TRADITIONAL VERSUS INTEGRATED PRESERVICE TEACHER EDUCATION CURRICULUM

A CASE STUDY

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This empirical study is intended to assess whether a standards-based integrated teacher preparation curriculum is more beneficial in developing professional competencies than a traditional course-oriented curriculum at a college of education in a state university. Using multivariate analysis of variance, we found that students who went through the new integrated curriculum reported higher levels of professional preparation in all 13 standards and competency areas than those who went through the traditional course-oriented curriculum. This finding remained strong even when the teaching majors were included and controlled as another factor variable. Students in the integrated curriculum and those in the traditional curriculum had comparable characteristics, high school grade point averages (GPAs), and college GPAs. Additional related findings and suggestions for future studies also emerged.

Keywords: *standards-based integrated teacher preparation curriculum; preservice teacher education; developing professional competencies; multivariate analysis of variance*

Over the past two decades, attention has focused on the issues surrounding educational reform. A significant component of these discussions has centered on the issues of teacher quality and competency, with a continuing interest in teacher preparation (Cochran-Smith & Lytle, 1999; Goodlad, 1994; National Commission on Teaching and America's Future, 2003). In 1995, a college of education in a Midwestern state university with a long tradition in teacher education at the undergraduate level concluded that it needed to examine its practices in teacher education. Over the next few years, in collaboration with its partners in arts and sciences and the public schools, the college redesigned its teacher education program to better prepare the next generation of educators.

The college faculty and administration, drawing on the latest research in the field of education (e.g., Anderson & Armbruster, 1990; Berliner, 1986; Beyer, 1988; Harris, 1993; Jennings & Kennedy, 1996; Kagan, 1992; Schön, 1987), developed three design principles for all programs within the college: (a) Programs at every level need to be organized around the problems of practice (e.g., instruction about pedagogical knowledge and practices in contextual specific fashion), (b) programs should

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provide opportunities for reflection-in-action and reflection-about-action by novices and experts, and (c) candidate evaluations should include assessment of performance in complex situations of practice appropriate to the practitioner's level of training. Moreover, in redesigning the teacher education program, the administrators and faculty members at this college determined that the key goal was to create a standards-based integrated curriculum to enhance students' professional competencies and promote their ability to perform effectively as teachers immediately after graduation.

The college task force took the 10 standards from the Interstate New Teacher Assessment and Support Consortium (INTASC) as a starting point for professional competencies. INTASC was established in 1987 within the Council of Chief State School Officers (CCSSO) and operates within the framework of reform in education, specifically as related to effective teaching. While the National Council for Accreditation of Teacher Education (NCATE) has played a critical role in the making of a profession and in leading the reform movement, INTASC has developed influential performance-based standards for licensing new teachers (Darling-Hammond, 2001; Roth, 1996). In 1992, the 10 standards, or a designated core of competencies, were developed through the joint efforts of personnel from 17 state education agencies and representatives of the teaching profession.

The 10 initial teacher preparation competencies, developed by INSTASC, included the following:

1. content knowledge and pedagogy,
2. student learning and development,
3. diverse learners and the ability to adapt to diverse learners,
4. instructional strategies,
5. classroom management and motivation,
6. communication techniques,
7. curriculum and planning,
8. assessment,
9. reflective practice, and
10. professional relationships internal and external to the school.

These 10 initial standards were modified and extended to 13 principles and practices to guide the teacher preparation program curriculum. Diversity, inquiry, and technology were added because the administrators and faculty members of the teacher education program agreed that effective educators should be inquiring professionals who value diverse aspects of the pluralistic world and are familiar with the use of new technology for enhancing P-12 student learning. (For the list of 13 competencies, see the Variables section.) A majority of states have adopted the INTASC standards as the foundation for standards utilized for the approval of teacher education institutions and programs (Roth, 1996). However, adoption of the 13 principles and practices for the newly revised program preceded the adoption of the INTASC standards by the case-study institution's state department of education.

Our study was an attempt to examine the differences between the traditional teacher education program, defined as a discrete set of courses, and the new standards-based integrated program offered in subsequent years at the college of education. Before we discuss our research findings, we will examine the related literature on standards-based programs and integrated curriculum and further discuss both the traditional and the new revised curricula of the case-study college in relation to that literature.

STANDARDS-BASED PROGRAMS

Standards-based teacher education has the potential to change teacher preparation programs and has therefore generated growing interest (Kaplan & Edelfelt, 1996; Otis-Wilborn & Winn, 2000; Wigle & White, 1998). The recent movement toward standards-based teacher education has generated numerous articles, chapters, and commentaries addressing the trends, necessity, and potential effect of standards-based teacher education programs or curriculum (Darling-Hammond, 2001; Dodd, 1996; Goodlad, 2002; Otis-Wilborn & Winn, 2000; Roth, 1996; Wigle & White, 1998). However, data-driven empirical studies on standards-based or competency-based teacher education programs are few in number (Otis-Wilborn & Winn, 2000; Wigle & White, 1998).

Wigle and White (1998) noted that a conceptual framework should be the foundation for teacher education, providing guidelines that direct all programmatic efforts. They also noted that the standards produced by the accrediting agencies and scholarly organizations reflect the knowledge and skills essential for competent teacher performance. They presented study findings to explain how a conceptual framework, portfolio assessment, and faculty mentoring can be used to transition from a traditional teacher education program to one that is standards based. Dodd (1996) described a teacher education program that moved toward the professional development school model. Her study discussed the value of using criteria to determine teacher competency (e.g., knowledge of subject matter, curriculum, instruction, classroom management, diversity, reflection, and technology).

Otis-Wilborn and Winn (2000) reviewed the process and the effect of a standards-based, postbaccalaureate-level teacher education program, especially efforts in a special education certificate program. The core values and expectations to drive the reform of the special education program were drawn from INTASC standards. Otis-Wilborn and Winn discussed the necessity of extended application of standards-based teacher education and the importance of collaboration among all faculty members in the teacher education program. Roth (1996) and Darling-Hammond (2001) also noted that new standards for teacher education accreditation could transform the current system of teacher preparation and the nature of knowledge acquisition. Almost all the related articles suggested the necessity or importance of creating the standards-based teacher education program. Several recent reports indicated the value of using professional standards or competencies suggested by related scholarly organizations or accrediting agencies.

INTEGRATED CURRICULUM

The benefits of an integrated curriculum have been noted by many educational philosophers and curriculum theorists (Bruner, 1977; Dewey, 1924, 1933; Howey, 1996). The integrated curriculum recognizes that the subjects within the curriculum are connected. The curriculum can be integrated from general standards and principles to specific practices and contents, from basic levels to complex advanced levels, and from one prerequisite course to another related course (Bruner, 1977). According to Howey (1996), the more coherent a teacher education program is, the more effective it is. Wortham (1996) stated, "An integrated curriculum crosses subject areas, but there are several combinations that can be achieved. In all examples, the intent is to construct meaningful bridges to show connections in development and learning" (p. 330). According to Wortham, curriculum integration is often achieved through the design of integrated thematic units, through study of a topic, or by developmental and subject areas.

Carter and Mason (1997) reviewed the empirical research on an integrated curriculum between 1986 and 1996, especially the effects of an integrated curriculum on the cognitive domains. Carter and Mason's study provides important insights, especially their discovery of four types of integration in the literature: intradisciplinary, interdisciplinary, infused, and correlated. An intradisciplinary approach combines different strands of one subject or discipline into the same lesson; an interdisciplinary approach combines different subjects or disciplines into a single course or unit; an infused curriculum has specific technologies or teaching strategies (e.g., study skills, computer applications) added to course content; and a correlated curriculum refers to the linkage of concepts (i.e., a related concept in different subjects) from separate subjects or courses (see Carter and Mason, 1997, for more detailed explanations and examples). Carter and Mason concluded that recent research comparing integrated and traditional curriculum shows no difference in preservice teachers' learning, although some researchers assert that an integrated curriculum provides positive effects in teacher preparation. Carter and Mason also discuss the methodological limitations of the 13 reviewed studies, pointing out data limitations,

poor research designs, and lack of comparative references.

Although there has been extensive research on teacher education, not many studies discuss an alternative integrated curriculum for teacher education (e.g., Carter & Mason, 1997; Dodd, 1996; Drake, 1993; Kain, 1999; Wigle & White, 1998; Wortham, 1996), and only a small portion of the research actually examined which programs or strategies prepare teachers well (Dodd, 1996; Wigle & White, 1998). Even among these limited studies, an empirical comparative study is rare in teacher education programs.

TRADITIONAL CURRICULUM VERSUS INTEGRATED CURRICULUM IN THE CASE-STUDY COLLEGE

In the traditional program at the case-study college, individual students encountered faculty in independent courses selected from a required course list, with each course having a different topic and emphasis. Students were then randomly assigned to individual field placements that were not connected to any individual courses. Students advanced through the program on the basis of grades attained in the individual courses. This traditional program consisted of a set of freestanding courses, each designed to achieve a discrete set of objectives. Students had considerable latitude in selecting the sequence in which they took courses, including field experiences. Successful completion of courses presumably produced a preservice candidate with a high level of readiness to teach. This course-driven curriculum had little or no sequencing of courses.

The integrated curriculum was designed around a set of professional competencies (e.g., learning, assessment, and instructional strategies) and performance standards; values, knowledge, and action were viewed as developmental and integrated throughout the teacher education program. The case-study college's new curriculum was integrated cooperatively among the disciplinary areas and subjects. It took mainly a combined form of correlated and interdisciplinary approaches as categorized by Carter and Mason (1997). The curriculum was interdisciplinary because different subjects and courses were combined into a single course or a series of connected courses (incorporating both theory and application), and it was a correlated curriculum because the concepts in separate courses and subjects were linked (creating connections among different subjects) to achieve professional competency standards.

The redesigned curriculum was implemented within and across a three-phase structure. As an example of the interdisciplinary approach to integrated curriculum, Phase 1 of the program integrated subject matter from the disciplines of educational psychology, special education, and curriculum and instruction to create a two-semester sequence of courses. This phase was designed to provide a general foundation for all program majors. Candidates then applied to Phase 2, which integrated, in sequential order, a series of two- or three-semester blocks of courses specific to the major or content area (e.g., math, art, elementary education), with an emphasis on inquiry into curriculum and pedagogy. Phase 2 also emphasized inquiry into the relationship of school, community, and society for all program majors. Phase 3, the final phase prior to graduation, provided a culminating semester-long internship for all candidates. In addition to this extended teaching experience, candidates also prepared a comprehensive portfolio (developed throughout Phase 1 and Phase 2 and reviewed at the end of Phase 3) summarizing the knowledge, skills, and dispositions required by the designated competencies. The portfolio component of the program provides an example of a correlated and interdisciplinary curriculum in that the concepts related to the specified competencies are linked across the phases, disciplines, and the candidate's coursework.

RESEARCH QUESTIONS

To add some insights to this much needed area of research on teacher education programs and to fill the gap in existing studies, this study investigated the following research questions.

Research Question 1: Is there any difference in self-reported preparation level relating to the 13 profes-

sional competency areas between students who went through the traditional versus the new curriculum, independent of teaching major?

Research Question 2: Is there any difference in self-reported preparation level between students who major in early childhood or elementary teaching versus secondary teaching, independent of curriculum type?

Research Question 3: Are students' differential background characteristics—that is, gender, race, high school core course grade point average (GPA), and college GPA—related to their self-assessment of their preparation level in the 13 professional competency areas?

Research Question 4: Do students' academic indicators (e.g., GPA), actual teaching experiences, and experience as a substitute teacher differ significantly between the two types of curriculum?

(Research questions 3 and 4 were included to identify potential confounding variables in examining research questions 1 and 2.)

METHOD

Data, Subjects, and Variables

Data and subjects. The data we used for this study were collected from 334 students who completed a major-required exit course—just before taking a student-teaching internship course—in 1998 and 1999. We believe this is the best time for such an assessment because virtually all the curriculum modifications occurred before student internship, and student internship experiences in various school settings are highly individualized and very diverse.

Virtually all students responded to the questionnaires; some cases with missing information were removed. Of the total 375 students (251 from 1998, 124 from 1999), 334 had comprehensive data throughout the variables. The cohort of 1998 is the last group that completed major courses under the traditional course-driven program, and the cohort of 1999 is the first group that finished major-required courses under the new integrated program. (So there was no self-selection; in 1999, all students shifted to the integrated curriculum.) The traditional-curriculum group consisted of 213 students and the integrated-curriculum group consisted of 121 students. About 50% (n = 107) of the traditional group and 57% (n = 69) of the integrated group were early childhood and elementary teaching majors. Student enrollment dropped in the 1999 group. There were only 9 non-White students in the traditional group (1998) and only 1 non-White student in the integrated group (1999). Because the institution is predominantly White, it is not surprising that fewer than 5%—sometimes even fewer than 1%—of students were non-White. In the traditional-curriculum group, 14.6% (n = 31) of the students were male, and in the integrated-curriculum group, 22.3% (n = 27) were male.

Because of similarities in course requirements, we combined the early childhood and elementary school majors into a single category. We also combined middle school and secondary school majors because those programs focused on individual subjects rather than on multiple-subject integration.

Variables. Table 1 presents all the variables used, the coding scheme, and the internal reliability (Cronbach's alpha) of the 13 composite outcome variables. Students responded to the 13 professional competency areas on a 5-point Likert-type scale (from 1 = *not at all* to 5 = *very well*). The survey instruction reads as follows:

> Please read each of the 13 principles in the boxes, then reflect on each of the practices outlined below the box and rate how well you believe you have been prepared to perform the practice. For example, if you consider you have been very well prepared, circle the 5; if you consider you have been very poorly prepared, circle the 1.

The 13 competencies (or principles) had a range of three to nine items. We combined the subitems to create a composite variable in each competency area. We checked Cronbach's alpha for each area to determine the internal consistency of the composite items. The item alphas are equal to or greater than .80, which indicates high reliability (interconnectedness) among the measures even though all measures are assessed on a 5-point scale (see Table 1.)

The 13 competencies in the survey were described as follows:

1. *Learner:* Effective teachers understand and value similarities and differences among individual

TABLE 1 Variable List

Variable	*Coding Scheme*	*Reliability (α)*
Independent variables		
Race	Students' race: 1 = Caucasian, 2 = African American, 3 = Asian American, 4 = Native American, 5 = Hispanic	
Female	Students' gender: 1 = male, 2 = female	
High school grade point average (GPA)	High school core course GPA	
College GPA	College GPA	
Teaching major	Teaching majors: 1 = early childhood and elementary teaching major, 2 = secondary teaching major	
Substitute teacher	Number of days worked as a substitute teacher: 1 = 0, 2 = 1-5, 3 = 6-10, 4 = 11-15, 5 = 16-20, 6 = 21+	
Actual lessons	Actual lessons taught in school through methods classes: 1 = 0, 2 = 1-5, 3 = 6-10, 4 = 11-15, 5 = 16-20, 6 = 21+	
Curriculum type	Types of curriculum: 1 = traditional curriculum, 2 = integrated curriculum	
Dependent variables		
Learner	5-point scale, composite variable of 5 items	.82
Learning	5-point scale, composite variable of 5 items	.81
Content	5-point scale, composite variable of 6 items	.84
Curriculum	5-point scale, composite variable of 9 items	.88
Instruction	5-point scale, composite variable of 6 items	.82
Assessment	5-point scale, composite variable of 6 items	.82
Management	5-point scale, composite variable of 5 items	.81
Diversity	5-point scale, composite variable of 5 items	.89
Professionalism	5-point scale, composite variable of 6 items	.89
Reflection	5-point scale, composite variable of 7 items	.93
Inquiry	5-point scale, composite variable of 5 items	.87
Communication	5-point scale, composite variable of 3 items	.80
Technology	5-point scale, composite variable of 7 items	.89

learners to develop each learner's potential. (Diverse learners may include gifted students, students with learning disabilities, and students with ethnic cultural backgrounds.)

2. *Learning:* Effective teachers understand and apply the theoretical foundations of learning and human development.
3. *Content:* Effective teachers understand and apply disciplinary structures, concepts, and tools of inquiry to create learning experiences within and across disciplines.
4. *Curriculum:* Effective teachers create, with their students, experiences that support their intellectual, social, and personal development.
5. *Instruction:* Effective teachers create a safe learning environment that encourages self-motivation, active inquiry, and positive social interaction.
6. *Assessment:* Effective teachers use a variety of strategies to monitor student progress and facilitate the learner's continuous development.
7. *Management:* Effective teachers use a variety of strategies to manage their classrooms within the school and community context.
8. *Diversity:* Effective teachers encourage students to value the commonalities and differences of our pluralistic world.
9. *Professionalism:* Effective teachers engage in professional, ethical practices.
10. *Reflection:* Effective teachers reflect upon all dimensions of their work.
11. *Inquiry:* Effective teachers focus their efforts as teachers and their students' efforts as learners on inquiry.
12. *Communication:* Effective teachers communicate clearly with students, families, colleagues, and the community.
13. *Technology:* Effective teachers understand the role and influence of technology on learners, learning, and society.

We obtained demographic characteristics of student race, gender, and high school core course GPA directly from the university's office of the registrar. Parental socioeconomic indicator variables were unavailable. However, signif-

icant differences in parental socioeconomic backgrounds between the two groups of students (1998 vs. 1999) are unlikely because most students in the teacher education program are historically in-state residents. College GPA was considered an indicator of college academic success. Also obtained, from the students, were potentially influential factors on the outcomes (i.e., number of days as a substitute teacher, number of actual lessons taught in schools as part of methods classes). Students' extracurricula-based substitute teacher experiences might influence their teaching skills (Craig, 1998; Warren, 1988; Weems, 2003) and professional competency levels. Students were required to teach actual lessons through regular methods courses, but substitute teacher experience was not required. It was part of the extracurricular activities and one of the extra-income sources for college students. Substitute teachers are not supervised by university faculty members.

Analysis Procedures

We conducted several statistical analyses for this study. We started with basic descriptive statistics, such as univariate (e.g., mean, standard deviation, frequency, range) and bivariate (e.g., cross-tabulation, correlation, *t*-test) analyses, to understand the patterns and characteristics of each variable as well as the relationship between two or three variables. Then, we conducted a principal components analysis, analysis of variance, and hierarchical multiple regressions for exploratory purposes. Principal components analysis can be used "to assess the actual dimensionality of the data" (Johnson, 1998, p. 96).

On the basis of examining various statistical analyses, as well as considering the nature of the comparative study, we decided to use a two-way multivariate analysis of variance (MANOVA) to achieve our major research goal—namely, to examine the effect of an individual course-driven traditional curriculum versus a standards-centered (or competencies-centered) integrated curriculum. When we have multiple, correlated, and characteristically similar response variables and when multiple treatments are compared, MANOVA is the appropriate choice. We chose a two-way MANOVA analysis instead of a one-way MANOVA because major has a potential to be confounded with curriculum and is an influential factor for the outcome. By including major as a second factor, we are adjusting for the difference in majors; and using the same model, we can examine the statistical significance of the mean differences of the two majors. We set the cutoff point for statistical significance tests at .05.

RESULTS AND INTERPRETATIONS

Correlation and Preliminary Analysis

Table 2 presents the bivariate correlation coefficients. The correlation among the 13 outcomes was in the range of moderate (r = .34) to strong (r = .77). Correlations were very strong between content and curriculum (r = .76), between content and instruction (r = .71), and between curriculum and instruction (r = .77). Assessment was also strongly correlated with curriculum (r = .69) and instruction (r = .69). This is not surprising given the closely related nature of these areas. On the other hand, the correlation between technology and each of the other outcomes was relatively moderate, ranging from .34 (with learner) to .53 (with curriculum). In short, all 13 outcomes are positively correlated with each other from a moderate to a strong degree.

The association between being female and teaching major was moderate and statistically significant (phi coefficient = –.294, $p < .0005$); the phi coefficient is very close to the zero correlation coefficient presented in Table 2 (r = –.282). We report the phi coefficient because both variables are nominal scales. The early childhood and elementary school major included a much higher proportion of females. This reflects the reality that there is a much higher proportion of females among teachers in the early childhood and elementary school programs than in the secondary school programs. Also, we found that female students tend to have higher high

TABLE 2 Zero-Order Correlation ($N = 334$)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Female (1)																			
High school grade point average (GPA) [a] (2)	.16**																		
College GPA (3)	.20**	.54**																	
Teaching major (4)	−.29**	.11	−.07																
Substitute teacher (5)	−.00	.13*	.14*	−.08															
Actual lessons (6)	.22**	−.15*	−.05	−.69**	.00														
Curriculum type (7)	−.10	.05	.10	−.07	.23**	−.07													
Learner (8)	.02	−.07	−.01	−.14*	.01	.09	.18**												
Learning (9)	.07	−.12*	−.03	−.08	.05	.12*	.18**	.59**											
Content (10)	.07	−.05	−.01	−.18**	.05	.11	.20**	.57**	.63**										
Curriculum (11)	.03	−.07	−.02	−.19**	.09	.12*	.24**	.59**	.59**	.76**									
Instruction (12)	.08	−.07	−.06	−.24**	.05	.16**	.17**	.56**	.57**	.71**	.77**								
Assessment (13)	.02	−.09	−.05	−.07	.00	.05	.14*	.56**	.53**	.59**	.69**	.69**							
Management (14)	.00	−.07	−.09	−.16**	.02	.16**	.19**	.48**	.45**	.52**	.57**	.58**	.57**						
Diversity (15)	.06	−.08	.00	−.15**	.08	.12*	.20**	.52**	.51**	.55**	.60**	.59**	.64**	.56**					
Professionalism (16)	.07	−.00	−.06	−.17**	.03	.11*	.16**	.47**	.40**	.49**	.62**	.59**	.55**	.61**	.64**				
Reflection (17)	.10	−.05	−.00	−.20**	.08	.19**	.25**	.52**	.54**	.53**	.61**	.59**	.54**	.52**	.60**	.65**			
Inquiry (18)	.01	−.07	−.05	−.06	.05	.07	.28**	.45**	.46**	.58**	.63**	.62**	.57**	.56**	.55**	.56**	.61**		
Communication (19)	.07	−.05	−.08	−.21**	.12*	.17**	.23**	.52**	.47**	.58**	.64**	.62**	.55**	.52**	.65**	.65**	.60**	.57**	
Technology (20)	−.00	−.07	−.11*	−.08	.07	.01	.13*	.37**	.34**	.41**	.53**	.49**	.48**	.43**	.44**	.48**	.42**	.45**	.52**

a. The correlation coefficient of high school GPA was based on 266 cases.
*$p \leq .05$. **$p \leq .01$.

school GPAs (mean for male: 2.06; mean for female: 2.92, $t = 3.73$, $p < .005$) and college GPAs (mean for male: 3.29; mean for female: 3.45, $t = 3.73$, $p < .005$).

The two curriculum groups differ in their experience as substitute teachers prior to the survey, but there is no significant difference in the actual number of lessons taught (Table 2). The integrated-curriculum group had more experience as substitute teachers, but this difference matters little because substitute teacher experience is not significantly correlated with students' perceived preparation in the competency areas, except for communication skills. Substitute teacher experience had a weak positive association with communication skills ($r = .12$, $p < .05$).

High school core course GPA was strongly and positively associated with college GPA ($r = .54$). Interestingly, these GPAs are not strongly correlated with outcome variables (except for a slight negative correlation between high school GPA and learning ($r = –.12$, $p < .05$).

Teaching major had a strong negative correlation with actual lessons taught ($r = –.69$, $p < .01$). This is related to the fact that early childhood and elementary school teaching majors have much more exposure to teaching in classroom settings. It also reflects the reality that this group must take more method courses, whereas the secondary teaching major group has to take more content courses. Both teaching major and actual lessons were moderately correlated with several outcomes.

t-*Test Analysis*

Table 3 shows the results of the *t*-test analysis comparing traditional- and integrated-curriculum students. Students in the integrated curriculum self-reported a higher level of professional preparation than did those taking the traditional curriculum. In all 13 areas, the means of the integrated-curriculum group were higher than those of the traditional-curriculum group, and all of the differences were statistically significant at the .05 alpha level. Consistent with the results of correlation analysis, the *t*-test analysis shows that the integrated-curriculum group had more experience as substitute teachers ($p < .001$), but students of the two programs did not differ in the number of actual lessons taught through their method courses. However, the means of high school and college GPAs between traditional- and integrated-curriculum groups were similar. This reflects the reality that no admission standard was changed between the traditional program and the integrated program.

Table 4 shows the results of the *t*-test analysis comparing early childhood and elementary majors with secondary school majors. Early and elementary school majors reported higher preparation in 9 of the 13 areas. The four areas of preparation similarity are learning, assessment, inquiry, and technology. The two teaching majors were not very different in high school GPA and college GPA.

MANOVA Analysis

On the basis of the above *t*-test and correlation results, we confirmed the necessity of including teaching major (as a control factor) to accurately measure the curriculum effect. At the initial stage, we also ran a principal components analysis to examine how the latent characteristics of the 13 competencies (outcomes) are related or categorized. We found that the 13 competency areas represented one underlying component or dimension, which could be named "professional teacher competency."

Through our two-way MANOVA model, we tried to answer the following question: Independent of teaching major, does curriculum treatment affect the composite score created from the 13 areas of professional competency? The primary null hypothesis that we intended to test in this study is that there is no curriculum effect on professional teacher competency (or a set of 13 competency areas).

Table 5 summarizes the MANOVA analysis. Our dependent variable was perceived professional teacher competency. Our independent factor variables were curriculum (traditional vs. integrated curriculum) and teaching majors (early childhood and elementary major vs. secondary school major). We found a strong indica-

TABLE 3 ***t*-Test Analysis Comparing Traditional and Integrated Curriculum (*n* for Traditional = 213, *n* for Integrated = 121)**

	M	SD	t *Ratio*
High school grade point average (GPA)[a]			
Traditional curriculum	3.47	0.41	–0.076
Integrated curriculum	3.51	0.40	
College GPA			
Traditional curriculum	3.40	0.32	–1.88
Integrated curriculum	3.46	0.29	
Substitute teacher			
Traditional curriculum	1.85	1.40	–3.94***
Integrated curriculum	2.61	1.82	
Actual lessons			
Traditional curriculum	3.11	1.70	1.23
Integrated curriculum	2.89	1.50	
Learner			
Traditional curriculum	3.91	0.67	–3.36***
Integrated curriculum	4.17	0.65	
Learning			
Traditional curriculum	3.92	0.65	–3.31***
Integrated curriculum	4.16	0.62	
Content			
Traditional curriculum	4.14	0.62	–3.78***
Integrated curriculum	4.40	0.57	
Curriculum			
Traditional curriculum	4.09	0.60	–4.50***
Integrated curriculum	4.39	0.54	
Instruction			
Traditional curriculum	4.04	0.61	–3.07**
Integrated curriculum	4.24	0.57	
Assessment			
Traditional curriculum	3.77	0.66	–2.56*
Integrated curriculum	3.96	0.68	
Management			
Traditional curriculum	3.77	0.78	–3.58***
Integrated curriculum	4.08	0.72	
Diversity			
Traditional curriculum	3.88	0.87	–3.87***
Integrated curriculum	4.22	0.72	
Professionalism			
Traditional curriculum	4.23	0.71	–3.03**
Integrated curriculum	4.45	0.58	
Reflection			
Traditional curriculum	4.06	0.76	–4.63***
Integrated curriculum	4.43	0.62	
Inquiry			
Traditional curriculum	3.91	0.72	–5.48***
Integrated curriculum	4.31	0.60	
Communication			
Traditional curriculum	4.12	0.77	–4.60***
Integrated curriculum	4.48	0.63	
Technology			
Traditional curriculum	3.94	0.74	–2.37*
Integrated curriculum	4.14	0.77	

a. The *t* test for high school GPA was based on 266 cases (173 for traditional curriculum, 93 for integrated curriculum).
*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

TABLE 4 ***t*-Test Analysis by Teaching Major (*n* for Early Childhood and Elementary = 176, *n* for Secondary = 158)**

	M	SD	t *Ratio*
High school grade point average (GPA)[a]			
Early childhood and elementary	3.44	0.41	–1.77
Secondary	3.53	0.40	
College GPA			
Early childhood and elementary	3.44	0.27	1.28
Secondary	3.40	0.35	
Substitute teacher			
Early childhood and elementary	2.25	1.71	1.52
Secondary	1.99	1.48	
Actual lessons			
Early childhood and elementary	4.09	1.46	17.66***
Secondary	1.85	0.80	
Learner			
Early childhood and elementary	4.09	0.62	2.53*
Secondary	3.91	0.71	
Learning			
Early childhood and elementary	4.06	0.61	1.46
Secondary	3.95	0.69	
Content			
Early childhood and elementary	4.33	0.53	3.20***
Secondary	4.12	0.68	
Curriculum			
Early childhood and elementary	4.30	0.57	3.45***
Secondary	4.08	0.61	
Instruction			
Early childhood and elementary	4.25	0.57	4.48***
Secondary	3.96	0.61	
Assessment			
Early childhood and elementary	3.88	0.66	1.23
Secondary	3.79	0.68	
Management			
Early childhood and elementary	4.00	0.72	2.95**
Secondary	3.75	0.81	
Diversity			
Early childhood and elementary	4.12	0.78	2.80**
Secondary	3.87	0.88	
Professionalism			
Early childhood and elementary	4.42	0.63	3.13**
Secondary	4.19	0.70	
Reflection			
Early childhood and elementary	4.34	0.65	3.72***
Secondary	4.04	0.79	
Inquiry			
Early childhood and elementary	4.09	0.69	1.09
Secondary	4.01	0.73	
Communication			
Early childhood and elementary	4.40	0.64	3.86***
Secondary	4.08	0.81	
Technology			
Early childhood and elementary	4.07	0.67	1.46
Secondary	3.94	0.84	

a. The *t* test for high school GPA was based on 266 cases (141 for early childhood and elementary teaching major, 125 for secondary teaching major).
*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

tion that there is a significant difference in students' self-assessed competency level between the traditional curriculum and the integrated curriculum. The $F(13, 318)$ statistic for the cur-

riculum difference is 2.86, and Wilks's Lambda is .895; its statistical significance level ($p = .001$) is lower than the cutoff point ($p = .05$). The $F(13, 318)$ statistic for teaching major is 3.65, and Wilks's Lambda is .870; its statistical significance level ($p < .0005$) is much lower than the cutoff point. These statistics indicate that students' reports on their professional competency differ significantly between the two types of curriculum as well as between the two teaching majors. Both null hypotheses—no curriculum effect and no teaching major effect—were rejected. The post hoc test results (Hotelling's *T*-square tests) also suggest that the curriculum effect is manifested in every dependent measure. Initially, we conducted 13 separate two-way ANOVA analyses and found the same result. No significant interaction effect was found between curriculum type and teaching major (Wilks's Lambda: .951, $p > .05$). Eta-squared is also presented in Table 5 (its interpretation is similar to that of *r*-squared in a standard linear regression analysis). We determined that 10.5% of the total variance in the outcome can be explained by curriculum alone, and 13.0% of the variance in the outcome can be explained by teaching major.

In addition, Table 6 shows means and standard deviations of four categories in each competency area; the four categories are (a) early childhood and elementary major within traditional curriculum, (b) secondary major within traditional curriculum, (c) early childhood and elementary major within integrated curriculum, and (d) secondary major within integrated curriculum. This table's purpose is to provide readers with more detailed information about where the differences are located. The pattern of mean differences between majors and between curriculum types remained consistent. The means of the integrated-curriculum group were consistently higher than those of the traditional-curriculum group. The means of early childhood and elementary teaching majors were also higher than those of secondary teaching majors (significant at the alpha level .05). Standard deviations (showing the variation of the scores) were larger in secondary major groups, perhaps because their various submajor backgrounds (e.g., English, math, arts) are more likely to make their curriculum experiences and professional preparations different.

TABLE 5 Multivariate Analysis

	Wilks's Lambda	F df *(13.318)*	p *Value*	*Eta Squared*
Curriculum type	.895	2.860	.001	.105
Teaching major	.870	3.654	.000	.130
Curriculum Type × Teaching Major	.951	1.256	.238	.049

NOTE: Model: Intercept + Curriculum Type + Teaching Major + Curriculum Type × Teaching Major

DISCUSSION AND CONCLUSION

The main goal of this study was to examine whether the new program, designed around notions of a standards-based integrated curriculum, prepares future teachers better (based on teacher candidates' responses) than the traditional course-driven form of teacher education curriculum. The standards aimed at developing teachers' professional competency were established to support the program in preparing educators to work effectively in P-12 school settings. An important goal of the redesigned program was the integration of theory, practice, and professional standards. The case-study college's teacher education program was integrated across disciplinary areas, taking the 13 principles and practices as a primary component of the conceptual framework. We will summarize and discuss the study's major findings, as well as its limitations and potential contribution to teacher education.

Research Questions 1 and 2: The Effects of Curriculum Type and Teaching Major

The two-way MANOVA analysis demonstrated a significant difference in the preparation level relating to the 13 professional competency areas between students who went through the traditional versus the integrated curriculum. This answers Research Question 1. The integrated curriculum better prepares individuals for the classroom than the traditional,

TABLE 6 Means and Standard Deviations (*n* for Traditional Curriculum = 213, *n* for Integrated Curriculum = 121)[a]

Competency Area	*Curriculum*	*Major Within Curriculum*	M	SD
Learner	Traditional	Early childhood and elementary	3.96	0.61
		Secondary	3.87	0.72
	Integrated	Early childhood and elementary	4.30	0.57
		Secondary	3.99	0.70
Learning	Traditional	Early childhood and elementary	3.95	0.58
		Secondary	3.89	0.72
	Integrated	Early childhood and elementary	4.23	0.64
		Secondary	4.07	0.60
Content	Traditional	Early childhood and elementary	4.19	0.52
		Secondary	4.09	0.70
	Integrated	Early childhood and elementary	4.56	0.47
		Secondary	4.18	0.63
Curriculum	Traditional	Early childhood and elementary	4.14	0.58
		Secondary	4.04	0.63
	Integrated	Early childhood and elementary	4.56	0.45
		Secondary	4.16	0.56
Instruction	Traditional	Early childhood and elementary	4.13	0.57
		Secondary	3.94	0.64
	Integrated	Early childhood and elementary	4.43	0.52
		Secondary	4.00	0.55
Assessment	Traditional	Early childhood and elementary	3.77	0.60
		Secondary	3.77	0.71
	Integrated	Early childhood and elementary	4.06	0.70
		Secondary	3.84	0.63
Management	Traditional	Early childhood and elementary	3.83	0.71
		Secondary	3.70	0.85
	Integrated	Early childhood and elementary	4.25	0.67
		Secondary	3.85	0.73
Diversity	Traditional	Early childhood and elementary	3.99	0.80
		Secondary	3.77	0.93
	Integrated	Early childhood and elementary	4.33	0.70
		Secondary	4.08	0.74
Professionalism	Traditional	Early childhood and elementary	4.35	0.63
		Secondary	4.11	0.76
	Integrated	Early childhood and elementary	4.52	0.61
		Secondary	4.36	0.52
Reflection	Traditional	Early childhood and elementary	4.17	0.66
		Secondary	3.94	0.83
	Integrated	Early childhood and elementary	4.59	0.56
		Secondary	4.23	0.65
Inquiry	Traditional	Early childhood and elementary	3.89	0.68
		Secondary	3.93	0.77
	Integrated	Early childhood and elementary	4.42	0.58
		Secondary	4.17	0.61
Communication	Traditional	Early childhood and elementary	4.24	0.66
		Secondary	3.99	0.86
	Integrated	Early childhood and elementary	4.63	0.53
		Secondary	4.27	0.69
Technology	Traditional	Early childhood and elementary	3.96	0.63
		Secondary	3.91	0.83
	Integrated	Early childhood and elementary	4.22	0.69
		Secondary	4.02	0.86

a. Traditional/early childhood and elementary = 107; traditional/secondary = 106; integrated/early childhood and elementary = 69; integrated/secondary = 52.

individual course–driven curriculum. The superiority of the standards-based integrated curriculum is somewhat consistent with Wigle and White's finding (1998) about standards-based teacher education programs but somewhat inconsistent with Carter and Mason's

(1997) conclusion based on their literature review on integrated curriculum studies. We also found a significant difference in self-assessed preparation level in the set of professional competency areas between students who majored in early childhood and elementary teaching versus secondary teaching, independent of curriculum type. Both curriculum type and teaching major were positively associated with all 13 competency areas, but we found no interaction effect between curriculum type and teaching major.

The difference between early childhood and elementary teaching major and secondary teaching major seemed related to differences in students' actual training in methods classes, which were positively associated with many of the professional competencies. Early childhood and elementary teaching majors must take more methods courses during preservice training than secondary teaching majors, and these courses in particular seem to develop students' professional competencies. However, the two curriculum types do not differ in the number of hours actually spent in training.

Anecdotal evidences from administrators, supervising teachers, and university supervisors also indicate that students entering Phase 3 from the integrated curriculum are stronger teaching candidates than those entering from the previous, traditional program. In the integrated program, students gain a greater perception of themselves as professionals and have the opportunity to internalize the professional competencies needed to succeed in the classroom prior to the induction year experience.

Higher levels of perceived competence could be associated with the actual probability that new teachers entering the field will be more successful and effective. The stress levels of new teachers may be reduced, and the amount of time spent on basic survival skills may be minimized. This could yield better learning outcomes for P-12 students and potentially increase retention of new teachers in the field.

Research Question 3: The Relationship Between Students' Background Characteristics and Their Preparation Levels in the Professional Competency Areas

To answer Question 3, we examined the results of correlation analysis and *t*-test analysis. Differences in students' gender, race, or GPAs (either high school or college) were not associated with the promotion of any professional competency areas. Because these background characteristics did not affect students' responses concerning their preparation levels in the 13 competency areas, we did not have to control for these characteristics to assess the differential curriculum effect. Although results are not presented here, we also conducted a multiple regression analysis that included all these background characteristics as independent variables and the 13 competency areas as dependent variables. We found that these background variables did not explain or predict students' preparation levels in individual competency areas. The insignificant correlation coefficients of gender, race, and GPA seem to be positive indications of equity for student development or professional development in this case-study college. However, future studies should reexamine the association between race and professional competency areas because the institution in this study was in a small, predominantly White town and had a predominantly White student body.

The very small standard deviations of students' GPAs in Tables 3 and 4 indicate that students in the teacher education programs have very similar high school and college GPAs. The program boundary seems to control academic variations in characteristics among entering students because the minimum GPA requirement for entry into the program is relatively high (2.75). It is important to note that the GPA requirements remained the same for the traditional and the integrated curriculum.

Research Question 4: Comparison of Students' GPAs, Actual Teaching Experiences, and Experiences as Substitute Teachers Between the Two Types of Curriculum

A *t*-test analysis (Table 3) was used to answer Research Question 4. Students in the integrated-curriculum group had high school and college GPAs similar to those of the students in the traditional-curriculum group. The two groups also spent a similar number of hours in methods classes. However, integrated-curriculum students had more substitute teaching experience. We did not have to control for this difference in substitute teaching experience because it did not correlate significantly with the dependent measures. More specifically, except for the area of communication, we observed no positive or negative association between substitute teacher experience and development in any of the competency areas.

Notably, students' experience in teaching actual lessons guided through methods courses seemed to relate somewhat positively to their perceived development in professional competencies, but substitute teaching experience did not seem to relate to future teachers' perceived professional development. This provides educators in teacher education with a new insight into the differential educational effects between systematically guided actual teaching experience through regular methods courses and unguided teaching experience as a substitute teacher. The guided teaching experience relating to pedagogical themes and practices seemed beneficial for the development of future teachers' professional competencies. Our finding of the insignificant effect of students' experience as a substitute teacher is inconsistent with Warren (1988) and Weems (2003); however, neither of their reports was based on empirical research. Further investigations on the substitute teacher experience are needed. Future studies should also seek to determine what content and activities guided by the methods courses are especially beneficial to student learning in conjunction with actual class teaching experience.

An additional interesting finding is the association between being female and teaching majors and between being female and high GPAs. It is well known that most early childhood and elementary teachers are female, whereas more male teachers are visible in secondary schools. The student (future teachers) composition of this case-study college reflects that reality. Interestingly, female students seeking to be teachers tend to have higher high school core course and college GPAs and appear to be better prepared academically than male students in teacher education. Educators may have noticed this phenomenon, but with research on the subject lacking, our observation may prove helpful.

Limitations

We acknowledge three potential arguments against our research findings: (a) use of self-rated student responses, (b) the novelty or motivation effects of a new curriculum, and (c) the difficulty of determining the extent of subtle changes in the integrated curriculum.

First, the finding of curriculum effects was based on the candidates' self-reports. Pace (1985) noted that although student reports are often the only available information—or a major source of assessment in education—critics tend to dismiss students' self-reports. However, Astin (1991, 1993), Kim (2002), and Pace (1985) reported that college students' self-reported responses on their learning and growth are quite valid. It follows, then, that candidates' self-reported responses on their professional preparation level could be an important indicator of preparatory success. Nevertheless, additional information from diverse sources, such as a coordinator or teachers who work with student teachers, and from actual employers in teaching settings after graduation would be helpful in judging students' professional competencies and the effects of the restructured curriculum.

Second, as some quasi-experimental studies in behavioral sciences have shown, a novelty effect or motivation effect might have influenced individual student and faculty motiva-

tion and behaviors beyond collective efforts of restructuring the teacher education curriculum. Unfortunately, it is difficult to tease out these aspects. However, the effect of the new integrated program was significantly stronger than that of the traditional program, and its effect was consistent throughout all dimensions of professional competencies. It cannot be attributed to just a motivation effect. Moreover, instructors' influence on student motivation would be quite unlikely to occur using an interdisciplinary approach to an integrated curriculum.

Third, in the previous sections, we described the collective efforts and major changes made by faculty members and administrators in the case college. We acknowledge the important roles individual faculty members play, but in reality, it is very difficult to capture the subtle changes made by an individual faculty member in his or her classroom or office. Nevertheless, we examined the syllabus changes of all related courses and other manifest efforts. Thus, our assessment about the integrated curriculum stands within these aforementioned limitations. Future studies should further identify what works well in the integrated curriculum and how the process of curriculum integration develops.

Conclusions

This empirical study demonstrated the benefits of the standards-based integrated curriculum in developing professional competencies for candidates in a teacher education program. The study's findings and implications support the value of an integrated and defined program in the preparation of teachers. Certainly, the efforts of the case-college faculty and related administrators who share a vision and adhere to program criteria tend to better prepare students in the focused competency areas. Other higher education institutions seeking to improve programs in teacher preparation may find this case study useful. We expect that our study not only offers new empirical findings in the much ignored area of teacher education curriculum but may also stimulate additional studies by researchers who understand that teacher preparation is critical to educational reform and that educational reform will not occur until teacher preparation programs change significantly.

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