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Comparison of Pedagogical Knowledge of Traditional and Alternate Routes to Teacher Certification

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How to cite this article:  

ABSTRACT  
The purpose of this study was to compare the pedagogical knowledge of teachers that were trained through traditional teacher preparation programs and those that were trained in alternate-route teacher preparation programs. Participants were selected via convenience sampling and included completers from both teacher certification pathways seeking middle level licensure (grades 5-8) from an institution of higher education in central Arkansas. The instrument used was the state licensure pedagogy exam and both the overall scaled scores and individual category scores from completers in both teacher certification groups were examined. An analysis of the results showed no significant difference in the overall scaled score and no significant difference in any of the five individual category scores that represent pedagogical knowledge. These results support the literature that there is no difference in quality of preparation between the two teacher preparation groups regarding pedagogical knowledge; however, further research is recommended.

INTRODUCTION  
Alternate routes for teacher preparation and initial teacher certification began in the 1980s to address teacher shortages both in hard-to-staff schools and in high-needs subject areas (Bireda & Chait, 2011; Buchanan, Lang, & Morin, 2013; Stoddart & Floden, 1995). Over the last seven years, the percentage of those initially certified as teachers through alternate routes has increased nationally, from 19.2% in the 2008-2009 academic year to 23% in the 2015-2016 academic year (United States Department of Education [USDOE], n.d.a). The largest segment of growth is in the non-university entities, such as Teach for America and state sponsored programs (USDOE, n.d.a). These alternate-route programs also provide a career change opportunity for those that hold a bachelor’s degree in a content area taught in K-12 schools (USDOE, n.d.b; Arkansas Department of Education, n.d.). Across the nation, there are various approaches to construction, content, and delivery of these alternate-route programs (Boser & Wiley, 1988). States vary widely on allowance of a provisional license for teacher candidates to be considered teachers of record in the classroom while completing the appropriate program of study required for standard teacher certification (USDOE, n.d.b; Arkansas Department of Education, n.d). In addition, alternate-route certification programs have implemented different strategies from traditional, university-based teacher preparation programs to recruit racially and ethnically diverse teachers of both sexes (Bireda & Chait, 2011) which better represents the composition of diverse learners in K-12 schools (Stoddart & Floden, 1995). With a lack of uniformity in program and delivery, there has...
been question of whether alternate-route certification produces
the same quality of teacher.

In addition, and regardless of the reason for the emergence
and various designs of these alternate-route teacher preparation
programs, all tend to require an abbreviated program of study
(Stephens, 2007) when compared to traditional certification
routes and focus primarily on pedagogical knowledge and
teaching practice (USDOE, n.d.b). There are both advocates
and critics of this shortened program of study for initial teacher
certification and there are mixed results from published studies
when it comes to determining teacher quality and effectiveness
in the classroom.

CONCERNS ABOUT QUALITY OF TEACHERS TRAINED IN
ALTERNATE CERTIFICATION PROGRAMS
Buchanan et al. (2013) assert that there should be a standard
required for these shortened alternate-route programs to
licensure. This could be difficult to achieve as there is no well-
defined process for how to best prepare teachers to be effective
in the classroom and to have an impact on student achievement
(Stoddart & Floden, 1995). Conflicting concepts that identify
the most critical skills teachers should have and demonstrate
before attaining a standard teaching license are found within the
literature. For instance, Stoddart and Floden (1995) state that
the most important areas for teachers are subject knowledge,
knowledge of students, the schools’ role in society, and
reflecting on teacher practice. In contrast, Buchanan et al.
(2013) state that pedagogical preparation should include
instructional strategies, lesson planning skills, professionalism,
and an understanding of school and student culture. These two
elements are representative of the multiple differing opinions
among various interest groups on what novice teachers should
pedagogically know and be able to do. Therefore, it is no
wonder that it is difficult to make definitive conclusions of what
is considered to constitute an effective certification program of
study regarding curriculum and field experiences.

Additional literature compares traditional and alternate
teacher preparation pathways to determine which is superior in
content and practice. Indeed, Boser and Wiley (1988) assert that
an additional reason for the emergence of the alternate path to
initial teacher licensure stemmed from criticisms of traditional,
university-based teacher preparation programs. Various studies
have reviewed perceptions of the two teacher preparation
pathways to certification, made direct observations of teacher
effectiveness in the classroom, compared impact of teachers on
student achievement data, and examined the ability of novice
teachers to pass state required licensure exams among
completers of the two preparation program options.

COMPARISONS IN PERCEPTIONS REGARDING QUALITY
OF TEACHER PREPARATION
In addition to concerns about the content in alternate-route
programs of study, there are also conflicting findings in the
perceptions of teachers that were trained through alternate-route
programs and their school administrators. Ring (2016) surveyed
administrators, and 48% stated that traditionally prepared
teachers were better prepared than alternate-route teachers due
to better classroom management skills developed during their
preparation program. These findings contradict Bowen (2013)
that noted no significant differences in principals’ perceptions
of teachers’ preparation, performance, pedagogical knowledge,
and professional development needs between completers of the
two preparation pathways. Boser and Wiley (1988) also
supported Bowen’s outcomes that administrators felt as though
alternate-route prepared teachers were as well prepared as
traditionally prepared teachers.

Roberts (2016) examined teacher self-efficacy between the
two groups of teachers and found that both felt they were
comfortable and confident. Traditionally trained teachers
highlighted teaching skills that were focused on curriculum and
classroom management strategies. Alternate-route trained
teachers were more focused on developing teacher-student
relationships, the students’ emotional well-being and stressors,
and exploring the underlying causes of student misbehavior in
the classroom (Roberts, 2016). This depth of inquiry about
identifying and addressing students’ needs for them to succeed
in learning is more favorable to working with diverse
populations and the urban classroom needs (Jenson, 2009;
Stoddart & Floden, 1995). This is important as alternate-route
certification programs are supplying more of the teachers in
these hard-to-staff schools (USDOE, n.d.b).

COMPARISONS OF TEACHER EFFECTIVENESS IN THE
CLASSROOM
Beyond teacher preparation and program curriculum, a key outcome for both traditionally trained or
alternately trained teachers is increased teacher effectiveness
to allow for improved student learning. However, teacher
effectiveness encompasses many practices within the classroom
environment. Bowen (2013) found that there was no significant
difference in the classroom management practice between the
two preparation pathways. Both groups of teachers had
concerns regarding student engagement, parental support, and
behavior management strategies (Roberts, 2016), but both
groups also felt that they had developed a functional and
comfortable protocol and process for their classrooms.
Interestingly, Bowen (2013) and Ring (2016) asserted that
additional professional development was needed for both
groups of teachers with Ring noting specifically that classroom
management training needed to include identifying issues and
applying appropriate and effective strategies.

Stoddart and Floden (1995) found conflicting results in
instructional strategies used in two common subject areas, math
and English, in a comparison between traditional and alternate
route trained teachers. Both groups of math teachers used
similar types of instructional practice, and both lacked the skill
to develop deeper student learning and understanding of
mathematical concepts. Additionally, Gimbert, Bol, and
Wallace (2007) noted that although there was little observed
difference between two groups of teachers in their use of
national math standards in the classroom curriculum, student
performance outcomes generated mixed results on the Virginia
schools’ Standards of Learning and quarterly district
assessments for Algebra I. In contrast, traditionally trained
English teachers had exposure to and learned various
approaches to improve student writing skills to support various
student learning styles, while alternate-route teachers relied on
personal and professional work experiences which limited the
foundation to teaching the subject matter (Stoddart & Floden, 1995).

There is much less research compiled to evaluate differences in certification programs on K-12 student achievement. Bowen (2013), Sass (2011) and Stephens (2007) found no statistical difference in student achievement between those taught by traditionally prepared teachers and students of their alternately prepared counterparts. Sass (2011) does note an anomaly of Florida teachers in which alternate-route completers trained specifically by the American Board for Certification of Teacher Excellence (ABCTE) programs show a significant difference in student Florida Comprehensive Assessment Test – Sunshine State Standards (FCAT-SSS) math scores compared to teachers prepared in other certification programs.

**COMPARISONS IN ABILITY TO PASS TEACHER LICENSURE PEDAGOGY EXAMS**

To apply for a standard teaching license, completers from both teacher certification pathways must pass required state licensure exams or other required measures. These test scores are collected annually and reported publicly by state on the Title II website (USDOE, n.d.c). Boser and Wiley (1988) found that alternate-route program completers scored significantly higher on the National Teacher Exam core battery tests than those traditionally prepared. These findings were also supported by Shuls and Trivitt (2015) who found that alternate-route program completers scored higher on licensure exams than those completing a traditional route. However, Shuls and Trivitt caution against using licensure exams to measure teacher quality as these should be viewed as a minimum threshold for eliminating poor test performers. Sawchuck (2014) supports that claim by stating that approximately 96% of completers of teacher preparation program pass their required state licensure exams.

As an alternative to traditional licensure tests, eighteen states have a policy in place that allows or requires the Teacher Performance Assessment (edTPA) as an assessment for initial teacher certification (American Association of Colleges of Teacher Education, n.d.). The edTPA is an authentic assessment, administered by Pearson Education, containing both video of observed practice and portfolio-based documentation and reflection that is externally scored by trained evaluators, and includes components of planning, instruction, and assessment (Stanford Center for Assessment, Learning and Equity, 2018). Realigning teacher preparation coursework for certification routes and determining appropriate cut scores for state licensure has been a challenge with the introduction of edTPA as noted by Thomson, Owens, Seed, and Key (2014) in Tennessee. Sawchuck (2014) cites the challenges that New York state has faced with early implementation which subsequently delayed use of edTPA as a consequential requirement for teacher licensure. In general, there have been mixed results on the success of the edTPA to predict the effectiveness of a teacher in the classroom (Goldhaber, Cowan, & Theobald, 2017); however, there is little information available to compare scoring between the two certification pathways using the edTPA assessment. This is most likely due to insufficient trend data since its inception and implementation.

Despite the intent for these alternate certification programs to increase the number of teachers, the teacher shortages have continued nationally. The number of initial teachers prepared reported to the US Department of Education dropped from 221,439 in the 2008-2009 academic year to 159,598 in the 2015-2016 academic year, a 28% decline (USDOE, n.d.a). However, alternate teacher certification programs have supplied more teachers nationally in high-needs subject areas (USDOE, n.d.b) which has fulfilled one of the initiatives in creating alternate teacher certification programs. There is continuing praise and criticism for these programs, and they vary widely in delivery and program content but remain generally focused on pedagogy and practice. Ring (2016) deduced that alternate-route certification teachers are not as well prepared as traditionally prepared teachers. Conversely, Stoddart and Floden (1995), Bowen (2013), and Stephens (2007) all conclude that completers from alternate-route programs for teacher licensure are at least as effective teaching in the classroom as traditionally trained teachers. However, both Stoddard and Floden (1995) and Ring (2016) agree that both routes to teacher certification still need to improve the preparation of teachers.

The purpose of this study is to determine if there is a difference in pedagogical knowledge as defined by knowledge of students as learners; instructional process; assessment; professional development, leadership, and community; and analysis of instructional scenarios between completers of traditional and alternate-route to initial teacher certification.

**HYPOTHESES**

H₁ - It is predicted the type of route to initial teacher licensure will have an effect on overall pedagogical knowledge of teachers.

H₂ - It is predicted the type of route to initial teacher licensure will have an effect on pedagogical knowledge of teachers understanding students as learners.

H₃ - It is predicted the type of route to initial teacher licensure will have an effect on pedagogical knowledge of teachers understanding the instructional process.

H₄ - It is predicted the type of route to initial teacher licensure will have an effect on pedagogical knowledge of teachers understanding assessment.

H₅ - It is predicted the type of route to initial teacher licensure will have an effect on pedagogical knowledge of teachers understanding professional

**METHOD**

**PARTICIPANTS**

The participants for this study were a convenience sample of 48 traditional-route and 50 alternate-route completers that were awarded degrees in middle-level initial teacher licensure programs in the academic years 2015-2016, 2016-2017, or 2017-2018 from a private institution of higher education in central Arkansas. Those seeking middle-level initial teacher licensure were selected to have a comparable sample size for
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Wright

each group for the three-year academic period. The demographic data describing completers of the program were taken through a query from the student information database used in the institution. Initially, there were 53 participants in the traditional-route completer sample group; however, 5 participants were removed from the sample as there were no test data associated with the participant at the time of the study. The demographic characteristics of the remaining sample participants are presented in Table 1.

Table 1: Demographic Characteristics of Participants

<table>
<thead>
<tr>
<th>Teacher Preparation Program Completer</th>
<th>Traditional ( (n = 48) )</th>
<th>Alternate ( (n = 50) )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>Female</td>
<td>41</td>
<td>38</td>
</tr>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>46</td>
<td>42</td>
</tr>
<tr>
<td>Black</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Asian</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Indian/Native American</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2 or More Races</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td><strong>Age Group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 26 years</td>
<td>27</td>
<td>8</td>
</tr>
<tr>
<td>26-35 years</td>
<td>14</td>
<td>20</td>
</tr>
<tr>
<td>36-45 years</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>Greater than 46 years</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

INSTRUMENTATION

The Praxis Series test, titled Principles of Teaching and Learning: Grades 5-9 (Educational Testing Service [ETS]), was used for this study as a measure of pedagogical knowledge. This is a two-hour exam with 70 selected-response questions and four constructed response questions required by the Arkansas Department of Education as partial evidence of sufficient pedagogical knowledge for teacher licensure along with the awarded degree from the institution. Information about the test and a study guide is provided online (Educational Testing Service, n.d.). Additionally, ETS does provide information regarding the validity and reliability of ETS-developed and administered tests in a quality assurance document (ETS, 2014). Test takers select institutions to which ETS sends score reports providing an overall scaled score for the test and the raw points earned in each of the five categories measured by the test. The categories include: students as learners; instructional process; assessment; professional development, leadership, and community; and analysis of instructional scenarios.

PROCEDURE

Once Institutional Review Board approval was received for this non-experimental study, data was gathered from the institution’s database identifying those awarded either an undergraduate traditional or graduate alternate-route degree that qualifies completers for an initial middle level teaching license for the last three consecutive academic years. Score report data from the Principles of Teaching and Learning: Grades 5-9 (#5623) pedagogy exam were then matched to each completer. It was found that there were five undergraduate completers that had not yet taken the test and these individuals were removed from the sample. Overall scaled scores of the two groups of completers were compared using an independent samples t-test. The hypothesis was examined using an alpha level of 0.05.

To compare the category scores of a test that utilizes multiple versions that each contain different raw points available for a category, the raw points earned were converted to a percentage of correct points possible. In examining the available data, there were two traditional and two alternate-route completers for which only an overall scaled score was available and no category information. These individuals were removed from the samples prior to comparing category performance. This reduced the number in the sample for category comparison to 46 traditional-route and 48 alternate-route completers. Comparisons were made between the two groups of completers for each of the five categories using an independent samples t-test. The hypotheses were examined at an alpha level of 0.05.

RESULTS

Several independent samples t-test were conducted to test the hypotheses for the five outcomes explored in this study. Table 2 provides a summary of these results. For instance, to compare the percentage mean overall scaled scores of traditional-route initial teacher preparation program completers with the percentage mean overall scaled scores of alternate-route initial teacher preparation program completers in overall pedagogical knowledge.

Table 2: Descriptive Statistics By Knowledge Categories

<table>
<thead>
<tr>
<th>Knowledge Category</th>
<th>Traditional ( \text{Mean} )</th>
<th>Alternate ( \text{Mean} )</th>
<th>( p )-value</th>
<th>( d )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1(^a)</td>
<td>174.35 (8.07)</td>
<td>176.76 (8.49)</td>
<td>&gt;.05</td>
<td>0.30</td>
</tr>
<tr>
<td>Category 2(^b)</td>
<td>0.77 (0.03)</td>
<td>0.76 (0.03)</td>
<td>&gt;.05</td>
<td>0.04</td>
</tr>
<tr>
<td>Category 3(^c)</td>
<td>0.07 (0.04)</td>
<td>0.79 (0.03)</td>
<td>&gt;.05</td>
<td>0.13</td>
</tr>
<tr>
<td>Category 4(^d)</td>
<td>0.74 (0.04)</td>
<td>0.78 (0.04)</td>
<td>&gt;.05</td>
<td>0.30</td>
</tr>
<tr>
<td>Category 5(^e)</td>
<td>0.76 (0.03)</td>
<td>0.08 (0.04)</td>
<td>&gt;.05</td>
<td>0.32</td>
</tr>
</tbody>
</table>

\(^a\)Overall pedagogical knowledge \(^b\)Understanding students as learners \(^c\)Understanding instructional process \(^d\)Understanding assessment \(^e\)Understanding professional development, leadership and community

No significant difference was found \( t (96) = 1.44, p > .05, d = 0.03 \), a small effect size (Cohen 1988). The mean overall scaled score of the traditional-route initial teacher preparation program completers \( \mu =174.35, sd = 8.07 \) was not statistically significant from the alternate-route initial teacher preparation
program completers ($m = 176.76, sd = 8.48$). Figure 1 presents a summary of these results.

![Figure 1. Comparison in overall mean scaled scores for the Principles of Learning and Teaching (PLT) pedagogy test for different program routes for teacher preparation.](image1)

Similarly, an independent samples t-test was calculated comparing the percent correct means in the Students as Learners category scores of traditional-route initial teacher preparation program completers with the percent correct means in the Students as Learners category scores of alternate-route initial teacher preparation program completers. No significant difference was found $t(92) = 0.19, p > .05, d = 0.04$, a small effect size. The mean Students as Learners category percent correct of the traditional-route initial teacher preparation program completers ($m = 76.54, sd = 11.24$) was not statistically significant from the alternate-route initial teacher preparation program completers ($m = 76.15, sd = 9.23$). Figure 2 presents a summary of these results.

![Figure 2. Comparison in mean percent correct for the Students as Learners subcategory on the Principles of Learning and Teaching (PLT) pedagogy test.](image2)

An independent samples t-test was calculated comparing the percent correct means in the Instructional Process category scores of traditional-route initial teacher preparation program completers with the percent correct means in the Instructional Process category scores of alternate-route initial teacher preparation program completers. No significant difference was found $t(92) = 0.66, p > .05, d = 0.13$, a small effect size. The mean Instructional Process category percent correct of the traditional-route initial teacher preparation program completers ($m = 77.02, sd = 12.26$) was not statistically significant from the alternate-route initial teacher preparation program completers ($m = 78.53, sd = 10.01$). See Figure 3.

![Figure 3. Comparison in mean percent correct for Instructional Process subcategory on the Principles of Learning and Teaching (PLT) pedagogy test.](image3)

To compare the percent correct means in the Assessment category scores of traditional-route initial teacher preparation program completers with the percent correct means on the Assessment category scores of alternate-route initial teacher preparation program completers, an independent samples t-test was calculated. No significant difference was found $t(92) = 1.23, p > .05, d = 0.30$, a small effect size. The mean Assessment category percent correct of the traditional-route initial teacher preparation program completers ($m = 74.27, sd = 13.46$) was not statistically significant from the alternate-route initial teacher preparation program completers ($m = 77.61, sd = 12.82$). These results are summarized in Figure 4.

![Figure 4. Comparison in mean percent correct for Assessment subcategory on the Principles of Learning and Teaching (PLT) pedagogy test.](image4)
percent correct means in the Professional Development, Leadership, and Community category of initial teacher preparation program completers. No significant difference was found $t(92) = 1.55, p > .05, d = 0.32$, a small effect size. The mean Professional Development, Leadership, and Community category percent correct of the traditional-route initial teacher preparation program completers ($m = 75.76, sd = 11.41$) was not statistically significant from the alternate-route initial teacher preparation program completers ($m = 79.62, sd = 12.65$). Figure 5 presents a summary of these results.

![Figure 5](image_url)

**Figure 5.** Comparison in mean percent correct for Analysis of Instructional Scenarios subcategory on the Principles of Learning and Teaching (PLT) pedagogy test.

**DISCUSSION**

**FINDINGS**

There was no significant difference between the traditional and alternate-route teacher preparation groups in overall test score averages on the Principles of Learning and Teaching (PLT) pedagogy test. In addition, there was no significant difference in the percentage of “points correct” averages in any of the five subcategories of the PLT test.

Although not significantly different, in all but the category Students as Learners, alternate-route initial teacher preparation program completers averaged slightly higher than traditional initial teacher preparation program completers. Both groups scored the lowest percent correct averages in the category of Analysis of Instructional Scenarios. The traditional route initial teacher preparation program completers scored the highest percent correct average in the category of Instructional Process. The alternate-route initial teacher preparation program completers scored the highest percent correct average in the category of Professional Development, Leadership, and Community.

**LIMITATIONS**

This study is limited by the convenience sample taken from a single institution and its specific programs of study for initial teacher licensure. Based on Boser and Wiley (1988), the sample does not represent the various approaches to construction, content, and delivery of the alternate-route teacher preparation programs that are represented across the nation. The study also did not account for the content and delivery variations among traditional route teacher preparation programs. Indeed, even within the single institution represented in the study, only middle level teacher licensure pedagogical test data was analyzed. This was intentional to provide enough of a sample size to provide some meaning; however, the validity and reliability of the results are not likely representative of the greater population of teachers in the state in which the institution resides or the nation.

**FUTURE RESEARCH**

As a result of the limitations of this study, additional studies at the state level may provide a better indication of the quality of teacher pedagogical knowledge between the two certification pathways. The limited state-level scope would keep constant the unique teacher preparation requirements within each state and allow for comparisons to focus on the quality of outcomes between the two types of teacher preparation programs. In addition, reviewing triangulated data of perceived quality of preparation, observed teaching ability using a specific instrument, and pedagogy of teaching exams may provide greater insight when comparing the pedagogical knowledge and skill of teaching in completers of the two pathways.
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