## Defining the Software Process

---

## Outline

- *Why Define Processes?*
- *SW Process Basics*
- *Process Definition*
- *Defining Process Phases*
- *Process Development Considerations*
- *Process Evolution*
- *The Process Development Process*
- *Homework #7 - Part 2*

---

## Why Define Processes?
*(cf. Humphrey, 1995, p. 441-442)*

- *The processes you have are not adequate for what you do or want to do.*
  - *new or more complex tasks*
  - *need to interact with teams*
  - *...*
- *You want to perform some repetitive activity:*
  - *write a program or report*
  - *analyze a requirement, run a test*
  - *plan and track work*
  - *guide in performing tasks*
  - *evaluate / improve work*
  - *...*

---

## SW Process Basics
*(cf. Humphrey, 1995, p. 442-445)*

- *Process Elements*
  - *Scripts*
  - *Forms*
  - *Standards*
  - *Process Improvement Provisions*
- *Process Formats*
  - *Processes are principally enacted by people.*
  - *Use simple methods, and*
  - *Adopt new techniques only when they will clearly help you.*
  - *Focus on the process content, and*
  - *Don't let technology become too important.*

---

## Process Terms
*(cf. Humphrey, 1995, p. 443)*

- *Accuracy*
- *Agent*
- *Development*
- *Enactable Process*
- *Fidelity*
- *Fitness*
- *Precision*
- *Process*
- *Process Architecture*
- *Process Design (noun)*
- *Process Definition*
- *Process Element*
- *Process Enactment*
- *Process Script*
- *Process Step*
- *Scalability*
- *Tailoring*

---

## "Information Mapping"
*(cf. Humphrey, 1995, p. 445)*

| Principles of Information Mapping<br>*Robert Horn, Information Mapping, Inc.* | |
|---|---|
| *Concept* | *Description* |
| *Chunking* | *Group information into manageable chunks.* |
| *Relevance* | *• Place "like things" together.*<br>*• Exclude unrelated items from each chunk.* |
| *Labeling* | *Provide the reader with a label for each chunk of information.* |
| *Consistency* | *Use consistent:*<br>*• terms within each chunk of information,*<br>*• terms in the chunk and label,*<br>*• organization, and*<br>*formats.* |
| *Integrated Graphics* | *Use tables, illustrations, and diagrams as an integral part of the writing.* |
| *Accessible Detail* | *Write at the level of detail that will make the document usable for all readers.* |
| *Hierarchy of Chunking & Labeling* | *• Group small chunks around a single relevant topic.*<br>*• Provide the group with a label.* |

## Activities in Process Definition
*(cf. Humphrey, 1995, p. 446)*

- *Determine your needs and priorities.*
- *Define the process objectives, goals, and quality criteria.*
- *Characterize your current process.*
- *Characterize your target process.*
- *Establish a process development strategy.*
- *Define your initial process.*
- *Validate your initial process.*
- *Enhance your process.*

*NOTE: These activities need not be performed in this exact sequence. Just be sure to address them all.*

## 1. Determining Needs & Priorities: The QFD Method
*(cf. Humphrey, 1995, p. 446-448)*

- *QFD (quality function deployment) method provides a way to relate process characteristics to user needs:*
  - *Determine nature of products your process is to produce*
  - *Identify principal product attributes*
  - *Determine relative attribute priorities (cf. PSP Ex. p. 447)*
  - *Determine process features necessary for producing these attributes (cf. Table 13.3, p. 448)*
  - *Note strong/medium/weak relationships between process features and attributes (cf. Table 13.4, p. 449) - Product "house of quality"*
  - *Prioritize process features as high priority, priority, needed, or not needed (cf. list, p. 448)*

## 2. Defining Obj's, Goals, & Quality Criteria *(cf. Humphrey, 1995, p. 448-453)*

- *PSP Process Quality Criteria:*
  - *Develop quality software*
  - *Be measurable*
  - *Be predictable*
- *Create a process "house of quality" by combining product needs and process priorities (cf. Tables 13.5 & 6, p. 451, 452).*
- *Combine product and process needs (cf. Table 13.7, p. 453).*
- *Create objectives (based on prioritized product / process needs), associated goals, and metrics (cf. Table 13.8, p. 454) - GQM.*

## 3. Characterize Your Current Process *(cf. Humphrey, 1995, p. 450-453)*

- *"If you don't know where you are, a map won't help."*
- *Plan multiple incremental improvements from your current process to your target process.*
- *Answer key questions about your current process:*
  - *How well do you understand it?*
  - *Do you have serious problems?*
  - *Do your steps have explicit entry / exit criteria?*
  - *Do you have good measurements to base improvements on?*
  - *Do you have a process baseline?*

## 4. Characterize Your Target Process *(cf. Humphrey, 1995, p. 453-454)*

- *"If you don't know where you are going, any map will do."*
- *Relate your goals & objectives to the target process.*
- *Identify principal elements of the target process.*
  - *This may be very difficult. You may not even know how to start. Look at PSP and other processes.*
- *Ask questions about the target process, compare to current process, and see what are most useful / important aspects.*

## 5. Establish a Process Development Strategy
*(cf. Humphrey, 1995, p. 455)*

- *Start collecting data on your current process*
- *Always include planning and post-mortem phases*
- *Create forms / reports*

- *Observe others, talk with them about their processes*
- *Start with previously-successful steps*
- *...*

## 6. Define Your Initial Process
*(cf. Humphrey, 1995, p. 456)*

- *Document your current process*
- *Include a few, small changes that move you toward your target process*
- *Define each task in whatever level of detail you are able*
- *Improve these over time as you come to better understand less-understood activities*

## 7. Validate Your Initial Process
*(cf. Humphrey, 1995, p. 456)*

- *Test your process*
- *Walk through a simulated enactment*
- *Use data from previous projects*
- *Then try the process on a small project or prototype*
- *Refine / modify as indicated in the tests*

## Defining Process Phases
*(cf. Humphrey, 1995, p. 457-459)*

- *Phase definitions include:*
  - *Purpose*
  - *Responsible Agent*
  - *Entry Criteria*
  - *Tasks (and Description References)*
  - *Exit Criteria*
  - *Next Phase (and Conditions or Selection Criteria)*
- *cf. Table 13.9 & 10, p. 458, 459 for example form*
- *Refine the phase so that you have multiple levels of detail described (you may proceed in a top-down, bottom-up, or middle-out fashion).*
- *Once you have the desired level of detail, produce & validate forms, scripts, templates, standards, ...*

## Process Development Considerations *(cf. Humphrey, 1995, p. 460, 461)*

- *Make sure your process descriptions are at the level you need to describe your work and are understandable.*
- *Describe steps that you do not understand well… (You usually describe steps you do well, not those you don't…)*
- *Continually revise after each use*
  - *Process scripts and forms are hard to develop and rarely are "good" or "right" the first time.*
  - *Start simple, then revise and refine.*

## Process Evolution
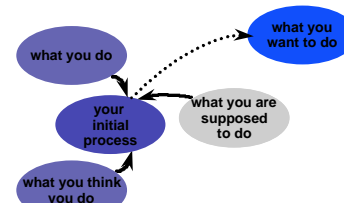*(cf. Humphrey, 1995, p. 461-462, and lecture notes)*

- *To evolve and improve your process:*
  - *it must be defined*
  - *it must reasonably represent what you do*
- *You must:*
  - *know where you want to go*
  - *be willing to experiment*
  - *observe and measure your own performance*
- *Expect process evolution to take time.*

## Convergence and Getting Where You Want to Be
*(Humphrey, 1995, p. 461-462, and lecture notes)*



- *Your first objective should be to converge what you do, what you think you do, and what you are supposed to do to a common process.*
- *Convergence is an iterative process that lasts throughout process development and evolution.*

## *Importance of Convergence*
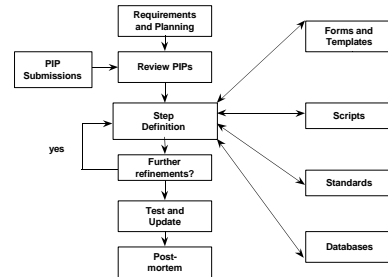*(Humphrey, 1995, p. 461-462, and lecture notes)*

■ *Process convergence is critical because:*
- *until converged, improvement actions will often not affect behavior*
- *convergence provides a deeper understanding of the current process*
- *convergence can result in substantial behavior modification*

## *A Process Development Process Model* *(Humphrey, 1995, p. 463)*

## *The Process Development Process* *(cf. Humphrey, 1995, p. 462-468)*

■ *Even the process of developing a process can be defined and managed!*
- *Start simple*
- *Include planning*
- *Record time by step and product category*
- *Track number of items produced in each category*
- *Define productivity measures*
- *Keep record of each process development*
- *Produce a summary report for each process development*

■ *cf. Example, p. 464-468*

## *Homework #7 - Part 2*

■ *See "Homework Assignments" list and textbook instructions*