



THOMSON JOB IMPACT STUDY

THE NEXT GENERATION OF
CORPORATE LEARNING

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EXECUTIVE SUMMARY

Global organizations are increasingly investing in learning programs to achieve business performance improvement and competitive advantage. Technology and learning methodology advancements have presented new opportunities for more efficient and effective implementation of learning programs. Most notably among recent trends are the acceptance of online learning, or e-Learning, and the advent of the Blended Learning concept. However, the overriding question of whether or not these learning approaches really deliver measurable impact in on-the-job business productivity has to-date gone unanswered.

How would a new Blended Learning model affect on-the-job performance? What should the Blended Learning model look like? And how much performance improvement would occur in moving from e-Learning to blended learning? These broad questions led to the development of the “Thomson Job Impact Study: The Next Generation of Corporate Learning,” an in-depth two-year study examining the application of a structured Blended Learning model and the subsequent results in on-the-job performance.

The participants in this study were representative of a broad scope of corporate and academic organizations, including Lockheed-Martin, National Cash Register, Utah State University, University of Limerick in Limerick, Ireland, Anoka-Ramsey Community College in Minnesota and Executive Service Corp. The study measured learning results among 128 participants – participant demographic information is highlighted in the full results presentation.

The primary research goals of the Thomson Job Impact Study were to determine if there were significant accuracy and time performance differences on real-world tasks among learners who received a blended learning solution, e-Learning alone or no training. This study was based on current instructional design, learning style, and training evaluation research and the theoretical significance of each construct is discussed in the body of the Thomson Job Impact Study report.

To compare E-Learning alone with a defined Blended Learning solution, a three-group study was designed and fundamental business skills selected as the instructional topic. Group One received a Blended Learning course and Group Two received a standard e-Learning course. The third group was a control group used to benchmark performance and did not receive any training. Groups One and Two completed a database application post-assessment and all groups completed three real-world tasks.

To measure a Blended Learning approach, this study first had to define a Blended Learning model (despite widespread attention to the blended learning concept, there is no standard for an applicable model). The defining viewpoint was that a productive Blended Learning model uses a structured combination of instructional media to appropriately present, practice and evaluate

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instruction. This model can include on-line instruction, mentoring/instructor-led support, and various sources of information and practice from text and electronic media. There were five core features identified as contributing to the overall success of the Blended Learning model defined for this study:

- Use of Scenario-Based Exercises as the basis for learning software.
- Integration of learning objects within real-world scenarios.
- Early use of full-featured, actual software.
- Access to live mentors during on-line training.
- Assessments designed to parallel real-world tasks.

The e-Learning alone measure was based on the NETg e-Learning model. This model includes five standard features that contributed to on-the-job performance results:

- Content presentation using NETg Learning Objects (NLOs) each containing a measurable objective, a relevant practice activity, and a valid assessment item for the stated objective.
- Access to Frequently Asked Questions (FAQs) and other supporting material.
- Access to mentoring.
- Post-assessment at the end of each unit of study and learner guidance to repeat any objects he or she had not successfully mastered.
- Use of actual database application software to perform the three authentic tasks that all members of the study were required to complete.

In the final analysis, the performance of all three groups on real-world tasks revealed the following results:

- The group that received Blended Learning performed with **30% more accuracy** than the E-Learning alone group.
- The group that received Blended Learning performed real-world tasks **41% faster** than those who received E-Learning alone.
- The group that received Blended Learning performed tasks with **159% more accuracy** than the control group
- The E-Learning alone group performed tasks with **99% more accuracy** than the control group.

These findings demonstrate that this defined Blended Learning solution heightens the overall on-the-job performance achieved by e-Learning alone and that either form of training is much more effective than no training at all. ***Simply stated, this study shows that a structured Blended Learning model does result in greater workforce productivity.***

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WHY THIS STUDY IS NECESSARY

Several factors make the current study essential as a response to current technology training needs and the increased capabilities of contemporary training systems. As businesses continue to depend on information technology, more individuals must be supported in their efforts to master critical technology applications. Further, ongoing technology change means that new software regularly introduced, and new technical capabilities are available to enhance business operations. These technological changes also make it more feasible to create individually responsive learning systems.

As on-line learning technology becomes more advanced, it is worthwhile to re-examine the characteristics of effective instruction. Some features that may have been technically and economically unfeasible in the past may now, possibly, be incorporated into instruction. Those characteristics addressed in this study include the following: creating realistic scenarios for learning; aligning learning objects with realistic scenarios; using the actual software being taught as soon as possible; providing access to live mentors; and providing assessment responsive to both the need for performance accuracy and yet allowing for individual differences. This study provides support to the importance of these characteristics of effective instruction.

As the global learning leader, Thomson offers a wide variety of learning solutions that support a flexible and effective blended model for instruction. Thomson's focus on client value drives ongoing examination of products and services. The Thomson Job Impact Study is a natural outgrowth of this continuous improvement effort and our mission to identify the best blend of learning solutions that produce significant business impact and return on investment.

GOALS OF THE THOMSON JOB IMPACT STUDY

The Thomson Job Impact Study objectives represent a pioneering effort for the corporate learning industry. The primary goals of the study were:

- *To determine if there are significant performance differences on real-world tasks among learners who received a Blended Learning solution, E-Learning alone, or no training.*
- *To determine if there are significant time performance differences on real-world tasks among learners who received a Blended Learning solution, e-Learning alone, or no training on real-world tasks*

DEFINING A STRUCTURED BLENDED LEARNING MODEL

Despite widespread learning industry attention to the concept of blended learning, there is no single model used as a standard for the industry. For this Job Impact study, a structured Blended Learning model first had to be constructed.

Historical instructional models focused on demonstration of skills. The cornerstone of the current learner-centric instructional design movement and an integration of the best instructional models is the First Principles theory/model set forth by David Merrill, a pioneer in contemporary instructional design methods and practices. It was decided that for this study the Blended Learning structure would adhere to the First Principles model and support Merrill's recommended phases.

The instructional design prescriptions based on First Principles are as follows:

- *Learning is facilitated when learners are engaged in solving real-world problems (**Problem**).*
- *Learning is facilitated when existing knowledge is activated as a foundation for new knowledge (**Activation**).*
- *Learning is facilitated when new knowledge is demonstrated to the learner (**Demonstration**).*

- *Learning is facilitated when the learner applies new knowledge (**Application**).*
- *Learning is facilitated when new knowledge is integrated into the learner's world (**Integration**).*

These cornerstone instructional design principles were integrated into the Blended Learning model defined for the Thomson Job Impact Study through the following core components:

Scenario-Based Exercises (SBEs). Employed individuals, and those seeking eventual employment, need to learn technology skills in a context similar to actual use. Without such a context, the skills attained are not likely to transfer to real world settings. The majority of current software instruction is focused strictly on software operation in isolation with little application to real-world uses. Learning technology in an abstract “out of context” way not only lacks motivation for learners, but it prevents understanding actual software use. A Blended Learning model needs to be empirically justified as an enhancement to current technology-based training. The concept of Scenario-Based Exercises (SBE’s) is core to the structured Blended Learning model developed for the Thomson Job Impact Study and will be referenced in relation to other model components.

Aligning Learning Objects with Scenario-Based Exercises (SBE’s). Learners need to learn in contexts that parallel the real world, and they also need to spend their learning time on only those learning objectives that match their needs and also match employment requirements. Standalone learning objects, such as defined by NETg, have provided verifiable learning activities that produce performance improvement. In the Blended Learning approach designed for the Thomson Job Impact Study, standalone learning objects are integrated with real-world tasks.

Use of Actual Software. As students learn, they need eventually to use the real, full-featured technology that is the object of instruction. Real software is an important source of illustrating actual use in the job context. Further, using real software provides essential feedback to confirm students' learning accomplishments. The Thomson Job Impact Study model for Blended Learning calls for integration of real software as early in on-line instruction as possible.

Use of a Mentor. In addition to the instruction and feedback provided through e-Learning, learners need a forum for getting questions answered and problems solved immediately. Not every question can be anticipated and provided for through formal technology-based instruction, and a real mentor is the best source of help to facilitate learning.

Authentic Assessment. Finally, the Blended Learning model designed for the Thomson Job Impact Study calls for the use of authentic assessment measures. In short, valid assessments require use of the real application or technology being learned, allowing learners to pursue

software solutions in all the different ways that people find to accomplish a similar task. The goal is to assess learners' individual skills using real-world task performed with the actual application. This type of assessment provides evidence that learners have actually acquired employment-ready skills.

HOW THE BLENDED LEARNING MODEL WAS DELIVERED

The Blended Learning model presented five Scenario-Based Exercises (SBEs) in order of progressive difficulty. The SBEs were designed by a database application subject matter expert and finalized by internal instructional design experts in conjunction with the External Principal Investigator.

The following chart illustrates how the SBEs were presented to study participants:

Scenario-based exercise	Training Matrix to Learning Objects	On-Line Mentor	FAQs	Demos	Learner Guidance	Learner Feedback
1	✓	✓	✓	✓	✓	✓
2	✓	✓	✓		✓	✓
3	✓	✓			✓	✓
4	✓	✓			✓	✓
5	✓	✓				✓

Training Matrix. The training matrix was a table of relevant learning activities that the learner could explore for in-depth instruction. The tasks that comprise the SBEs were mapped to individual learning objects (for this study, NETg Learning Objects, or NLOs, were employed) that support the specific task the learner was being asked to perform. In this way learners could access only the learning objects that they personally needed to successfully complete the SBE without having to review unnecessary information. Learners used this matrix to locate specific learning objects within a database application Fundamentals course.

Online Mentoring. On-line 24x7 mentoring provided access to certified database application personnel through the mentoring program. The mentors were provided copies of the SBEs for reference and were directed to support the learning process rather than provide outright answers. The study participants were told that the expert resource was available to them

anytime and that they could even access it for support when back on the job. The only restriction was that they were not allowed to confer with an expert when completing an assessment activity. Experts were told not to support assessment queries as well.

Frequently Asked Questions. Written Frequently Asked Questions (FAQs) were available to the study participants via Ask the Expert and in the participants study manual. Specific FAQs were generated by experts with the database application for each scenario-based exercise based on the learning objectives for that exercise. FAQs in the study manual were only available for the first two exercises as this form of additional support was eliminated as SBEs increased in difficulty.

Demonstration. Demonstrations were on-line screen-cams of the tasks the learner was asked to complete. Demonstrations were provided only for the first scenario-based exercise. Other explanations and demonstrations of procedures were available when learners chose a learning object associated with one of the five scenarios. While not directly related to the specific business content of the scenario, the learning objects were available through the scenario/learning object matrix. If the learner was interested in viewing a demonstration of the required activity or seeing the associated learning object, they would access them on-line. While many providers offer demonstration throughout the entire training event, the Thomson Job Impact Study model offers demonstration only initially to build an autonomous learner. Thereafter, learners exercised their own judgment about whether a more detailed explanation/demonstration was necessary.

Guidance. In the first and second SBE, learners were provided detailed step-by-step guidance. Learner Guidance was provided at the end of the third and fourth SBE for additional assistance. The five SBEs provided progressively less assistance to the learner. Starting with the third SBE, detailed guidance was withdrawn from the body of instructions. To support the learner's adjustment to the decrease in assistance, they were provided a Learner Guidance section at the end of the third and fourth SBE. Learners were instructed to use the Learner Guidance section only if they needed additional assistance. All learner guidance was then removed for fifth SBE.

Learner Feedback. Feedback was provided to the learner by associating model solutions to each scenario. Feedback was also provided at the conclusion of all five SBEs. A scoring macro built into the application spreadsheet provided the learner task-specific feedback. The scoring macro could be run only once at the end of each SBE. Study participants were trained to use the macro and how to interpret the results.

Taken together, the scenario-based exercise support features were more comprehensive initially and gradually eliminated as recommended by Merrill's First Principles model and to scaffold the learner to autonomy. This Blended Learning model ensures that the learner is prepared to perform independently on post-instruction assessments and real-world tasks.

THE E-LEARNING MODEL

To measure on the job productivity differences between Blended Learning and e-Learning alone, this study relied on NETg e-Learning to represent a real-world e-Learning experience. This is a valid representation based on the ongoing, widespread global usage of NETg e-Learning in corporate learning environments.

NETg e-Learning was developed with the premise that the adult learner has a set of unique work-related needs that must be met if the instruction is to be accepted. There is a list of principles aimed at making these e-Learning courses both acceptable and relevant to this important population.

The main adult learning principles addressed in the NETg e-Learning courses are: learner control, time sensitivity, real world application, and concrete examples.

Adult learners want to control their learning environment - controlling the pace, content, appearance, presentation and modalities. The e-Learning courses support these principles by providing learners with the maximum control possible over their learning environment, allowing them to set their own pace and select the content they wish to pursue. Thus, learners are able to meet timeframe requirements rather than have a set schedule forced upon them. The instruction is unit-based and allows learners to select only the material they need to learn at any given time, progressing at their own pace.

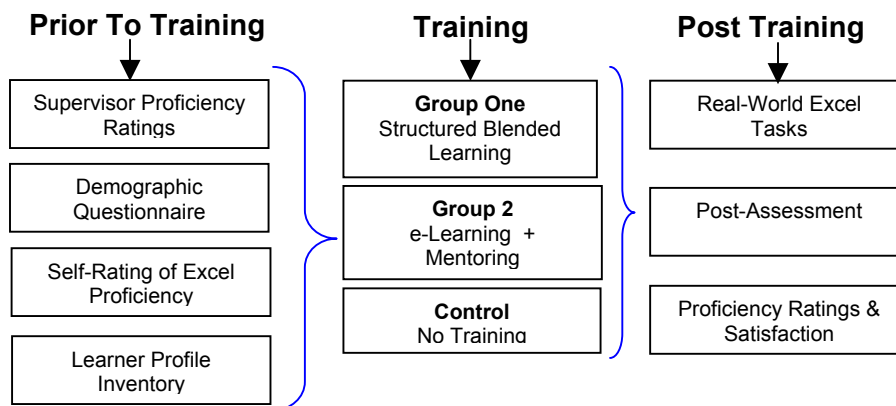
The next key feature is the ability of the course to administer a pre-test, determine precisely which units or topics learners need to experience, and provide instruction focusing on only that content. This feature reduces the amount of training time required for learners who have prior learning regarding some of the lessons within a course.

Using established instructional design principles, NETg has created modular components of instruction, NETg Learning Objects (NLOs). In NETg e-Learning courses, these modules exist at the topic level. Each topic contains one measurable objective, a learning activity, and unique assessment items. This stand-alone structure allows NETg to extract topics from a lesson or course and recombine them into a new, customized learning solution on demand, creating the instruction a learner requires.

As with the Blended Learning Model, on-line mentoring and FAQs were available to the e-Learning alone participants through mentoring. This is representative of real-world e-Learning application as delivered through hosted service, XtremeLearning.

IMPLEMENTING THE STUDY

The Thomson Job Impact Study design, illustrated below, measured all participants' skill levels to verify consistency and then applied the prescribed learning approach. Following completion of the learning process, study participants' ability to perform real-world tasks was monitored and then compared.



A customized on-line learning environment (using NETg XtremeLearning) was developed for this study and was used to deliver all instruction and assessments. The duration of the training was approximately five eight-hour days. Specific weeks were targeted for the study, and participants were asked to select a specific week to participate. The majority of the study took place in a corporate or academic computer lab. The internal researchers and project manager secured the lab and set up the computers to meet the necessary requirements for the study.

The participants were given a manual containing the activities for their respective groups. All manuals introduced the on-line environment and took the participants through the necessary steps to log on, set up passwords, access e-Learning, access the on-line mentor, and complete surveys. The Group One manual contained the five SBEs. The manual for all three groups also included the same three Real World Tasks for completion after training.

Real-World Tasks. To assure accurate scoring of the real-world tasks, two researchers independently scored each task using a set of standardized scoring sheets. The independently derived scores were then compared and any discrepancies resolved. Statistical measurements of the results indicate a very high level of agreement and providing strong support for the accuracy of the scoring process.

Overall, the real-world tasks developed for this study are believed to be robust enough to adequately measure basic database application proficiency and to be used to determine if there is a difference between or among instructional groups. These instruments provided data to meet

Kirkpatrick's Level III form of evaluation, the level at which improvement is observable in on-the-job performance.

Post Assessment. The same post-assessment test was used for all groups regardless of training and was presented online. The assessment consisted of 41 items consisting of multiple-choice, multiple-multiple-choice, sequencing, labeling, and simulations. There were no time limits on the test. The participants were allowed to complete the test in whatever time they needed. Participants could also take a post-assessment more than one time. The post-assessment data provided the necessary data to determine if learning had occurred and served as the Kirkpatrick Level II evaluation.

JOB IMPACT STUDY RESULTS

The first primary goal was to determine if there were significant performance differences on real-world tasks among learners who received a Blended Learning solution, E-Learning alone or no training.

Comparison	Performance Improvement
Blended Learning v. e-Learning alone	30%
Blended Learning v. Control	159%
e-Learning alone v. Control	99%

The above chart shows that Group 1 (Blended Learning model) performed 30% more accurately than Group 2 (E-Learning alone) and 159% more accurately than Group 3 (Control). Group 2 (E-Learning alone) performed 99% more accurately than Group 3 (Control).

The second primary goal was to determine if there were significant time performance differences.

Comparison	Time Performance Improvement
Blended Learning v. e-Learning alone	41%

The statistical difference in time performance to complete the real-world tasks between Group 1 (SBE) and Group 2 (e-Learning) represents a 41% decrease in time

In summary, the following findings supported the primary goals of this study:

- The Blended Learning group significantly out-performed both of the other groups in database application performance.
- The Blended Learning group took significantly less time to complete the real-world tasks than did the e-Learning alone group.
- The e-Learning alone group performed significantly better on the database application tasks than the Control group.

CONCLUSIONS AND IMPLICATIONS

The following conclusions can be drawn from the findings of the Thomson Job Impact Study:

- ✓ Corporate learning programs *are* measurable by employee on-the-job performance.
- ✓ A structured blended model, as outlined in the Thomson Job Impact Study, *does* improve employee productivity – speed and accuracy – over non-blended learning.
- ✓ The Blended Learning model defined by the Thomson Job Impact Study achieved performance improvement by 30 percent.
- ✓ High-quality e-Learning alone delivers nearly *100 percent* improvement in employee performance in on-the-job tasks.
- ✓ The Blended Learning and e-Learning models represented in the study are both realistic and repeatable.

The results of this study have the potential to significantly impact the direction of corporate learning program development. As a result of this study, global organizations now have a performance benchmark for their learning programs. Further, this study provides the structure and process for repeatable learning models. This may prove to have the most immediate impact as corporate learning executives will undoubtedly seek products and services capable of replicating this model.

Overall, this study establishes a first benchmark correlating corporate learning with on-the-job productivity and will undoubtedly incite vigorous discussion and examination from the learning community.

For more information on the Thomson Job Impact Study: The Next Generation of Corporate Learning, please contact Bill Bonner, NETg, at 630-637-8924 or via email at bbonner@netg.com.