

Field Experience Tracking and Management in Teacher Development Programs

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Field experiences are considered one of the most important and powerful components of teacher education programs. Field experiences of pre-service teachers include visits to pre-K-12 classrooms to observe and to participate in teaching practices under the direction of a veteran teacher. Many universities use a paper-based approach to track these experiences. This approach is cumbersome and inefficient and provides no method for aggregating data or tracking experiences over time. In an effort to facilitate, streamline and improve field experience tracking and management, a web-based instructional system was developed. The purpose of this paper is to share our experience in designing, implementing and evaluating this system. The system provides students, host teachers, instructors, and administrators with web-based tools to track time spent in the classroom, record the types of experiences, post and review the reflections and artifacts of students, and increase communication between all parties.

Keywords: Field Experiences, Knowledge Management, Teacher Education

FIELD EXPERIENCE TRACKING AND MANAGEMENT IN TEACHER DEVELOPMENT PROGRAMS

Field experiences are designed to expose pre-service teachers to pre-K-12 classroom experiences under the direction of veteran teachers, and to provide these students with the opportunity to ground their coursework in the practices they observe in such classrooms. Many of the teaching methods courses in Teacher Development Programs (TDP) have a

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field experience within or associated with the course. Pre-service teachers are given opportunities to observe and assist with classroom activities, apply theory from their coursework, examine problems that arise in classroom situations, and become inquiring, reflective professionals (Schön, 1993). In addition, field experiences provide pre-service teachers with the opportunity to develop their pedagogical skills, anchor their developing beliefs and put theory into practice in order to prepare them for future teaching jobs (Kauffman, 1992; Puckett & Anderson, 2002).

The field experience aspect of pre-service teachers' teacher training is highly valued in teacher education programs (Kauffman, 1992). Researchers suggest that all institutions housing teacher education programs should incorporate some form of field experiences and make these field experiences an integral part of teacher education programs (Carnegie Forum on Education and the Economy, 1986; Holmes Group, 1986; Ribich, 1995). Nowadays almost every teacher education program in the U.S. has incorporated field experiences into their program requiring that students spend time observing and working with pre-K-12 teachers in the field.

Many people are involved in creating successful field experiences. University faculty and staff, school administrators, pre-K-12 teachers and pre-service teachers each have a role. The key players in the field experience are the pre-service teachers, the host school pre-K-12 teachers, and the university instructors (Association of Teacher Educators, 2000). Figure 1 displays the relationship among them.

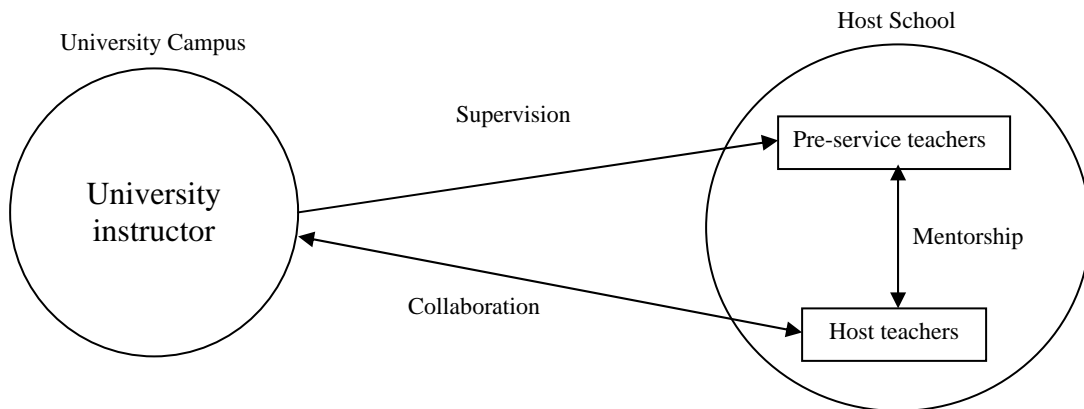


Figure 1. Field experience relationship

Researchers have long studied the role of field experiences and consider these experiences as important and worthwhile for the professional development of teachers. The majority of literature on field experiences focuses on the following issues: the actual field experience time (Simpson, 2002), quality standards (Ribich, 1995), integration of fieldwork and class work (Ribich, Agostino, Barone, & Birch, 1982), supervision and reflection (Ishler, Edens, & Berry, 1996; Nolan & Huber, 1989; Roth, 1996), student outcome assessment (McIntyre, Byrd, & Foxx, 1996; Tellez, 1996), partnerships with schools (McIntyre, et al., 1996; Simpson, 2002), and impact of field experiences on pre-service teachers (Lamaster, 2001).

While these are all important issues to research, little attention has been given to the use of information technology in administering pre-service teachers' field experience.

ADMINISTRATION OF PRE-SERVICE TEACHER'S FIELD EXPERIENCES

Administering pre-service teachers' field experiences is a challenge that many teacher education programs are facing and it presents a range of problems, including: supervision of students, difficulty in developing and maintaining collaborative relationships between host teachers and university instructors, communication between all parties, and accessibility and portability of paperwork. These issues are described in detail below.

It is difficult for university instructors to supervise pre-service teachers who are participating in field experiences. University instructors in teacher education programs work with teachers and administrators in host schools to provide a variety of clinical experiences for pre-service students (Garland & Shippy, 1995). However, due to time and cost issues, university instructors have few opportunities to actually visit host schools to supervise students participating in field experiences. This is especially difficult when the schools in which the pre-service teachers are placed at are far from the university campus (Simpson, 2002). To compound the issue, as more teacher education programs have made the move to use of the Web as the medium for delivering teaching and instruction, there are more students in teacher education programs taking courses at a distance. For this reason, supervision is even more time-consuming, expensive and even at times impossible for university instructors with students placed in various school districts.

This leads to another related issue, the difficulty in developing and maintaining collaborative relationships between university instructors and host teachers. Since university instructors have few opportunities to visit schools they do not get to meet with host teachers. This can be one contributing factor in a lack of effective communication between them. This may give rise to a number of problems in communicating about the pre-service teachers' field experiences in schools. Lack of effective communication between university instructors and school teachers can lead to lack of clearly agreed upon goals, roles, values, requirements and responsibilities and give rise to the tendency to blame each other when problems arise (Tittle, 1974; Yee, 1967).

Lack of communication between the university faculty and the host teachers not only hampers the university-school partnership, but this lack of communication also causes problems in providing effective support to advance the growth and development of pre-service teachers (McIntyre et al., 1996). One of the outcomes sought from field experience is the development of a sense of being part of a community and a profession (Simpson, 2002). Pre-service teachers who participate in field experiences need support and supervision from host teachers in the field, peers and university instructors (Simpson, 2002). This support will help them develop a sense of belonging to a teaching and learning community (Edens, 2000; Howey, 1986; Ishler et al., 1996). Therefore, good communication and a supportive organizational culture among all parties involved in field experiences are essential. Such collaboration and supportive organizational culture is challenging to achieve due to the physical distance, leaving the relationship prone to conflicting values and unclear communication of requirements (Cooper, 1995).

Once students have participated in field experiences, there are various forms and associated paperwork needed to document the experiences. These forms and reports are usually stored in binders, filing cabinets and boxes. The storage of these forms becomes cumbersome over time. The escalation in costs for storage is also an issue as more pre-service teachers, university instructors, and host teachers are involved in field experiences each year.

To address these challenges and issues, development and implementation of an electronic platform became a program goal for the teacher development program at the University of Missouri. To this end, a pioneering web-based solution was developed. This system was designed to help the teacher education program overcome the described

challenges in administering field experiences. In the following sections, we introduce the project background and describe our design and implementation of a web-based field experience tracking and management system.

PROJECT BACKGROUND

The TDP in the College of Education at the University of Missouri employs a variety of forms and paper documentation in order to record pre-service teachers' field experiences. These forms are kept for administrative purposes and do not offer methods for tracking the types of experiences or the reflections of the pre-service teachers. It is obvious that paper-based approaches have certain limitations such as low efficiency and are cumbersome to search and store. It is also nearly impossible to aggregate data about the students' experiences, update information or follow-up with pre-service teachers' progress in field experiences. In addition, these paper-based records are inconvenient to move from one location to another.

The improving Teacher Readiness through Active eXperiences (iTRAX) system was designed to track pre-service teachers' experiences in TDP methods courses; to provide a method of recording and maintaining documentation of pre-service teachers' progress throughout their field experiences (including field experience reports, event logs, artifacts, reflections of pre-service teachers, and evaluations); to increase communication between host teachers and university instructors; and to offer host teachers and instructors methods of evaluating the field experiences. In addition, the system was designed to provide instructors and program administrators with access to aggregated data about the students' experiences. This means that instructors and program administrators could use data collected from this system to inform their teacher development efforts including policy making and decision support. Therefore, the iTRAX system is not only an instructional course management system, but also an educational knowledge management system.

SYSTEM DEVELOPMENT AND IMPLEMENTATION

ORGANIZATIONAL CULTURE

The importance of a supportive organizational culture must be considered from the beginning in any development project. Organizational culture is a term describing the shared values (what is important), beliefs (how things work), standards, perceptions, and expectations of individuals in organizations (Allaire & Firsirotu, 1984). Having a supportive organizational culture is often considered important for the adoption of information technology. The organizational culture will influence any effort to implement change. For a major change such as moving field experience tracking and management from a paper-based approach to a web-based technological approach, resistance is an inevitable response for personnel involved in the field experience. The change could generate skepticism and resistance in personnel, making it sometimes difficult or impossible to implement organizational improvements (Folger & Skarlicki, 1999). Individuals naturally rush to defend the status quo if they feel their job security or status is threatened (Bolognese, 2002). In an effort to overcome this issue, before designing the system, we spent considerable effort in cultivating the support of the TDP administrators, faculty, staff and students by continuously meeting to develop common understandings, listen to feedback, and address specific benefits, issues and concerns. These regular meetings with stakeholders kept the design of the system on track and alleviated several concerns about the viability of the system.

STRATEGIES AND IMPLEMENTATION

The process of building the iTRAX system followed the ADDIE model. The ADDIE model is a model of Instructional Systems Design (ISD), originally developed by Florida State University (Branson, 1975). ADDIE is an acronym referring to five major phases: analysis, design, development, implementation, and evaluation, as illustrated in Figure 2. The five phases are viewed as cyclical, that is, each phase has an outcome that feeds the subsequent phase. Evaluation takes place after each phase in order to receive continual or formative feedback. The revisions of the product are made based on feedback collected.

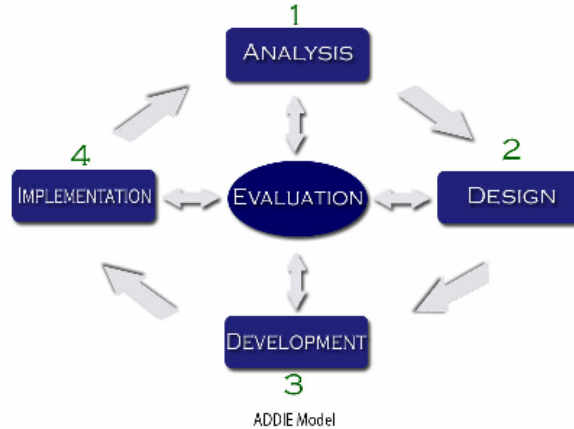


Figure 2. ADDIE model (from itsinfo.tamu.edu/consult/howtodesign.htm)

Specifically, in building this system, we undertook different steps and activities within each phase of the AADIE model. These steps and activities follow the ADDIE model as seen in Table 1. Each phase with its steps and activities is explained in detail below.

Table 1. Steps and Activities in iTRAX Development using ADDIE Model

ADDIE Model	Steps	Activities
Analysis	Needs analysis Knowledge acquisition	Review of current forms and processes, regular stakeholder meetings & individual interviews
Design	Interface design Database structure design	Prototype design & entity-relationship diagram (ERD)
Development	Interface development Database development	Programming
Implementation	Module integration	Deployment of test system & testing of module integration
Evaluation	Usability testing Formative evaluation	Individual testing with 3 graduate students & pilot study with actual class of 13 students using midterm-final surveys, instructor interviews and host teacher discussions

Analysis. In the analysis phase, we conducted needs analysis and knowledge acquisition. These steps are interconnected and are the most important steps in implementing a knowledge management system (KMS) (Anbulagan & Kuswara, 2001). They are the basis for design of a useful and effective knowledge management system. In order to implement a KMS system that fully captured the field experiences aspect of pre-service teachers' teacher training, we established our understanding of users' needs from a variety of sources including original paper reports, manuals and forms, historical documents, and interviews with the current administrator of the field experience office and faculty from the teacher development program.

After observing the current field experience tracking processes in the TDP, interviews were conducted with related staff in order to cultivate a supportive organization culture and understand their information needs and their knowledge of field experiences. A series of interviews were conducted with the TPD administrator and assistants and several experts of learning systems (based on design meetings with representatives of the four groups of stakeholders: pre-service teachers, university instructors, host teachers, and system administrators). Through the interviews, we identified characteristics of our future users. We also defined team roles, accountability and expectations in order to facilitate project management. Evaluations and analysis on the current paper-based approach were made and artifacts were collected. As a result, we identified related field experience activities and questions the system needed to track in order to allow the university instructors and program administrators to assess the student's progress toward achieving the learning outcomes.

Design and development. Following the needs analysis and knowledge acquisition, we designed and developed a list of modules to meet the needs of our target users. This process included:

- System Conceptual design: We developed a conceptual model of the functions and modules in a diagram and created a database-related entity-relationship diagram (See Appendix). We then formalized this conceptual design by creating a prototype system. We presented this system to the stakeholders for feedback.
- Modules construction and integration: An instructional designer, an instructional technologist and an interface designer were involved in actual system programming and development. We first created shared modules such as user registration and the login/authentication module. Then for each user role, we constructed separate modules. Finally we integrated these modules into a fully functional system.
- System testing: All user modules and functions were tested with real data from the TDP prior to actual use of the system.

Implementation. The iTRAX system consists of three-tiers, including a web browser, a web server and a back-end database system. Users of the system can access the iTRAX system by logging in through a web browser. The web server services the requests of the system, accessing data from the back-end database. The database system stores all information and materials. To deploy the system on the Web, an Oracle database was used as the backend database environment because of its rich capabilities in supporting the required functionalities. Java server pages (JSP) and PHP were used as scripting languages to create dynamic web content by querying the database. CSS was used to ensure the overall consistency of the system's look and feel.

Four types of users have access to the iTRAX system: pre-service teachers, host teachers, university instructors, and system administrators. System administrators have access to a module for user management in order to allow various users to register, login and logout, maintain user profiles and modules for course management. Also included are

tools to assist in the maintenance of school and host teacher information. A centralized authentication server maintained by the University is used to prevent unauthorized access to the system resources, thereby enforcing security of the applications. The following is a brief overview of each of the key features in the modules available in the iTRAX system.

The pre-service teachers' module is designed for use by those participating in field experiences. These field experiences involve visits to classrooms in order to observe and work with pre-K-12 teachers as they teach. This module of the iTRAX system allows pre-service teachers to input their field experiences into the event log. The event log records student input of the school district, school, host teacher, subject and grade level of the classroom, date and duration of experiences, type of experiences (observation, one-on-one teaching, small group teaching, shadowing, etc.) and any notes specific to the experiences. In addition, the pre-service teachers can submit a field experience report and reflections and upload related artifacts.

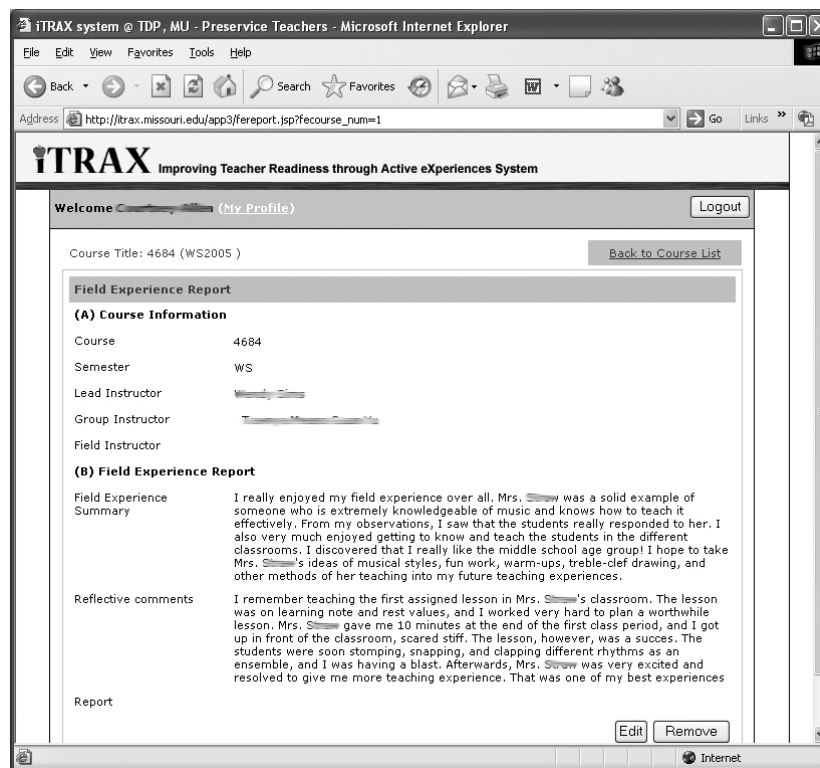


Figure 3. The pre-service teachers' module allows students to reflect and upload reports.

The host teachers' module is designed for use by those providing supervision in the field. Host teachers are the teachers in the schools who open their classrooms to pre-service teachers for field experiences. Without these host teachers, the field experiences program would not be possible. The host teachers are asked to provide evaluations at the end of each semester for each of the pre-service teachers that they host in their classroom. In the past, the host teachers have completed paper surveys for each student. This module of iTRAX provides host teachers with easy web-based access to the pre-service teacher field experience evaluations. The forms are automatically submitted through a web form and can then be accessed through the instructor's view of the system. In addition, host teachers have easy access to contact information for each student and university instructor.

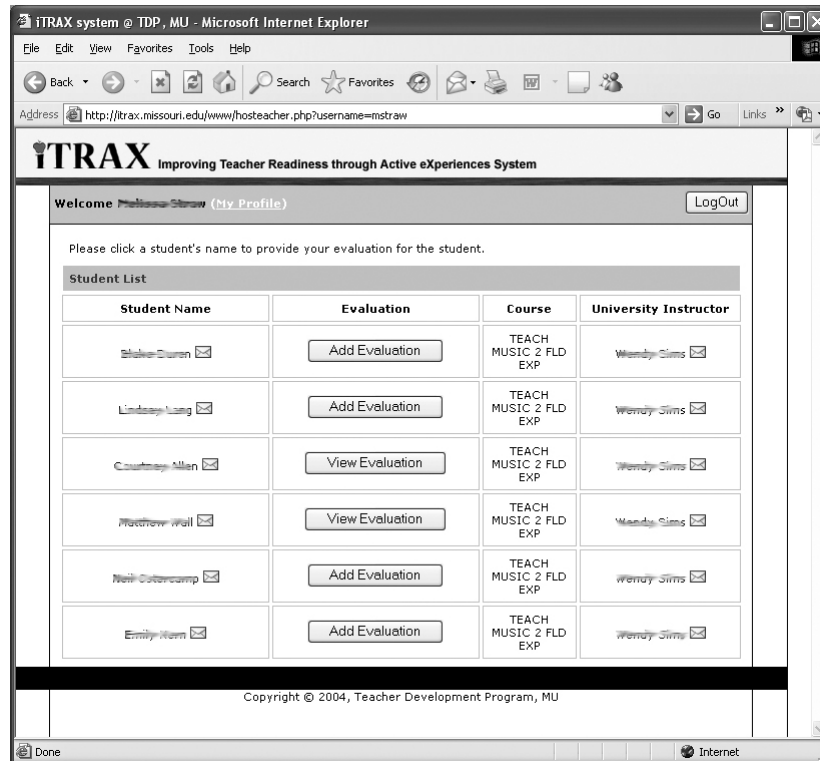


Figure 4. The host teachers' module allows host teachers to submit evaluations for each student.

The university instructors' module is designed for use by those managing the students' overall experiences. University instructors are rarely able to observe the pre-service teachers in their field experience settings. They rely on the pre-service teachers to record their time spent in the field experience in event logs. In the past, this event log was a set of papers the students turned in at the end of the semester. This did not allow the instructor to monitor the pre-service teachers' experiences throughout the semester, if needed. It also did not allow the instructor to have access to contact information, reports and event logs all in one place. The instructor module of the iTRAX system provides university instructors with the ability to view student information, including event logs, email addresses and contact information, and to view and grade the student reflections and artifacts. The university instructors can access the host teacher evaluations for each pre-service teacher. The host teachers' feedback then influences the university instructors' grades for the pre-service teachers. In addition, contact information for each student and host teacher are available.

The administrators' module is designed for the coordinator of field experiences and for administrative access to data about all participating in field experiences. The field experiences office in the TDP has the immense task of assigning students to field experiences each semester. They must keep track of all the host teachers and demographic and contact information about the schools and teachers who are willing to include pre-service teachers in their classroom experiences. They must keep track of the experiences that each pre-service teacher has already had in order to assure that the pre-service teachers are well-rounded in their field experiences. The administration module of the iTRAX system allows administrators and the field experience program coordinator to

A pilot study was conducted to evaluate the iTRAX system in a pre-service teacher education class in the winter semester of 2005. The evaluation goal was to identify the difficulty level for pre-service teachers in using the system; how the pre-service teachers perceived the system and how effective the system was in tracking the field experiences in the real setting. Additionally, the evaluation aimed to identify the ease of use for the university instructors and the host teachers.

There were 13 undergraduate pre-service teachers, one university instructor and three host teachers participating in the pilot study. The pre-service teachers in the pilot study had all had previous field experiences and had used the paper system in those previous experiences. The pilot study included two surveys (one at mid-way through the semester, and one at the end of the semester), ongoing discussions with the university instructor, and a final discussion with the host teachers over email. In the initial student survey, only two of the pre-service teachers reported that they preferred the paper system to the iTRAX system. The survey revealed some minor difficulties for pre-service teachers in using the system. These included redundancy in the need for data entry in the event log and confusion in how to upload reflections.

As a result of this initial evaluation, immediate improvements were made in the programming techniques for the event logs and functionality was added to the system, including pre-filling the data entry values based on the values that the user selected the previous time. The auto-fill feature reduced keystrokes and redundancy in the data entry. We also made the function of uploading reflections easier by providing better instructions.

The second student survey indicated that about half of the pre-service teachers entered all their field experiences into the event log at one time. There did not seem to be much difference in how these pre-service teachers felt about using the two different systems. However, those who entered their events as they occurred found the system to be helpful in tracking their experiences. These pre-service teachers preferred the iTRAX system to the paper-based system and reported that they would like to use the system again. In order to prevent future students from entering all events at one time, instructors could plan for regular reviews of event logs and include this as part of the students' grade for the experience.

In ongoing discussions with the university instructor, she reported that in the past, it was very difficult to manage the paperwork associated with a full class of students in various field experiences; but that with the iTRAX system, she was able to quickly see how each pre-service teacher performed and she was able to easily grade the students and complete the paperwork for the class. She reported that she would like to use the iTRAX system again in future classes. The host teachers were unavailable for interviews at the end of the semester, but in email discussions, they indicated that the web-based surveys were easy to use and that they would use them again.

Maintenance and evolution of iTRAX. Maintaining the iTRAX system for future changing needs is a concern faced by the TDP. As the TDP makes changes in field experience practices, any changes in procedure or operating practices should be documented within the iTRAX system. It is important that the iTRAX system be properly maintained, so that it provides on-going and increasing benefits to the TDP. The current implemented iTRAX system is a development in progress and is still evolving along with the development of user demands and knowledge management requirements.

Benefits of the system. There are many benefits of the iTRAX system to Teacher Development Programs. Access to up-to-date information and knowledge about field experiences, including the ability to track the types of experiences and the reflections of the pre-service teachers will lead to better field experiences overall for these students. In addition, this system increases the ability to easily search and store records, track pre-

service teachers' experiences over time, and provide host teachers with evaluations that can be stored and searched. The system also increases the portability of data and the ability to aggregate data about the students' experiences, update information and follow-up with pre-service teachers' progress in field experiences. Costs associated with field experience tracking (including paper printing, duplication and delivery) are reduced. There are reductions in barriers of time and distance, enabling pre-service teachers, host teachers and instructors to work together asynchronously and remotely. This increases each pre-service teacher's sense of being part of a community and a profession.

CONCLUSION

Field experiences are one of the most important and powerful components of teacher education programs (McIntyre et al., 1996). Traditional paper-based approaches for tracking student experiences are cumbersome and inefficient and provide no method for aggregating data. Therefore, it is important to develop a systematic way to streamline the collection and management of field experiences with the use of modern information technology. In this paper we have described our experience in designing and developing a web-based system for tracking pre-service teachers' field experiences. The iTRAX system provides students, host teachers, instructors, and administrators with tools to track pre-service teachers' time spent in the classroom, types of experiences, reflections of their experiences, and host teacher evaluations of the pre-service teachers. The iTRAX system has been pilot tested and will be used in more courses in the following semesters. Interested parties can refer to the system's web site: <http://itrax.missouri.edu> or contact the authors for a demonstration of the system.

Future plans for the system include a plan to collect longitudinal data on pre-service teachers' experiences over time. We will aggregate this longitudinal data about the students' experiences for detailed analysis. Based on the results of such analysis, educators can make informed data-driven decisions to improve pre-service teachers' progress in field experiences. Additional research is also needed to evaluate the long term impact of the ITRAX system on the curriculum and organizational culture of the TDP program.

The potential for future use of the iTRAX system in teacher development programs is open. Some possibilities include: increasing the opportunity for pre-service teachers and instructors to reflect together on the experiences and their learning from the host classroom through meeting (either physically or virtually) and discussing the events and reflections and discussing reports (Pryor & Kuhn, 2004); providing the opportunity for small group discussions among pre-service teachers about their field experiences based on common entries in event logs (Pryor & Kuhn, 2004); and developing the capability of reporting for program evaluation purposes or for assessment of individual pre-service teachers' overall experiences in the program. It is worth noting that the methodology and ideas we used behind the system design are not limited to teacher education. They can be widely applied into any other fields associated with field experience tracking and management such as agriculture, business, medicine and journalism. Many other possibilities exist and the authors seek future collaboration with any organization that includes field experience work for further development of the system.

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APPENDIX
Entity Relationship Diagram for the iTRAX System

