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**Continuous Quality Improvement with the
Plan-Do-Study-Act Model**

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Abstract

Continuous quality improvement (CQI) is the idea that projects should constantly go through a cycle of evaluation and incremental change to produce better outcomes following each cycle. The Plan-Do-Study-Act (PDSA) method is one such approach that has grown in popularity, especially among several federal funding agencies. The PDSA includes four phases. These four phases are planning an activity, conducting that activity and collecting data, studying that data and comparing it to expectations, and acting on that data by making changes. These four phases are further contextualized through an example of a small training program in a rural area. The PDSA works best when implemented collaboratively with a committed project team and a process focused on improving program outcomes. With these in place, the PDSA will build a continuous cycle of feedback to facilitate team learning and positive outcomes over the lifespan of a project.

GPCI Competencies:

- 3: Knowledge of strategies for effective program and project design and development
- 4: Knowledge of how to craft, construct, and submit an effective grant application
- 9: Ability to write a convincing case for funding

Introduction

Continuous quality improvement (CQI) is the idea that projects should constantly go through a cycle of evaluation and incremental change to produce better outcomes following each cycle. Several methodologies such as Lean, Six Sigma, and Agile have been developed around this idea and adapted across a wide variety of industries including grant writing and management. The strength of CQI in the grants field is that it succinctly clarifies the evaluation process for funders and grantees and provides a framework to evaluate and improve programs.

PDSA

One particular CQI methodology required by several federal agencies in their notice of funding opportunities is the Plan-Do-Study-Act (PDSA) Model. Originally developed by W. H. Deming in the 1950's for the manufacturing industry in Japan, it was later reintroduced to the U.S. by Deming in 1986 and has been implemented in additional settings from healthcare to powerplant management (Deming, 1986). Also known as the She-whart Cycle, Deming Cycle, the PDCA model, and the IHI Model for Improvement, the PDSA model as shown in Figure 1 consisting of four phases: plan, do, study, and act.

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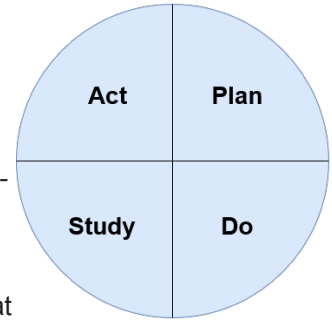
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Each phase of the PDSA cycle represents a different action a project team should take with multiple cycles occurring over the lifespan of a project. The Plan phase consists of reviewing the current format of the project, establishing expectations for the results of the Do phase, and identifying data to measure changes in outcomes. In the Do phase, the team conducts the activities outlined in the Plan phase and collect data for the Study phase. The Study phase is where the project team compares expectations outlined in the Plan phase to the data collected by the team during the Do phase. Here the team decides if additional changes need to be made to the project either because it did not meet expectations or that higher expectations for the project can be set. The Act phase is where any changes are implemented based on the analysis. The cycle then starts over with another Plan phase (Gorenflo & Moran, 2010). However, many PDSA cycles are needed for the lifespan of the project.

Figure 1: PDSA Model



PDSA in Practice

While understanding the theoretical structure of the PDSA process is important, the real-life example below will further illustrate the PDSA in action. A rural city applied for and received a federal training grant with a goal to train rural residents about how to respond to physical trauma and opioid overdose until medical help arrives. The training also served as a recruitment tool for EMT training funded by the grant. The expected outcomes for the training outline in the proposal were:

1. Increase participants' knowledge of how to respond to physical trauma and opioid overdose
2. Increase participant's confidence in their abilities to respond to physical trauma and opioid overdose
3. Convert 30% of training participants to grant-funded EMT trainees

Additionally, the evaluation section of the grant outlined the PDSA process taken to evaluate and improve the quality of the training. This outline, which included the expectations above, was explained to be the first Plan phase for our project. The proposal predicted what the team expected to happen as a result of the training and identified how they would collect the outcomes data needed to evaluate those predictions through a post-survey. The proposal then outlined that the Do phase of the grant would consist of the first training planned for Month 2 of the grant. After that training was completed, the project team reviewed the data collected through the post-training surveys as part of the Study phase and identify recommendations for improvement for the next training. The results from this first Study phase would then be implemented by the project director and other grant partners. Figure 2 shows this first PDSA cycle as outlined in the proposal.

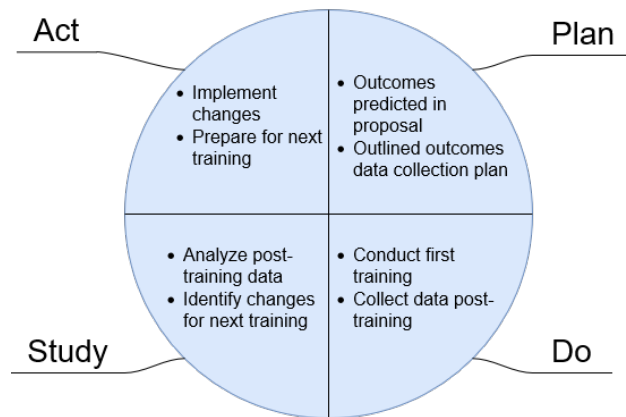
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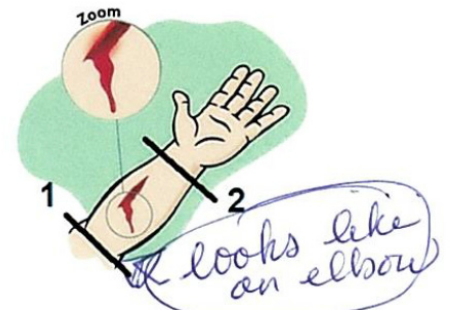
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Figure 2: Training Project - Cycle 1



In the first study phase, the research team noticed a problem based on their outcomes data predictions. Participants failed to correctly answer several content knowledge questions on physical trauma. Further study showed that students were misunderstanding the order in which they should respond to an emergency. As a result, the team recommended that the trainer emphasize this more in the next training.

Additionally, the Study phase in another PDSA cycle identified a problem with the format of the post-training survey. Several participants wrote comments on an image expressing their confusion about what the image was communicating. As shown in the image to the right, students were confused about the placement of line 1 at the elbow. The question was asking if and where a tourniquet should be placed with options being line 1, 2, both, or neither. The training covers tourniquet placement and explicitly teaches participants that a tourniquet should never be placed at the elbow. This had been missed during the survey development process but was easily corrected by editing the image to move the line down.



As a result of the PDSA process, not only was the team able to monitor for potential corrections to the training, but they were also able to see real-time progress on the program's goals. Through the PDSA process, the team observed each trainee's knowledge and comprehension improve as issues with the curriculum were addressed. The team was also able to identify participants interested in becoming an EMT and connected them to training. The PDSA produced improvements in outcomes through a structure where the team was able to quickly analyze post-training data for problems, develop and implement solutions to those problems, and determine if those problems are corrected through additional analysis.

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Conclusion

The PDSA system is most effective if the entire project team is committed to using the PDSA. Even if a funder requires that the PDSA be used, the best practice is for the team to take steps during the grant writing process to get buy-in from all project partners; and to illustrate that the PDSA is a valid approach to produce the quality outcomes and change addressed through the proposal. If anyone on the team is not “bought into” the PDSA, gaps may occur in the outcomes data collected for a Study phase, and the team may not implement the changes identified through the PDSA. The PDSA works best when the entire team is actively engaged in the project’s activities, analysis, and problem-solving.

Another consideration is to make sure the data collected through the PDSA process is outcome-focused. The PDSA process is designed around producing positive changes in the behaviors of the project’s population. Data like frequency counts are important to collect to show that the work occurred, but data should also be collected that answers the question “What change do we expect to see as a result of what we did?” The data that answers this question should then be analyzed in the Study phase. This data could be quantitative, qualitative, or both, but it should be collected in a way that the team can use the data to compare to the expectations established in the planning phase. Finally, the example above represents just one possible implementation of the PDSA. Every project is different with diverse organizational settings, activities, and expectations. The project may not require the team to meet after every activity to analyze data as was done in the above example. The budget or program structure may not allow for data to be collected with the same frequency as the example. The aspect of the PDSA which must be preserved is its cyclical structure. If phases are skipped or omitted from the PDSA, the cycle of informed feedback that leads to better outcomes for the target population will not be built. Continuous quality improvement only works if the process is continuous.

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- Gorenflo, G., & Moran, J. W. (2010, April). The ABCs of PDCA. Public Health Foundation. http://www.phf.org/resourcestools/documents/abcs_of_pdca.pdf

Biographical Information

Nathaniel Steinlicht is a research associate with the Center for Rural Health Improvement which is housed in the University of South Dakota Sanford School of Medicine. In that role, he works with community organizations interested in healthcare workforce development to identify and secure funding for their programs with a specific focus on federal grants. He also works with these organizations post-award to evaluate their programs outcomes and improve the quality of their programs. Nathaniel has a Master’s degree in Public Administration from Ohio State University with a focus on program evaluation.