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ABSTRACT

The EnterTech Project was a collaboration of over 80 coalition members (employers, educators, community-based organizations, government entities) whose purpose was to develop a training program to prepare unskilled workers for employment opportunities in Texas high-tech industries. Development of the EnterTech curriculum and instructional design centered on incorporating guidelines from the targeted learners' needs assessment into an integrated learning environment (ILE), or blended learning, that used simulation-based training and other instructional strategies to construct a comprehensive employability skills training program. ILE components were computer-based training, instructor's role, group-based projects, print material, and skills transcript and work portfolio. A study addressed issues pertaining to EnterTech ILE. Participants were learners who attended EnterTech classes from March 2000 to November 2001. Data were collected by online surveys, instructor evaluations of learner performance, and computer-embedded tracking. Findings indicated learners' expectations were met at end of training; at least 93 percent of learners were able to correctly perform tasks without significant help from others and without significant errors; the overall employment rate was 44 percent; employers expressed high levels of satisfaction with learners' on-the-job performance. (Contains 16 references, 9 tables, and 3 figures.) (YLB)

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The EnterTech Integrated Learning Environment:

Simulating Entry-Level Job Skills in a Virtual Company

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The State of Texas' Governor's Office awarded funding for the EnterTech Project through a three year demonstration project grant and the Texas Workforce Commission provided grant oversight. The opinions expressed herein are solely those of the authors and do not necessarily represent those of the State of Texas' Governor's Office or the Texas Workforce Commission.

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Abstract

The EnterTech Project demonstrates the effectiveness of a theoretical based integrated learning environment in training non-traditional learners to perform required skills and abilities to be successful in entry-level jobs. The ILE places instruction in a real world, workplace context with realistic settings, characters, and storylines. The multimedia interface actively engages learners and encourages them to apply what they know and to seek out new skills and information. Instructional techniques include project-based and problem-based learning, "just-in-time" remediation, scaffolding, mentoring, and individualized instruction. Transparent assessment, embedded in computer-assisted tasks, insures consistent monitoring of learner progress and skill mastery. The success of the EnterTech ILE broadens the application of multimedia-based simulation to education.

The EnterTech Integrated Learning Environment:

Simulating Entry-Level Job Skills in a Virtual Company

The EnterTech Project was a collaboration of more than 80 coalition members (employers, educators, community-based organizations, and government entities) whose purpose was to develop a training program to prepare unskilled workers for employment opportunities in the high-tech industries in Texas. In 1998 when development of the EnterTech Project began, high technology jobs were projected to have the largest increase in job vacancies or openings in Texas by 2005 (Texas Workforce Commission, 1998). Yet, employers were having trouble filling their current job positions. Sixty percent of employers within high-tech companies reported a shortage of qualified workers. Furthermore, employers noted many of their current employees lacked essential skills, including computer skills, communication skills and problem-solving skills (Regenstein, Meyer, & Hicksl, 1998). Employers needed a skilled and reliable workforce.

EnterTech developers saw the employers' need for a skilled workforce as an opportunity to help less skilled or unskilled workers fill these positions. Therefore, EnterTech was designed for a specific population, referred to as the targeted learners, which included individuals who were unemployed or underemployed, welfare recipients, at-risk youth, teen parents and dislocated workers. Many of the targeted learners lacked work experience and computer skills. Those who were employed often had jobs that were temporary, seasonal, or offered unstable work hours (Nightingale, 1997). The targeted learners needed skills improvement to gain employment.

The goal of the EnterTech Project was to satisfy both the employers' needs and the targeted learners' needs by enabling learners to gain knowledge and skills that would allow them to attain entry-level positions in the high-tech industry. *The Monthly Labor Review* (1998) reported higher average weekly salaries for manufacturing employees, $533.40 per week, versus

service industry employees earning $400.33 per week. Not only did the high-tech positions offer better wages than jobs in the service industry, but also many included healthcare benefits. Entry-level positions in the high-tech companies were more than jobs; entry-level positions were opportunities for targeted learners to start their personal career ladders.

In order to help the targeted learners, a needs assessment was conducted to identify the learners' characteristics and the possible barriers to employment that prohibited the learners from gaining stable employment. As a result, it became evident that the EnterTech curriculum and instructional design would need to encompass a variety of aspects that were typically not found in a traditional classroom. The ideal form of training was apprenticeship, yet this was an inefficient and costly process. At EnterTech's inception, however, simulation on desktop computers had become a feasible facsimile to on-the-job training. Advances in multimedia technology facilitated the recreation of workplace environs within reality-based simulation technologies that can be experienced on computers in public schools, libraries, colleges, and community-based centers.

The employer requirements, the nature of the learner population, and the complexity of the surrounding issues necessitated the creation of an integrated learning environment (ILE), also called blended learning, that used simulation-based training and other instructional strategies to construct a comprehensive employability skills training program. The ILE creates a holistic environment to train individuals in the skills that employers need most. Through computer simulation and instructor facilitation, a computer lab becomes a high-tech manufacturing company of which the learners are now "role playing" as EnterTech employees. Situations arise that require immediate action. Decisions are made and consequences are experienced. Learners are exposed to various aspects of a high-tech manufacturing company, from the tedious repetitive

tasks to the rapid actions required during rush orders. Learners experience a complete environment through performance-based activities. For example, safety awareness in the warehouse becomes top priority after a simulated forklift accident. The EnterTech employees are required to assess the current safety rules, make necessary changes, and report their findings during a presentation to the company. Just-in-time remediation materials, team-based projects, and the mentorship and facilitation of the instructor round out a learning environment designed to foster both individual and group success.

Figure 1 illustrates the structure of the ILE and the flow of the learner through this blended learning environment. The components of the ILE are computer-based training, role of instructor, group-based projects, print materials, and skills transcript and work portfolio. This study focuses on the performance of the targeted learners within the ILE and the effectiveness of the ILE components to meet the expectations of the learners in enabling them to gain employment.

[Insert Figure 1 about here]

The following discusses the results of the targeted learners' needs assessment; the theoretical framework for the curriculum and instruction; a basic description of the EnterTech training program; the components of the ILE; and the research questions under investigation. The remaining sections of this article report the methods, results, discussion, and the educational importance of the EnterTech ILE.

Needs Assessment

Jackson (1998b) conducted a needs assessment on persons receiving welfare benefits, such as Temporary Aid to Needy Families (TANF). By focusing on the hardest to serve group, the EnterTech curriculum and instruction would address the needs of a broad range of learners. The

needs assessment identified the characteristics of the learners, described employment barriers, and resulted in five guidelines for the development of the EnterTech curriculum and instructional design.

A large majority of welfare recipients were single mothers ages 20 to 30 years old. The ethnicity of mothers on welfare varied: 37% white, 36% African American, 20% Hispanic, and 6% other. Most welfare recipients had one to two children. In terms of education level, 58% of welfare recipients reported graduating from high school and some enrolled in college courses. The remaining 42% did not graduate from high school (Demetra, 1997).

Olson and Pavetti (1996) identified several barriers to the targeted learners' employment, including low skills, which were the most common barrier for welfare recipients. Additional barriers to employment were substance abuse, health limitations, depression, childcare, transportation, and a chronically ill or disabled child. Many of the targeted learners lacked social, emotional, and monetary support. A general aim of employment is to provide monetary support, but for the targeted learners this was not sufficient to transition successfully to full-time employment. Based on the findings from the needs assessment five guidelines were recommended for the EnterTech instructional design process.

Create a learner support model connecting learners to necessary resources within their community. The targeted learners needed a process to establish a support network. Learners needed a variety of different supports, including childcare and transportation. EnterTech training needed to provide learners a safe environment and specific instructions about establishing support networks.

Assist learners in attaining entry-level job skills and familiarity with high-tech industry. Most of the targeted learners did not think that working in a high-tech company, such as

Motorola or Dell, was possible for themselves. EnterTech training needed to acclimate them to the culture of high-tech industries thereby allowing them to gain the confidence to apply for these positions.

Learners require interpersonal and teaming skills such as positive attitude, reliability, and dealing with authority. EnterTech training needed to focus on people skills, not just technical skills. Learners needed to gain experience in dealing with social challenges in the work place.

Provide for individual differences in academic and social abilities. The diversity of the learner population required a training program with multiple ways to impart information. The curriculum needed to provide time for remediation and needed to accommodate learners who progressed more quickly or slowly through the program.

Provide instructor support mechanisms to create a holistic environment for teaching. The instructor needed a way to monitor learners as they progress through the program at different paces. Support resources for the instructor were needed to assist all learners in reaching the instructional goals.

Theoretical Framework

Incorporation of these guidelines in to the instructional design and curriculum of the EnterTech Project were based on constructivist theory (sometimes called situated learning), social learning theory, and cognitive theories. Constructive views the learner as an active participant in the learning process. Bandura's social learning theory emphasizes learning through reinforcement from the environment (Lefrancois, 1991). Cognitive theories focus on information processing whereby the organization and interpretation of stimuli are transformed into meaningful information.

The constructivist theory defines learning as knowledge gained through interactions with the environment. Constructivism is a dynamic learning process. As learners interact with other learners or objects in a situation, the learners are determining their own meaning and constructing knowledge (Fosnot, 1996). This knowledge is added onto previous knowledge and is used in building new knowledge in future situations. EnterTech created an active learning environment with the situated structure of a high tech manufacturing company. The simulated environment provided learners with a situation in which to build knowledge.

Bandura's social learning theory emphasizes knowledge gained through observing behaviors that are reinforced and then imitating the behaviors to receive reinforcement (Lefrancois, 1991). The simulated high-tech environment of EnterTech models desired skills and behaviors through the interactions of virtual characters. Instructors lead group activities in which learners observe each other performing work tasks such as presentations and teaming. Then the learners are afforded the opportunity to perform the tasks in a non-threatening environment.

For remediation, Ausebel's recommendations for connecting prior knowledge to new materials were used in the form of "advanced organizers" (Lefrancois, 1991). Ausebel emphasizes that new learning is made meaningful by its association to previous learning. Some learning theorists call this "scaffolding" because the strategy is to help students bridge prior knowledge to new concepts. Rather than an abstraction or rote recall of information, learning is made "meaningful" because it has a direct relationship to known ideas. For remediation materials, EnterTech starts with what is commonly known and associates it to new or unfamiliar concepts and uses within the work environment.

EnterTech Training Program

Before discussing the components of the ILE, a brief description of the EnterTech training program follows. EnterTech consists of 45 (50-minute) modules in which 70% of training involves computer-based activities and 30% of training includes group-based and instructor led activities. Training takes place in a computer lab with 5-20 learners and one instructor. The training assists learners in gaining the knowledge, skills, and abilities to perform 44 employer-validated performance objectives organized into the following eight skill areas.

Job Skills. Job skills focus on the processes and procedures to be followed within any employment setting. This includes familiarity with various job responsibilities and understanding customer relationships. Learners develop an appreciation for company procedures, such as knowledge of the employee handbook and proper work attire.

People Skills. People skills involve self-awareness and interactivity with coworkers and supervisors. Learners identify their personal strengths. These skills address good work habits, positive attitude, cooperative learning skills, giving and receiving criticism and dealing positively with diversity.

Organizational Skills. Organizational skills include locating and evaluating information, time management, and use of business tools such as email, flowcharts, and word processing. Accurate use of organizational skills often leads to increased productivity and a positive work environment.

Communication Skills. Communication skills include written and oral communication. These skills consist of imparting information to others and gaining information through listening. Speaking clearly and concisely and following directions leads to competent work teams.

Reading and Writing Skills. Basic reading and writing skills are necessary for most job positions. These skills allow learners to attain information from visual inspection and interpret the valuable aspects. Information is gained from a variety of sources, such as graphics, maps, charts, and invoices. Learners gain writing skills to record and report information.

Number Skills. Number skills, such as basic addition, subtraction, multiplication, division, and use of measurement tools, are prevalent in many job positions. Within the context of work, number tasks are often subtle aspects of more complex tasks. Proficiency in number skills allows learners to complete work tasks that may otherwise be difficult.

Strategy Skills. The application of strategy skills to problem situations is critical to any self-sufficient working environment. Strategy skills focus on the use of problem-solving techniques to generate solutions and to evaluate productivity.

Growth Skills. Growth skills encourage learners to continuously enhance their skills and abilities. Effective learners are aware of their personal learning strategies; evaluate their level of knowledge and skills; and recognize when these need to be improved. Growth skills consist of ongoing learning and sharing learning with others.

The EnterTech skills are presented through experiential learning set in three sections, Warehouse, Materials Handling, and Materials Assembly, which reflect the departments of a typical high-tech manufacturing company. Within each section, learners meet virtual co-workers and supervisors, perform simulated tasks thereby gaining the employer-validated skills, and experience the sights, sounds, and terminology of a high-tech manufacturing company. The simulated environment supports an engaging narrative storyline that is threaded throughout the program.

Integrated Learning Environment (ILE)

In order to meet the diverse needs of the targeted learners, the instructional design team incorporated a variety of teaching tools into the curriculum. Although the goal of the EnterTech training is to have each learner achieve a high level of performance on all of the 44 performance objectives within the eight learning areas, the curriculum presents the performance objectives within a narrative storyline imparted to the learners through visual, audio, and multimedia techniques. The simulated tasks, group projects, and workbook activities are all based on the 44 performance objectives. As learners traverse the simulated environment, they gain skills within the context of a high-tech manufacturing company.

The development of the EnterTech curriculum and instructional design centered on incorporating the guidelines from the targeted learners' needs assessment into the ILE. The following discusses each component of the ILE: computer-based training, role of instructor, group-based projects, print materials, and skills transcript and work portfolio.

Computer-based training. The computer-based training includes "just-in-time" learning, interactive multimedia, and audio and visual stimuli. The culture, sights, and sounds of a high-tech manufacturing company are incorporated in simulated tasks that provide the learners with realistic job previews. For example, tasks include reconciling invoices, tracking inventory, packing boxes, building computers, and testing equipment for quality assurance. Each learner becomes an employee of the EnterTech Company with a badge, ID number, and pass code. The computer environment consists of team meetings, simulated tasks, decision points, and a learning resource library. A supervisor begins each virtual "work day" with a team meeting, thereby exposing learners to issues dealing with tardiness, absenteeism, work safety, and personal

attitudes. A virtual coworker explains and demonstrates how to perform each simulated work task. As learners complete tasks, they progress to more difficult tasks.

Decision points enable learners to make choices in a non-threatening environment. Virtual characters discuss a difficult or dangerous situation and learners chose from a list of solutions to the situation that leads the story in different directions. For example, Rita, a virtual character, packs several boxes incorrectly causing them to break. This leads to a safety violation and slows productivity. The learner has to decide how to handle this situation. Some of the choices include reporting the incident to a supervisor, talking with Rita, or ignoring the situation. At the end of the decision point, a virtual character named Adelle, who mentors the learners throughout EnterTech, discusses the learners' decision and the associated consequence. The learners are able to redo the decision points and change their previous choice to see various consequences.

The online learning resource library contains "just-in-time" learning, biographical information on virtual characters, and rules and regulations of the EnterTech Company. The "just-in-time" learning includes written and verbal directions; vocabulary lists pertaining to each task; and is instantly accessible from the task screen. Depending on the type of task, the "just-in-time" learning has interactive tutorials about calculating percentages, estimation techniques, or correcting invoices that are explained by virtual characters.

Role of Instructor. Instructors facilitate the learning experience, creating a working environment rather than a traditional classroom environment. An instructor support model includes an instructor guide and an instructor support web site. The EnterTech learning management system (LMS) provides the basic, electronic tools for class management by the instructor, including syllabus organization, adding and deleting student users, monitoring individual and group progress, and recording performance measures. This provides a flexible

learning environment, allowing the instructors the ability to modify the syllabus or add new learners to the class. The instructor support web site enables instructors to monitor the performance of the learners as they traverse the simulated tasks. Instructors are automatically notified of learners having difficulty on a particular task. The instructor guide provides instructors with a variety of options and resources for facilitating the learners through the program. Instructors are given strategies for involving local employers in the EnterTech training program and helping learners gain employment or continue education after training.

Project-Based Group Activities. The project-based group activities focus on communication and teamwork skills identified as most valuable by employers. Peer to peer interactions enable learners to gain these skills. Presentations and teaming skills focus on three main themes: safety, teamwork, and quality control. For the safety project, learners brainstorm and discuss safety issues in the warehouse. Learners divide into two groups and develop safety presentations. For the teamwork project, learners perform a variety of activities in which they are dependent on each other to successfully complete the activities. One activity involves building a structure out of paper with some learners unable to see, hear, speak or use their hands. For the quality control project, learners are exposed to employer and customer perspectives. As a group, learners compose response letters to customer complaints and discuss the various ways of handling these situations.

Print Materials. The learner print materials include the Student Workbook, Learning Resource, and Personal Planner. The Student Workbook enables learners to engage in activities along with the computer tasks such as writing autobiographies, completing W-2 forms, and diagramming safety signs. The Student Workbook is also used during group activities.

The Learning Resource includes additional exercises for each performance objective illustrating how to perform them in different contexts. The Learning Resource focuses on the fact that the learners already know how to do many of the skills in domestic or social contexts. It identifies for the learners how to perform the skills in a work context. The learning resource provides four types of information:

1. *You've Done This Before.* This information introduces the skill and describes how the learner uses it in everyday life.
2. *How It Works at Work.* This information shows the learner how to apply the skill to situations at work.
3. *Try It.* This information presents exercises to help the learner apply the skill to different work situations.
4. *Remember.* This information recaps the important information about the skill.

The Personal Planner addresses the intersections of the learner's personal life and work. It is designed to help the learner define a support network, handle stress and raise self-confidence, and plan for on-going learning. It also contains information about topics such as money management, paychecks and benefits, childcare and transportation. The Personal Planner includes a 12-month calendar and is designed to be an ongoing resource for the learners long after completing the EnterTech training.

Skills Transcript and Work Portfolio. After completing the EnterTech training, learners receive a Skills Transcript and Work Portfolio. The Skills Transcript has three sections. First, it graphically illustrates the learner's performance for each of the eight skill areas. This visually demonstrates the learner's ability in a clear and concise format. It allows interviewers to see the specific skills attained by the learner. The second section is allotted to the instructor to add

qualitative information about the learner. The third section lists the 44 performance objectives and the highest performance level attained by the learner for each performance objective.

The Work Portfolio is a combination of documentation illustrating the learners' performance in the EnterTech training. Included in the Work Portfolio are the Skills Transcript, resume, cover letter, I-9, and W-2 forms. Learners are encouraged to include samples of individual work completed during training, peer collaborations and team projects.

Research Questions

The focus of this article is the EnterTech integrated learning environment (ILE). Within this context, a variety of questions arise from various stakeholders, such as learners, administrators, instructors, and employers. The following lists the main research questions addressed in this article that were identified by the stakeholders to assess the ILE:

1. To what extent does the integrated learning environment meet the learners' expectations?
2. To what extent do the learners achieve the performance objectives and skill areas within the integrated learning environment?
3. How successful was the integrated learning environment in preparing learners for placement in entry-level employment?

Methods

EnterTech is currently in the final stage of development: statewide implementation. The EnterTech Project has progressed through several stages, including beta testing (Jackson, 1999), implementation testing at a high school and community-based organization (Boyd, Jackson, & Lyons, 2000a), and pilot testing at thirteen sites throughout Texas including high schools, community colleges, and community-based organizations (Boyd, Jackson, & Lyons, 2000b).

This study addressed issues pertaining to the EnterTech integrated learning environment (ILE). The following discusses the participants, procedures, and materials used.

Participants

The participants were learners who attended EnterTech classes from March 2000 to November 2001. Therefore this data was a combination of pilot and statewide implementation classes. Twenty-eight classes were offered at a variety of sites, including community-based organizations, high schools, technical colleges, and community colleges. Each site offering the EnterTech class was responsible for recruiting learners. Some sites marketed EnterTech through brochures or flyers; others had case managers recommend individuals for training. Each learner completed a referral form to verify sixth grade math and sixth grade reading ability levels and to ensure the learner's goals and motivation were synonymous with EnterTech's goals.

A total of 238 learners started EnterTech of which 206 (86%) completed training. Table 1 reports demographic information for both the completers and non-completers. Demographic information was collected through an online survey. Survey data was missing for 28 completers and 17 non-completers. The missing survey data appeared to be due to learner forgetfulness and instructors failing to inform learners about the online surveys.

[Insert Table 1 about here]

For the learners completing the program, the mean age was 27.5 years with a standard deviation of 11.8 years. The minimum age was 16.1 years and the maximum age was 65.0 years. For the non-completers the mean age was 31.3 years with a standard deviation of 10.2 years. The minimum age was 19.0 years and maximum age was 48.5 years. During telephone calls with non-completers, most of the learners attributed language barriers and lack of computer skills as their reasons for ending training.

A control group was not included in these analyses mostly due to feasibility. A separate curriculum, such as a traditional classroom format, that did not include the aspects of the ILE needed to be created. Also, costs for instructors and facilities would have to be covered.

Procedures

Once learners were recruited and met the prerequisites, the EnterTech training class began. Although originally designed as a three-week course corresponding to the three simulated industry sectors, EnterTech was a modular program allowing for flexibility in deployment of the training. As a result, EnterTech classes were offered for varying lengths of time. The mean length of time for offering the EnterTech training was 5.9 weeks with a standard deviation of 3.0 weeks. The shortest length of time was 0.6 weeks and the longest time length was 13 weeks. Some programs offered EnterTech on the weekends or at night to accommodate underemployed learners. Often times, EnterTech was included in an ongoing program, such as GED classes, a high school business and marketing class, and additional adult basic education programs.

Materials

EnterTech classes required a computer lab in which each learner and the instructor had their own computer. The computers needed to be equipped with speakers, headphones, Internet Explorer, and have access to the Internet. The instructor materials included the Instructor Guide and the instructor support website. The learners' materials included the Student Workbook, Learning Resource, Personal Planner, and access to the EnterTech website.

Learners, instructors, computer-embedded tracking, and employers assisted in determining the effectiveness of the ILE. Data was collected through online surveys, instructor evaluations of learner performance, and the computer-embedded tracking. Learners completed a survey on their pre-expectations of the ILE and a post-expectation survey on the extent to which the ILE met

their pre-expectations. These surveys consisted of the same 20 items. For each expectation, the learners responded on a scale of 1 (not at all) to 5 (to a great extent).

Instructors assessed the ability of the ILE to assist learners in gaining the eight skill areas and how well each learner performed the eight skill areas. Instructors evaluated the curriculum and the ILE using the Instructor Importance Checklist, a 30-item checklist that described classroom activities. For each item, the instructor responded on a scale of 1 (not at all) to 5 (to a great extent). Instructors also assessed learners' performance on the same 30 classroom activities using the Instructor Performance Checklist. For each item, the instructor responded on a scale of 1 (not at all) to 5 (to a great extent).

The computer-embedded tracking consisted of embedded assessment in which the learner was simultaneously evaluated on performance objectives while performing the simulated-computer tasks. This allowed for assessment without the need to interrupt the learners or break their engagement during problem-solving tasks. Each task corresponded to three to four performance objectives. Several performance objectives were assessed more than once in order to attain a more reliable assessment of learners' performance. Learners' performance was recorded in an Oracle database.

Follow up evaluation consisted of three to four telephone surveys over a 90- to 120-day period after training. Learners' employment and/or continuing education status was recorded, along with responses to open ended questions about EnterTech and each component of the ILE. For employed learners, their supervisors completed surveys on learner's on-the-job performance.

EnterTech staff members asked employed EnterTech learners for permission to contact their supervisor to complete the Employee Importance Checklist and the Employee Performance Checklist. The checklists contained the 44 performance objectives. Employers assessed the

importance that entry-level employees perform each performance objective and how well the EnterTech learner has actually performed on-the-job each of the performance objectives. The employers responded on a five-point scale ranging from 1 (not at all) to 5 (to a great extent) to each performance objective. For learners employed before attending EnterTech, an additional checklist was administered, Employee Improvement Checklist to determine if the learner's on-the-job performance improved after EnterTech.

All surveys and checklists are available through contacting the authors or through the Report on Implementation Testing that is available online (Boyd, Jackson, & Lyons, 2000a).

Results

Within the EnterTech curriculum, the unit of measurement was the performance objective. The SCANS (Secretary's Commission on Achieving Necessary Skills) standard was selected as a foundation for organizing the performance objectives. The Work Keys, a workplace skills assessment tool developed by ACT, Inc., was used in operationally defining each performance objective through a three-tiered leveling system (Jackson, 1998a):

Level 3: A learner is able to state, describe, or explain procedures and concepts.

Level 4: A learner is able to correctly perform tasks without significant help from others and without significant errors.

Level 5: A learner is able to integrate skills into problem resolutions.

Each task measured three to four performance objectives at varying levels. As learners progressed through each level of a performance objective, the learner moved from less complex to more complex skills. Both the instructor and the computer-embedded tracking assessed the learners on the performance objectives using the three levels. For example, Table 2 lists the

operational definitions of the performance objective, 3.1 Identify, evaluate, process and store information.

[Insert Table 2 about here]

Both quantitative and qualitative data were used to assess the effectiveness of the ILE through analyzing the performance objectives. The learner, instructor and employer surveys contained Likert type items. These were analyzed with both descriptive and inferential statistics. Learners' scores on the performance objectives were not averaged, due to the belief that this did not accurately represent the learners' abilities. Therefore, for each performance objective, a learner's performance equaled the highest level attained by the learner. Performance on the eight skill areas consisted of averaging learners' performance on the performance objectives within each skill area. Qualitative data was attained from the learners, instructors, and employers. This information was collected and organized as quotes or anecdotes for reporting.

In order to determine the effectiveness of the integrated learning environment, a variety of data were collected from learners, instructors, the computer-embedded tracking, and employers. The results of the analyses are reported in the following sections: learner expectations, instructor assessment, instructor and computer assessment of performance objectives, learner follow-up, and employer evaluations.

Learner Expectations. Overall, learners' expectations of the knowledge and skills gained during EnterTech training were met at the end of training. Table 3 reports the mean, standard deviation, and number of learners completing the pre- and post-expectation surveys. The mean for both surveys represents the average expectation across all 20 items. The overall difference between pre- and post-expectations means was not significant, $t = -.897$, $df = 143$, $p = .371$. This

indicated that the learners' expectations listed as important before the training program were met at the end of the training program.

[Insert Table 3 about here]

Instructor Assessment. Fourteen instructors completed the Instructor Importance Checklist. On average, the instructors reported that it was fairly important (4 on a 5 point scale) that the EnterTech curriculum teach the 30 classroom activities. Table 4 reports the descriptive statistics for the Instructor Importance Checklist. The instructors evaluated 147 learners on the Instructor Performance Checklist. On average, the instructors reported that the learners to a fair extent (4 on a 5 point scale) were capable of performing the 30 classroom activities. Table 4 reports the descriptive statistics for the Instructor Performance Checklist.

[Insert Table 4 about here]

Instructor and Computer Assessment of Performance Objectives. Both the instructor and the computer-embedded tracking system assessed the learners on the performance objectives using the three-tiered leveling system (Level 3, 4, and 5). The instructor based their assessment on learners' performance during group activities, on written assignments, and activities performed in the Student Workbook. The instructors recorded their assessments in the computer database. Instructor and computer assessment of the performance objectives were combined to determine learners' performance in the eight skill areas. Table 5 reports the distribution of learners' highest performance levels on the eight skill areas, which combines the instructor and computer assessments.

[Insert Table 5 about here]

Learners' performances on the eight skill areas were aggregated to create a Skills Total score. The Skills Total had a mean equal to 35.79, standard deviation 3.43, minimum score 24,

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and maximum score 40. The Skills Total was used in comparing learners' performance on two demographic characteristics: gender (male/female) and ethnicity (European American/ African American/ Hispanic American). With an alpha level of .05, a two-way analysis of variance (ANOVA) indicated no interaction effect of gender and ethnicity, $F(5,183) = 1.510$, $p = 0.189$. The main effects were not statistically significant for gender, $F(1, 183) = .023$, $p = .880$, and ethnicity, $F(5,183) = 1.386$, $p = .231$.

Learner Follow-Up. During the follow-up period, data collection on learners' progress had four categories: employed, continuing education, unemployed, and progress unknown. Throughout the course of the follow-up period, several learners were employed and continuing their education. They are included in both categories.

Overall 91 of the 206 learners (44%) were employed during the follow-up period. Learners were employed at a variety of businesses including communication companies, warehouses, national retail chains, food services, educational entities, health care facilities, and temporary agencies. Of the 91 employed EnterTech completers, 50 learners gained employment after the training program. The 41 EnterTech completers remaining were working before beginning the EnterTech training program. These learners hoped to enhance their skills in order to be promoted, receive a raise, or gain a better job with a new company.

Forty-four learners were employed full-time during the follow-up period. Table 6 reports learners' average weekly income, standard deviation, minimum income and maximum income.

[Insert Table 6 about here]

Sixty-five learners employed full or part time during the follow-up period reported hourly wages during the follow-up interviews. Table 7 reports learners' average hourly wage, standard deviation, minimum wage and maximum wage.

[Insert Table 7 about here]

Fourteen learners earned raises or changed jobs for higher wages after completing the EnterTech training program. Five of these learners were employed before EnterTech. Due to improved on-the-job performance, they received raises after completing EnterTech. Two learners changed jobs after EnterTech and received an increase in their hourly wage. One received a $1.00 increase and the other $3.56 increase. The mean hourly raise, standard deviation, minimum wage, and maximum wage increase received by EnterTech learners is reported in Table 8.

[Insert Table 8 about here]

One learner started her own company after completing EnterTech. She had been working for a painting company earning $10.00 per hour. She started her own painting company and now earns an average of $30.00 per hour.

Overall, 60 of the 206 learners (29%) attended continuing education classes during the follow-up period. The continuing education classes consisted of computer classes, technical classes, high school, GED classes, college courses, and the Armed Services.

Overall, 41 of the 206 learners (20%) did not gain employment or attend continuing education classes during the follow-up period. Many of the unemployed learners were unable to gain employment due to transportation and/or childcare problems. One learner did not gain employment due to health problems.

Overall, 15 of the 206 learners (7%) could not be contacted during the follow-up period. Several learners were not contacted due to disconnected telephones or they did not complete the biographical survey. Two learners moved before initial contact could be made. Attempts to gain contact information from instructors or Texas Workforce Centers were not successful.

The Skills Total was used in comparing learners' performance on follow-up status (employed/continuing education/unemployed). With an alpha level of .05, a one-way analysis of variance (ANOVA) indicated that the effect of follow-up status was not statistically significant, $F(2,152) = 2.40$, $p = 0.09$.

Although EnterTech was contextualized within a high-tech manufacturing company, not all learners gained employment in the high tech industry. One-third found jobs in technology industries. Table 9 reports the percentage of learners gaining employment in various job positions. The food industry (20.8%) and the customer service sector (16.9%) had the highest number of employed learners. Learners gained employment in a variety of industries and sectors. Table 9 also reports the different types of continuing education programs in which learners enrolled.

[Insert Table 9 about here]

In addition to hours worked and wage earnings, the targeted learners voiced their opinions of the ILE. During follow-up telephone surveys, each learner was asked their overall impression of the EnterTech training program and about each of the components of the ILE. Learners' responses included:

> EnterTech helped me with computer skills, getting a job, and real life issues. *European American male, lives with domestic partner, dependent on family/friends for transportation, age 17.*

> "I loved the EnterTech program. I thought it was great and interesting. I loved the group work. It makes you think. I liked the people I worked with and how it challenged my mind. I plan to continue using my personal planner in the

future." *Single mother, African American, high school graduate, welfare recipient, age 33.*

"EnterTech helped with time management. I liked the teaming projects. They helped us to socialize and voice opinions." *Single mother, African American, high school graduate, welfare, recipient, age 26.*

At EnterTech, I learned many things and I feel ready to work at many places. I had never touched a computer. It was scary, but I learned many computer skills. I enjoyed the group projects. I will use the workbook and personal planner. They taught me how to be a good mentor and leave stress out of work. *Hispanic American, male, married with children, 9th grade education, age 35.*

I loved the EnterTech training program. I liked the situational questions. They taught me how to do things. I wrote in my learning resource all the time. The personal planner is really good and simple to use. *Hispanic American, female, high school graduate, lives with and takes care of parents, age 46.*

Employer Evaluations. Twenty-five surveys were mailed to supervisors after learners were employed at least 30 days. Twelve were completed and returned. Figure 2 and Figure 3 report the average score across all items for the Employee Importance Checklist and the Employee Performance Checklist for the eight skill areas. For the eight skill areas, employers reported learners' on-the-job performance to be very close to the importance placed on these skill areas.

[Insert Figure 2 about here]

[Insert Figure 3 about here]

During phone conversations with employers, several expressed high praise for their employee who completed the EnterTech training program:

> She is easily adaptable and very productive. In my opinion she is more easily trainable, more likely to stay on the job longer, and more productive than non- EnterTech employees. - *National retail chain*

> She is very good. She understands everything. Whenever she is being trained or is training other people she is great. She is one of my best workers and I can depend on her to get things done. The first time I ask her to do things she gets things right away. – *Electronic manufacturing company*

> She is doing wonderfully. She is exceeding the expectations of her job requirements. – *Telemarketing Company*

> She has an outstanding attitude, which is half the battle. She takes good care of the customers. She is a good employee. - *National Retail Chain*

Discussion

In order to incorporate the needs assessment within the framework of cognitive and social theories for an employability training program, an integrated learning environment (ILE), also called blended learning environment, consisting of an employer-validated and learner-centered curriculum was created. The ILE is composed of computer-based training, role of instructor, group-based projects, print materials, and skills transcript and work portfolio. This study focused on learners' performance within the ILE in order to answer stakeholders' questions.

1. To what extent does the integrated learning environment meet the learners' expectations?

Learners' responses to the pre- and post-expectation surveys indicate that learners' pre-expectations, which are fairly high, are met at the end of the training program. During follow-

up telephone surveys, learners indicate high satisfaction with the components of the ILE through qualitative data.

2. To what extent do the learners achieve the performance objectives and skill areas within the integrated learning environment?

Most, at least 93%, of the learners are able to correctly perform tasks without significant help from others and without significant errors on each of the eight skill areas (Level 4). Except for communication, over 53% of learners are able to integrate skills into problem resolutions for each skill area (Level 5). Forty-five percent of learners are able to integrate skills into problem resolutions for the communication skill area. Therefore the majority of learners achieve the highest level of performance within the ILE.

3. How successful was the integrated learning environment in preparing learners for placement in entry-level employment?

The overall employment rate for EnterTech completers is 44% and the overall continuing education rate for EnterTech completers is 29%. These rates compare favorably to college graduate employment and continuing education rates. A Harris Interactive survey of 512 people who graduated from college in 2001 found 61% employed five months post-graduation and 25% continuing their education (Generation 2001 Report).

Employer evaluations of employed learners are high for the skills required for the learner's job position. Employers express high levels of satisfaction with learners' on-the-job performance. Learners' performance within the Enter ILE does not impact learners' follow-up status (employed, continuing education, and unemployed). Unemployed learners frequently attribute their inability to gain employment or continue their education to secondary factors such as lack of transportation and/or childcare. This supports the importance of creating

training programs with wrap around services that take into account learners' life situations. Learners, also, do not differ in their performance based on their gender or ethnicity. This supports the EnterTech integrated learning environment and its purpose to train a diverse targeted learner population.

The EnterTech Project is designed to enable learners to gain basic employability skills to perform well in an entry-level position and/or continue their education. As a result of post surveys and follow-up telephone conversations with the learners, it became evident that EnterTech not only enhanced the learners' skill levels, but also impacted their lives.

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Figure 1: EnterTech Integrated Learning Environment (Blended Learning)

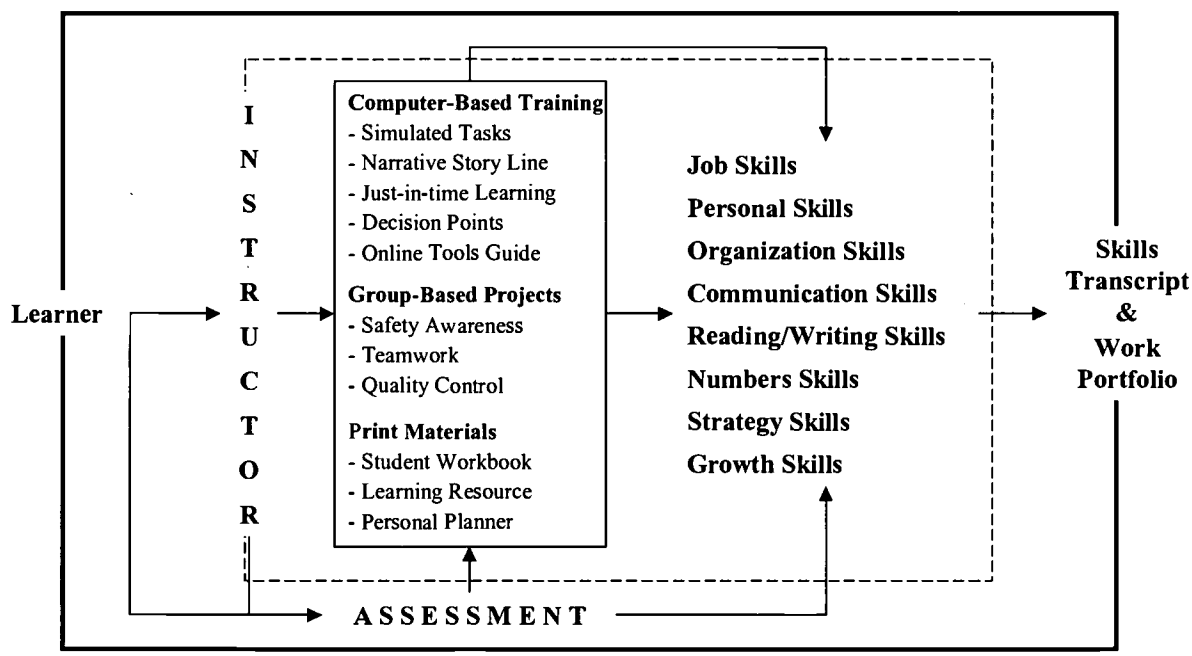


Table 1: Demographic Data for EnterTech Completers and Non-Completers

		Completers (N = 178) percent	Non-Completers (N = 15) percent
Gender	Male	26	27
	Female	74	73
Ethnicity	European American	10	13
	African American	40	20
	Hispanic American	43	60
	American Indian	4	.
	Other	2	7
Education Level	6^{th} to 9^{th} Grade	16	20
	10th Grade	12	.
	11^{th} Grade	10	.
	12^{th} Grade	46	60
	GED	16	20
Computer Experience	Beginner	46	60
	Intermediate	51	27
	Advanced	3	13

Table 1 cont.: Demographic Data for EnterTech Completers and Non-Completers

		Completers (N = 178) percent	Non-Completers (N = 15) percent
Learner Characteristics*	Welfare	15	13
	Homemaker	15	13
	Full Time	18	40
	Part Time	12	13
	Unemployed	57	47
	Teen Parent	13	7
	Single Parent	27	20
Currently Living With*	Spouse	19	4
	Parent	39	20
	Domestic Partner	3	.
	Dependent Children	24	27
	Alone	15	13
Transportation*	Own	50	73
	Public	11	.
	Family/Friend	42	20
	None	3	.
	Other	3	.

* Learners may be in more than one category.

Table 2: Three levels of a performance objective

3.1 Identify, evaluate, process and store information
Level 3: Defines and describes nature and source of important information
Level 4: Performs procedures to monitor and utilize information
Level 5: Utilizes information to optimize job performance

Table 3: Descriptive Statistics for Learners' Pre- and Post-Expectations

	Mean	Standard Deviation	Number of Learners
Pre-Expectation Survey	4.54	.51	144
Post-Expectation Survey	4.50	.52	144

Table 4: Descriptive Statistics for Instructor Importance and Performance Checklist

	Mean	Standard Deviation	Minimum Score	Maximum Score	Number of Responses
Importance Checklist	4.26	.45	3.40	5.00	14
Performance Checklist	4.22	.61	2.00	5.00	147

Table 5: Distribution of Learners' Highest Performance Level on the Skill Areas

(N = 206)

SKILL AREAS	Level 3	Level 4	Level 5	Level 4 or 5
Job	1.9%	42.7%	55.3%	98.1%
Personal	2.9%	44.2%	52.9%	97.1%
Organization	2.4%	41.3%	56.3%	97.6%
Communication	7.3%	47.6%	44.7%	92.7%
Reading/Writing	0.5%	29.6%	69.9%	99.5%
Numbers	2.4%	31.6%	66.0%	97.6%
Strategy	1.5%	40.8%	57.8%	98.5%
Growth	4.4%	42.7%	52.9%	95.6%

Table 6: Mean Weekly Income for Full Time Employees

Weekly Income:	Mean (N = 44)	Standard Deviation	Minimum Income	Maximum Income
Full Time Employees	$314.97	$77.80	$210.00	$586.00

Table 7: Mean Hourly Wage for Full Time and Part Time Employees

Hourly Wage:	Mean (N = 65)	Standard Deviation	Minimum Wage	Maximum Wage
Full and Part Time Employees	$7.42	$2.00	$5.15	$14.65

Table 8: Mean Hourly Raise for Full Time and Part Time Employees

Hourly Raise:	Mean Raise (N = 14)	Standard Deviation	Minimum Raise	Maximum Raise
Full and Part Time Employees	$1.06	$.95	$.25	$3.56

Table 9: Percent of Learners in Subcategories of Job Type, Education, and Not Employed

Job Type (44% of Total)	Percent
Bank	1.3%
Cashier	2.6%
Childcare	2.6%
Clerical	3.9%
Customer Service	16.9%
Entrepreneur	3.9%
Food Industry	20.8%
Government	2.6%
Health Care	2.6%
Management	3.9%
Manufacturing/Warehousing	11.7%
Nature	1.3%
Printing/Painting Industry	1.3%
Production	5.2%
Retail	1.3%
School District	2.6%
Technology	6.5%
Telemarketing	5.2%
Temporary Agency	1.3%
Trucking	2.6%

Education (29%)	Percent
Community College	32%
Computer Class	8%
GED Program	24%
High School	16%
Military Service	4%
Technical College	4%
University	12%

Not Employed (20%)	Percent
Applying	5.9%
Caring for ill family member	11.8%
Childcare	5.9%
Lack childcare & Transportation	5.9%
Not stated	52.9%
Taking care of ill mother	5.9%
Transportation	5.9%
Would lose VA benefits	5.9%

Figure 2: Average Employer Response for Importance and Performance Checklist for Job, Personal, Organization, and Communication Skills.

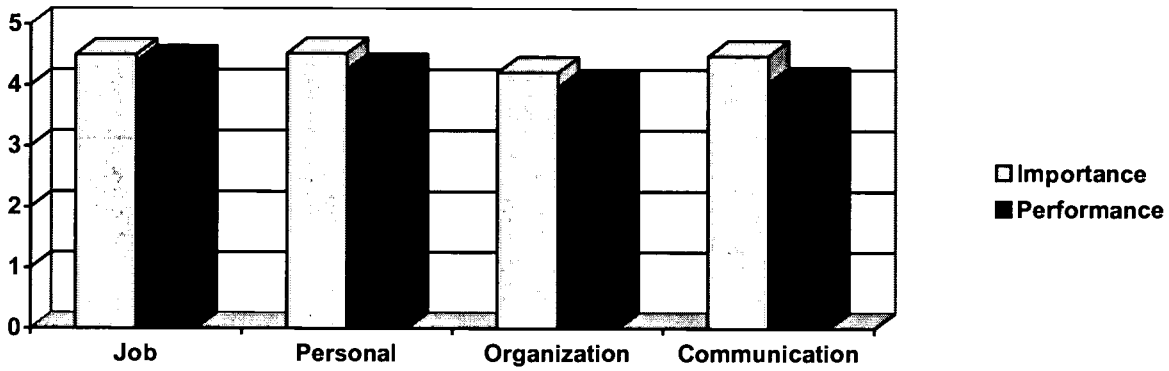
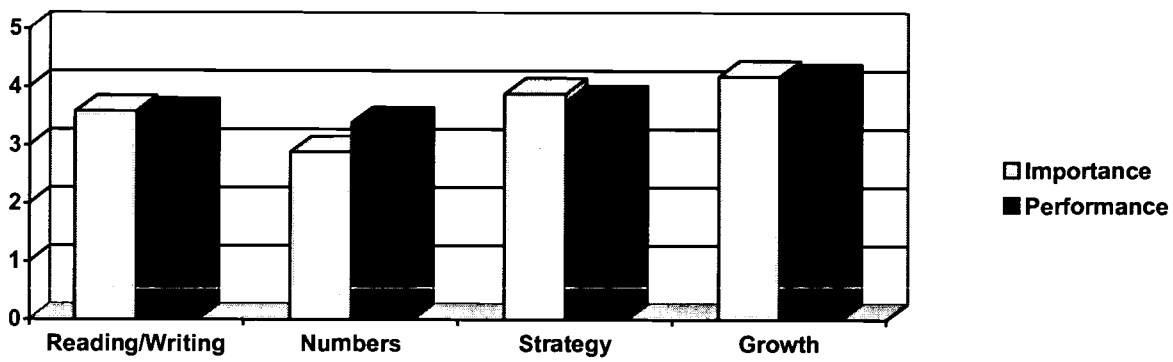


Figure 3: Average Employer Response for Importance and Performance Checklist for Reading/Writing, Numbers, Strategy, and Growth Skills.



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