A Simulated Time Study Development Model:
“A Program for Training Individuals In
The Development of Time Standards
For Processes Involving The Human Element”

Submitted by:

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Course Title: A Simulated Time Study Development Model: “A Program for Training Individuals In The Development of Time Standards For Processes Involving The Human Element”

The title reflects that the method of training includes, but is not limited to, a simulation aspect to the course and the focus of developing time standards is targeted for processes involving humans. It is important to include the human element in the title as there are many manufacturing processes that include no human element. It is the human element that justifies the need for simulation as processes involving humans are much harder to develop standards on due to the variability humans bring to the operation. The word individuals indicate that the training is not for groups, but will focus on individual performance.

Course Description:

This course is a combination of class work, hardcopy material, power point presentations, videos, hand tool demonstrations and interaction with a simulation training tool that illustrates a Human Involved Work Place (HIWP) in various manufacturing processes. The purpose of the course is to train individuals with or without prior training in developing time standards for a variety of work place scenarios. The course offers three focal paths (See Course Overview for Three Focus Paths Chart, Append. A); individuals with no prior training, those with varying degrees of training, and those who take the training for information only with no intentions of setting time standards. The goal in developing the course is to end up with components of the course that interact
effectively and are linked by a common approach that carries throughout the course structure.

Time standards are very important to not only manufacturing companies, but to all types of organizations. Time standards provide the foundational data for scheduling and planning functions, cost estimation, budget analysis and long and short term strategic planning. It is very important that companies have a complete and accurate time standard database that is maintained on a continual basis. To insure consistent and accurate development of time standards, an effective and efficient training tool is needed by any company that values the integrity of one of their most valuable databases.

The course involves both classroom activities and the use of a simulation tool. The Course Overview Chart illustrates how the three focus paths flow through the eight segments of the course. The first two focus paths are for applicators that will actually develop time standards and either have prior training or very little if any prior training. The third focus path would be for those who only want to understand the basic aspects of developing time standards and gain an appreciation for the resources required. The “information only” path would be for management, union representatives and operators of critical equipment. The primary difference between the two applicators focus paths is the amount of time required in classroom activities and the amount of time involved with the simulator-training tool. Those with prior training would need less time to pass the evaluation modules.

The course requires the individual to pass a series of post training evaluation modules that measure the level of skill gained in the previous training module prior to moving to the next training module. The development of time standards requires
knowledge of the individual tasks of setting time standards as well as the application of those tasks to a variety of processes. The training reflects those two distinct areas by focusing first on the task specific skills and then the application of the learned task skills to the four processes. The specific tasks are treated as sub-modules (See the Simulation of Specific Tasks charts, Append. B-E) which are spread over four Specific Task Modules. The four Specific Task Modules are: 1) Communication (3 Sub-Modules); 2) Prep Work (5 Sub-Modules); 3) Time Study Activities (2 Sub-Modules); and 4) Data Analysis (1 Sub-Module). After each of the four specific task modules has been mastered, the application of the specific tasks is mastered in the Total Process Skills (See Append. F) area of the course. This area covers four types of operations: 1) A single operator, pick and place operation; 2) A single operator, single machine operation; 3) A single operator, multiple machine operation; and 4) A multiple operator, assembly operation. The mastery of these four types of operational processes will cover 90% of all manufacturing processes in a variety of industries.

The Course Overview Chart illustrates the flow of training and the importance of evaluation prior to moving to the next training area. Task awareness versus task focused techniques refers to a focus on knowledge of the different tasks versus mastering the techniques of each. The individual must be able to speak the language of the tasks prior to understanding the use of the tasks. This holds for the overall processes as well.

A pre-course evaluation is required to inform the classroom instructor, who also is responsible for maintaining the simulation tool as well, of the level of expertise of the trainees. It allows the instructor to effectively manage his time and focus of the classroom activities. The pre-course evaluation uses a computer questionnaire test that has multiple
choice questions relative to the topic. The individual’s performance will automatically be recorded and available to the instructor days ahead of the actual start of the course.

Classroom work is a classic setting involving hardcopy documentation, lectures, and examples of the tools used in the setting of time standards. The instructor will use PowerPoint presentations and video to illustrate the various task techniques and application of those skills in the development of time standards for the four basic process scenarios. Prior to moving to the next classroom segment, each individual is evaluated using a similar computer based evaluation tool as the pre-course evaluation. Depending on class size, the trainees may be separated by experience level and by applicator and “information only” status.

Simulation is used to exercise the trainees’ skills in their command of the recently learned knowledge of both the specific skills and the application of those skills on simulated processes. The specific skills area is broken into the four modules and are evaluated using simulation prior to moving to the next module. The simulation will be interactive in that the simulation program will take a path depending on how the student responds to an initial question. Of course, the questions will be related to the specific topic. After completing the simulation-based evaluation of the specific skills area, the trainee will then proceed to the Focus On Total Process Skills area of the course. Here the trainee will practice developing time standards for each of the four process types. As the process types increase in complexity, the trainee must pass an evaluation using the simulation tool prior to proceeding to the next level of process complexity. After successfully passing the evaluation for the Multiple Operator, Assembly Operation Process, the trainee is ready to take the Qualification Simulation. The trainee must
achieve a specific level of mastery in this area before they are allowed to develop time standards in the company. Trainees are supplied with feedback of the qualification simulation to help them focus on additional work with the simulator to retake the qualification test.

**Course Justification:**

There is a critical need in a manufacturing concern to have operational time standards that are not only accurate, but consistently applied across the many different processes within the company. To achieve this, requires that the developers of the standards are adequately trained and the skill levels of the developers are consistently maintained. Do to the human element being a critical part of the processes, a significant level of subjectivity on the part of the developer is always present in the time standard development process. This element of subjectivity requires regular maintenance of skill levels. To lower training costs, a training tool is needed that can be used on demand for periodic skill maintenance as well as initial training of prospective time standard applicators.

Time standards can be very controversial as they are the basis for most of a company’s budgetary concerns and are the heart of labor incentive systems. It is critical that people within a company be familiar with the development of time standards as a means of understanding the strengths and weaknesses in the base data they are using. It is not uncommon for the accuracy of time standards to be at the heart of labor disputes, thus requiring labor union representatives to have a level of understanding regarding time standard development. To effectively and efficiently train applicators and inform those
with a need to know, a user friendly tool is needed that is sufficiently robust to be of use by people with a large of variety of needs and backgrounds.

As the development of training courses utilizing simulation are inherently expensive, the potential payback must be clearly articulated if management’s approval is to be obtained. The payback relative to this course is directly linked to the value to the company of accurate and consistent time standards. This can be easily achieved by tracing the impact of cost fluctuations to the effectiveness of management tools in the organization. As the costs fluctuate, the management tools become less reliable, thus the existence of a need to reduce variability in the organization cost structure. The existence of inconsistent and inaccurate time standards can be determined in a specific process and linked to the existence of cost variation, which could easily result in a costly wrong decision on the part of management. Cost avoidance is an effective manner of justifying the cost of this type of training.

The trainer could be a company member that has been trained as a trainer and can perform the training on an as needed basis. The simulator aspect of the course may be used without the trainer, but with the trainer’s cognizance. To enforce serious use of the simulator, the trainer keeps use records per trainee. Time spent in training would be kept and reported to management. The trainer would be responsible for tracking those company performance metrics that relate directly to this training. Management would then relate hours spent in training to those metric indicators.
Target Audience:

The focus paths (See Course Overview For Three Focus Paths, Append.A) are targeted for three basic types of individuals: 1) An individual who desires to become a qualified developer of time standards and has no or very little previous training in the subject; 2) An individual who also wishes to become a qualified developer of time standards and has had significant previous training or experience; and 3) An individual who wishes to know more about the process of developing time standards for a reason relating to their job performance. The educational levels may vary as the only requirements are the basic ones of reading, some basic math skills, basic computer skills, and ability to retain some basic definitions and rules and apply them in the accomplishment of a task.

The classic target audience would be Industrial Engineers who wish to establish a company wide consistency with regards to developing time standards. Also, members of management who need to know the weaknesses in the cost collection system for risk analysis relative to financial decision making. Often, when individuals move from the hourly ranks to management, they do so by way of spending time in a Process Engineering function that utilizes their technical expertise by generating target hours for work packages. These people would be trained using this course as part of a management development plan aimed at career development for promising employees. In short, anyone who is involved in the development of time standards should take this course following one of the three focus paths.
Justification for Using Technology Based Training (TBT):

As companies move away from the classic method of sending people away from the company for long formal training courses, they will be replaced with a just-in-time, on-the-job approach. The formal approach required the trainee to ingest huge amounts of material in short amounts of time and retain that information until needed sometime well into the future. The perfect method would be to train an individual only with those skills needed to do a specific task, just minutes or hours before they actually are required to perform the task. The problem with the just-in-time approach is that it requires almost constant access to training resources. The use of TBT allows the individual to use technology, usually a nearby computer, for training as they enter a new area of their job.

The downside of TBT is the relatively large front-end development cost of the tool. The cost must be spread among the potential users and the benefits calculated, or estimated, for each user family. The benefits of TBT if implemented properly include:

- A flexible independent study environment
- Learner controlled progress especially in the simulated area
- Learning is organized according to learner’s needs
- Direct trainee’s involvement in the training activities
- Systematic practice through the simulation aspect of the course
- Immediate feedback of the trainee’s learning progress
- The privacy factor to lower inhibitions
- Enhanced involvement and higher motivation
The trainer will manage the course using the tool as well, in that he/she will keep all data on the system regarding qualifications, evaluation scores, cumulative time on tool, dates on tool, etc. The system can also be used to generate reports for management regarding tool utilization and impact of training on various company metrics. This is important as training tools must be constantly justified as companies are always looking for ways to cut costs, and changes in management can often spell doom for a training program sponsored by a previous manager.

Not only will the simulation aspect of the course speed the user along in their training by tailoring to their needs, but also the need for regular skill maintenance by previously trained individuals requires repeated use to the tool. The use of previously trained users will be independent and not requiring the instructor as in the case of first timers. The repeated use of the tool will ensure consistency of time standard development throughout the company which will payoff in lowering variation in manufacturing costs. Variation in any organization is a cancer that spreads to all aspects of management control efforts and erodes management’s ability to effectively control the company. The simulation aspect of the training tool could be put on a CD and taken home for home use. Or the company may wish to permit access to the company’s LAN by its employees, which would permit easier course management database maintenance.

**Description of Simulation:**

The trainee will utilize a personal computer to use the simulation aspects of the course for all five types of simulations. The five types of simulations are: 1) The simulation that focuses on the four groups of specific skills; 2) The evaluation of
performance of learning the specific skills; 3) The simulation that focuses on the four
types of total process skills; 4) The evaluation of obtaining the skills necessary to develop
time standards for each of the four total processes; and 5) The qualification testing of the
four process types. The Course Overview For Three Focus Paths Chart outlines the steps
in using the simulation tool relative to the classroom work and which modules and sub-
modules must be mastered prior to progressing in the course.

The module breakdowns, shown in the Simulation of Specific Skills and the
Simulation of Total Process Skills Charts(Append B - F ), show the detailed steps that
each simulation model follows relative to the particular area the trainee is learning. For
example, in Sub-Module 2-2 within Module 2 the Prep Work Module, which is in the
Simulation of Specific Skills simulation section, the trainee first selects the type of
process to be simulated, then proceeds as prompted by the simulator from task to task.
The trainee must learn how to select from a wealth of information only that information
necessary to do the task and then generate a list that the simulator will compare to a list
that the trainee should have generated. The information provided by the simulator will
vary according to the type of process selected by the trainee. If the trainee’s list of
information is within previously set limits, then the trainee may proceed to the evaluation
simulation of this particular task. Otherwise, he/she will be required to repeat the task.

The evaluation simulations of the various Specific Skills, are essentially repeats of
the training simulations, however, the help and suggestion buttons have been removed. In
other words, during all the evaluations and qualification simulations, the trainee is on
his/her own with no help from the simulator. The simulation tool for the Specific Tasks
and the Total Process Skills, have help and suggestion buttons that will give the trainee hints regarding the next step and include reasons for selecting a particular path.

After the trainee has completed the evaluations of the Specific Skills, they then begin training on utilizing those skills to develop time standards for four different types of manufacturing processes. This is achieved by using the simulation tool to proceed from the first, most simple, Total Process (Single Operator, Pick & Place) through its respective evaluation simulation, until all four Total Processes have been mastered by completing their respective evaluation simulations. The trainee must then navigate through the Qualification Simulation, which does not have evaluations after each process type and gives the user no feedback until the results are given at the end. The trainee receives feedback to help them in doing additional training on a particular simulation on which they are seeking more training. The company will set the policy regarding the number of times a trainee may seek qualification within a specified period of time.

The trainee will see diagrams and scenes of the work place as well as pertinent documents that would normally be present at the work site for which they are attempting to develop work standards. The trainee generates lists and sketches by clicking on words and moving the mouse as they would a pencil on paper. Calculations are made by using a calculator provided by the simulator with data entry points clearly indicated. The simulator will alter the work setting on a random basis to introduce variance into the simulation. The Total Process Simulation Module, will use the data picked by to trainee to run the process to let the trainee observe the effects of using their data regardless of how much in error it might be. This provides the trainee, or management personnel taking the course for information only, with excellent feedback regarding the impact
incorrect time standards have on the total process. This will be available in both the
learning and evaluation modules, but not in the qualification module.

**Type of Simulation:**

The simulation used in this course is “Interactive” in that it is designed to support
trainees in practicing a specific performance, and the trainee is free to change values and
observe the effects on the type of manufacturing process being studied. It is a Tactical-
Decision type of simulation, in that the trainees are faced with a complex process and
they must perform a function using their skills, interpreting data and organizing
information presented to them to come up with a solution – i.e. the correct time standard
for the manufacturing process being studied. The Tactical-Decision simulation is
diagnostic in nature in that the trainee is faced with a sketchy description of the process
and through executing their role as a time standard developer, must determine what
information is needed and then use that information to develop the time standard. It is a
closed-structure simulation in that the trainee selects their process category and the data
they need, then based on feedback of their choices after comparing to a base result that
the simulation tool uses as a check, subsequent choices are made as the trainee progresses
through the simulation training tool.

**Scope of Simulation:**

With respect to the development of time standards, the use of simulation in the
training course is used to master the eleven specific skills and evaluate the mastering of
the skills by the trainer. Also, to master the application of those eleven skills to the
development of time standards for four process types including the evaluation of the application skills. In addition, simulation is used to assess a desired level of mastery by its use for qualifying trainees. In the learning modules of both the specific skills and total processes, the simulation-training tool will help the trainee with hint and suggestion buttons that will suggest the correct answer and provide reasons why it is the correct answer. Another training aid of the simulator, is the ability to run the specific total process, e.g. multiple operator, assembly operation, using the data generated by the trainee to illustrate the differences between the trainee’s standards and the correct ones.

The simulation tool does not replace the classroom setting which is intended to acquaint the trainee with more of the human side of the training course. The use of the measuring tools such as the stop watches and other timing devices, and the interpersonal aspects of working with people who are unwilling to cooperate, are the type of aspects taught in the classroom. In addition, testimonials will be provided of actual cases along with videos of the many varied types of processes within the company and how their differences affect the manner in which time standards are developed. The training may be kicked off with a short introduction by a member of the senior staff to impress the importance of the training to the trainees.

In short, the simulation tool is focused on the actual mastering of the eleven specific skills and their direct application to the four types of manufacturing processes. The simulation is one component of the course, however, it is designed to stand-alone if a trainee is maintaining skills and does not need the classroom component. Also, if a trainee is re-qualifying due to a company policy regarding qualification frequency, they may take only the qualifying module. As the company expands or changes its type of
business, the four main types of processes may be modified to include others. These could be easily added to the software as needed. The original code should be capable to accepting add-on macros to accommodate the possibility of process expansion.

**Learning Objectives Included in Simulation:**

Performance objectives will be provided to the trainees prior to the beginning of each training module, including the classroom module and the pre-course evaluation. In addition, the trainees will provide the trainer with their respective expectations for the course. This will provide the trainer with an idea of the mindset of the trainees and an idea of how the course is viewed by those not familiar with it. The pre-course evaluation will provide insight regarding how company personnel perceive the course in general. This perception is important as sometimes the return on investment of a training tool is subjective and can be swayed by it’s reputation by those unfamiliar with it’s value to the company.

Prior to the beginning of each simulation module, the trainee is provided with the skills they will be expected to perform and to the degree each skill will be evaluated. This is important, as it will help the trainee better allocate his/her “attentiveness” and focus on what is important. The basic objectives are stated on the Simulation of Specific Skills and Simulation of Total Process Skills Charts at the top of each sub-module flow chart. The evaluation criteria imbedded within the Evaluation modules have limits set to the expected performance levels of the trainees. These limits are made available to the trainees by clicking on the “Performance Expectations” button on the tool bar, which will remain visible throughout the simulation modules except for the Qualification Module.
Framework:

Problem/Scenario:

The goal is to learn the Specific Skills as they relate to the four types of processes, and the application of the skills to the four processes in the Simulation of Total Process Skills Module. The Specific Skills Simulation is broken into four families or modules, which are broken down further into sub-modules. Each sub-module within each of the Specific Skills Modules teaches a specific skill relative to one of the four basic manufacturing processes. Under each process type within each sub-module, are specific tasks that the trainee must perform using the simulation tool, given the information needed to do so. Often, the trainee is given much more information than is needed, as is the case in real life, and must choose the correct data and then interpret it correctly. The simulator will often take a different path of questioning depending on the response of the trainee. This often leads the trainee to repeat steps to obtain information or do a task over. Within each task block, lowest level of detail shown on the sub-module charts, the simulator tool will prompt the trainee for input and compare the trainee’s response with the correct one. The problem or task depends on the sub-module task within the type of manufacturing process selected by the trainee. The type of prompts by the simulator depends on the individual task being studied and the last response by the trainee.

The simulation of Total Process Skills requires the trainee to utilize their Specific Skills to successfully develop time standards for the four manufacturing processes. The trainee is provided with the work site information including visual and tabulated data. They must also communicate with the supervisor and operator as part of the
communication module (See Module No. One of the Specific Skills Chart, Append B).

The trainee must determine the proper information needed and the best method of recording it, as well as properly dividing the process into elements, calculating the proper number of cycles, developing the correct operator rating, and analyzing the data. The individual tasks will differ according to the type of process selected by the trainee.

**Participant Roles:**

The participants in this case are the trainer and the trainee during the classroom aspect and during the simulation, the participant is the trainee only. The simulation is activated by the responses of the trainee, with the nature of the responses dependent on the type of responses by the trainee. The simulation software triggers off of the trainee’s responses with regards to the logic path taken during the task simulations. The software is expecting one of several potential answers to the various task responses, with only one or a few being acceptable as correct. The simulation software will prompt the trainee dependent upon the class of responses he/she gives, classes being determined as triggers for logic paths taken for the next simulation prompt. The trainee will get immediate feedback due to the type of prompt the simulation gives, ranging from incorrect requiring a complete redo of the task, to a nearly correct answer prompting a variety of logic paths, to the correct path as a result of a correct answer.

During the classroom and simulation aspects of the course, the trainee is responsible for treating the simulation as a serious training tool that replicates the real world and not as a game with an infinite number of trials. Each simulation must be treated as a real time standard development task with the same consequences as a real
situation. The course management data will easily isolate abuses of the tool and should serve as a deterrent for such activity. The trainer will be skilled in training techniques and be well versed in classroom management skills, as well as adult education techniques. To reduce training costs for the company, the trainer will probably be a regular employee with other duties besides the time standard development training course. The trainer will be responsible for managing the course using the course management software, which is built into the simulator software.

**Staff and Peripheral Roles:**

The software developer with regards to code changes or additions to the manufacturing processes will maintain the simulation software. The trainer will have sole responsibility for managing the course, with company management supplying support for classroom equipment, refreshments, etc. The course hardcopy, hand tools and videotapes are managed by the trainer. The videotapes will be developed by a company experienced in making manufacturing training videos and modified with respect to content changes by the same company. The training videos will not be interactive, but will follow the classroom course material. There is no need to create expensive interactive tapes when the classroom trainer needs only video examples of the various work sites, and examples of hand tool usage. The classroom trainer will operate the tape player and the power point projector. The trainer will also be responsible for the maintenance of the equipment including the classroom computers and their associated equipment. When a trainee takes a simulation disc home to use on their computer, they
are responsible for the well being of the disc. No qualification testing may be performed without the trainer being present to validate the user’s identity.

**Events: Refer to Example of Event Sequencing Append. G**

The individual tasks are comprised of events, which are triggered by the responses of the trainee. An example of an event would be a type of prompt the simulator would give the trainee after the trainee gave a previous response. When the trainee answers a question in the form of a prompt, the simulation will decide on a path, display the results of the trainee’s response, and then prompt the trainee for an answer that keys off of the trainee’s previous response.

The Example of Event Sequencing Chart (Append.G) illustrates the typical type of events that happen in this example. An event in this example would be an element happening thus triggering the trainee to trigger the simulator that he/she has observed an element and wants to stop the action to determine types, etc. After receiving input by the trainee, the simulator would prompt the trainee for answers as indicated by the chart. Depending on the trainee’s answers, the simulator will proceed along a logic path as indicated by the chart. At the end of the simulation of this module, the evaluation will indicate to the trainee if the trainee’s responses were correct. All of the sub-modules will have events determined in a similar fashion as this particular example indicates.

**Projected Sequence: Refer to Example of Event Sequencing Append. G**

The sequence of events for the simulator logic depends on the responses of the trainee to the prompts of the simulator software. As in the referred example, the
sequence of events for these particular 4 tasks follow logic paths dependant upon decisions made by the trainee. An incorrect decision will lead to an incorrect sequence. However, the trainee may seek help using the help or hint buttons prior to responding to a simulator response. The help and hint options are not available during the Qualification Simulations for the various manufacturing processes.

All of the sub-modules have event sequences similar to the above example, of course, with different decision prompts based on the particular area within the simulator the trainee is working. The looping of sequences depend on the length of time between evaluations. The longer the trainee goes between evaluations, the fewer number of loops, with the return loops spanning more events. The shorter time between evaluations, the more loops, with each return loop spanning fewer events. The criteria determining return loop frequency is mainly the complication factor of the material being covered. The more complicated the material, the shorter the loop span.

**Consequences:**

As stated earlier, the simulator will proceed according to the response of the trainee. The logic path taken by the simulator software depends on the accuracy of the response. Limits will be built into the software prohibiting extremely inaccurate responses by the trainees that will stop the trainee from proceeding to the next event. However, during the Qualification Simulations, all answers will be accepted by the computer. It is assumed that the trainee will respond within acceptable limits by the time they have completed the previous eight segments of the course.
The consequences of incorrect responses will take the form of highlighted feedback after completing the evaluation simulations. During the Mastery simulation segments, the trainee may use the help and hint buttons if he/she is completely baffled. The consequences for not meeting required performance limits during the qualification simulation would be determined by company management. It is assumed that the trainee may retake the qualification simulation, however, the number of retakes and the time between retakes is a policy matter.

**Resource Requirements:**

Personnel requirements for routine training are basically limited to the trainer who will not be a full time trainer, at least for this particular course, and the individual trainees who will require time away from their respective jobs for the duration of the training. The development of the training course will require a team of people with representation from the company proposed to use the tool, and the company developing the simulation, video, and course hardcopy material. It is critical that the user company representatives be knowledgeable in both setting time standards and the various manufacturing processes within the company. An expert in the field to insure the latest and most efficient methods are imbedded within the course should provide the skill set required to develop time standards. The company representatives must insure that the methods proposed by the expert apply to the manufacturing processes within the company.

The company selected to develop the course material, videos and simulation tool should have a successful track record developing such systems within the same type of industry as the user company. The techniques for the development of time standards vary
between industries, thus requiring differences in time standard training methods. Representatives from the developing company should be able to relate with the representatives from the user company.

The classroom mechanics should be developed by people skilled in adult education techniques, as the primary target audience is adults. A consultant with such skills should be part of the team to act as an overall check regarding the effectiveness of the course for the target audience. This consultant will have the overall responsibility of tying the course aspects together to ensure cohesion between the various elements.

Another member of the team should be someone skilled in manufacturing methods and their relationship to manufacturing costs. This team member will have the responsibility of ensuring that the return on investment is at least measurable, and hopefully met if not exceeded. This individual will insure linkage between skill objectives and measurable outcomes that can then be linked to overall productivity improvements within the user company. This is critical for funding of future courses.

Physical resources will include classroom facilities – desks, white boards, refreshment availability, restrooms, etc., video equipment for projecting power point programs and showing videos, and personal computers for using the simulation tools. The simulation modules will be on CD’s allowing the trainees to work at home on their own computers. If possible, the company may allow trainees access to their LAN which will help with course management maintenance. Hardcopy material and time study measuring tools will also be needed for training.

The development costs for the course design, generation of hardcopy materials, video, simulation software, and projector and computers, including labor for meetings of
company representatives is estimated to be $150,000. The majority of the cost will be the software development costs. For a medium sized manufacturing company with gross annual revenues of over $250 Mil., and given the importance and impact that time standards have on a typical company, the estimated payback will easily be within a two year time period. The user company could turn the training tool into a profit center by offering the training to other companies not in direct competition with the user company.