# PMPP 201 Unit 6: Quality Knowledge Area

## Overview

Welcome to Unit 6 of PMPP 201. In this Unit, we take our weekly dive into the fourth of the 10 “Project Management Knowledge Areas”, as listed in the Project Management Institutes Body of Knowledge (PMBOK). As noted in PMPP 201 Unit 1, the PMBOK is at the core of our curriculum and Learning Outcomes.

This unit will consider the Knowledge Area of **Quality**.

Meeting customer expectations is the second highest priority of any organizations (second only to safety). Therefore, a project manager must have a clear knowledge of what the expectations are. These expectations are only known through appropriate communications. Hence, there is a lot of ‘pressure’ on the project manager to ensure the communication is fitting and correct.

This unit focuses on how to ‘communicate quality’.

To facilitate the communication of quality during a project, there are valuable *tools* available to aid in the collection of data, formulating it into a reportable form, and sharing it with stakeholders. We will discuss several of these *tools*.

We target our assignments to prepare you for use in real-world project management. You will commonly perform work based on a given scenario or use samples/templates from the web. Plus, each week, you’ll be submitting a Weekly Recap Status Report that discusses lessons learned.

## Topics

This unit is divided into the following topics:

1. Quality Management Plans
   * An organization must meet the quality expectations of the customer, the most important stakeholder of all
   * To ensure these expectations are met, a project manager will use a systematic approach, in the form of a Quality Management Plan
2. Monitoring and Controlling using The 7 Quality Tools
   * The 7 Quality Tools are powerful tools to gather (quality) data and formulate it into meaningful/consistent presentations that can be used to communicate quality metrics to stakeholders (monitoring).
   * Stakeholders can then make decisions accordingly (controlling).
3. Cause and Effect Diagrams and the 5-Why’s
   * A Cause and Effect Diagram displays the numerous *causes* of a given *effect*. It is usually built backwards… knowing the effect first, filling in the causes as you proceed. Its shape gives this diagram its common name, a Fishbone Diagram.
   * The 5-Why’s can be used to dig into each potential cause to reach the *root* *cause*… the cause you may choose to ‘fix’.
4. Standard Deviation and 6 Sigma
   * ‘6 Sigma’ may be a common term but few understand it’s meaning, and therefore, it’s power. It is a calculation of Standard Deviation commonly presented in a ‘bell curve’ shaped chart.
   * There are two formulae for Standard Deviation. One uses ALL of the data (called population) and the other considers a ‘sample ‘of the data (yielding a more conservative result).
   * 6 Sigma is used for variance (or deviation) control

## Learning Outcomes

When you have completed this unit, you should be able to:

* Formulate a Quality Management Plan
* Convert a Histogram (similar to 6 Sigma) to a Pareto Chart
* Build a Cause and Effect Diagram
* Calculate Standard Deviation using both formulae

## Activity Checklist

Below is a checklist of learning activities you will benefit from in completing this unit. You may find it useful for planning your work.

It is important to complete ALL Personal Activity PRIOR to FAR Centre sessions.

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| 🗹 | **Activities** | **Expected Time Commitment** |
|  | **Personal Activity 6.0.1:** Watch Instructor Video (PowerPoint file included for reference). | 30 minutes |
|  | **Personal Activity 6.0.2:** Read Fundamentals of PM (FPM), chapters 9-10. | 50 minutes |
|  | **Personal Activity 6.0.3:** Read All In One (AIO), chapter 8. | 60 minutes |
|  | **Personal Activity 6.0.4:** Watch AIO Video “Project Quality Management” by Phillips. | 10 minutes |
|  | **Personal Activity 6.0.5:** Watch Web Video “Drawn Out: Plan Quality Management Process 6th edition PMBOK ®” by The Crowd Training | 10 minutes |
|  | **Personal Activity 6.0.6:** Watch Web Video “Project Quality Plan” by Terrena Hooper | 5 minutes |
|  | **Personal Activity 6.0.7:** Watch Web Video “The Seven Basic Quality Tools” by Lean Strategies International LLC | 10 minutes |
|  | **Personal Activity 6.0.8:** Watch Web Video “Whiteboard: Cause and Effect Diagrams” by IHI Open School | 6 minutes |
|  | **FAR Centre Activity 6.1.1:** The entire group is to watch the web video, “Project Quality Plan Template Review”. | 6 minutes |
|  | **FAR Centre Activity 6.1.2**: Using the AIO text, pg 314, and maybe a web search, draft a Quality Management Plan based on the file, “Scenario for QMP” | 30 minutes |
|  | **FAR Centre Activity 6.1.3**: As a full group, discuss the strengths and weaknesses of the final result. This should take about 3 to 5 minutes for each. | 15 minutes |
|  | **FAR Centre Activity 6.2.1:** Form groups of 3 to 5. Using the file, “Converting Histogram Data into a Pareto”, your team is to build a Pareto Chart. | 20 minutes |
|  | **FAR Centre Activity 6.2.2:** Share your Pareto with the class. Feedback may require revision, so make adjustments, as desired. This should take about 2 to 3 minutes per group | 10 minutes |
|  | **FAR Centre Activity 6.3.1:** Return to your groups and open the file, “Sample Cause and Effect Template”. Now, fill out the template using this scenario: “My goat ate my homework and that’s why its late.” Yes, you’ll have to be creative to fill in as many blanks as possible. | 20 minutes |
|  | **FAR Centre Activity 6.3.2:** Share your results with the class. This should take 2 to 3 minutes per group. | 10 minutes |
|  | **FAR Centre Activity 6.4.1:** As a full group, watch the web video, “Standard Deviation – Explained and Visualized” | 4 minutes |
|  | **FAR Centre Activity 6.4.2:** As a full group, watch the web video, “How to Calculate Standard Deviation.” NOTE: the final formula at the 3:33 mark. | 4 minutes |
|  | **FAR Centre Activity 6.4.3:** As a full group, watch the web video, “How to use the STDEV Function in Excel”. Be sure to note that “sample” and “population” are different Excel Functions (they have different formulae). | 4 minutes |
|  | **FAR Centre Activity 6.4.4:** Return to your groups. Open the file, “Standard Deviation Data”. Now, use Excel to calculate the Standard Deviations for each list of data in the file. | 20 minutes |
|  | **FAR Centre Activity 6.4.5:** Discuss as a group the correct answers and which formula was used for each list of data. | 15 minutes |
|  | **Assessment 6.1: Written Assignment:** Scenario: You are the Project Manager at work to put together a retirement party for you beloved boss. Your team has to secure the venue, provide ORGANIC food, and provide entertainment from a local Blues band (your boss’ favorite genre of music). Using the template from the web video “Project Quality Plan”, noting the 3 above measurements. Write out 3 Characteristics of each and your chosen Control Process for each. Then convert the above into a formatted Word document using the headers from the web video, “Project Quality Plan Template Review” by Victor Allen. Your finished Project Quality Management Plan should be about 300 to 500 words. | **Tbd** |
|  | **Assessment 6.2: Far Centre Participation:** Yourdiscussion and presentation participation will be considered by Facilitator and an evaluation will be submitted weekly to the Instructor. Plus, you will submit your Weekly Recap Status Report (using the template provided). | **Tbd** |

## Resources

Purchased Resources (textbooks, DVD):

* Fundamentals of PM (FPM), (Heagney), Chapter 9-10
* All In One (AIO), (Phillips), Chapter 8
  + AIO Video, “Project Quality Management” (from CD that comes with the textbook)

Provided Resources (files/weblinks):

* File: Week 6 Instructor Video Recording [Link]
* File: Week 6 PowerPoint [Link]
* Web video: “[Drawn Out: Plan Quality Management Process 6th edition PMBOK](https://www.youtube.com/watch?v=cq22U4k5Ecg) ®” by The Crowd Training
* Web video: “[Project Quality Plan](https://www.youtube.com/watch?v=ziFvAulmbk0)” by Terrena Hooper
* Web video: “[The Seven Basic Quality Tools](https://www.youtube.com/watch?v=7Kc1reo8NU0)” Lean Strategies International LLC
* Web video: “[Whiteboard: Cause and Effect Diagrams](https://www.youtube.com/watch?v=387chd8p54c)” by IHC Open School
* Web video: “[Project Quality Plan Template Review](https://www.youtube.com/watch?v=QGgzaHEgH10&t=13s)” by Victor Allen
* File: “Scenario for QMP” [Link]
* File: “Converting Histogram Data into a Pareto” [Link]
* File: “Sample Cause and Effect Template” (‘Blank using the ‘M’ words) [Link]
* Web video: “[Standard Deviation – Explained and Visualized](https://www.youtube.com/watch?v=MRqtXL2WX2M)” by Jeremy Jones
* Web video: “[How to Calculate Standard Deviation](https://www.youtube.com/watch?v=WVx3MYd-Q9w)” by Jeremy Jones
* Web video: “[How to use the STDEV Function in Excel](https://www.youtube.com/watch?v=nAV6rLmSBi4)” by Computergaga
* File: “Standard Deviation Data” [Link]

The most recent PMPP Textbook List, including ISBN’s, for all PMPP courses can be found in Moodle.

## Notes on ALL Learning Activities

Note that the learning activities in this course are ungraded, unless specified. All learning activities are designed to help you succeed in their assessments in this course, so you are strongly encouraged to complete them.

## Personal Activity:

The following activities are to be completed **before** your FAR Centre weekly session. Be sure to complete them to be fully prepared. Your familiarity with the topics and concepts will greatly help you participate with confidence during FAR Centre Activities.

#### Personal Activity 6.0.1: Watch Instructor Recorded Video

The weekly video is a preview of the topics to be studied for this unit. They are usually 15 to 30 minutes and have a supplemental PowerPoint file. You may find this gives you an edge in retaining the content you are ‘about to read’.

* Watch the video here: [link to file added when available].
* Find the supplemental PowerPoint file here: [link to file added when available].

#### Personal Activity 6.0.2: Read Fundamentals of PM (FPM), Chapter 9-10

These chapters of FPM discuss process controls and change management. These topics complement the discussion in the AIO text. It isn’t good enough to *just* know what is going on within a project. As the project manager, you’ll need to steer the team into understanding the data given (project monitoring) and then taking the appropriate corrective action (project controlling).

These are usually performed in an organization’s existing change control system. But, if one does not exist, or if it is not fitting with your given project, you must take action to create/develop this process.

#### Personal Activity 6.0.3: Read All In One (AIO), Chapter 8

Quality is one of the three Triple Constraints of a project (along with time and scope). Quality is not an accident. To ensure the customer’s quality expectations are met, you must have a plan. This chapter discusses the components of a project’s Quality Management Plan.

You will be introduced to The Seven Quality Tools. These are powerful tools, usually existing as forms or charts (depending on which tool). They are essential. Happily, they are not complicated. You will likely use some of these on a regular basis, so we will dig into a few to give you a stronger understanding.

Strongly related to The Seven Quality Tools are the calculations for Standard Deviations. These are only briefly mentioned in the book. But there are only two formulae, depending if your data is a sample, or if your data is from the whole ‘population’. We will discuss this in another activity shortly.

#### Personal Activity 6.0.4: Watch Web Video: “Project Quality Management”

This video, with a link above in Resources, gives an overview of all of the major components of the Quality Management Plan. If you need to, watch it a couple times to grasp how the components of a Quality Management Plan fit together.

#### Personal Activity 6.0.5: Watch Web Video “Drawn Out: Plan Quality Management Process 6th edition PMBOK ®”

We use the Project Management Institute’s (PMI) concepts and terminology in all of our PMPP courses. The PMBOK is the ‘master textbook’ of the PMI.

This video, with the link above, visually displays the PMBOK’s rendition of the components and their relationships in project Quality Management Plans. You are welcome to watch this video more than once.

#### Personal Activity 6.0.6: Watch Web Video “Project Quality Plan”

This video, with the link above, provides another perspective in understanding what makes up a project Quality Management Plan.

Since you’ll have an assignment coming up to build a project Quality Management Plan, pay close attention as to the headers and major topics covered on this video. You’ll need these for your assignment.

#### Personal Activity 6.0.7: Watch Web Video “The Seven Basic Quality Tools”

This video, with the link above, begins to define and explain the power of each tool. These tools are extremely common in project work. It is likely that a project manager will be fluent in two or three of these charts.

Pay close attention to Histograms and Pareto’s. These are closely related and are very powerful tools in problem solving in organizations/projects.

#### Personal Activity 6.0.8: Watch Web Video “Whiteboard: Cause and Effect Diagrams”

This video, also with a link above, you’ll be able to see how easy and powerful this diagram is. The typical purpose is to start with a problem and chase it back to the *root* *causes*. With the root causes known, a project manager can better attack them.

## Topic 1: Quality Management Plan

‘Quality’ can be defined only by the customer… it is their expectations, whether product or service. They, in turn, try to communicate to the supplier (you?). The supplier tries to comply, providing the product or service. The quality is then verified. If it passes, great. If expectations are not met, then *corrective* *action* must occur.

All of the above activity needs to be part of a *documented* process. The Quality Management Plan helps to define the quality processes to be used or developed. It will communicate *how* quality will be managed throughout the life of a project.

#### FAR Centre Activity 6.1.1: Watch Web Video “Project Quality Plan Template Review”

The whole group is to watch this video, using the link in Resources, above. This video supplements the Personal Activity reading and videos on Quality Management Plan development. The key here is the headers (displayed in a Table of Contents form). These headers form the basic structure of topics to be covered in a standard Quality Management Plan.

#### FAR Centre Activity 6.1.2: Draft a Quality Management Plan

Your team will use the file, “Scenario for QMP”, and build a Quality Management Plan. You are welcome to consider additional formatting (template) ideas via a web search. A QMP is not that complicated. If the scenario is limited on details, creatively make up your own. The key is to have a great format and have the content fit.

#### FAR Centre Activity 6.1.3: QMP Presentations

After 6.1.2 is completed, your team will share the results with the class. The key is to be able to justify the formatting (template) and offer some fitting content. Feedback is great and could lead to a quick revision.

## Topic 2: A Histogram into a Pareto

A histogram is one of The Seven Quality Tools. In fact, it may be the most common for data to be collected into. It gives us our ‘bell curves’ and is the very basis of many decisions, personal and business. (For example, all gambling is based on probabilities that a histogram can prove.)

For the sake of your assignment, you need to take steps beyond just collecting data. You have to figure out what to do with it. A histogram will reveal the most frequent, least frequent, and all points in between. If the data is collected about ‘problems’ and *resorted by frequency*, usually most to least (descending) and put into the form of a bar chart (namely, a Pareto chart), it can reveal the problems that are creating the most offense – the ones that should be addressed first.

Project managers should be able to build a Pareto chart from histogram data with ease (using average chart building skill in Excel). If you need help building charts in Excel, you should consider viewing web tutorials. (This is a common skill for all project managers.)

#### FAR Centre Activity 6.2.1: Build a Pareto Chart

Returning back to your groups, your team is to look at the file, “Converting Histogram Data into a Pareto”. Use the data to build a (descending) Pareto chart. This file will over a handful of data collections that will be charted. You will start with a simple chart and end with a more complicated one.

#### FAR Centre Activity 6.2.2: Present your Pareto Chart

Your team will share your Pareto chart with the group. Get and offer feedback, revising as necessary. Your presentation should only take 2 to 3 minutes.

## Topic 3: Cause and Effect Diagrams

Projects exist to either fix problems, or problems occur during project work (or both). The best method to understand how to fix a problem is to dig to find the *root* *cause*, or causes. A Cause and Effect Diagram (C&E), in its common ‘fishbone shape’, can be called a ‘fishbone diagram’ or, naming it after the man who invented it, an ‘Ishakawa diagram’.

Regardless of the name, the diagram is a very powerful tool to discover the root cause(s) of a problem.

During the building of the C&E, teams usually deploy the tactic of using the “5-Why’s”. This is just a method of relentlessly asking ‘why’ until the root cause is revealed.

#### FAR Centre Activity 6.3.1: Building a Cause and Effect Diagram

Returning to your same teams, open the file, “Sample Cause and Effect Template”. Using the scenario, “My goat ate my homework and that’s why its late,” fill out the Cause and Effect Diagram. You will have to ask the 5-Why’s and come up with creative content to complete this exercise.

There are many varying forms of this diagram, with different headers, but they all do the same function (and look roughly the same).

#### FAR Centre Activity 6.3.2: Present your C&E

Your team will share your Cause and Effect Diagram. All will be encouraged to offer additional content.

## Topic 4: Standard Deviation

In the project management sphere, standard deviation calculations commonly happen. The good news is, that despite formulae that looks scary, there are automatic ways to calculate them (in Excel).

Standard deviations ALWAYS refer to the deviation from the MEAN average, commonly shown in standard deviation formulae as an “X” with a bar over the top of it. Hence, the MEAN average is called “X-bar”.

There are two calculations for standard deviation. In most project quality situations, your data will be ALL of your data. When you have all the data, it is referred to as the ‘population’ (this part of the formula shows ‘n’). If you only have a sample of all the data points, then your standard deviation calculation will be the one specific to ‘samples’ (using the formula with ‘n-1’). By subtracting 1, this positions the standard deviation in a slightly more conservative light.

#### FAR Centre Activity 6.4.1: Watch Web Video “Standard Deviation – Explained and Visualized”

The whole class is to watch this video, with the link found in the Resources section above. This is the first of three videos on standard deviation, covering the flow of how the calculations are made. each taking you one step further toward being able to perform the calculations yourself.

#### FAR Centre Activity 6.4.2: Watch Web Video “How to Calculate Standard Deviation”

This video, with the link above, takes you through the calculations step-by-step. Be sure to pay attention at 3:33 for the “sample” formula, only briefly mentioned. Feel free to watch this video a couple times to increase your confidence.

#### FAR Centre Activity 6.4.3: Watch Web Video “How to use the STDEV Function in Excel”

This video, also with the link above, takes the formulae you just learned and shows you how Excel can calculate standard deviation *automatically*. You just have to determine if your data is from the entire population, or if it is collected as a sample. With the Excel function being STDEV.p or STDEV.s, respectively.

#### FAR Centre Activity 6.4.4: Calculating STDEV

Return to your teams and open the file, “Standard Deviation Data”. Using Excel, select the right function (formula) for the data (using the description of the data as your guide as to whether the data is *population* or *sample*).

If time permits, your team can create more data and plug in the correct STDEV formula.

#### FAR Centre Activity 6.4.5: Share STDEV Calculations

As a class, discuss the answers obtained. Were they correct? What clues did the descriptions offer in selecting the right formula? Each student should

## Unit 6 Summary

In this unit, you have had the opportunity to learn about…

1. How the process of Quality Management flows through an organization during a project. This process is documented in a project’s Quality Management Plan (QMP).
   1. There are several components to a QMP, but they all have the same basic structure.
   2. Of course, QMP’s vary from project to project to fit the specific needs of that project.
2. The QMP clearly calls out the process as to how the quality expectations are collected, compiled, and managed throughout the life of a project.
   1. To sum this up, *how* quality is communicated.
3. The existence of tools that can help in communicating quality
   1. AND how to use them

## Assessments

### *Assessment 6.1: Written Assignment*

Scenario: You are the Project Manager at work to put together a retirement party for you beloved boss. Your team has to secure the venue, provide ORGANIC food, and provide entertainment from a local Blues band (your boss’ favorite genre of music).

Using the template from the web video “Project Quality Plan”, noting the 3 above deliverables, write out 3 Characteristics of each and your chosen *control* *process* for each. Then convert the above into a formatted Word document using the headers from the web video, “Project Quality Plan Template Review” by Victor Allen.

Your finished Project Quality Management Plan should be about 300 to 500 words.

You will upload this into Moodle for grading.

### *Written Assignment Grading Criteria:*

The grading of the Written Assignment will be based on the PMPP Standard Rubric:

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| **Syntax and Spelling:** | |  |  |
|  | Emerging (0 to 6 points) | Developing (7 to 8 points) | Mastering (9 to 10 Points) |
|  | Student appears to not have checked for spelling and grammatical errors. Sentence structure is difficult to follow. Basic composition rules may not be followed. APA formatting has errors. | There are limited minor errors in spelling or grammar. The content may not flow smoothly and may be disjointed in thought and application. APA formatting is adequate. | There is either no errors or just a minor error in spelling or grammar. The content flows well and are a solid example of proper composition elements of style. APA formatting is exemplary. |
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| **Thorough Answers to Assignment:** | |  |  |
|  | Emerging (0 to 21 points) | Developing (22 to 30 points) | Mastering (31 to 35 Points) |
|  | Student may have simply just answered the assignment demonstrating limited knowledge of the content, lacked depth, and offered limited (or no) sources. Major points of the assignment are not developed. | Student answered the minimum of the assignment and offered undeveloped use of sources. They may need to cultivate some portion(s) of the assignment more in order to head toward mastery. | Student has clearly mastered the assignment content and properly used sources to thoroughly prove their thesis Content is clear and concise, without being too wordy; finishing with a great conclusion. |

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| **Personalization/Examples:** | |  |  |
|  | Emerging (0 to 21 points) | Developing (22 to 25 points) | Mastering (26 to 30 Points) |
|  | Student offers shallow or no personal examples to support their thesis. | Student shows personalization, but may be offering 'someone else's story' or one that doesn’t fit the assignment. Application of the content may not be thoroughly explained (to fit their thesis). | Student offers are least one strong example from personal experience, and fits well with their thesis and conclusion. Impact on faith may be included in the answer. |
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| **Professional Presentation:** | |  |  |
|  | Emerging (0 to 9 points) | Developing (10 to 12 points) | Mastering (13 to 15 Points) |
|  | Paper is offered in an acceptable presentation but lacks consistent formatting. Paragraphs are too large. Word choice may not be appropriate for the ‘business style’ required for this course. Overall appearance detracts from the content. | Paper is better than an ‘acceptable’ presentation. Paragraph size is appropriate (limited to 4 sentences each) and word choice is fitting. Overall appearance is on the brink of greatness. | Paper is very professional looking. Paragraphs are well formulated. Excellent word choice and appearance add to the overall content. Total appearance is exceptional. |

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| **Sources:** | |  |  |
|  | Emerging (0 to 5 points) | Developing (6 to 8 points) | Mastering (9 to 10 Points) |
|  | Student use of citation(s) does not comply with the assignment minimums; and sources are (just) from textbooks. | Student uses minimum quantity of required citations, but a majority are from the textbook(s). | Sources are rarely from textbooks and often from creative sources. |

### *Assessment 6.2: FAR Centre* *Participation*

You are expected to complete your reading assignments prior to class. Then during class, opening (with honesty and respect) join in on class discussions, small group discussions, and presentations.

Plus, you will submit a Weekly Recap Status Report (uploaded onto Moodle), using the template provided. You can score up to 100 points for this.

### *FAR Centre Participation Grading Criteria:*

Using the TWU general guide to grading found in the syllabus, the Facilitator will provide a score (and any applicable feedback) to the Instructor, namely, an evaluation of each student’s participation in the weekly sessions. Since these cannot be made up, attendance is mandatory.

For the Facilitator feedback, scoring is based on the below rubric.

* Attendance: 0 points for an absence, 10 for being late, and 25 for full attendance
* Attentiveness, up to 25 points
* Quality of class & small group discussions, up to 25 points
* Quality of presentations, up to 25 points
  + In the event of group presentations, the group will share the same score

Plus, you will submit a Weekly Recap Status Report (uploaded onto Moodle). You can score up to 100 points for this.

## Checking your Learning

Before you move on to the next unit, you may want to check to make sure that you are able to:

* Formulate a project Quality Management Plan, containing all appropriate content; using templates, as applicable.
* Using a couple of The Seven Quality Tools, take the data from a histogram and plug it into a descending Pareto chart.
* Build a Cause and Effect Diagram to trace a problem back to the root cause(s).
* Calculate standard deviation using both formulae, *population* and *sample*; because standard deviation is commonly used in project quality plans (namely 6 Sigma and variance control).