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Technical Training
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Ford Motor Company

Dearborn, Michigan

General Physics Corporation

Troy, Michigan

Blended Learning for 6-Sigma Green Belts

SUMMARY

6-Sigma was implemented in 2000 to improve the quality of the Company's products and services. Black Belts apply statistical tools to reduce or eliminate defects, while Green Belts provide support and lead small projects. In 2001, the Company decided to accelerate Green Belt deployment with a goal of training 70,000 employees by 2004.

Time away from the job was highlighted as a barrier to reaching this goal. Five days of instruction prepared employees in the existing Green Belt program. Championed by senior management, a cross-functional team reviewed opportunities to reduce time in training. The team concluded that e-learning alone could not address the performance gap. A blended solution would provide the optimal approach.

Analysis activities culminated in a design that moved knowledge-based activities to the web while providing application-based learning in a classroom environment with the support of a Black Belt facilitator. The new solution enhanced global consistency through a 6-8 hour web-based Overview that serves as a prerequisite to a three-day facilitated session. This solution reduced participant time in training by twenty percent; in addition, Black Belt facilitators have additional time for 6-Sigma project work due to shortened class periods.

The results of 6-Sigma in the Corporation are substantial. Given the importance of Green Belt training in the overall success of this initiative, the blended solution remains in use today and is an integral component in the corporation's quality program. The Company anticipates becoming a benchmark in the industry by ensuring that 6-Sigma is "the way we do business."

BACKGROUND

In May of 2000, the Company developed 6-Sigma Green Belt training to provide the skills and knowledge necessary to support Black Belts as part of a project team and lead small projects. Participants of the original five day Green Belt program learned to apply the DMAIC process to issues faced by their organization and make decisions based upon 6-Sigma analysis tools in their daily work.

With the exception of a significant change in the implementation timeline, the goals of the Green Belt program have not changed.

The blended Green Belt solution is fully implemented. The solution is in use today and will be utilized for the foreseeable future.

The Company reviews the Green Belt program as part of a continuous improvement plan and content revisions to the program occur as required. At present, consideration is being given to integrating the Green Belt program with the Company's existing technical education program. This modification is being subjected to further analysis.

Green Belt training is implemented globally (North America, South America, Europe, Asia Pacific) as part of the Company's commitment to the 6-Sigma initiative. The blended solution was extended to the external supply-base earlier this year.

The target audience for the blended solution consists of nearly all salaried employees and a subset of the hourly workforce. This group accounts for approximately twenty-percent of the workforce employed by the Company.

The Green Belt training project was championed by senior management. The table below identifies the approximate number and level of employees involved at each stage of the development project associated with converting the five-day course into a blended solution.

STAGE	RESOURCES / NUMBER	LEVEL
Analysis and Design	<ul style="list-style-type: none"> • Cross-functional team 8 • Instructional designers 2 • External consultants..... 1 • Target audience members 12 	<ul style="list-style-type: none"> • Management – Functional Organizations • ISD experts • Process consultants • Salaried and Hourly representatives

Development	<ul style="list-style-type: none"> • Instructional designers 2 • Instructional developers .. 2 • Programmer 1 • Subject matter experts 4 	<ul style="list-style-type: none"> • Senior ISD experts • ISD practitioner • Advanced web programmer • 6-Sigma expert
Implementation	<ul style="list-style-type: none"> • Developers 2 • Programmer 1 • Curriculum manager..... 1 	<ul style="list-style-type: none"> • ISD practitioner • Advanced web programmer • Staff
Evaluation	<ul style="list-style-type: none"> • Curriculum manager..... 1 • Quality office NA 	<ul style="list-style-type: none"> • Staff • Varies

The external costs associated with the original Green Belt course were approximately \$150,000. An additional \$220,000 was invested to convert the solution to its current blended format. It should be noted that these figures do not reflect costs associated with resources that include managers and other employees participating as part of the target group.

Demonstration of new skills and knowledge, both during and after training, validates the learning strategies incorporated in this blended solution. This approach ensures consistency of instruction across the global Company, while also providing a connection with the business of each organization. Facilitation by an expert member of each organization signifies a dedication to employee development, the relevance of the instruction, and offers an excellent opportunity for employee commitment.

Use of 6-Sigma Black Belts as facilitators contributed significantly to the results of the blended learning solution. Providing the opportunity to leverage Black Belt experiences connects the training to the work new Green Belts will be asked to perform.

In addition, the partnerships established between the functional organizations and the development team at the onset of the solution and maintained through the present date have been a key factor in the continued success of this solution.

DOCUMENTATION

Needs Identification

1. *Describe the problem or need for which this practice is designed and implemented. How was this problem identified, and how was it determined that this practice is an appropriate response?*

6-Sigma is a tool that has enabled the Company to produce affordable products that meet or exceed consumer expectations. Business results have been substantial and are critical to the Company's position in this competitive global industry.

Black Belts are extensively trained and certified in the 6-Sigma discipline. This select group of employees has contributed significantly to the Company's recent successes.

However, their efforts alone are not enough to achieve the Company's improvement goals for quality and customer satisfaction.

Engaging employees across the Company as Green Belts is a key element in meeting the goals of the 6-Sigma initiative. Although Green Belts do not receive the in-depth training required for the Black Belt program, they are expected to demonstrate their understanding through practical application on the job and support of Black Belts on projects.

In 2001, the Company decided to accelerate Green Belt deployment with a goal of training 70,000 employees by 2004. Five days of instruction prepared employees in the existing Green Belt program. Time away from the job was highlighted as a barrier to reaching this goal. Championed by senior management, a cross-functional team reviewed opportunities to reduce time in training.

With the guidance of ISD professionals, a cross-functional team analyzed the needs of the target audience and those of the Company. Analysis activities confirmed:

- Time-in-training must be minimized for both the target audience and Black Belt facilitators to support the accelerated implementation requirement.
- The implementation of 6-Sigma at this Company differed significantly from others in the industry.
- The majority of the target audience did not have significant statistical backgrounds.
- The target audience would need to achieve proficiency in the DMAIC process and complex disciplines associated with 6-Sigma.
- Foundational information should be presented in a manner that provides global consistency, while allowing the target audience to progress at their own pace.
- Green Belt training must continue to provide examples applicable to specific organizations, while affording the opportunity to eliminate portions of the training that do not apply to a specific group.

Given the size of the target audience and duration (5-days) of the existing course, employees would spend thousands of hours in training in support of this initiative. While the training would pay dividends in the future, the short-term impact of time away from the job presented a significant barrier to the compressed implementation timeline.

The accelerated deployment plan for Green Belt training led to scoping activities that included a front-end analysis that served as the basis for the development project. A cross-functional team, championed by senior management, was responsible for analyzing the training and requirements. The team, comprised of significant stakeholders, assessed training needs through reviews and discussions about anticipated performance problems and their root causes.

The performance of specific functional organizations within the company was compared to the metrics associated with improving product quality. In many cases, a direct correlation could be established between the performance of the organization and the performance of the employees who support it.

The team also reviewed hard quality data and related learning opportunities to identify resources that could be utilized in developing a solution. Research included a review of

the preliminary findings, discussions with Subject Matter Experts (SMEs), audience/task analysis, and a review of potential delivery options/environments.

The team's analysis of the target population and the learning environment clearly indicated that the existing learning solution would not support the compressed implementation timeline and would require revision.

Consideration was given to external Green Belt programs; however, the decision to revise the existing solution to support the compressed implementation timeline was based upon the unique implementation of 6-Sigma by the company and a desire to control the cost of training. The need for an internal program was evidenced by the data.

Design Values

- 2. Please describe how this practice takes into account the best interests of both the organization and the employees targeted.*

Senior management sought an innovative approach to supporting the accelerated implementation goal. A review of the analysis information led the design team to a determination that e-Learning would provide a suitable approach for foundation information. However, the complexity of the subject matter, coupled with the need for organization specific context and examples, required individualized instruction.

Given the size of the target population and the timeframe of the required roll out, the design team determined that a blended solution would provide the optimal approach. Candidates would participate in a facilitated session after completing a self-paced Overview delivered via the Company's intranet and extranet.

Migrating a portion of the instruction to the web provided global consistency and benefited employees who did not have significant statistical backgrounds. This self-paced environment affords the opportunity for employees to progress based upon their ability to comprehend the subject matter. Before the blended solution, participants progressed through introductory concepts with the facilitated group, which could be difficult for those who needed more time to grasp these concepts.

The design team carefully considered the analysis data to ensure that appropriate objectives were established for the program. The needs of a global audience were balanced with the differences in roles and responsibilities; for example, the developmental needs and responsibilities of a design engineer are significantly different from those of a purchasing agent. This balance was reached by:

1. Placing high-level concepts applicable to all employees in a self-paced Overview that serves as prerequisite to facilitated instruction. The designers projected learner seat time between six and eight hours for the web-based portion of the blended solution.
2. Designing an application-based session with multiple variations of organization specific case studies. Black Belts from the participant's organization would facilitate this three-day session and put the training in the appropriate perspective. This

provides the opportunity to relate the training to the required job performance for each organization.

Robust opportunities for learner practice and remediation were an important design element in the intervention and supported the objectives. Practice and remediation opportunities began with the web-based Overview and extended throughout the facilitated three-day class.

Beyond the fundamental improvement in skill and knowledge afforded by the training, factors such as cost, timing, and regional availability were addressed. Global consistency would improve by moving foundation concepts to the web. Black Belt facilitators would improve not only the relevance of the training, but also decrease implementation costs when compared to delivery by external instructors. Use of local facilities would also help contain cost and improve availability.

Alignment

3. How is this practice in alignment with the performance identified, as described in your answer to question 1?

Efficiency gains derived from the blended solution produced a significant reduction in participant time in training. Given the size of the target audience, even a small improvement in learner efficiency will reduce time away from the job by several hundred thousand hours over the life of the initiative. Efficiency improvements continue to provide value to shareholders while ensuring the needs of the employees and initiative are met.

The solution provides individuals with the fundamental skills and knowledge necessary to participate in 6-Sigma projects and apply the tools and principles to daily work so that project improvements can be made and sustained over time. The needs of each functional organization have been met by the blend of a core curriculum with case studies unique to the organization. Web-based delivery of the Overview and regional delivery of the facilitated portion of the course supported the global implementation and accelerated deployment.

4. Please describe how this practice integrates other training, learning, and performance improvement practices, and aligns itself with organizational goals to achieve the desired outcomes.

The blended Green Belt training solution is part of a specialized curriculum supporting the deployment of 6-Sigma throughout the company. The 6-Sigma curriculum also includes courses for Leadership, Project Champions, Black Belts.

Green Belt training is viewed as an essential element in building the infrastructure to sustain long-term deployment and create a critical mass of trained employees. It is one element in a curriculum designed to move employees from an awareness level to becoming practitioners of 6-Sigma.

The skills and knowledge developed within the Green Belt training are continually reinforced by the company's commitment to 6-Sigma. The Company anticipates

becoming a benchmark in the industry by ensuring that 6-Sigma is "the way we do business."

5. *What evidence is there of partnerships within and outside the organization (e.g. with senior management, frontline supervisors, unions, external training suppliers, consortia)?*

The success of the 6-Sigma Green Belt course is due in part to the partnerships that exist within and outside the organization. Internally, 6-Sigma deployment directors (designated from each functional component of the corporation) championed the initiative, providing organizational support for the project. They also actively participated in course design and the review of course materials. As part of the design team, Subject Matter Experts provided invaluable assistance in validating the accuracy of course content. In addition, the training manager from the Education, Training, and Development organization was an active member of the launch team supporting the 6-Sigma initiative. External providers worked closely with the Company's ISD professionals in support of the development activities.

Evaluation Strategy

6. *How is this practice evaluated? What factors are included in your calculations (e.g. time, costs, staff count, lost phone calls, customer satisfaction)? Are the financial costs of this practice calculated? If so, how? How often is this practice evaluated?*

Given the importance of 6-Sigma to the Company, a plan to evaluate the program was developed during the design stage of the Company's ISD process and is comprised of both formative and summative evaluation techniques. The evaluation model is summarized below:

- Level I - Course completion surveys provide immediate feedback from participants. The team managing delivery of the program reviews Level I feedback on an ongoing basis.
- Level II - Participants must demonstrate mastery of performance-based assessments included in the web-based Overview before they are allowed to register for the three-day facilitated session.
Black Belt facilitators utilize case studies and practice exercises to evaluate participant performance in the three-day facilitated session.
- Level III - Following successful completion of training, Green Belts are expected to demonstrate the necessary skills to complete an application approved by their local management within six months of training.
Black Belts within each organization conduct an on-going assessment of the on-the-job application of individual's Green Belt knowledge and skills.

Organizations are able to tie to Green Belt projects to performance objectives. Focus groups are assembled periodically to obtain additional feedback.

Level IV - Organizationally, success of the Green Belt training program is measured in actual cost savings generated by projects supported by Green Belts and the overall level of Customer Satisfaction. The Corporate Deployment Office conducts summative evaluations on a routine basis.

Evaluation data is presented to the Corporate Deployment Office periodically for review and consideration of change. A dedicated 6-Sigma "Project Tracking System" supports the evaluation process and is available on the intranet.

6-Sigma is a methodology that applies a set of statistical tools to help improve quality and the Company's deployment focuses specifically on improving customer satisfaction. Measurement of the participant's application of the skills and knowledge gained through training was the true indication of success.

Metrics directly associated with the Green Belt program include:

- Level I survey data
- Level II examinations
- Black Belt evaluations of Green Belt skill application
- Customer satisfaction data
- Average waste elimination per 6-Sigma project
- Average time to complete a 6-Sigma project
- The number of Green Belts trained by calendar year

A variety of factors are considered when evaluating the financial impact of the Green Belt program, these include:

- Currency value of direct savings/expenses yielded by Green Belt projects
- Defects per million opportunities
- Direct cost of instruction

A system known as the Green Belt Tracking System supports tracking of Green Belt training and projects.

The blended solution is evaluated on an on-going basis to ensure that actual results are aligned with the expectations of the Corporate Deployment Office.

Evaluation cycles vary according to the type of evaluation. For example, evaluation actions at Level I and II occur with each class, while Level III actions occur based upon factors such as participation in project work. Level IV evaluation actions occur on a monthly basis and are reflected in corporate metrics reports.

Results

7. *What specific participant behaviors are observed as a result of this practice, and how do these behaviors contribute to the goals of the practice? Are the impacts of these behaviors short-term or long-term? How do these behaviors differ from the results of previous practices?*

Use of examples and case studies based upon "real" projects provides direct support for the participant's immediate application of the new skills and knowledge. Evidence of on-the-job application has been the best indicator that the blended solution addressed the performance gap identified in the analysis activities.

Corporate measurement and Black Belt observations confirm that Green Belts prepared through the blended solution now apply 6-Sigma problem solving tools. Green Belts have been instrumental in accelerating the deployment of Consumer Driven 6-Sigma. In one recent project, a 6-Sigma Black Belt, assisted by a team of Green Belts, diagnosed a problem based upon a series of tests and reduced ongoing costs by nearly \$2 million.

Behaviors derived from the blended solution have both short and long term impact on the Company.

In the near term, the behavioral changes resulting from the solution:

- The workforce takes a more active role in controlling quality
- Employees approach work in a data driven manner

In the long term, these behaviors will position the Company as a benchmark in the industry, specifically as it relates to quality and 6-Sigma deployment.

Organizational support for reinforcing Green Belt skills and knowledge in the workplace is probably the most significant differentiator between this and other programs. Given the importance of 6-Sigma to the Company, a concerted effort is put forth by each organization to remove barriers to practicing what was learned in training.

Participants are strongly encouraged to taking this learning and integrating it into daily performance. The blended solution has been an enabler in the significant acceleration of the 6-Sigma initiative. The Company has prepared approximately 40,000 Green Belts and completed about 8,000 6-Sigma projects worldwide.

8. *What was the impact of the practice on your organization? Are the impacts of these behaviors short-term or long-term?*

Revising the Green Belt program from its prior configuration of five days of classroom training to a total of four days, with one of these days at the employee's discretion is a significant improvement. This enhancement supports not only the accelerated roll out plan, but also improves global consistency while reducing short-term implementation costs associated with the amount of time employees spend in training.

Listed below are several of the benefits of the blended Green Belt solution.

COMPANY BENEFITS	EMPLOYEE BENEFITS
<ul style="list-style-type: none"> • Accelerated training schedule • Global consistency • Reduced time away from the job in training • Twenty percent reduction in opportunity costs • Improved customer satisfaction • Accelerated waste reduction • Reduced direct costs of training delivery 	<ul style="list-style-type: none"> • Expanded access to Green Belt instruction • Forty percent reduction in classroom time • Reduced impact on work schedule • Twenty-five percent self-paced • Connection to the business

Monthly corporate deployment metrics continue to show significant progress toward the goals of the initiative. In addition, according to an external research firm, initial quality surveys indicate that the Company has improved more rapidly than others in its industry have during the past two years.

By supporting Black Belt projects and managing smaller 6-Sigma projects, Green Belts prepared through the blended solution provide the critical mass necessary to accelerate the initiative. The results of the initiative are improved quality, customer satisfaction, and elimination of waste.

The blended solution provided direct support for the Company's goal of accelerating 6-Sigma deployment. In addition, this solution has dramatically reduced deployment costs by reducing time away from the job for Green Belt candidates.

One of the key benefits of the new approach is that it offers the ability to provide instruction that meets the needs of each functional organization, while also capitalizing on elements that are common across the entire company.

The behaviors derived from the blended solution have both short and long term impact on the Company.

In the near term, the behavioral changes resulting from the solution:

- Improve customer satisfaction with the products and services of the Company
- Directly impact the Company's bottom line

In the long term, the accelerated implementation of Green Belt training will help ensure that customer satisfaction and quality improvements will be sustained over time. Since its implementation, 6-Sigma is credited with saving approximately \$1 billion worldwide in waste reduction.

Shared Learning

9. *What have been some of the specific lessons learned from designing and implementing this practice for the purposes of continuous internal improvement? Please discuss whether and how this practice might be transferred and replicated both internally and external to your organization.*

- Leadership and a shared vision for learning were critical factors in aligning the learning team with the corporate deployment team.
- The partnerships established at the beginning of the project (at all levels) were key factors in the success of this solution.
- Global representation ensured commitment and buy-in across the organization.
- Ensuring that the learning team was part of the 6-Sigma launch community heightened the success of the program.
- Application of a data-driven mindset provides an assurance that the product developed will meet or exceed expectations. Careful interpretation of data gathered during the analysis provided clear direction for the development of an impactful program.
- The opportunity to utilize real world examples that are closely aligned with the needs of each organization was extremely beneficial to participants.
- Some organizations requested that their Green Belt candidates work on an actual project during the facilitated session. Black Belt facilitators quickly learned that it is not effective to have every employee have his or her own project in the learning sessions as this provides too many projects for one session.
- It was very important to provide a strong "case for change" at the beginning of the training. This engaged participants in the initiative and set the stage for the actions they are expected to take when they complete the Green Belt training.

Green Belt training was replicated across the global organization and the blended model was extended to the external supply-base earlier this year. The web-based overview provides consistency for global employees through the Company's intranet and was replicated on the extranet for external access by suppliers.

The facilitated instruction is replicated on an on-going basis by the functional organizations that comprise the global Company. Deployment teams within each organization support the instruction by ensuring the training provides an organization specific context, identifying Black Belts to deliver the instruction, and managing the roll out process as it applies to their needs.

This strategy is well suited for major initiatives in all corporations. Facilitation by an expert member of the target audience's organization (Black Belts) provides a true connection to the business for the participants. While it is not appropriate to utilize a subject matter expert in the delivery of all training interventions, key initiatives such as this derive significant benefits from this delivery model. This learning strategy clearly

signifies the organization's commitment to employee development, the relevance of the instruction, and offers an excellent opportunity for employee commitment.

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