



# **Advanced Tools for Quality and Process Approach - Part 1: PDCA, KANBAN**

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# Structure of the Presentation

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# PDCA TOOL

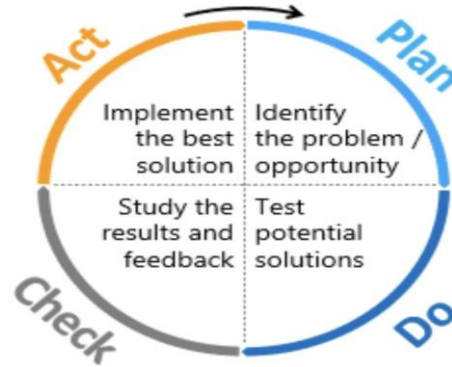
- **In the 1950s, management consultant Dr William Edwards Deming developed a method of identifying why some products or processes don't work as hoped. His approach has since become a popular strategy tool, used by many different types of organizations. It allows them to formulate theories about what needs to change, and then test them in a “continuous feedback loop”.**
- **Importance in continuous improvement: PDCA provides a structured approach for formulating theories, testing them, and implementing changes in a continuous feedback loop.**



Anon, (n.d.). Photo Gallery - The W. Edwards Deming Institute.

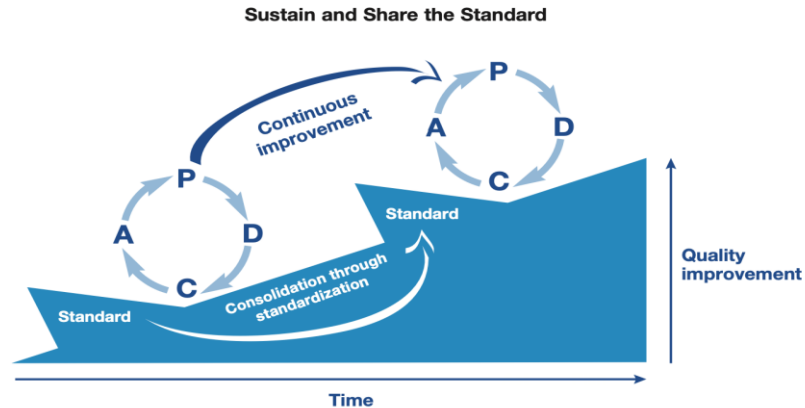
# What does PDCA mean?

- The **PDCA cycle** begins with the **Planning phase** which involves the identification of the problem and objectives. During this phase, a collaborative effort is made to agree on the problem to be solved or the process to be improved. Subsequently, an in-depth analysis of the existing as-is situation is conducted, alternative solutions are identified, and the most promising solution is selected and scheduled for implementation.
- In the **Do phase**, the selected solution is put into action on a limited scale. This phase also involves ongoing progress measurement, data collection, and feedback gathering to facilitate subsequent analyses.



# What does PDCA mean?

- **PDCA is the foundation of continuous improvement or kaizen. Leaders set targets (plan) against a stable baseline of performance..**
- **The main purpose of PDCA-cycle application lies in process improvement. When process improvement starts with careful planning, it results in corrective and preventive actions supported by appropriate quality assurance tools which lead to true process improvement.**



(Lean Enterprise Institute. (n.d.))

# Tools which can be used in PDCA.

- Most of the 7QC tools can be used for problem identification: Flow chart, Cause-and-Effect diagram, Check sheet, Pareto diagram, Histogram and Control charts. For problem analysis the following tools can be used: Cause-and-Effect diagram, Check sheet, Pareto diagram, Scatter plot and Control charts. When a team is developing a solution for the analyzed problem, Flow chart and Scatter plot can be useful as well. In the phase of achieved results evaluation, most of 7QC tools can also be successfully implemented: Check sheet, Pareto diagram, Histogram, Scatter plot and Control charts.**

Seven basic quality tools (7QC tools)	Steps of PDCA-cycle				
	Plan	Do	Plan, Check	Plan, Act	Check
	Problem identification	Implement solutions	Process analysis	Solutions development	Result evaluation
Flow chart	✓			✓	
Cause-and-effect diagram	✓		✓		
Check sheet	✓		✓		✓
Pareto diagram	✓		✓		✓
Histogram	✓				✓
Scatter plot			✓	✓	✓
Control charts	✓		✓		✓

Soković, M., Jovanović, J., Krivokapić, Z. and Vujović, A., 2009. Basic quality tools in continuous improvement process. *Journal of Mechanical Engineering*, 55(5), pp.1-9

# What does PDCA mean?

- **The Check phase involves analyzing the collected data and feedback and comparing the outcome against pre-established objectives. This phase allows us to evaluate how well the solution has worked and where further enhancement may be needed. Additionally, it involves the identification of unexpected issues and the gathering of key learnings. It is important to note that the Do and Check phases may need to be repeated until the desired results are achieved.**
- **The Act phase is the point at which the chosen solution is fully integrated. This phase requires taking actions based on the insights acquired from the Check phase. A plan for full-scale implementation is carried out, taking into account the associated costs and benefits. The Act phase is also concerned with standardizing, documenting, sustaining the improved process, as well as integrating it into the organization's system.**
- **The utilization of the PDCA cycle doesn't necessarily stop once the Act phase is completed. The improved process often becomes the new baseline, which may prompt a return to the Plan phase. Multiple iterations of the PDCA cycle may be essential for a permanent resolution of the problem and the attainment of the desired future state. Each cycle brings one closer to their goals and extends their knowledge further.**

# When to Use the PDCA Cycle

## List of instances where PDCA can be applied:

- **Beginning of a new improvement project: Establishing clear objectives and identifying areas for enhancement.**
- **Introducing a Kaizen program: Driving a cultural shift towards continuous improvement by engaging employees at all levels.**
- **Identifying root causes of problems: Systematically addressing underlying issues to prevent recurrence.**
- **Improving inefficient processes: Optimizing operations and enhancing efficiency to meet quality standards and customer expectations.**



# Practical Example of Tools

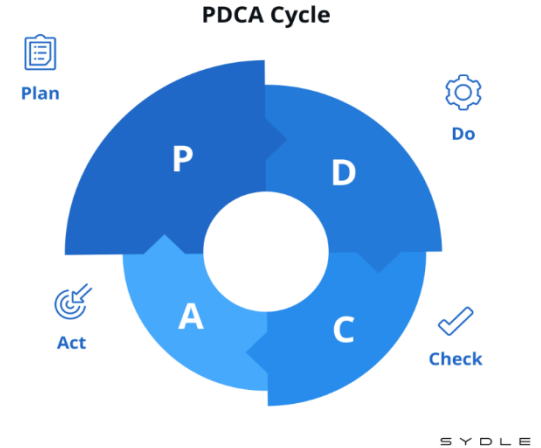
- **Example of PDCA tool: For students to prepare for their semester Exams**

## Plan Phase:

- **Identify Goals: Set specific objectives for improving study habits**
- **Create a Study Plan: Allocate time for studying each week**
- **Set Objectives: Define measurable goals for each study session**

## Do Phase:

- **Follow Study Plan: Stick to the planned study schedule**
- **Engage Actively: Actively participate in study sessions**
- **Stay Focused: Minimize distractions and maintain focus during study time**



(Sydle (2021c). Blog SYDLE.)

# Practical Example of Tools

- **Example of PDCA tool: For students to prepare for their semester Exams**

## **Check Phase:**

- **Assess Progress: Review study logs and performance on assignments/exams**
- **Reflect on Effectiveness: Consider what worked well and what needs improvement**
- **Identify Areas for Improvement: Recognize challenges and shortcomings in the study routine**

## **Act Phase:**

- **Adjust Study Plan: Modify study schedule and goals based on reflection**
- **Implement Changes: Try new study methods or techniques**
- **Monitor Progress: Continuously track progress and make further adjustments as needed**

# KANBAN

**Definition of Kanban:** Kanban is a visual framework utilized in project management and software development. Its primary purpose is to visualize work, limit work in progress (WIP), and optimize efficiency throughout the workflow.

- **Origins of Kanban:** The term "Kanban" originates from Japanese, meaning "visual signal" or "card." It was first developed by Toyota in the 1940s as a key component of their just-in-time (JIT) production system, aimed at reducing waste and enhancing productivity.
- **Core Components:**
  - **Visualizing Work:** Kanban utilizes visual representations such as cards or sticky notes on a board to represent work items, making it easier to track progress and identify bottlenecks.
  - **Limiting Work in Progress:** By imposing WIP limits at each stage of the workflow, Kanban helps prevent overburdening team members and maintains a steady flow of work.
  - **Maximizing Efficiency:** Kanban aims to optimize the flow of work through the system, minimizing lead time and maximizing throughput.

# Principles of Kanban

- **Visualization:**

**Explanation of Kanban boards:** These boards provide a visual depiction of the workflow, with columns representing different stages (e.g., To Do, In Progress, Done). This visualization enables teams to monitor progress and identify areas for improvement easily.

- **Work in Progress (WIP) Limitations:**

**Importance of WIP limits:** Setting WIP limits at each stage prevents work overload, ensures a smooth flow of work, and helps teams focus on completing tasks rather than starting new ones prematurely.

- **Flow Management:**

**Objective of Kanban:** Kanban aims to optimize the flow of work through the system, minimizing delays and maximizing efficiency. Teams collaborate to identify and eliminate obstacles that hinder the flow of work, promoting continuous improvement.

# Benefits of Kanban

- **Continual Reflection and Adaptation:**

**Kanban encourages teams to regularly review their processes and implement small, incremental improvements. This fosters a culture of continuous learning, innovation, and adaptability within the organization.**

- **Adaptability and Flexibility:**

**Kanban's flexible framework allows teams to adapt to changing requirements and priorities quickly. It provides a scalable solution that can be tailored to the specific needs of different teams and projects.**

- **Applicability Across Industries:**

**Kanban is not limited to a particular industry or sector. Its principles of visualization, WIP limitations, and flow management are applicable to teams of all sizes and across various domains, including software development, manufacturing, healthcare, and more.**

# Why Kanban was Created

- **Context of Industrial Waste Reduction:**

**Kanban originated as part of Toyota's efforts to minimize waste and improve efficiency in their manufacturing processes. By implementing Kanban, Toyota achieved just-in-time (JIT) production, where parts and materials are ordered and produced only as needed, reducing inventory costs and improving responsiveness to customer demand.**

- **Application Beyond Industrial Sector:**

**While Kanban's roots lie in manufacturing, its principles have been successfully applied to other domains, including software development, project management, and knowledge work. Kanban's efficacy in workflow management, visibility enhancement, and continuous improvement advocacy make it a valuable tool for any team or organization seeking to improve its processes.**

# How to Implement Kanban

- **Understanding Your Current Workflow:**

Before implementing Kanban, it's essential to gain a thorough understanding of your existing workflow, including the steps work items go through from initiation to completion.

- **Visualizing the Workflow:**

Create a Kanban board with columns representing different stages of the workflow (e.g., To Do, In Progress, Done). Use visual cues such as cards or sticky notes to represent work items within each column.

- **Setting Work-in-Progress (WIP) Limits:**

Determine the maximum number of tasks allowed in each column at any given time. Setting WIP limits helps maintain a steady flow of work, prevent bottlenecks, and ensure that team members are not overwhelmed.

- **Initiating Work, Moving Tasks, Monitoring and Optimizing, and Continuously Improving:**

Implement Kanban by adding tasks to the "To Do" column, moving tasks through the workflow as work progresses, monitoring progress on the Kanban board, and continuously seeking ways to improve the workflow based on feedback and insights gained from using Kanban.

# USING KANBAN TO CALCULATE STOCK LEVELS:

Let's say you manage the office supplies for your company, and you want to use Kanban to ensure you always have the right amount of stock on hand. Here's how you can calculate stock levels:

## ▪ Determine Demand Rate:

- Calculate the average daily usage of each office supply item over a specific period, for example, one month.
- Let's say your office uses 20 pens per day, 10 notebooks per day, and 5 packs of printer paper per day.

## ▪ Estimate Lead Time:

- Determine how long it takes to restock each item once an order is placed. This includes the time to place the order, process it, and receive the items.
- Suppose it takes 5 days to receive a new shipment of office supplies after placing an order.

## ▪ Calculate Safety Stock:

- Safety stock is the extra inventory you keep to buffer against unexpected increases in demand or delays in lead time.
- Let's assume you want to keep a safety stock equivalent to 2 days' worth of usage for each item.

## ▪ Using the Formula:

- **Stock Level = (Demand Rate × Lead Time) + Safety Stock**
- **For pens: (20 pens/day × 5 days) + (20 pens/day × 2 days) = 100 pens + 40 pens = 140 pens**
- **For notebooks: (10 notebooks/day × 5 days) + (10 notebooks/day × 2 days) = 50 notebooks + 20 notebooks = 70 notebooks**
- **For printer paper: (5 packs/day × 5 days) + (5 packs/day × 2 days) = 25 packs + 10 packs = 35 packs**

## ▪ Set Reorder Points:

- Reorder points are the stock levels at which you need to place an order to replenish inventory.
- In this example, you would reorder pens when the stock level reaches 140 pens, notebooks at 70 notebooks, and printer paper at 35 packs.

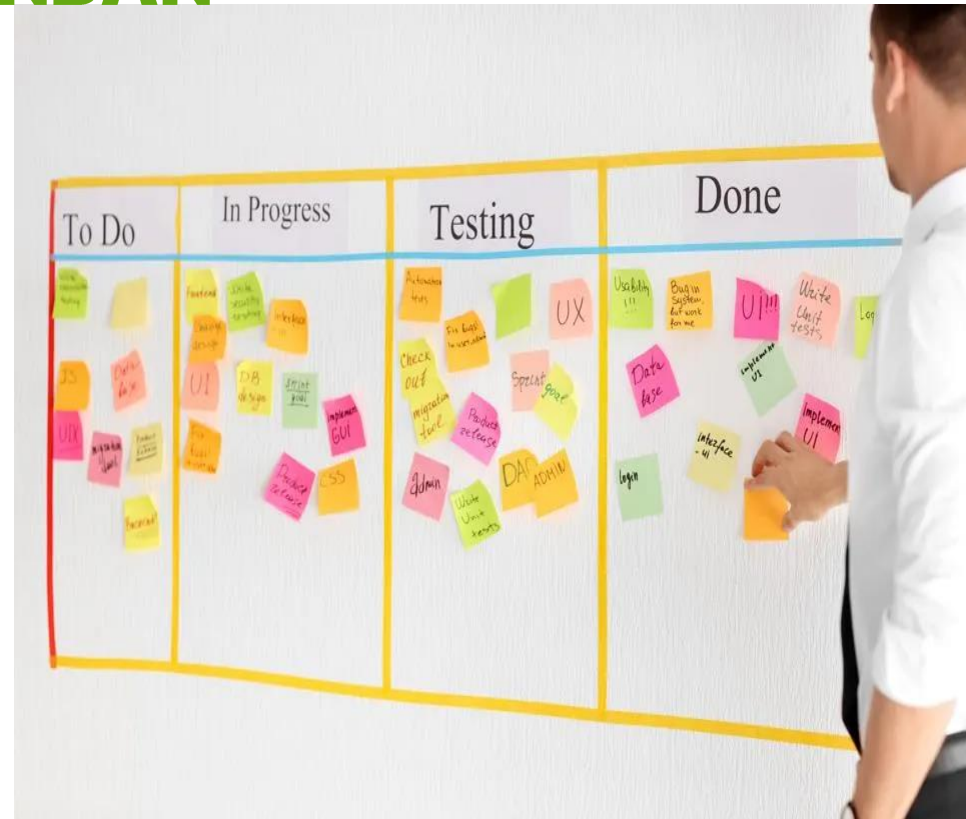


# Practical Example of KANBAN

- **Example of KANBAN: How a student can use the KANBAN system to manage their task and assignments**

- **STEPS TO USE KANBAN**

1. Visualize the workflow
2. Set Kanban limits
3. Create Kanban cards
4. Implement Pull Systems
5. Replenish resources
6. Monitor and improve
7. Celebrate Achievements



(Collins, B. (2018d). Forbes. 19 Jul.)

# KANBAN System

## 1. Visualize the Workflow:

Identify the different stages involved in completing academic tasks. These stages could include "To Do," "In Progress," "Waiting for Feedback," and "Completed."

## 2. Set Kanban Limits:

Determine the maximum number of tasks that you can effectively work on at each stage. For example, you might limit yourselves to having no more than three tasks in progress at any given time.

## 3. Create Kanban Cards or Signals:

Each task or assignment can be represented by a Kanban card or sticky note. These cards include details such as the task description, due date, and any relevant resources or instructions.

## 4. Implement Pull System:

As you progress through your tasks, you move the corresponding Kanban cards across the board based on their status. For instance, when you start working on a task, they move the card to the "In Progress" column. This ensures that work is pulled through the process based on the student's pace and priorities.

# KANBAN System

## 5. Replenish Resources:

**If you encounter challenges or need additional resources to complete a task, you can initiate replenishment by seeking out help from instructors, accessing library resources, or scheduling study sessions with classmates.**

## 6. Monitor and Improve:

**Regularly review the Kanban board to monitor progress and identify any obstacles or areas for improvement. If you notice that certain tasks consistently take longer than expected or they struggle to meet deadlines, you can adjust your workflow or seek assistance to improve your efficiency.**

## 7. Celebrate Achievements:

**When tasks are completed, you move the corresponding Kanban cards to the "Completed" column. Taking time to acknowledge and celebrate these achievements can help boost motivation and maintain momentum.**

# KAHOOT TIME!!!!

- <https://create.kahoot.it/details/3e59c578-b7e1-4233-84e2-6e783e4409fa>



**Thank You  
for Your Attention**

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