructional strategies to support/enhance each child’s unique skill and knowledge levels (Tomlinson, 2007; Tuttle, 2009). For example, authentic performance assessments provide educators data which serve as (1) avenues by which to examine current skills and knowledge prior to instructional decision-making and (2) precise connections to authentic instruction.

The research in this article explored how pre-service educators determined what worked in a data literacy intervention and the potential impact this had on their instructional decision-making process. Implications for instructor professional development are offered for consideration.

3. Method

3.1. Purpose statement and research question

The purpose of this research was to explore a data literacy intervention embedded in a pre-service teacher education instruction and assessment course from the perspectives of the participants. The research questions were: How do participants view what works in a data literacy intervention and in what ways? What are the implications for our own work?

3.2. Design

This research was conducted using teacher-researcher methodology (Cochran-Smith & Lytle, 1993, 2009), specifically within practical action research design (Leitch & Day, 2000), in that the research will guide our future instruction, but we also focus upon the process of our reflective practice. We studied our own instructional intervention (Piro, Dunlap, & Shutt, 2014; Piro & Hutchinson, 2014) to better understand how the participants were experiencing data literacy instruction in a pre-service teacher education course and how their experiences could structure and inform future instructional choices. This pedagogical inquiry (Cochran-Smith & Lytle, 1993, 2007; Dewey, 1910/1933; Gore & Zeichner, 1991; Schön, 1983; Zeichner & Noffke, 2001) served as a reflective practice into curriculum development and reform at the program level in teacher education. IRB protocols for working with human subjects were followed. All participant names have been given a pseudonym.

3.3. Description of the participants and sampling procedures

Purposeful sampling (Patton, 2015) of students within a pre-service teacher candidate instruction and assessment course was used. Participants for the study were students in the course and were recruited through an online invitation to participate at a public university in the southwest of the USA. There were a total of 54 participants from two sections in two semesters of an academic year

of the hybrid-format class which contained primarily undergraduate seniors in the semester prior to student teaching. Each of the 54 participants completed the data collection. Thirty hours of classroom observation were required as part of the course containing content in instructional methods and assessment procedures. Participant certification areas included: Early Childhood-Grade 6, some with additional English with a Second Language (ESL) or Special Education (SPED) certification; Grades 4–8, some with content area specialization and/or ESL or SPED; Grades 8–12, with content area specialization and/or ESL or SPED; or other specialized content areas such as Dance, Art, Music, Health, Family Consumer Sciences, Deaf Education, and Theatre.

3.4. Instructional intervention

The instructional intervention utilized to increase students' abilities to translate data findings into more effective instruction for all students was entitled the Data Chat. This intervention grounded in the premise that learning is fundamentally a social phenomenon where individuals construct new knowledge is based on (1) prior experiences and (2) social interactions in authentic contexts (Vygotsky, 1978; Wenger, 1998), and (3) reflective practice (Buysse, Sparkman, & Wesley, 2003). Additionally, Data Chats incorporated adult learning theory, which purports adults are more apt to effect sustainable change if they garner the support of other adults, rather than trying to "go it alone" (Lomos, Hofman, & Bosker, 2011; McLaughlin & Talbert, 2001; Showers, 1996). Teacher candidates collaborated in content-specific groups as they worked to comprehend, desegregate, and interpret actual classroom sets of standardized test score data. The Data Chat intervention was informed by three primary principles from the *Understanding by Design* framework (Wiggins & McTighe, 2005): (1) use of accredited standards to establish educational focus, (2) determination of assessment to be used in the monitoring of student progress and goal/objective attainment, and (3) creation of instruction that addresses and enhances student needs.

3.4.1. Instruction

Initial instruction within the Data Chat intervention took place in one, three-hour session of an undergraduate-level instruction/assessment class. In this setting, students engaged in tasks focused on understanding the definitions of statistical terms and procedures needed for future numerical analysis and interpretation. In the second session of the intervention, the professor focused on the reading and comprehension of sample data-sets. Within this session of the intervention, groups were assigned based on similar content or grade levels and were provided with state-level standardized testing data reports. The third session of the intervention included self-directed inquiry learning that utilized group blogs, wikis, and discussion boards as they began inquiry into the type of data-set and initial analysis of the numbers, looking for strengths and weaknesses of the outcomes based on the numerical data. In the last session of the intervention, the groups of participants finalized their analyses and instructional interventions. Subsequently, each collaborative content-focused group presented the results, including graphical representations of their numerical analysis. It should be noted that since the data used were obtained with permission from a local school district (student names and all identifying information were removed from the data-sets prior to release by the district), participants created pseudo-names and ethnicities in their final reports to mirror the demographics reported in the classroom-level data.

3.4.2. Data Chat steps

The Data Chat instructional intervention comprised eight steps [The following steps were taken from Piro et al. (2014, pp. 5–6) and Piro and Hutchinson (2014)]:

- (1) *Enlist support from the local school districts.* Procure data-sets from local school districts. Ensure that copies of the state-standardized test classroom-level data have all been de-identified.
- (2) *Purposefully target statistical literacy and interpretation through explicit instruction.* Once basic statistical terminology has been introduced, provide multiple opportunities for students to practice reading sample data-sets.

- (3) *Create grade-level or content-oriented teams.* Teams of four–five teacher education candidates simulate grade- or content-level teams. In this configuration, students collaboratively analyze the data-set most closely aligned with their grade level/content area.
- (4) *Analyze data-set to discern both strengths and weaknesses.* Using numeric data (by percentage) to support their analyses, the participants analyze the data-sets for strengths and weaknesses. Specifically, participants analyze content-reported categorical information (RCAT). For each test given, specific skill groups are targeted by the state. For example, on the Mathematics Grades 3–8 standardized tests, RCATs include: Number Operation & Quantitative Reasoning, Patterns & Algebraic Reasoning, Geometry, Measurement, and Probability & Statistics (Texas Education Agency, 2012). Each of these large categories comprises a targeted skill subset that is dependent upon the academic level of the student being assessed. Students with a Level III (Advanced Academic Performance) have demonstrated the ability to think critically and transfer knowledge across a variety of contexts. Students receiving a score of Level II (Satisfactory Academic Performance) have a reasonable likelihood of success in the next course of grade, yet may need targeted academic intervention at some point(s) along the way (Young, 2012). Finally, students receiving a score of Level I (Unsatisfactory Academic Performance) are viewed as unlikely to be successful in the next course or grade without significant academic interventions (Young, 2012).
- (5) *Incorporate state standards and local curriculum guides.* Standards and content drive the selection of assessments and the development of instructional strategies following the previous two steps (Wiggins & McTighe, 2005). The participants in this study investigated the state standards and local curriculum guides that applied to their data-set generally and the sub-standards for weakness areas.
- (6) *Create both formative and summative assessments.* In this step of the Data Chat, participants consider the assessment procedures they would incorporate as interventions based on the strengths and weaknesses of the assessment data. After student weaknesses are identified in the class data-set, participants create assessments to address those areas where students were found to be struggling.
- (7) *Create specific instructional strategies as interventions to address weaknesses.* The participants decide how they would address weaknesses found within the classroom data through instructional interventions. The research supporting the instructional strategy choice was cited if used (Marzano, 2009), thus promoting the use of research-based instructional strategies. In addition, participants are required to detail differentiated instruction for each identified weakness. Instructional strategies are correlated to state standards.
- (8) *Write a final presentation.* The participants create a presentation of their data analyses and plan following the Data Chat intervention. The Data Chat intervention report for this research included: names of literacy group members; the type of data-set; the specific test; when the test was given; strengths and weaknesses of student performance; numeric, graphical, and narrative descriptions of the weakness areas; formative and summative assessments to be given prior to the next testing period; and instructional strategies for interventions. Final presentations are reflective of a format/language that could be utilized in a parent meeting, at a grade-level or faculty meeting, etc. to explain results in verbiage that could be easily understood by the targeted educational audience.

3.4.3. Assessments used in the intervention

Authentic State of Texas Assessment of Academic Readiness (STAAR)-standardized test data-sets at the classroom level were used for the participants to analyze in the Data Chat intervention. The data-sets included item analysis of specific content questions from a released version of grade-specific STAAR tests. Actual student names on the sample data-sets were erased prior to participant use in the Data Chat.

Table 1. Post-intervention survey question content

- (1) How will the use of data impact your instructional delivery?
- (2) What was your “take away” from the data chat?
- (3) What did you learn from the intervention that you did not know before?
- (4) Why is it important to use data appropriately? What types of situations might occur if a teacher is not using the data in a manner that enhances instruction?
- (5) In your opinion, when data “talks,” what is its most important message?

Participants analyzed these state-wide mandated achievement tests at the 3–8 grade levels and end of course assessments in grades 9–12 in varying contents given for accountability purposes. Data-sets were focused at the classroom level. At the 3–8th grade levels, content areas included Reading, Math, Science, and Social Studies. At the 9–12th grade levels, content areas included Algebra I and II, English I and II, Biology I, and US History. Data-sets in every teacher candidate content area were not available at the secondary level. When data in a content area were not available in a content area at the secondary level, participants chose a content group in which to work. Participants ended up working in a grade-level or content area team.

3.5. Instrumentation

The post-intervention survey consisted of open-ended responses to questions regarding data understanding, analysis, and use. Five questions comprised this survey and were collected through standardized, open-ended questions within Psych Data, an online, secure survey instrument platform, after the instructional intervention. Table 1 demonstrates the open-ended questions from the survey.

3.6. Data collection and analysis procedures

All data were collected through a survey following the intervention of a five-week Data Chat in a pre-service undergraduate assessment and instruction class. This survey was available electronically to participants in Psych Data. Coding was conducted by hand using an inductive content analysis method (Bogdan & Biklen, 2003; Gall, Gall, & Borg, 2007; Hsieh & Shannon, 2005; Patton, 2015) with an inductive analysis approach initially guided by the survey questions (Hatch, 2002). Initial themes and patterns (Gall et al., 2007) were developed as the data were reduced, leading to the final codes. There were no outlying data. A constant comparative method (Glaser & Strauss, 2009) was used throughout the analysis of the data. In order to retain verisimilitude, the students' own words were used (Tracy, 2010). Bracketed words were added sparingly to enhance comprehension. Inter-rater agreement between the two researchers added trustworthiness to the interpretation of the qualitative data (Creswell & Miller, 2000).

4. Findings

Findings of the post-intervention survey indicate several themes in participant responses. This section demonstrates the final themes: pre-intervention beliefs, understanding and analyzing data, classroom data and instructional practices, and contextual uses of data.

4.1. Pre-intervention beliefs

Participants unanimously stated their discomfort with understanding data prior to the Data Chat. For example, Karrie stated, “I knew nothing about data or what it was.” Shawna mirrored, “I didn't know what constituted data. I also didn't know you could read data.” Frank commented, “I had no ideas about what the numbers meant or really that I needed to be concerned [with the data].”

All participants reported they perceived they had limited ideas regarding data for instruction prior to the Data Chat intervention. For example, Ana stated, “I did not know that data could ‘predict’ things like students passing in later years.” Lynn stated, “I did not know that classroom data was given to the teacher. I didn't know they had to interpret scores for parents, sometimes.” Two participants understood that data were used at the school level, but not by classroom teachers. Gina said,

"I thought standardized tests were a tool the administrators used to get an overall perspective of the performance of the school. I didn't think the classroom used it." Sara stated, "I honestly had no idea that teachers looked at the data to plan instruction." Dan said, "I never would have guessed that one could look at the grades of a class, find the low questions, high questions and change instruction based on those."

4.2. Understanding and analyzing data

Participants' perceptions regarding understanding the data and analyzing them were evident after the intervention. General skills were noted. For example, Fiona stated, "Data may easily be skewed or read incorrectly; so I learned to be conscious of common mistakes in order to read data correctly and use it effectively." Specific skills were also gained through the Data Chat intervention. For example, Janice learned, "How to correctly read and interpret scale scores, RCATs and percentages." Marcia stated she learned that "Data exists on many levels: district, school, grade level and classroom." Jerry commented that he learned "how to read the results of standardized tests and make sense of them in the class." Jeff said he felt it was important to "have a wide range of assessments and use the data collectively to give a detailed picture of classroom potential." Judith commented, "My biggest take away was how to read the results of a standardized test and make sense of them and their impact on student instruction." Dan stated, "I learned you can disaggregate the data in many ways: SES, ethnicity, gender, etc." Sara concurred. "I never realized how much could be gathered from taking apart data." Kathleen reported, "I learned how to extract information and to use it." Michael said, "I need to be able to interpret or decode data to be able to use it to my advantage and to shape instruction."

Other participants mentioned that data were "a valuable resource;" were "used to remediate instruction;" that "data is intense;" that "data contains an incredible amount of information;" and that the general public "often misinterprets it."

4.3. Classroom data and instructional practices

Specific outcomes regarding instruction from data analysis were expressed by all participants. Specific skills gained by learning to analyze data for instruction were noted by some. Analysis of the data led Cathy to state that "the data help me to see the gaps that existed between instruction and assessment." John noticed that test item analysis was a useful way to understand next instructional practices by helping the teacher "identify areas of instruction the teacher needs to work on." Jolie stated that data analysis helped her "identify objectives [that] students master and those that are challenging to students."

Other participants recognized how data analysis would inform and adapt their future instruction. The importance of data in relation to adapting instruction for specific learners was noted. Jeff reflected that, "Showing the teachers what students do not understand, thereby giving the teacher the opportunity to differentiate lessons and facilitate cognitive development" was an outcome of analyzing the data. Shawna agreed. She stated that data analysis led her to "giv[e] the teacher information for reflection on effectiveness of her practice" and to "promote student and teacher self-monitoring." Frank also concurred. He stated, "Giving the teacher opportunities to reteach a concept from a different perspective through the identification of intervention strategies" was an outcome of the data analysis process. Gina stated that data analysis helped her "illuminate the need for accommodations and/or modifications in future lessons." Cathy said analyzing data, "Giv[es] the teacher information for reflection on effectiveness of her practice." Katie commented, "I will differentiate instruction and teach concepts using multiple mediums to help my students grasp the concepts." Judith agreed. "I will apply different strategies to my teaching to help equip my students with the learning they need to be successful." Tim stated, "Data analysis will help me find holes in my instructional practice as well as highlight those areas I am teaching well."

Several participants focused upon how their beliefs had changed regarding understanding the connection between instruction and assessment. The Data Chat intervention led Fiona to state:

"Working with data taught me the importance of assessment and the importance of analyzing data to improve instruction." Simi said, "[Data chatting] taught me how to find areas of weakness and strength and how content, assessments and teaching interventions are related and aligned." Laura provided an emotional response to using data for instruction when she stated she did not grasp the importance of understanding how data could inform her instruction prior to the Data Chat. "I think it would be horrible if a student got swept under the rug and the teacher moved on and left a gap in the student's learning".

4.4. Contextual uses of data

Several participants reflected upon the contextual uses of data, such as when certain data have more value, or when certain forms of assessments informed them for future instruction. For example, Jolie reflected upon how in-class student behaviors could be interpreted as data: "What I love is that any targeted behavior a student does can be used as data. Using data insures your teaching is authentic and student-centered." Hannah demonstrated her understanding that multiple forms of assessments should guide instructional decisions when she stated:

Standardized test scores is one thing ... but formative and summative assessments play a role as well. Using the appropriate intervention to address a skill that a student struggles with helps to make sure the objective of the lesson, the assessment, the teaching, and the strategies are all aligned and scaffolded.

Frank's final belief comments are worth quoting in whole and demonstrate an overall perception regarding the contextual uses of data.

In order for data to be especially useful, teachers must identify the student's problem, decide a data collection method, collect data to calculate the baseline, determine the timespan, set a goal, decide how the student's progress will be assessed and summarize the outcome. This is the way I would correlate and construct lesson plans based on empirical evidence.

Contextual uses of data indicate an advanced cognitive awareness of data literacy for teaching. It indicates that the uses of data depend upon the context and a cognizance of when certain data are more significant than others. Jolie's comment that other forms of data, such as classroom attendance data, have value; Hannah's belief that multiple forms of assessments can provide valuable information; and Frank's appraisal that empirical evidence are necessary to guide successful, uses of data demonstrate a form of conditional knowledge (Jacobs & Paris, 1987; Schraw & Moshman, 1995) that rises above declarative (the what of using data) or even procedural knowledge (applying data to instruction) to an awareness of when to apply data in specific instances.

5. Discussion of findings

The data suggested four themes: pre-intervention beliefs, understanding and analyzing data, classroom data and instructional practices, and contextual uses of data. Initial perceptions regarding using data for instruction suggested that many of the participants had limited knowledge regarding data use at the classroom level in schools. Further, they expressed a sense of discomfort with using data before the intervention. Previous research has found that a teacher's sense of confidence with data analysis and interpretation rested largely on their sense of self-efficacy with those skills and that teachers with higher confidence levels were more likely to use data for instructional interventions (Bettesworth, Alonzo, & Duesbery, 2008; Tschannen-Moran & Hoy, 2007; U.S. Department of Education, Office of Planning, Evaluation & Policy Development, 2008). In teacher education data literacy intervention research, Reeves and Honig (2015) found moderately higher self-efficacy results after an in-course data literacy intervention. The implications from these and previous research suggest that providing opportunities for pre-service teacher candidates to work with varying data literacy behaviors during their teacher preparation program may result in more self-efficacy with data use in teacher's professional contexts.

The results of an exploratory study that investigated teachers' thought processes as they worked through data scenarios found several common data literacy behaviors (Means et al., 2011) to the present study. Specifically, they found that teachers use data for data location, data comprehension, data interpretation, data for instructional decision-making, and data for posing questions about present and future inquiries. Similar to previous inquiries into the Data Chat (Piro & Hutchinson, 2014; Piro et al., 2014), the present study found that qualitative responses to post-intervention data literacy instruction demonstrated some comparable responses from the participants. Results from the current study suggest that the participants used a data literacy intervention to assist them comprehend and analyze data and use it for instructional purposes. Previously (Piro et al., 2014), we suggested that conditional uses of data—the when of using data in context—is an area of inquiry needed regarding data interventions in pre-service teacher education.

Beginning teachers have expressed that they feel unprepared as they initiate their teaching practice (Levine, 2006; National Council for the Accreditation of Teacher Education, 2010a,b). It may be inferred that as new teachers are expected to use data for instructional purposes in an environment that expects data-driven decision-making, a better sense of preparedness in using data in their first year of teaching would additionally be perceived. Training novice teachers to develop their ability to investigate inquiries into classroom data uses (Athanases, Bennett, & Wahleithner, 2013) is necessary so that new teachers may improve the effectiveness of their practice (Means et al., 2011). Consequently, teacher preparation programs have been charged to develop data literacy practices in their programs (Mandinach & Gummer, 2013), thus reducing the reality shock (Huberman, 1989) of beginning teachers as they encounter the complexities of using data for accountability and instructional purposes in their professional practice. Reeves and Honig (2015) found few pre-service teacher interventions for data literacy and suggested that this paucity of research suggests further research to identify effective interventions with this population. This current study adds to the scant literature on instructional interventions on data literacy in pre-service teacher education. More research is needed on instructional interventions in teacher education to best understand how pre-service teachers use data for later professional practice. For example, do content- or grade-level teams work for collaborative learning teams? For learning the ways to analyze data in teams, do common summative assessment data function best or does specific, contextual data from real students in clinical placements provide more situated learning (Reeves & Honig, 2015)? Does collaboration scaffold the learning process? Each question provides a focus for follow-up studies.

5.1. Implications for practice

Based upon our action research methodology, we reflect upon how the research will impact our instruction, conceptions, and future curricular choices. It is clear that connecting data to instruction is an important component of data literacy. Interventions in teacher education should connect data interpretation with instructional decisions. To this end, we provide several suggestions. First, it is important to teach statistical literacy prior to the Data Chat. Reviewing statistical terminology including test literacy, measurement terms, location of data, reporting categories, and demographic data will likely expedite the actual analysis, interpretation, and application of the data in the data teams. Second, the findings suggest that understanding how data, standards, assessment, and instruction all inter-relate was perceived as important to participants. Classroom data are important for instructional decisions. Students need to understand that data can have implication for instruction and not just accountability or just for whole school analysis. Using a backward mapping system or framework for teaching data literacy such as *Understanding by Design* (Wiggins & McTighe, 2005; Yelland, Cope, & Kalantzis, 2008) enhances the interrelated relationships of data, standards assessment, and instructional interventions for pre-service teachers. Additionally, self-efficacy in data usage is crucial for actually using data in future educational contexts. Continue providing opportunities for students to become familiar with the data literacy behaviors they will use as practicing teachers. Last, the contextual uses of data are capacities to develop with students. However, these advanced cognitive skills must occur after students learn the declarative and procedural uses of data.

6. Conclusion

Today's educational climate places immense pressure on teachers at all levels to collect and analyze student data. Most commonly, this burden takes the form of examining standardized test scores with an eye focused on skills, giving students the most difficulty. What is gleaned from such a practice only becomes meaningful if combined with purposeful actions that appropriately address targeted student learning outcomes (Means et al., 2011). To a novice educator, this process is often very intimidating.

To help alleviate such perceptions, this research explored a data literacy intervention called a Data Chat embedded in a pre-service teacher education instruction and assessment course from the perspectives of the participants. The findings suggested that pre-intervention beliefs, understanding and analyzing data, classroom data and instructional practices, and contextual uses of data were each significant outcomes for the participants after participating in the Data Chat. Beginning teachers have expressed that they felt unprepared to use data as they initiate their teaching practice. Therefore, explicitly teaching data literacy knowledge and skills to teacher candidates may sufficiently develop the data literacy self-efficacy and content to achieve the desired improvements in student learning and to be successful in their chosen profession.

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