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## Educator Beliefs Regarding Computer-Based Instruction

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## Educator Beliefs Regarding Computer-Based Instruction

### Abstract

The purpose of the mixed quantitative/qualitative study discussed here was to ascertain the beliefs Purdue Extension Resources have regarding Computer-Based Instruction (CBI) for in-service training. Seventeen educators participated in the in-service training using two of five technical sections from an aquaculture CD-ROM tutorial. Educators completed pre-training questionnaires, content assessments, post-instruction evaluations, and follow up interviews. Educators participating in this study had favorable views toward the use of CBI for in-service training programs. The ability to spend less time out of their county and to review materials after the training were two of the key CBI benefits cited by educators.

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## Introduction

In-service training programs are critical to the success of educators employed by the Cooperative Extension Service. In Purdue Extension, professional development through internal training opportunities is an ongoing process where each educator is allocated 15 days per year to attend annual training events. Development of in-service training programs results from the interactions of county and campus staff in responding to the prioritized needs of stakeholders.

Content specialists use a variety of delivery methods, including face-to-face lectures, satellite video conferencing, videotapes, and the World Wide Web (WWW) (Seevers, Graham, Gamon, & Conklin, 1997). More recently, computer-based instruction (CBI) has generated considerable interest among administrators, content specialists, and educators as a supplement or replacement to traditional methods of in-service training. Some of the cited benefits of CBI for adult learners include:

- Privacy,
- Achievement gains,
- Learner control,
- Cost effectiveness,
- Open entry and exit,
- Individualization of pacing and content,

- Student record keeping,
- Flexibility in scheduling,
- Consistency of content, and
- Instructional timesavings (Askov & Clark, 1991; Kulik, Kulik, & Shwalb, 1986).

## **Purpose of Study**

Because of the growing interest in the use of CBI, there is a need to compare its effectiveness with typical 1-to-3-day, face-to-face lecture in-service training prior to widespread implementation. The study discussed here investigated the mode of content delivery, time to deliver the instruction, delivery cost, and educator beliefs toward CBI during an aquaculture in-service training program. This article presents qualitative results describing Purdue Extension Agriculture and Natural Resources (ANR) Educator beliefs regarding CBI for in-service training.

## **Materials and Methods**

### **Participants**

In December 1998, 34 Purdue Extension ANR educators volunteered to participate in the study. Of the 34 educators participating in the overall experiment, 17 were selected to participate in the beliefs aspect. All participants were County Extension Directors (CED) who used personal computers at least weekly. Participant's beliefs regarding CBI for in-service training were obtained using an open-ended questionnaire and follow-up interviews of six key informants from the CBI group. Stratified purposeful sampling was used to address the beliefs held by educators because it involves picking a small group of educators within the ANR program area with the purpose to describe some particular subgroup in depth. This approach was best suited for determining educator beliefs.

### **CBI**

The CBI tutorial *Getting Started in Freshwater Aquaculture* (Swann, Katz, Merzdorf, Brown, Luba, & Talbert, 2000) was used. Of the five technical sections on CD-ROM, water resources and production methods were used during this experiment.

### **Pre-Training Questionnaire**

All participants in the study completed a demographic profile questionnaire prior to the training. An open-ended questionnaire was developed to obtain pre-training beliefs on the design and delivery of in-service training, computer experience for training, beliefs regarding implementation of CBI for in-service training, and their view of the advantages and disadvantages of CBI. Questionnaire results were used to select six educators as key informants for follow-up in-depth interviews.

### **Post-Instruction Evaluations**

The 25-item post-instruction CBI evaluation had questions pertaining to the training facilities, program content, program objectives, program functionality, and program user-friendliness. In addition, one question asked participants about their willingness to participate in independent study programs instead of face-to-face in-service training. A second question asked participants to estimate the potential of in-service timesavings through the use of CBI at their office. Evaluations were scored using a 10-point Likert-like scale and summarization of written comments.

### **Interview**

Six participants from the CBI group were selected to be key informants for in-depth interviews following the in-service training. Participants were purposely selected to represent gender, age, and responses to the pre-training questionnaire. One of the two females in the CBI group was selected. A representation of respondents who provided either positive or negative comments toward CBI on the pre-training questionnaire was interviewed. Representation of late-career and mid-career participants was included.

After completing a 120-day delayed posttest, interview participants were asked to respond to four questions regarding their beliefs toward CBI in Purdue Extension in-service training. The questions were written to allow the educators to provide in-depth comments on any change in beliefs since participating in the CBI training, perceived time savings from CBI, potential impediments to widespread implementation of CBI, and their perception of how CBI could be integrated into existing in-service training programs.

### **Training Format**

CBI participants were provided access to a 15-station computer laboratory at the training site. Headphones were provided to reduce distractions when multiple users were working simultaneously in the computer laboratory. Prior to the training, each educator completed the pretest. Each participant was then allocated up to 2 hours to complete the training. When each participant felt prepared or at the end of the 2-hour allocation, the posttest was administered and the post-instruction evaluation completed.

## Data Analysis

Inductive analysis using sensitizing concepts was used to determine patterns, themes, and assertions from the open-ended pre-training questionnaire and post-instruction interviews (Patton, 1990). Inductive analysis means that the patterns, themes, and assertions of analysis come from the data rather than being imposed by the researcher. Sensitizing concepts provide a basic framework highlighting the importance of certain kinds of events, activities, and behaviors. Sensitizing concepts means the researcher has conducted the required background work necessary to understand the experimental setting before entering it. These patterns, themes, and assertions helped the researcher understand the educators' beliefs regarding the appropriateness of CBI for in-service training (Patton, 1990).

Data from the pre-training questionnaires and post-instruction interviews were compiled into data matrixes for each group. These matrixes were used to identify emergent patterns and themes found through analysis and to make assertions by the author (Erickson, 1986). Each data source was examined for disconfirming evidence (Erickson, 1986) in an attempt to test emerging assertions. Data clips were included for each assertion developed. Individual assertions were tested based on confirming/disconfirming evidence between the individual and evidence of the other key informants. Questionnaire and interview data were compared for congruency and triangulation across data sources for the purpose of addressing validity of participant beliefs (Patton, 1990).

## Results

### Pre-Training Questionnaire

When asked to describe expectations when enrolling in a training program, educators responded with a general belief that training programs should:

- Use a variety of delivery methods,
- Be applied rather than theoretical,
- Provide interactions with instructor and other participants, and
- Involve minimal travel.

Interaction was viewed as an essential part of in-service training programs. Peer interaction and interaction with instructors were viewed as a valuable way of addressing difficult concepts and as a means of placing new technical information in perspective with the daily work function of the educators. CBI was viewed as a way of decreasing travel, reducing program cost, providing timely content information, providing flexibility in scheduling, allowing self-pacing, and providing the opportunity to review technical information after the training. The educators, however, viewed computer hardware and software incompatibilities, the lack of interactions with peers and instructors, and motivation to complete the CBI training as disadvantages of CBI.

### Post-Instruction Evaluation

Overall, each evaluation category received either a medium or high rating. Highest scores were in the content category, and the lowest score was the question about whether the presence of an instructor would have enhanced the quality of the training (Table 1). It was possible to determine internal validity regarding the need for an instructor or the interest in future CBI. However, there is evidence that educators were interested in participating in future CBI with a preference for CBI with some form of interaction with an instructor.

**Table 1.**  
Results of Post-Instruction Evaluation

Category	Mean Score <sup>1</sup>	SD
Training Facilities (1) <sup>2</sup>	8.06	1.44
Content (4)	8.43	0.55
CBI Program Functionality (6)	7.83	0.51
Assessment (3)	7.78	0.39
Need for Instructor (1)	6.29	0.87

Interest in Future CBI (1)	7.82	1.08
<p><sup>1</sup>Score based on the mean of each question within a category using a 10-point Likert-like scale with 1 = strongly disagree and 10 = strongly agree.</p> <p><sup>2</sup> Numbers in parenthesis indicate the number of questions within each category.</p>		

## Case Studies

Case studies of six key informants were developed using the demographic data and test results.

### **Case CBI-1**

CBI-1 was a 44-year-old female who has worked in Purdue Extension for 23.5 years and served as CED for 19.5 years. She spends 15 days per year in professional development programs. CBI-1 used 90 minutes to complete the CBI training and had 19 correct responses (35%) on the pretest, 34 correct responses (63%) on the posttest, and 33 correct responses (61%) on the delayed posttest.

### **Case CBI-2**

CBI-2 was a 43-year-old male who has worked in Purdue Extension for 16 years and served as CED for 10 years. He spends 14 days per year in professional development programs. CBI-2 used 90 minutes to complete the CBI training and had 18 correct responses (33%) on the pretest, 41 correct responses (76%) on the posttest, and 28 correct responses (52%) on the delayed posttest.

### **Case CBI-6**

CBI-6 was a 57-year-old male who has worked in Purdue Extension for 9.5 years and served as CED for 9.5 years. He spends 15 days per year in professional development programs. CBI-6 used 105 minutes to complete the CBI training and had 30 correct responses (56%) on the pretest, 54 correct responses (100%) on the posttest, and 46 correct responses (85%) on the delayed posttest.

### **Case CBI-11**

CBI-11 was a 48-year-old male who has worked in Purdue Extension for 20 years and served as CED for 19 years. He spends 15 days per year in professional development programs. CBI-11 used 71 minutes to complete the CBI training and had 14 correct responses (26%) on the pretest, 39 correct responses (72%) on the posttest, and 25 correct responses (46%) on the delayed posttest.

### **Case CBI-12**

CBI-12 was a 52-year-old male who has worked in Purdue Extension for 7 years and served as CED for 2.5 years. He spends 13 days per year in professional development programs. CBI-12 used 60 minutes to complete the CBI training and had 13 correct responses (24%) on the pretest, 39 correct responses (72%) on the posttest, and 28 correct responses (52%) on the delayed posttest.

### **Case CBI-16**

CBI-16 was a 49-year-old male who has worked in Purdue Extension for 15 years and served as CED for 9 years. He spends 6 days per year in professional development programs. CBI-16 used 94 minutes to complete the CBI training and had 30 correct responses (56%) on the pretest, 49 correct responses (91%) on the posttest, and 47 correct responses (87%) on the delayed posttest.

## Assertions

The assertions made in the study discussed here suggest that, when properly integrated, CBI is an effective and efficient means of providing in-service training to Purdue Extension ANR educators.

### **Assertion 1: CBI Has the Potential to be Effectively Used for Extension In-Service Training**

All of the interview participants had favorable comments toward the use of CBI for in-service training. The two educators with the most computer experience had the most favorable comments regarding CBI. This is demonstrated by a comment made by CBI-1.

In today's busy lifestyle, with people trying to balance work and family, as well as keep up career-wise, that it (CBI) gives them an opportunity for a flexible learning schedule.

The oldest participant was CBI-6, who had no prior experience using computers for this type of learning. Comments on the pre-training questionnaire indicated that his prior experiences using computers were less than satisfactory.

They have all been rather "bad" experiences in that I learn through repetition and with manuals to refer back to. Most Extension computer training sessions are "one shot-one time" deals with no written manuals and this for me is no good!"

After participating in the aquaculture CBI in-service, CBI-6's belief about the use of CBI for in-service appeared to have changed to a more favorable attitude.

Before the aquaculture training, I'd never had any so-called computer-based instruction and I had no opinion about. My opinion now is that I think its super. I like the idea that you can at your own pace go back and refresh yourself after a week or two months, 6 months or a year later.

Not all of the interview participants felt as strongly about CBI for in-service. CBI-12 felt that CBI had potential, but that there were also shortcomings in the use of CBI for in-service.

The one shortcoming is that if you have a hot topic that is not specifically answered through the computer you don't have anybody to go to that can answer this question.

***Assertion 2: CBI Has the Positive Attribute of Decreasing the Amount of Time Out of the Office***

CBI-2 recognized that CBI could reduce the amount of time he would have to spend out of the office.

I think what the educator would have to realize is that. . . hey I'm going to be able to spend another day in the office or be available for my clientele if I can dedicate this two hours or what ever it takes to complete this training. I think if you can be disciplined enough to do that, then I think that's maybe what you're going to need to do.

CBI-16 felt that a CBI training format decreases the training time by allowing self-pacing.

In the computer based format I can cut to the chase, so to speak and eliminate a lot of the information that I may feel I have a grasp on and go to the stuff that I need to bone up on a little better. If at that higher level I felt that I needed a little a more background, I could zip right back to that background information.

***Assertion 3: Interaction with Participants and Instructors Is a Very Important Part of In-Service Training for Extension ANR Educators***

CBI-6 felt the need for group interaction was an important part of in-service training, but not solely for the purpose of discussing content.

The (personal) interaction part to me is important because if you visualize a situation where here I am sitting in this office, in the middle of my county, and I'm the only one here that gives a hoot about agriculture, and you do that for weeks on end you start feeling just a little isolated. Interaction with participants and the instructor is important, but interaction doesn't all have to be face-to-face. . . . The interaction sometimes can be email back and forth over a computer.

CBI-2 provided evidence against the common pattern among educators that interaction is best in a face-to-face format.

I guess the positive thing that I see is that instead of having 30 educators at a training where you lecture to them for three days it's going to provide more opportunities for one-on-one interactions. I think most educators feel that's probably where more education takes place.

***Assertion 4: Incompatible Computer Hardware/Software Has Been an Impediment to Wider Implementation of CBI for Purdue Extension In-Service***

Comments made by CBI-6 exemplify the past frustrations educators have had with county computer systems being incompatible with most software developed.

If some of the people that were trying to be trained didn't feel comfortable sitting there using a computer it would be difficult for them. The other problem might be if the computers that are being used like many of us have here in offices now are incompatible with those on campus.

***Assertion 5: Self-Discipline by Educators and Flexibility in Scheduling by Specialists Will Increase the Effectiveness of CBI***

CBI-12 expressed a common concern of educators in regard to the self-discipline required to complete CBI.

Knowing whether in fact I did take the time to complete it (training) or whether it was one of those things that. . . gosh, I have three other meetings today, I'm gone on vacation at the end of the week. All of a sudden that thing has been sitting there for a couple weeks and I've forgotten about it.

## Conclusions, Implications, and Recommendations

The Purdue Extension ANR educators participating in this study had favorable views toward the use of CBI for in-service training programs. Spending less time out of their county and the ability to review materials after the training were two of the key CBI benefits cited by educators.

### Implication

A "one-size fits all" approach may not be the most effective way of delivering instruction to Purdue Extension educators. They prefer a variety of delivery systems when receiving in-service training. A combination of CBI, the Web, electronic mail, Internet chat software, Internet discussion groups, satellite teleconference, phone conferencing, small group interactions, hands-on activities, and face-to-face lecture would be preferred to the use of only one or two delivery methods. Based on the participants' comments from the pre-training questionnaire, pure lecture alone, without other activities such as field experiences, was the least preferred method of acquiring new technical information by educators.

### Recommendation

Purdue Extension would benefit by creating an assessment team composed of educators and specialists to compile a list of in-service training programs currently conducted by Purdue Extension. A prioritized list based on audience size, frequency of occurrence, funding sources, and multi-departmental involvement will aid in concentrating efforts and resources toward the development of high-priority CBI training modules useful in conjunction with traditional lecture formats or as stand-alone training modules for educators.

Any CBI should include some form of interaction with the instructor and other participants. Ideally, the interaction would be a shortened face-to-face session to assist in processing the information from the CBI module through clarification of difficult concepts. Alternative methods of interaction between instructor and participants could include the use of conference phone calls, two-way video conferencing, and Internet chat rooms and discussion groups.

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