

An Evaluation Model for Practice Fields in Teacher Education: Contexts, Process, Outcomes, and Transfer

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Abstract: Practice fields provide authentic learning experiences where users come to “know about problems and practices” faced in real professional practice and develop knowledge and skills to transfer to professional roles. Evaluating learning outcomes and transfer of knowledge and skills from training to use is complex. The evaluation needs to identify the contexts and implementation strategies that are effective for producing learning as well as facilitating their transfer to professional practice in real environments. This presentation describes an evaluation model based on multiple research studies that can be used for assessing learning outcomes and transfer from practice field systems involving interactive cases, computer-mediated discussions, and electronic performance support tools.

In K-12 education, educators must learn to use problem-solving approaches for working with children with behavioral problems and/or disorders. By learning and reflecting on these skills during the pre-professional training period, future educators are more likely to possess the knowledge, attitudes, and skills necessary for teaching these children. These skills are difficult to learn and practice without supervised direct contact with children, parents, teachers, and other care providers. Case-based learning approaches delivered through practice fields can provide a bridge between learning as a student and professional practice. Practice fields provide authentic learning experiences where users come to “know about problems and practices” faced in real professional practice and develop knowledge and skills for transfer into professional roles.

Practice fields—a term introduced by Senge (1994)—provide knowledge and skill-building opportunities that are situated in authentic learning activities. In practice fields, students deal with the kinds of problems and practices that they will encounter in real practice, although the practice situation may be delivered through a simulated environment. According to Barab & Duffy (2000), eight principles are necessary in designing practice field learning environments that offer the learner:

1. domain-related practice,
2. ownership of the inquiry,
3. coaching and modeling of thinking skills,
4. opportunity for reflection,
5. ill-structured dilemmas,
6. complex dilemmas with appropriate supports,
7. collaborative and social negotiation of meaning, and
8. motivating learning context.

Practice fields are different from field-based learning experiences but they offer similar activities for practicing future skills. Learning in practice fields builds domain knowledge and problem-solving skills in realistic situations, and this authenticity promotes transfer to practice (Riedel, Fitzgerald, Leven, F., & Toenshoff, 2003).

Need for Evaluation Model for Determining Effectiveness of Practice Field Systems

By dealing with multiple scenarios from multiple perspectives in practice fields, learners move closer to thinking like experts: they learn to extract pertinent information, generate problem solutions in flexible ways, and transfer knowledge and skills to new contexts. However, virtual learning experiences are not the same as real ones. Whereas practice fields offer authentic learning experiences, there are certain limitations within those environments because legitimate participation in the professional community is not a part of the system (Barab & Duffy, 2000). A context is needed to provide meaning to the knowledge and skills gained in the practice field. Learning in practice fields and involvement in communities of practice both involve working collaboratively on shared tasks, but meaning making occurs in the broader context of the profession. Hence, research is needed in identifying the contexts and implementation strategies that are effective for producing learning outcomes and transfer of new knowledge and skills to professional practice in real environments.

The design of a comprehensive evaluation model that can identify learning outcomes and transfer of knowledge and skills is a necessary, prerequisite step for conducting such research. The model must take into account differences in contexts and implementation in relation to outcomes and transfer, and offer prescriptive recommendations for effective use of practice field systems (Fitzgerald, Koury, Hollingshead, Miller, & Mitchem, 2003-2006). Since practice fields have common elements across different professions), the corresponding evaluation model must be one that can be replicable across multiple disciplines

Conceptual Framework

Many of the current learning theories focus mainly on the benefits of authentic, student-centered learning environments. As Jonassen and Land (2000) state, the past decade “has witnessed the most substantive and revolutionary changes in learning theory in history” (p. iv). Newer theoretical learning approaches are based on the belief that learning is a willful, intentional, active, conscious, constructive activity that requires reciprocal intention-action-reflection cognition. The movement to constructivist-learning paradigms has influenced the design and development of open-ended learning environments. Land and Hannafin (2000) describe open-ended learning environments generically as student-centered learning environments that focus on the affordances within environments that allow learners to affect their environments and make meaning. These learner-centered environments provide interactive, complementary activities that enable individuals to address unique learning interests and needs, study multiple levels of complexity, and deepen understanding (Hannafin & Land, 1997). Technology in these environments is frequently employed as a tool to support experimentation, manipulation, and idea generation in the construction of knowledge (Jonassen, 2000).

A critical extension of knowledge construction is transfer, which can be defined as the use of knowledge for particular tasks in context. Studies of differences between novice and expert use of knowledge demonstrate that

experts go beyond merely acquiring knowledge; they are able to retrieve knowledge in a flexible way and apply it differentially within different contexts. Experts understand how and when to use knowledge (National Research Council, 2000). Knowledge that is acquired out-of-context often remains as “inert knowledge” that is not retrieved and used across contexts (Hasselbring, 2001). Transfer of learning is enhanced when learning approaches facilitate knowledge construction by having learners crisscross multiple, real world problems and use meta-cognitive strategies to self-regulate learning (Brown, 1975). Technology has a great deal of potential to provide well-designed learning environments for improving transfer of learning by bringing real world problems into learning space, providing internal supports to facilitate complex learning and the use of meta-cognitive strategies, and increasing the opportunities for feedback for learners (National Research Council, 2000). Technology in these environments is frequently employed as a tool to support construction of knowledge (Jonassen, 2000).

The Research Base Underlying the Evaluation Model

The Practice Field Case Series

The evaluation model is derived from research with a series of ten interactive, multimedia case studies focusing on children with emotional and behavioral disorders (Fitzgerald & Semrau, 1998-2000). The case programs, designed as practice fields, offer active, constructivist, and collaborative systems to promote flexible thinking in complex real-world cases and problem solving in ill-structured situations. These interactive cases provide opportunities to understand children’s behavioral disorders from multiple perspectives, to learn and practice assessment and planning procedures, and to develop instruction and management plans as interventions. The materials in the cases include videos of children in a variety of real school settings; interviews with their teachers, principals and parents; computerized case records; information databases; and prompted problem-solving and reflection activities. The programs also include matched electronic performance support tools to help learners utilize the skills in real situations in professional practice. Online discussion groups are used for students to discuss cases across asynchronous training settings. Using these digital case materials and transfer materials contribute to better application in transfer situations for teacher education.

Description of the Design Principles in the Case Programs

The ten cases in the series provide opportunities for domain-related practice (principle 1) for professionals: understanding the complexities of children’s behavioral disorders from multiple perspectives, assessing and planning to meet their needs, and instructing and managing their behaviors in schools and clinical settings. The cases are completely authentic, requiring the application of domain knowledge to problems of professional practice.

The dilemmas presented in the cases are ill-structured so that learners must define and solve problems (principle 5), thereby owning the inquiry (principle 2). Consistent with the definition of ill-structured domains requiring cognitive flexibility (Spiro, Coulson, Feltovich, & Anderson, 1988), information in each case is loosely structured and requires the user to consider multiple sources of information from multiple perspectives, timelines, and varied solutions by previous service providers, teachers and parents. The use of the case simulates case practice in the real world of special education: much information exists that must be evaluated, synthesized, and utilized by individuals and by teams; success depends on effort.

A variety of scaffolds are embedded within the case programs that coach the user in the problem-solving activities (principle 3), support the learner in working with the complex, ill-structured case rather than simplifying the case for the user (principle 6), and provide opportunities for reflection (principle 4). As the user completes the primary problem-solving activities of creating interventions, the case environment issues a series of “best practice” prompts that guide user reflections and self-evaluation. The performance support tools serve as scaffolds that enable users to work as experts within the case as a practice field, and later, to help users transfer and apply new knowledge and skills to actual job situations.

Providing a motivating (principle 8) and social, collaborative learning environment is critical in meaning making (principle 7). Within the constructivist-learning paradigm, meaning is defined as a process of continual negotiation with others who share points of view in a social environment (Jonassen, Peck, & Wilson, 1999). By creating a practice environment that simulates the dialogue and teamwork necessary in helping children with behavioral

disorders, the learning context becomes both motivating and real. Beyond work within the case environments, users can participate in online discussion groups centered on the cases and online conferences with related psychological topics (Peng, Fitzgerald, & Semrau, 2000). By engaging in this process, new knowledge is socially constructed and shared in legitimate communities of practice.

Research Procedures and Findings with the Practice Field Cases

Research conducted with the practice field cases during the period 1997-2003 validates the efficacy of the evaluation model. All evaluation procedures have been used in previous research studies and were found useful in measuring outcomes and establishing effectiveness of learning through practice field cases. By combining the measures and procedures into a comprehensive evaluation model, research can now be carried out to study instructional contexts and implementation strategies for practice field instruction that will most effectively produce transfer of learning to professional practice for teachers.

Fitzgerald, Wilson, & Semrau (1997) reported on the use of the field practice materials in graduate education courses in two field test sites that differed in course structure and available technical support. Analyses of data included audit trail user records, computer-generated reports while working on the materials, and qualitative interviews from participants in the two sites. Significant differences were found in the use of materials, learning outcomes, and satisfaction with the materials between users in the two sites. Full use of the materials and positive outcomes were only found with users in the site where the materials were fully integrated in course instruction and technical support was provided in a computer lab. Using a holistic scoring rubric, learning outcomes demonstrated modest change in perspectives towards behavioral disorders, significant change in views towards teamwork, and a high value placed on the importance of multiple perspectives. Thematic analysis of user interviews supported the belief that the program was a good way to learn and emphasized the importance of technical support.

A similar study was conducted in a graduate behavioral disorders course (Fitzgerald, Semrau, & Deasy, 1997). Audit trail user records supported the previous findings. Student feedback documented that users were satisfied with the quality and usefulness of the interactive case materials. Through open-ended questionnaire responses, students expressed comfort with the use of computers and multimedia to support their own learning. They valued the opportunity to "see" children in naturalistic situations, gain information from expert commentary in the programs and case records, and practice the steps of the assessment process.

Demographic surveys, a learning styles instrument, and pre/post concept maps were used to examine the effects of individual differences on usage patterns and learning outcomes from the cases (Fitzgerald & Semrau, 1998). Significant pre-to-post learning was found across users for achievement scores, breadth and interrelatedness of knowledge measured by analysis of users' concept maps, and the quality of problem-solving reports measured through rubrics. No effects were found for demographic grouping variables on the outcome measures. Growth in knowledge construction was displayed on concept maps through the number of unique nodes (breadth of knowledge) and number of links (interrelatedness of knowledge) but not on the number of levels (depth of knowledge). Students with differing field dependence/independence learning styles used the program an equivalent amount of time. Differences were found in their allocation of usage time across two of the four instructional components in the cases, but these differences did not influence learning outcomes. Results suggested the practice field cases provided an equally-effective learning environment for students regardless of learner differences.

Two studies have been conducted on the use of online conferencing related to topics in behavioral disorders for students who used the field practice materials. One study examined the variation of structure and participation for online conferences (Peng, Fitzgerald, & Semrau, 2000). Four different structural models were used in running conferences. Data were collected on frequency of messages, word counts of messages, and key word analysis for themes. The findings revealed equivalent levels of user participation regardless of prior computer experience, teaching experience, access to equipment, typing skills, learning styles, writing anxiety, or frequency of e-mail and Internet use. Graduate students demonstrated significantly higher levels of participation compared to undergraduate students. Less structured conferences allowed participants to initiate more of their own topics of concern. Structure and facilitation provided an even level of participation and ongoing discussion. A second study focused on online dialogue among inservice teachers who had been introduced to the performance support materials for children that accompany the case materials (Koury, Cosgrove-Grubisa, & Fitzgerald, 2001). An

online discussion group was provided following training to discuss the use of the program. Coding of messages suggested that the online discussion format and involvement of experts helped sustain the dialogue about the use of materials and assisted in implementation.

The Evaluation Model

The evaluation model is a mixed-methods model appropriate for measuring and explaining the effectiveness of practice field instruction occurring in multiple training programs where contexts and implementation are allowed to vary naturally. The data serve to document contexts, implementation variables, learning outcomes, and transfer of knowledge and skills to professional practice. The purpose of using a mixed methods analysis is to incorporate both qualitative and quantitative data to aid in interpretation of findings. Information from multiple data sources within and across trainings can be integrated to explain outcomes and guide practice. Although the following model is described for practice field instruction in teacher education, the methods should be easily adapted to training in other professions. This particular model focuses on use of technologies in practice fields: interactive cases, online discussions and chats, and electronic performance support systems.

Evaluation Questions and Methodology

Question	Sub-Questions	Data Sources	Data Collection
1. How are practice field cases implemented effectively in teacher education? What implementation variables influence effectiveness in multiple contexts?			
1A	How are practice field cases implemented?	<ul style="list-style-type: none"> • Syllabi and assignments • User audit trail records on disk collected while using cases • User statistics during use of online discussion board or chats • Records of materials usage • Instructor field notes • Researcher memos 	Ongoing throughout each semester of implementation
1B	What do students learn from practice field cases?	<ul style="list-style-type: none"> • Qualitative analysis of artifacts within cases using rubrics • Concept map scores for maps created at multiple benchmarks during training • Instructor field notes • Researcher memos 	Near the end of each semester of implementation
1C	What do learners perceive as the benefits and limitations of practice field case-based instruction?	<ul style="list-style-type: none"> • Semi-structured interviews • Researcher memos 	Following each semester of implementation
1D	What changes are needed in preparation programs to utilize and sustain practice field cases in preservice/ inservice training?	<ul style="list-style-type: none"> • Coding and theme analysis of online discussion with consumer focus group members • Researcher memos 	Following completion of all implementations
2. How are practice field discussion groups offered effectively during training? What participation variables influence effectiveness in multiple contexts?			
2A	How does online discussion with other learners affect social construction of knowledge, skills, and problem solving?	<ul style="list-style-type: none"> • Discourse analysis of online discussions and chats through coding and theme identification • Instructor field notes • Researcher memos 	Ongoing throughout each semester of implementation
2B	How does online discussion with field-based professionals	<ul style="list-style-type: none"> • Qualitative analysis of artifacts contained in instructional and 	Ongoing throughout each

	and parents affect social construction of knowledge, skills, and problem solving?	intervention materials <ul style="list-style-type: none"> • User audit trail records on performance support tool programs • Concept map scores for maps created at end of applied practice • Observations by field supervisors • Instructor field notes • Researcher memos 	semester of implementation
2C	What do learners perceive as the benefits and limitations of practice field discussion groups?	<ul style="list-style-type: none"> • Semi-structured interviews • Researcher memos 	Following each semester of implementation
3. How are knowledge and skills gained in practice field cases utilized in child services during training? What sustained outcomes emerge during guided practice?			
3A	In what ways are knowledge and skills applied to child services during training?	<ul style="list-style-type: none"> • Qualitative analysis of artifacts contained in instructional and intervention materials • User audit trail records on performance support tool programs • Concept map scores for maps created at end of applied practice • Observations by field supervisors • Instructor field notes • Researcher memos 	Ongoing in semesters following training when placed in student teaching, field practice, or internships
3B	How do learners perceive the applicability of knowledge and skills developed in the practice field cases to child services?	<ul style="list-style-type: none"> • Coding and theme analysis of online discussions and chats during guided practice phase • Semi-structured interviews • Interviewer field notes • Researcher memos 	Ongoing in semesters following training when placed in student teaching, field practice, or internships
4. How are knowledge and skills gained in practice field cases transferred to child services in employment settings? What sustained outcomes emerge during employment?			
4A	In what ways are knowledge and skills transferred to child services in employment settings?	<ul style="list-style-type: none"> • Qualitative analysis of artifacts contained in teaching and intervention materials • User audit trail records on performance support tool programs • Concept map scores for maps created at end of follow-up phase • Researcher memos 	Follow-up when trainees enter professional practice settings related to training
4B	How do practicing teachers perceive the applicability of knowledge and skills developed in the practice field cases to child services?	<ul style="list-style-type: none"> • Coding and theme analysis of online discussions and chats during employment phase • Semi-structured interviews • Interviewer field notes • Researcher memos 	Follow-up when trainees enter professional practice settings related to training

Evaluation Instruments

Contextual Factors

- Setting: face-to-face, online, web-enhanced, summer
- Course offering: preservice, inservice, undergraduate, graduate
- Type of discussion group: within class, within field; mixed class with field professionals, chats

- Type of required application/transfer: simulated, real practice settings, employment settings
- Implementation of children's electronic performance support software: yes or no; how implemented

Demographic Factors

These should be selected to answer specific questions about learner differences, such as age, rank in school, computer experience, online experience, licensure, years of professional experience, etc.

Audit Trail Records of Case Usage

Program usage data are collected automatically as users interact with the case programs through an audit trail. These data include time, sequence, embedded notes, and written records entered into the computer-generated activities. The user records can then be used to generate information for user variables important for questions being addressed in the evaluation (time in case, activity completion rate, activity sequence, time in different types of case activities), to capture activity artifacts (reports, plans, reflections) for assessment with rubrics, and the use of performance support tools (within the case and in real-world applied settings).

Artifact Analysis Using Rubrics

Rubrics can be used to evaluate the quality of problem solutions within the case activities. Rubrics are well-suited to assess performance on learning activities that are complex and authentic. A rubric offers a number of codes that are scaled for the important dimensions of a performance. Prior to using the rubrics, reliability across the scorers must be established.

User Statistics during Online Discussion Board

Data can be captured from online discussion groups and chats, including frequency of participation and number of accesses over time.

Coding and Interpreting Online Discussion Groups and Chats

Coding and Interpreting Instructor Field Notes, and Researcher Memos

Coding can be done in two ways. First, discussions and field notes can be coded as labels; the purpose of label coding is to find data that capture what people say and do and code in a way that data can be categorized, linked, identified by themes, and interpreted. Second, discussions can be coded analytically to identify and retrieve data that fit categories of interest to the evaluator to aid in following hunches and interpretation. Instructor field notes can be coded to document implementation variables.

Concept Map Scoring

Concept maps can be constructed by participants at training and transfer milestones to display how they conceptualize problem-solving approaches in their areas of training. Participants must follow standardization guidelines for the length of time to spend creating the map, but they have no restrictions on detail or complexity to represent their concepts. Concept maps are scored for (a) number of unique nodes that represents the breadth of the concept, (b) number of links between nodes that represent the interconnectedness of knowledge within the concept, and (c) number of levels out from the center node which represents the complexity or depth in the concept. Instructors can provide a memo for each concept map commenting on the correctness of the information, its organization, and growth in learning by the participant (by comparing maps across time). The qualitative information from the memos are then linked to the map scores to provide interpretive data.

Semi-structured Interviews

Interviews can be conducted near the end of each natural phase of the training program, such as end of semesters, end of practical training periods, and at some point after entry into professional practice (employment). The primary purposes for conducting the interviews are to: (1) capture the participants' perceptions and exemplars they can provide that can demonstrate their learning through the use of cases, participation in online discussions, and use of electronic performance support tools, and (2) query reflections on how the knowledge and skills gained through the training impacted what the learners did in child services during training and/or employment (transfer). Interview data can be coded by labels to help develop categories and themes for analysis.

Future Developments

With funding from the U.S. Department of Education, this evaluation model is currently being implemented by a research consortium to study the contexts, implementation, learning outcomes, and transfer from the practice field systems to professional practice. Findings from this three-year study will be forthcoming and used to revise the evaluation model as well as to make recommendations on effective implementation of practice field systems in teacher education (Fitzgerald, Koury, Hollingsead, Miller, & Mitchem, 2003-2006).

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