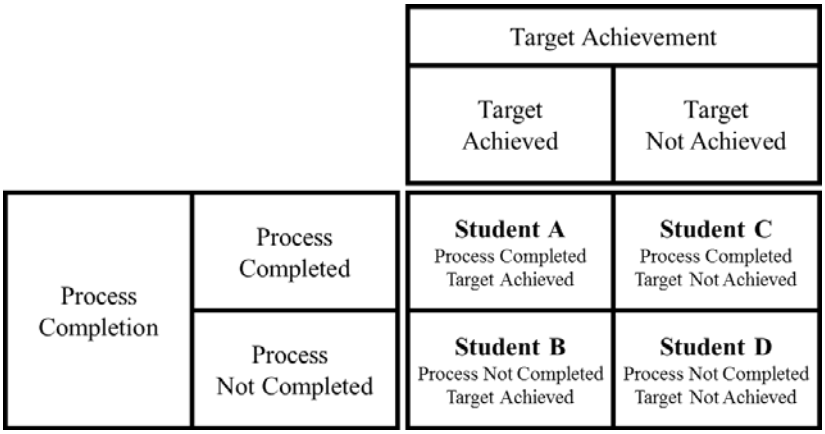

Figure 4. Four Student Model for Policy Management.

true state for each PAP hopefully leading to consensus on a positive way forward. The analysis will help you assess the level of the policy target and the weaknesses associated with a particular PAP.

4. Applying the Four Student Model During the SDCA Cycle

4.1 Revised Four Student Model for SDCA

The PDCA and SDCA cycles have many similarities. *Step 0* for both involves ideation—either an idea for change in the case of the PDCA cycle or an idea for a standard in the case of the SDCA cycle. We then either "Plan the Change" for PDCA or "Plan the Implementation of a Standard" for SDCA. The FSM can be modified for use during the Check step of the SDCA cycle. This is depicted in Figure 5. The two dimensions are now "Compliance with the Standard" and "Quality of the Results." There is either "Good Compliance" or "Poor Compliance" with the standard and there are either "Good Results" or "Poor Results." The dimensions have been *simplified* for ease of interpretation and use although we can imagine the dimensions having more than two categories.

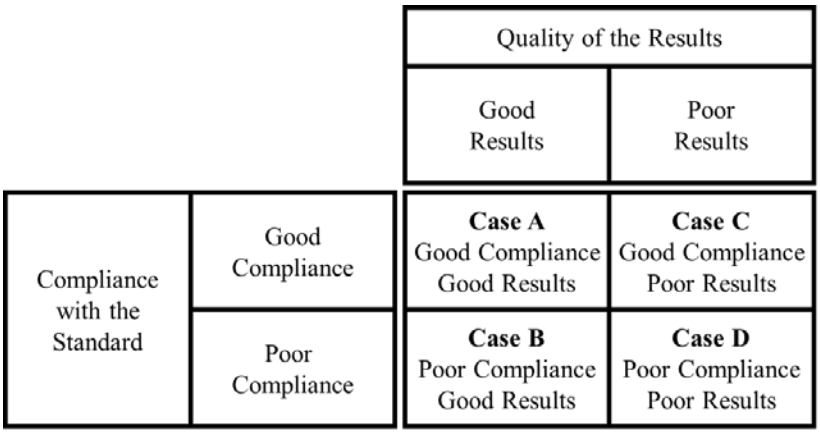

Figure 5. Modified Four Student Model for SDCA.

Suppose there is a work cell in a manufacturing plant and a new SOP is introduced into the work cell. There will be a formal review in thirty days (1) to determine if the workers complied with the SOP and (2) to evaluate the quality of the results. There are four possibilities:

Case A: Good compliance and good results (*attended class* and *passed exam*). This is good news because the quality of the results were good and compliance with the standard was good providing evidence that the standard was effective. Work system members should still identify and document any compliance barriers and unusual operating conditions. They should also determine if anyone has ideas for doing the work safer, better, faster, or cheaper. A root cause analysis might not be necessary although you could perform a prospective causal analysis for predicting the *causes of future success*.

Case B: Poor compliance and good results (*missed class* and *passed exam*). This is good news overall because the quality of the results were good, but we don't know if the standard is effective because compliance was poor. Work system members should investigate the causes of poor compliance and determine what was actually done instead of the standard. Whatever the workers did—it worked. Perhaps what was done instead of the standard should be the standard! A root cause analysis could be conducted aimed at determining the causes of non-compliance.

Case C: Good compliance and poor results (*attended class* and *failed exam*). This is bad news because work system members complied with the standard, but the quality of the results were poor. How bad were the results? Where did the standard fail? Should the standard be modified? Were the operating conditions different than what was expected? A root cause analysis could be conducted aimed at determining the causes of poor results.

Case D: Poor compliance and poor results (*missed class* and *failed exam*). This is not good news because the quality of the results were poor and work system members did not comply with the standard. We are not sure if the standard is effective because it wasn't truly tested. How bad were the results? Why was compliance poor? What were the compliance barriers? What was done instead of the standard? Whatever was done instead of the standard, did not work! A root cause analysis could be conducted aimed at determining the causes of non-compliance and the causes of poor results.

4.2 Hypothetical Manufacturing Example

Let's suppose a worker in the Molding Section of a manufacturing plant suggested new settings for the injection molding machines in order to decrease defects. The members of the Molding Section agreed that the *suggested machine settings* should be the new standard and so a new procedure with instructions was developed. Compliance with the new procedure and defects per million opportunities (DPMO) was tracked for twenty-four consecutive shifts. Fictitious data is shown in Figure 6. Compliance with the new injection molding procedure increased over the twenty-four shifts eventually attaining 100%. However, there was no detectable improvement (decrease) in the DPMO over the same time period. The predictive theory failed. It is useful to track compliance and the quality of the results over time so that any patterns, trends, or other special causes can be identified. In this situation, there was "Good Compliance" and "Poor Results" which represents Case C in Figure 5. We should investigate where, how, and why the new procedure failed. Were the operating conditions different