The Development and Implementation of an Online Professional Development Model for Pre-service Teacher Education

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Abstract

Accelerate Online/OPTIONS is a three component program for certifying secondary mathematics and science teachers in Texas. *Accelerate Online/OPTIONS* provides those possessing or pursuing science degrees with an online program of education that can be completed in 12-18 months. The **On-line Curriculum** consists of 35 online modules developed to engage the candidate with issues identified as necessary for a beginning teacher by the Texas Board of Educator Certification. The **Field Based Experience** consists of a 40 clock-hour supervised teaching field experience in a secondary school during the initial phase of the program. The final program component is a paid **internship** where candidates are supported by a trained mentor and a university supervisor, who guides, observes and provides constructive feedback to the interns during their year-long development as a beginning teacher. Continuing supports offered in this program include on-going communications and an ePortfolio resource provided via the *eZone* portal, and the availability of mentor teacher advice for former program participants continuing to teach in the position that they held during their internship experience. Over three years the applicants have increased four fold.

Viewing the preparation of teachers as the initial step of a career long professional development program for teachers is logical, but it is not the conventional view held by

teacher educators and professional development specialists. We have invested over three years of continuous effort and resources in developing a teacher preparation program that incorporates an on-line delivery system and have come to view this delivery system as holding significant promise for the continuing education and formal development of teachers following their initial certification and entry into the profession. The Information Technology (IT) attributes of accessing reliable and valid multimedia resources 24/7 from your personal workstation with moderate training are powerful influences for changing how professional development experiences are envisioned.
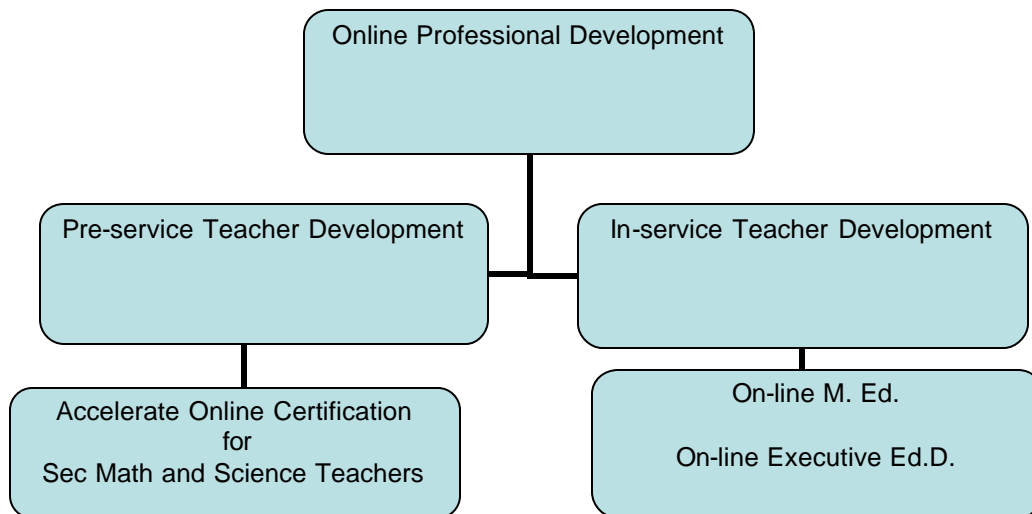
In the arena of information technology, it is accepted that professional development efforts have not "kept pace with the rapid changes in the quality and quantity of information technology" (Moursund & Bielefeldt, 1999). Further, the oft-used practices of providing faculty with one-shot workshops on topics of little professional interest with little or no follow-up have not been effective interventions for faculty professional development on teaching and learning strategies (Hargreaves & Fullan, 1992; Joyce & Showers, 2002). These statements reflect "operational problems" with mandatory professional development experiences designed as single experience workshops that often employ a skilled presenter who includes engaging activities skillfully but little or no change occurs in the classroom following the experience. If educators begin to access the Internet for ideas to inform their professional practice, IT may change the "single experience" notion for educator professional development.

Perspectives

The literature is consistent regarding professional development experiences that emphasize academic subject matter (content), provide opportunities for "hands-on" activities (active learning), are integrated with ongoing classroom operations (coherence), and provide many development experiences for an extended period of time are more likely to produce desired knowledge and skill changes (Garet, Porter, Desimone, Birman & Yoon, 2001; Loucks-Horsley, Hewson, Love & Stiles, 1998).   Joyce and Showers (2002) contend that at least 12 sessions are necessary to impact classroom integration. Similarly, recommendations from a national survey on the preparation and qualifications

of public school teachers by Lewis, et al., (1999) are consistent with the program timeline and activities we have undertaken, that include, collaborative activities with common planning time, regularly scheduled meeting times, having a formal mentoring relationship, and networking with other teaching candidates outside a single school.

The following figure illustrates an on-line professional development model we are developing that target different career opportunities for classroom teachers. We believe that IT will serve as the binding agent for these career-long professional development programs beginning with an online teacher certification program and then continuing with formal professional development experiences leading to graduate degrees if the educator elects to pursue them. However, multiple opportunities for continuing education on issues selected by individuals in different educational roles, such as, the classroom teacher, school administrator, curriculum specialist that are available 24/7 at their home will soon replace organized seminars and workshops on a single topic for a single day or part of a day experience. This paper addresses the development and implementation of the pre-service strand of this model that is changing the nature of programs leading to teacher certification.

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        │  Online Professional Development    │
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        │ Pre-service      │   │ In-service Teacher   │
        │ Teacher          │   │ Development          │
        │ Development      │   │                      │
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     │ Accelerate Online  │   │  On-line M. Ed.      │
     │ Certification for  │   │                      │
     │ Sec Math and       │   │  On-line Executive   │
     │ Science Teachers   │   │  Ed.D.               │
     └────────────────────┘   └──────────────────────┘
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Figure 1. Career Long eLearning Professional Development Programs

Development of Teacher Pre-service Development Program

This portion of the paper describes program development issues and decisions that have occurred after we received approval to offer a secondary teacher certification program online.

Overview of Pre-service Teacher Development Program

The *Accelerate Online/OPTIONS* program was established to provide a flexible alternative certification program for life science and physical science, including chemistry, physics, composite science, and mathematics (grades 8-12). *Accelerate Online/OPTIONS* has three features setting it apart from other alternative certification programs offered in Texas. First, it is offered as a university-based continuing education program that does NOT yield student credit hours to the University, thus reducing costs (no tuition expenses) for candidates. Second, because the pedagogy content associated with state licensure is accessible, 24/7 as an on-line experience, certification can be completed by a baccalaureate graduate, graduate student or science/engineering professional in 12-18 months. Third, the program has been developed from a partnership between a College of Education and Human Development and a College of Medicine that is providing a talent pool of candidates with strong academic backgrounds in science and mathematics. The curricular elements of the *Accelerate Online/OPTIONS* program consist of an On-line curriculum with IT influenced field-based experiences.

Multimedia Module Design

Initial decisions about content selection, module format and the framework of the digital delivery system were made as the application for program approval was being developed. The following sections address these components of the program.

Specifications and content elements for the on-line line curriculum. The on-line modules address state and national educational standards [State Board of Educator Certification Pedagogy and Professional Responsibilities Standards and Science Standards, (SBEC, 2002); The *Accelerate Online* certification options were approved on [May 8, 2002 for life science; February 4, 2003 for physical science and science; and May 9, 2003 for mathematics and physics/mathematics] by the Texas State Board of Educator Certification based on plans established to fulfill the following state statutes: Commitment and Collaboration to promote Educator Certification 19 TAC Chapter 228,

par. 228.20; Admission Requirements 19 TAC Chapter 227, par. 227.10; Curriculum 19 TAC Chapter 228, par. 228.3 & 228.4; Program Delivery, Evaluation, and On-going Support. 19 TAC Chapter 228, Par. 228.30(b) and 19 TAC Chapter 228, Par. 228.40. International Society for Technology in Education, (ISTE, 2000); National Science Education Standards, (NRC, 1996); and the Interstate New Teacher Assessment and Support Consortium (Mitchell, Robinson, Plake, & Knowles, 2001)] and include the following Attributes of On-Line Resources:

- Intended clock hour requirement of module for targeted knowledge/skill – unless stated otherwise, the intended length of an on-line module is one (1) hour.
- Extensive use of graphics, video segments incorporated in module.
- GUI Navigational resources on each webpage.
- Modules require interaction (active response/performance) to module queries/activities with feedback to performances provided.
- Module components include: objective(s), presentation of information, activity to apply information with feedback, post-assessment including TExES type test items and instructional product development (as appropriate).
- Framework of knowledge, dispositions, and performances and glossary of related terms for standards addressed in each module
- Underlying management tracking resource for user.
- Underlying management resource for project administrator
- On-line registration system with password protection for project entry.

On-line module development process. To begin the process, the afore listed guidelines, a content framework for the module developed from state knowledge and skill standards for teachers, examples of a word processed version and HTML version of a module, and a contract agreement noting the payment and time for delivery of the text were provided to experienced teacher educators who had authored instructional methods textbooks. If the prospective authors accepted the conditions of the agreement they prepared and refined text versions of their module. Project staff then converted module text into a multi-media module that incorporated the previously listed attributes.

Delivery system for online modules – eEmpowerment Zone (eZone). The eEmpowerment Zone, an eLearning system has been designed as a dynamic, on-demand delivery system that enables cohorts/communities of teaching candidates to access instructional modules, and integrated resources and tools that support teaching and learning, supervision, resource evaluation and collaboration. By organizing instructional web-based modules, electronic portfolios, resources and tools into an integrated system, teaching candidates can seamlessly complete the online and field-components of the program, while receiving extensive support from university supervisors, mentor teachers, fellow students and program staff. eZone community-building features like the *Community Discussion Boards*, *ePortfolios* and *Resource Media Center* allow candidates to participate in online professional development seminars, as well as, develop, evaluate and share a broad range of instructional resources online.

Table 1.
eZone Features: Descriptions of Components and their Functions

eZone Feature	Description/Function
eZone Modules	eZone Modules include hands-on or interactive online instructional content, tutorials or project-based learning activities. Modules incorporate feedback prompts, and are designed around ongoing needs sensing and state and national standards.
My eAccount Administration and Reporting System	The My eAccount reporting system enables students and instructors to track student progress remotely. My eAccount pages include student progress data on module enrollment, completion and assessment. Administration and Facilitator Pages include information on students, learning objects, overall module progress, student portfolios and customized news submission.
ePortfolios	The ePortfolio feature in the eZone allows interns to submit various classroom artifacts and then their web-based portfolios are dynamically or automatically updated, without requiring formal web development. Intern portfolios serve as a resource for teaching interns to share their professional goals, interests, and classroom artifacts with supervisors, mentor teachers and other interns in their cohort over the course of the year.
Discussion Boards	Discussion Boards were set up in the eZone to facilitate ongoing support and communication among students, instructors, or interns and supervisors. All Options/Accelerate students should subscribe to their Mailing List. Whenever a new article appears in the Discussion Board, you can have a copy of that article emailed to you. Articles are compiled in digest format and emailed daily.
NewsFlash [eZone Quarterly]	This feature highlights state and some national educational technology news, professional development and funding announcements and initiatives.
Spotlight Resource [eZone Quarterly]	This feature spotlights an educational resource or application; many resources are nominated or created by educators or educational technology leaders.

Powerful Practice [eZone Quarterly]	This feature highlights what model K-20 educators are doing. How are educational technologies impacting teaching and learning in a wealth of situations? Exemplary curricula, diversity responsive practice, and mentor programs are highlighted.
Resource Media Center	The resource media center is designed as a dynamic shared resource center for communities of learners that include pre-service and in-service teachers, administrators, library media specialists, higher education faculty, parents and students. eZone community members are encouraged to nominate and rate resources.
Break Room	The break room is designed to give users a space to freely explore diverse web-resources, outside of structured instructional activities. The eZone's community of learners can take breaks in between modules or at any time, to freely experience the breadth, depth and creative power of the web.

Formative Assessment of Online Modules

The following five-step assessment protocol was implemented to examine each module during the development process.

Step one. *Text Review* consisted of a careful examination of the text to determine whether the state standards specified for the module were included in the instructional resources, and whether all concepts and instructional activities in the module were clear, accurate, and internally consistent. Frequent modifications occurred during this step (i.e., rephrasing the module's objectives, preparing additional test items, developing new application activities or restructuring activities, rewriting and expanding sections, adding references and glossary terms).

Step two. *Text to HTML Conversion* consisted of an examination of textual adjustments that were made to accommodate the presentation of the instructional resources on a web page as well as the means of presenting links and extensions. The HTML design specialist worked closely with the module author and project staff responsible for *Text Review* during this step of the process.

Step three. *Internal Online Review* consisted of a different staff member working through the online module to check every link and response application in the module after it had been put online. Applications and links that did not function correctly were noted and returned to the HTML design specialist to correct. All navigational components of the module were rechecked and determined to be operating correctly before the lesson was released for teaching candidates to complete.

Step four. *Candidate Feedback* consisted of comments and observations candidates make about the lessons as they worked through the module. Technical issues, content clarity, errors were noted by candidates and provided electronically to project staff through eEmpowerment Zone. Issues and concerns from candidates were used to determine whether adjustments were needed in a module as the comments were received.

Step five. *Accelerate ONLINE Reports* were then compiled from the *Internal Online Review* and *Candidate Feedback* and reviewed electronically by project staff to determine whether additional adjustments were needed for a particular module.

A list of all thirty-five modules is provided in the following table under ten headings. Candidates with science teaching fields select all modules except those four modules under VII. Mathematics Instruction and Assessment, while candidates with their teaching field in mathematics select all modules except for the four modules under VI. History & Nature of Science.

Table 2.

Accelerate Online/OPTIONS Online Modules

I. School & Classroom Environment

Time Management
Discipline Management Techniques and Code of Class Conduct

II. **Designing Instruction I**

Instructional Planning *
Performance Objectives *
Instructional Strategies *
Accommodating Student Diversity in the Classroom
Adolescent and Learner Development
Diagnosing Learners for Instructional Delivery
Communication Skills Part I & II

III. Technology Applications I

eCommunication Tools and Applications *

Basic Productivity Tools

Online Resource Applications

IV. Promoting Student Learning

Inductive (inquiry) Instructional Delivery

Deductive Instructional Delivery Strategies

V. Professional Roles & Responsibilities I

Code of Ethics for Educators

Responsibilities to Educational Partners

VI. History & Nature of Science

History and Nature of Science

How Processes and Principles of Science Influence Decisions

Unifying Concepts that are Common to all Sciences

Safety Plan for Classroom and Science Laboratory

VII. Mathematics Instruction and Assessment

Mathematical Perspectives *

Mathematical Processes *

Mathematical Assessment

Mathematical Learning and Instruction

VIII. Designing Instruction II

Constructing Tests and Program Assessment

Multiple Choice Item Construction *

True False Item Construction *

Matching Item Construction *

Essay Item Construction *

IX. Technology Applications II

TrackStar 1: Finding Online Modules

TrackStar II: Preplanning an Online Module *

TrackStar III: Developing an Online Module *

Professional Growth and Continuing Education

Educational Philosophy - Approaches to Teaching *
(* Indicates that student projects are submitted to ePortfolios).

An underlying assumption of the program designers is that candidates will complete all on-line modules prior to beginning their final field experience (internship or student teaching experience). Candidates complete 31 of the 35 listed modules, unless the candidate is seeking certification in both science and mathematics, then 35 modules are completed.

Early Field Experience

This program component consists of a 40 clock-hour supervised teaching field experience in a secondary school during the initial phase of the program. When candidates have completed the first 5 online modules, they receive an email providing them access to a letter of introduction and overview for the school administrator and mentor/cooperating teacher, a Field Experience Manual, forms to be used, and assignments to be completed during the early field experience. These forms and assignments are submitted to the appropriate section of the candidate's ePortfolio. In addition, a Field Experience Log Sheet is completed and signed by the mentor/cooperating teacher to document completion of the observation hours.

The field experience has been structured to enable candidates to experience a gradual induction into the teaching environment through observing quality teaching and gaining insights about the school's organizational culture. The following table outlines the activities and experiences that are desired.

Table 3.
Expected Candidate Activities During Early Field Experience

Week One	General observations (Complete observation forms as outlined in the manual.)
Week Two	Using the provided lesson plan format, observe the teacher and translate the lesson into the lesson plan format. Identify the parts of the lesson as the teacher conducts the lesson. Interview the teacher using the Teacher Interview form found in the manual.

Week Three	With the teacher's permission, begin assisting with students (i.e., working with individual students, monitoring students during independent practice, monitoring small groups). If the teacher agrees, try to do a "follow-me teach." To do this you will need to request a copy of the teacher's lesson plan prior to the day of the "follow-me teach" in order to review the material. Observe and take notes as the teacher delivers the lesson, then conduct this same lesson during the following class period. Complete a reflection of your week in the classroom and post it to your ePortfolio.
Week Four	Continue to assist. Using the lesson plan format provided, develop a lesson that could be used in the class you are observing. Prior to developing the lesson, consult with the cooperating teacher to determine an appropriate topic. Submit this lesson to the cooperating teacher at least two days prior to teaching so that he/she can provide feedback and adjustments can be made. With the teacher's approval, deliver this lesson. Complete a reflection of your week in the classroom and post it to your ePortfolio.

Approaching the field experience in this manner allows candidates to interact directly with students. Project staff members believe these activities greatly enhance the candidate's transition into the internship.

Year-long Internship or Semester-long Student Teaching Experience

The final program component is the paid internship where candidates have a trained mentor and a university supervisor who will guide, observe and provide constructive feedback during the candidate's year-long development as a beginning teacher. A non-paid student teaching assignment for one semester is an option for candidates not locating a paid internship. Guidelines for the interns, student teachers, mentor and supervisor and evaluation criteria for the intern/student teacher's instructional performances are provided in the *Accelerate Online Internship Handbook*. These guidelines include the following objectives for either of these experiences:

1. To observe the behavior and learning styles of students in a world of diverse cultures and expectations.
2. To develop high levels of teaching competence through guided teaching experience.
3. To learn how to create and use effective lesson plans for instruction.
4. To become competent in creating and using instructional materials and techniques.
5. To effectively use technology for instruction and communication.
6. To become familiar with the total public school organization and programs.
7. To establish professional relationships with fellow teachers, students, administrators and parents.

8. To engage in self-evaluation and professional goal setting.

During the final field experience, candidates add artifacts to their ePortfolios that represent the organizational, instructional, and management processes used in the classroom. Extensive file types [PDF, MS Word, MS PowerPoint, MS Excel documents, graphics (gif, jpeg, etc.) and web addresses (URLs)] are expected to be submitted as artifacts. Each ePortfolio is reviewed at the beginning of the internship year or student teaching experience by the University Supervisor and periodically throughout the experience by both the Mentor Teacher and University Supervisor. Prior to the final evaluation conference, the University Supervisor will complete a final review of the ePortfolio that will be discussed at the final evaluation conference. The following table presents expected possible ePortfolio entries resulting from the final field experience.

Table 4.
ePortfolio Internship/Student Teaching Artifacts

Artifact	Number	Examples
Resume and Professional Goals		Entries and attachment on Welcome page
Module Plans	1/week or as specified by University Supervisor	Outstanding examples of your module plans
Samples of Instruction		Pictures of bulletin boards or displays, student work, electronic copies of units/activities you have created
Samples of teacher-made assessment tools used in a variety of classes		Teacher-made tests, rubrics
Classroom Management Plan		Class rules, procedures
Parental Collaboration		Example of a parent newsletter, example of a letter to parents about curriculum events, description of parent volunteer activities or responsibilities
Professional Development		Master Teacher Observation Forms, staff development meeting materials/notes
Reflections		Reflections on classroom events, student interactions, and faculty collaboration (See Journal section below)
Guidance and Encouragement		Observation notes from cooperating teacher/mentor and supervisor, notes from

		students/parents, positive notes from administrators, supervisors and cooperating teacher/mentor
Evaluations	All evaluations from Mentor Teacher and University Supervisor	Copies of supervisor evaluations, copies of cooperating teacher /mentor evaluations, copy of mid-point and final evaluations (PDAS evaluation – optional),

Implementation of Teacher Pre-service Professional Development Program

Extensive marketing efforts were undertaken to launch this initiative because the *Accelerate Online/OPTIONS* program differs dramatically from other teacher certification programs offered by the college. The distinguishing characteristics are that it is offered as an online experience through continuing education and does NOT yield student credit hours to the University.

Admission of Candidates

The following requirements for admission into *Accelerate Online/OPTIONS* were adopted from the undergraduate teacher preparation programs at Texas A&M University. These adopted requirements provide quality assurance to teacher education faculty that entry requirements into *Accelerate Online/OPTIONS* do not differ from the requirements they developed and approved for the undergraduate teacher education programs. In order to be admitted the applicant must:

- either be a science or engineering professional or graduate student, or be within one year of completing a science baccalaureate. Applicants must have at least a 2.5 GPR in their baccalaureate course work attempted or a 2.75 GPR on the last 60 hours of the baccalaureate degree or 3.00 GPR on advanced degree course work.

- have a minimum of 24 semester hours in a specific content specialization, or 36 semester hours in a composite field (including a minimum of 3 semester hours in all sub-areas).

- pass or be exempt from TASP (basic competency test).

- pass the required Texas Examinations of Educator Standards (TExES) content exam(s) .

- have access to an Internet-capable computer.

- pass a background check of any criminal activity relating to children.

- submit three letters of recommendation.

- demonstrate verbal fluency with English in a personal interview with program staff.

Demonstrating verbal fluency in English in a personal interview was added to the selection criteria in year 2, after a number of candidates in year one exhibited some difficulty in communicating orally in English. While the primary function of the interview is to determine oral fluency, this interview also provides the candidate an opportunity to meet project staff and seek additional information about the program before making a commitment.

Candidate Recruitment

Extensive recruitment efforts have been implemented by the Office of Continuing Education. A sampling of marketing techniques applied include: a Jumbotron ad placed on the scoreboard screen during a home football game; a program flyer used as a screen saver on all student workstations located in university computer laboratories; newspaper ads placed in the Battalion (campus newspaper) targeting particular times in the semester; ad in the Texas Aggie (alumni association quarterly journal); face-to-face interactions at career fairs and booths at professional conferences; poster placements on bulletin boards at strategic locations on campus (close proximity to college advising offices); information presented about the *Accelerate Online/OPTIONS* program at local school district substitute teacher meetings held each month; direct mailings targeting school district certification offices; website banner ads; program announcements submitted to Aggie Hotline, (an intranet bulletin board service for daily news items that are distributed to faculty and staff across university at no cost) and a program description link on college homepage. Gradually, these marketing efforts and personal contacts have succeeded in raising awareness to the extent that 30 to 40 inquiries are received from prospective candidates each month.

Candidate Program Costs

This program costs approximately $5,100 (an enrollment fee of $4,775, is assessed by the Office of Continuing Education and an additional $300.00 is assessed by the State of Texas for certification examination and license fees). For a candidate to

begin the program an Enrollment Agreement is entered into by the candidate and the Office of Continuing Education. This agreement delineates the cost of the program with different payment options, and the expected time to complete the program with provisions for extending the time to complete the program. Generally, candidates opt for an extended payment schedule with the convenience of online payments.

Scholarships

Scholarships contingent on employment in particular schools are available to candidates with funding provided by a federal grant. The candidate is eligible to receive a award of $2,000 if the candidate accepts a teaching position in a high need school in a high need school district in Texas, or $3,000 if the candidate accepts a teaching position in a high need school in a high need school in Houston ISD or in another high need school district in Harris county, Texas. Opportunities for these scholarships began during the current year with 3 of 31 candidate placements being eligible for scholarships. While the eligible candidates have received these awards, this less than anticipated response is due to position offers being extended from non-high need school districts to our candidates. The candidates being financially constrained accept positions that are offered and forego the opportunity for positions that might materialize from a high need school district and a scholarship.

Monitoring Candidate Progress

An extensive digital monitoring system was developed for ***Accelerate Online/OPTIONS*** that includes an on-line registration system with password protection for candidate entry, and an underlying management tracking resource. For the candidates, the management system serves to affirm their program status in terms of completed assignments and module deliverables and it will return them to the unfinished section of a module that was exited before the module was completed. As a management resource for program administrators, this digital monitoring system attends to each candidate's visits to a module, the elapsed time spent examining the contents of the module and whether items requiring a response have in fact been completed as well as module pretest and posttest performances by the candidates. Given these data, candidate progress in completing the modules are reviewed to determine whether individual

Table 5. Sample of Weekly Student Module Tracking Data

ID by Cohort	Time Man.	Discipline	Instruct. Plan.	Perform. Objective	Instruct. Strat.	Accom. Diverse.	Adoles. Dev.	Diag. Learner	Commun Part I & II	eComm.	Product. Tools
2E	100%	100%	100%	100%	80%	100%	100%	100%	100%	100%	80%
3A	100%	100%	100%	60%	60%	100%	100%	100%	80%	80%	100%
3A	100%	100%	100%	60%	100%	60%	60%	100%	100%	100%	80%
3A	100%	100%	100%	80%	40%	100%	100%	100%	100%	100%	100%
3A	40%	100%	100%	80%	80%	40%	40%	100%	80%	100%	100%
3A	60%	100%	80%	100%	100%	100%	80%	80%	100%	100%	100%
3B	100%	100%	80%	60%	80%	100%	60%	100%	100%	100%	100%
3B	60%	100%	40%	100%	80%	100%	80%	100%	100%	80%	100%
3B	100%	100%	80%	100%	80%	100%	80%	100%	100%	100%	100%
3C	100%	100%									
3C											
3C											
3C											
3C											
O3B	100%	100%	80%	80%							
O3B	60%	100%	40%	80%	100%						
O3B	100%	100%	100%	80%							
O3B	100%	100%	100%	100%	100%	100%	100%	100%	100%	80%	100%
O3B	100%	100%									
O3C	60%	80%									
O3C											
Average	86	99	85	83	82	90	80	98	96	94	96

NOTE: cell values represent candidate performance on module post-test expressed as percentage correct of total items on post-test. Posttest score average across all modules (Fall 2004 Cohort) was greater than 90%

candidates are progressing satisfactorily in the program, as well as determining whether modules have potential design flaws given the collective performance of the candidates on particular activities as well as overall performance on the module.

Online module completion. Table 5 represents an actual weekly report on module completion by candidates recruited during year 3 of the program.

Performance data from year 1 candidates presented in a similar table revealed a number of candidates who were slow in completing certain modules. The reason for the slow completion rate appeared to be linked to module requirements that requested an instructional product to be developed and then submitted electronically for review by project staff. Candidates often worked through the module, but did not submit the final product to signal completion of that module, rather they proceeded to the next module. This strategy threatened to delay candidate eligibility for completing their early field experience and it created a module completion pattern that was a function of the type of assessment employed rather than the nature of the content and the clarity of the module's presentation. The corrective strategy has been to continue to request the development of an instructional product (such as, a set of multiple choice test items, or a set of performance objectives) but the products are submitted to the candidates' electronic portfolios to represent their knowledge of an instructional concept or principle with an application. Completion of the module is signaled by the candidate's performance on a module posttest, rather than the assessment and feedback to the instructional product.

Early field experience and postings to ePortfolio. Early field experience activities were assigned to engage candidates in thinking about classroom actions in terms of the principles and concepts presented in the online modules. Candidates are instructed to upload completed lesson observations and interview forms to their ePortfolio across the multiple week experience to document their experiences and reflections.

For each observed lesson during the *first week*, candidates complete both observation forms (Instructional Design and Implementation and Classroom Management). For *second week* observed lessons, candidates translate the lesson delivered by the classroom teacher into the lesson plan format. Recording what the classroom teacher does in a lesson plan format provides the candidate practice in identifying lesson components.

There are two important components of teaching that candidates usually do not have the opportunity to observe. These areas are parent communication and adapting/modifying instruction to meet the needs of individual learners. A partial listing

of types of students who require special attention in this area include gifted students, students receiving special education services, English as a Second Language (ESL) students, and at-risk students. During the *second week,* candidates schedule a time to interview the teacher they are observing about how to address these important issues. The "Field Experience Teacher Interview Form" is completed based on this interview.

During *weeks three and four* candidates move into activities that involve more interaction with students. At the end of each week, candidates complete the assignment outlined on the Field Experience Reflection Form.

Candidate Placement in Final Field Experience

Establishing effective strategies for placing candidates in paid teaching assignments has evolved from *denial* (affirming among ourselves that job placement was NOT our responsibility) to *affirmation* (actively marketing all of our candidates to school districts). Ultimately, our goal is to place **all** of our mathematics and science candidates who have completed their online modules and early field experiences in paid internships. As placement protocols have evolved, we have actively communicated the qualities of the *Accelerate Online/OPTIONS* program and the credentials of our candidates to school officials in assisting our candidates in obtaining **paid** internships**.** Approaches we have employed include: **direct mailings** to school districts about our available secondary mathematics and science teaching candidates; **personal visits** with Human Resource directors at fall and spring TAMU Career Fairs regarding our available mathematics and science teaching candidates; **booths** at the Texas Association of School Administrators/ Texas Association of School Boards annual meetings to inform school administrators and board members about the program and our available candidates; and **luncheons** with superintendents and Human Resource professionals to promote teaching candidates participating in the *Accelerate Online/OPTIONS* program.

We have found that powerful tools in recruiting schools to hire our candidates are the ePortfolios the candidates have developed after beginning their programs. To facilitate reviewing our candidates, an online *ePortfolio Center* was set up for school administrators to search *ePortfolios* of teaching candidates - by *Last Name*, *Certification Area*, or *Regional Preference* (http://empowermentzone.tamu.edu/portfolios/center/).

Over the course of these events and activities, we learned that contacting secondary school principals about our available candidates and providing them access to the candidates' ePortfolios are very effective placement tools.

Unfortunately some of our candidates do no locate a teaching position they will accept. An option for these candidates is to complete certification in a non-paid semester-long student teaching experience. A second option is to delay program completion for a year while continuing to seek a teaching position. Candidates finding themselves in this circumstance have generally elected to complete the program with a student teaching experience.

Support and Development of Interns/Student teachers

Guidelines and responsibilities for the intern/student teacher, the university supervisor and the mentor teacher stated in the *Accelerate Online Internship Handbook* are provided to each of them in a professional development experience just before they begin their final field experience as a classroom teacher. The *Handbook* was developed from protocols and experiences of supervisors of student teachers in the traditional teacher preparation programs at Texas A&M University. The resulting guidelines reflect successful practices gleaned over time by teacher educators and university supervisors.

Supervisor and Mentor Teacher Support. First, interns/student teachers submit their instructional plans weekly to their ePortfolio to be reviewed by their supervisors and mentor teachers in preparation for classroom visits. Although six classroom visits across the school year are specified to meet certification expectations, supervisors have elected to observe their interns/student teachers nearly every two weeks for twelve visits.

Second, Baylor College of Medicine has recently introduced a professional development website for life science teachers, BioEdOnline (www.BioEdOnline.org). In reviewing this website, Science NetLinks notes this website highlights the foremost current developments in biology. It is written in a news format that is simple to read, and covers a broad array of topics such as biodiversity, childhood obesity, exobiology, mad cow disease, stem cell research, and wildlife genomics. Supervisors of life science teachers are encouraged to use this resource with their interns/student teachers.

Third, four scheduled professional development experiences are offered to all candidates participating in *Accelerate Online/OPTIONS* to orient them to the different

phases of the program (i.e., orientation to online resources and e-empowerment zone ; orientation to school setting and planning for the first week of school; review session for state pedagogy test; review sessions on former editions of PPR (State Pedagogy Test). In addition, a cross-referenced listing of the teaching skills on the supervisor rating scale referenced to available resources has been prepared and is provided to interns/student teachers and their supervisors as possible resources for targeted professional development. An illustration of these listings for Domain I, Student Participation in the Learning Process and Domain II, Learner Centered Instruction are provided in Table 6.

Table 6.
Alignment of Supervisor Observation Scale Items to Module Content

Intern Classroom Evaluation Alignment	Module Topics	TEXT
Domain I: Student Participation in the Learning Process	**eEmpowerment Modules**	**Fred Jones Text**
STUDENTS:		
1. Are actively engaged and successful in learning.	• *Time Management...*	• Chapter 8
2. Demonstrate critical thinking and problem-solving.	• Inductive Instructional Delivery…	
3. Connect learning to life applications.	• Instructional Planning – A Model • Diagnosing Learners…	
Domain II: Learner-Centered Instruction		
A. PLANNING AND PREPARATION		
1. Exhibits knowledge of subject matter.	• Instructional Planning – A Model • Mathematical Perspectives • Mathematical Processes • Mathematical Learning and Instruction • Mathematical	

	Assessment OR	
	• History and Nature of Science	
	• How Processes and Principles of Science Influence Decisions	
	• Unifying Concepts that are Common to all Sciences	
2. Aligns instructional strategies with lesson objectives.	• Instructional Strategies	

Fourth, a digital learning community has been established among our supervisors of interns and student teachers for sharing ideas and digital resources. This learning community arose from supervisors needing a forum to discuss challenges they face in supporting their interns and student teachers.

Mid-point and Final Assessments. Mentor teachers and university supervisors complete both midpoint and final classroom evaluations of candidates. Seven domains address areas like student participation in the learning process; learner-centered instruction; and evaluation and feedback. The candidate, supervisor and mentor meet following the classroom observations to discuss these evaluations and sign the assessment form before the forms are submitted online at http://accelerate.tamu.edu/forms.

Throughout the final field experience, supervisors review candidate ePortfolios and submit online evaluations. These artifacts provided in the candidate's ePortfolio profile their development as beginning teachers. We have realized that by permitting these beginning teachers continued access to their ePortfolio after completing this program to document new and enhanced skills and notable events, we will be able to maintain professional contact with them and suggest future professional development opportunities that may be of interest.

Completing Certification. The final steps to be certified as a secondary science or mathematics teacher assuming a successful year as a beginning teacher are that the candidate passes the TExES Pedagogy and Professional Responsibilities (grades 8-12) examination, receives a favorable evaluation from the university supervisor and submits

the certification forms and payment to the State Board of Educator Certification office. We are happy to report that 100% of our program completers have passed this examination on their first attempt and have been certified.

Results of Implementing Pre-service Teacher Development Program

An extensive database has been established to evaluate key elements of the program using candidates' performance in the classroom and on state examinations as criterion variables. Candidate biographic and outcome data have resulted in a database of over 300 variables. These variables will be examined in addressing research issues presented in the following section. For this report, candidate status has been selected to communicate the results of implementing our *Accelerate Online/OPTIONS* program. The following tables provide summaries of candidate status across the three years of program operation.

Table 7.

Status of Year I Candidates

Degree of Candidate	Applicants	Recruited	Placed	Certified
PhD/MD	13	3	3	2
MS	2	1	1	1
BS	10	5	5	4
Total	25	9	9	7

One candidate with a PhD degree was hired, taught for approximately 6 weeks then resigned from position giving health as the reason for resignation. Similarly, one candidate with a BS candidate, taught for 6 months and then resigned from the internship position and program giving personal finances as the reason for resignation. During our

initial year of operation, seven candidates successfully completed the state pedagogy

examination on their initial try and fulfilled all requirements for secondary teacher

certification. Six of these certified teachers returned to the school where they completed

their intern experience. The remaining candidate completed a non-paid student teaching

experience. Examining the progression of these candidates from recruitment through

certification suggests an inverse relation between success rate for completing certification

and the academic preparation of the candidates.

Table 8.

Status of Year II Candidates

Degree of Candidate	Applicants	Recruited	Placed	Certified
PhD/MD	1	1	1	1
MS	4	4	3	
BS	18	16	16	1
Total	23	21	20	2

Table 8 presents the status of candidates currently in their final field experience.

During the fall semester 2004, two science candidates completed their certification

requirements with one candidate completing an internship and the second candidate

completing a student teaching experience. Another intern has resigned, but is considering

returning to the program next fall as a student teacher. We anticipate that the 17

candidates remaining in their final field experience will successfully complete the

program and be certified. If this assumption holds, the ratio of program completers to

applicants will have dramatically improved across two years from 7:25 to 19:23.

Table 9.

Status of Year III Candidates

Degree of Candidate	Applicants	Recruited	Placed	Certified
PhD/MD/DVM/DDS	13	7	0	0
MS	5	3	0	0
BS	76	20	11	1
Total	94	30	11	1

Table 9 presents status of individuals being recruited during the current year. While 11 placements have occurred for this cohort, these individuals have just begun their final field experiences. At this juncture, we are interested in the number of applicants who become candidates. The total applicants cell value suggests that the candidate recruitment strategies we have implemented are attracting prospective candidates to the program.

Educational Significance and Future Research

Identifying the patterns that occurred in Table 7, and then adjusting recruitment strategies to focus primarily on BS degree candidates based on the results from the year 1 cohort would be an unsound strategy. It is quite likely that many factors influenced the success of candidates fulfilling all requirements for secondary teacher certification. As we gain experience with recruiting different populations and then support these candidates in locating teaching positions, we are confident the overall candidate success ratio of certified to applicants will exceed .28. In fact, this shift appears to be occurring with candidates in the year 2 cohort.

Retention of program completers in teaching positions has not been a priority issue for us, given the challenges of getting a sufficient number of *Accelerate Online/OPTIONS* candidates recruited and placed in internships. Our experience with the initial nine (9) placements in year 1, indicate that personal circumstances (such as, health and personal finances) do affect decisions to remain in the program. Elements in the

program that we are confident that are working are the quality of supervision being provided by our supervisors and the support being provided by the mentor teachers. We hope to maintain contact with the year one interns who are successfully completing the program through their continued access to BioEdOnline resources and eZone resources that include ePortfolio files. One element in the program that will be available to the interns is the continued service from the mentor teacher, if the intern elects to continue in the same teaching position next year. Yet we consider retention strategies to be one of the major development efforts for our program as implementation continues.

Research issues that we are beginning to explore, given the level of program implementation that has occurred include:

- Relation of biographic and academic profile to program completion
- Relation of biographic and academic profile to retention as classroom teacher
- Relation of biographic and academic profile to program admissions
- Relation of biographic and academic profile to elapsed time for program completion
- Relation of online formative assessments to classroom performance
- Relation of candidate recruitment strategies to number of candidates
- Relation of program admission procedures to program completion
- Relation of online preservice completion to continued online professional development
- Relation of candidate program performance to student classroom performance

As we implement the *Accelerate Online/OPTIONS* teacher certification program we are continually realizing nuances that can be addressed by developing additional IT tools to enhance communication that in turn, increases both effectiveness and efficiency across all components of our program. This program is changing how we think about professional development programs and especially the delivery of formal professional development that spans the educator's career.

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