

Function Points and Agile – Hand in Hand

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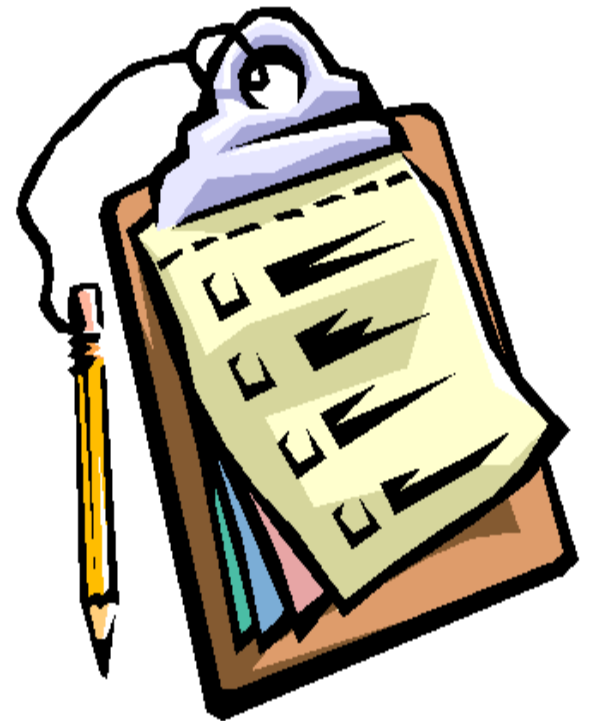
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Agenda

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FPA and Agile

Why Agile?

Agile is a software development methodology which encourages iterative, continuous integration and faster delivery of software products. Agile comes up with many value added project management techniques which leads towards the following statistics:

1. 36% of increment in average productivity
2. 52% of more morel for the project teams
3. 62% more ownership for an individual in a project
4. 81% more collaboration and co-operation among teams
5. 44% overall quality improvement

FPA and Agile

Why Function Point Analysis?

Function Point Analysis could be used in the following:

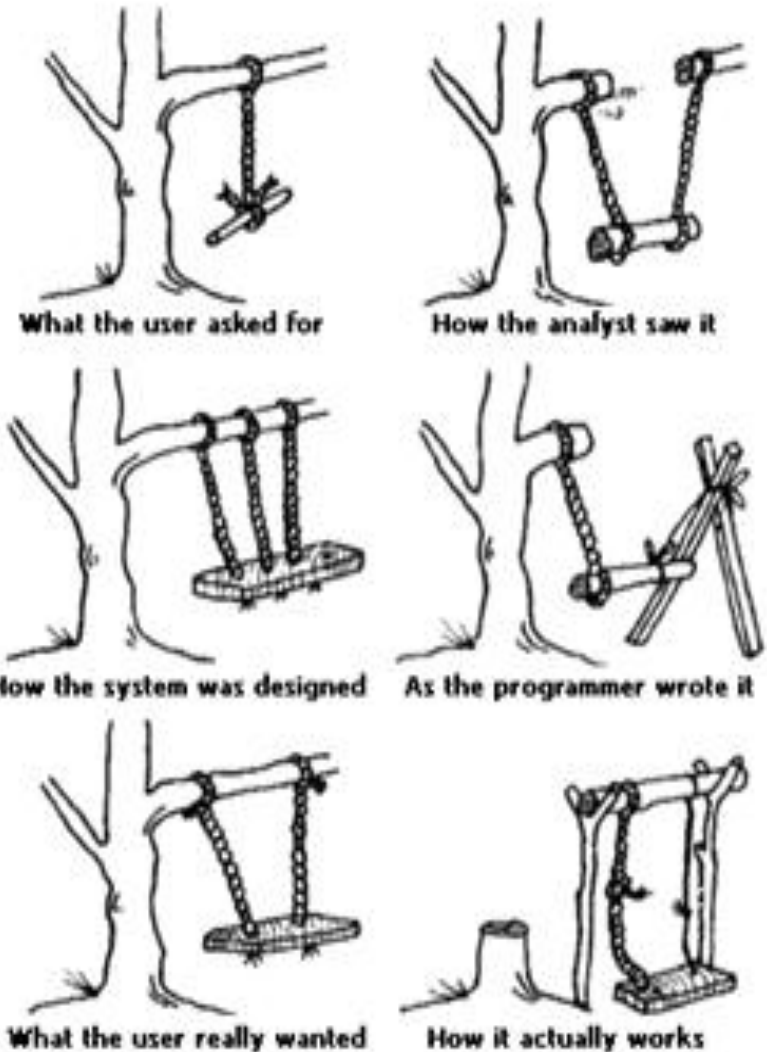
1. To measure the productivity analysis and evaluate the % of increase and decrease in productivity rate
2. Helps end users/clients to quantify the number of requirements emended in software
3. Prepare the estimation for software development
4. Prepare the cost related metrics for software development
5. Could be used in Decision Analysis and Resolution Techniques (DART)
6. Could be used to prepare the resource pyramid for software development

Agile Requirements Gathering Using Function Points

Agile (Scrum) requirements are managed as a Product backlog and Sprint backlog

- The highest priority requirements will get delivered first
- The lowest priority requirements will get delivered last

The same phenomenon applies to Agile – XP methodology as well.



Agile Requirements Gathering Using Function Points

Steps to Requirements Gathering with Function Points in Agile

- Once the Function Point Analysis (FPA) gets completed, list down all the business functions in a requirements traceability matrix.
- Modify the business transactions if required. Low level requirements will be reflected in the traceability matrix.
- Add weighting to each business transaction from the FPA so the priority of the requirements can be set.
- Group similar priority/nature of requirements together and consider those as a Product Backlog.
- If there is a change in requirements then a modified FPA can be used as the Requirement Traceability Metrics.
- By analyzing frequency of change in the FPA of business transactions we could track the volatility of requirements in Agile.

I.e. At the proposal stage initial size of an application is 100 FPs and at the design stage the sum of Add, Changed, Deleted function points were 30 then Volatility in requirements till design stage is 30%.

Agile Project Estimation Using Function Points

Agile has different segments for estimation like estimation for Product Backlog, User Stories, Scrum, Sprints etc. Each segment has business functionality associated with it.

Prepare or list down the business and data transactions for each low level component such as a Sprint. The lifecycle of a Sprint could be for a week's time so adjust the identified FP transactions accordingly.

Example:

User wants to create a login functionality in a specific sprint in Java

- The associated FP count for login functionality 10 FPs and velocity for delivering 1 FP for Java technology is 0.5 person days which was taken from an internal productivity baseline or a market benchmark of Java technology
- Then delivering the 10 FPs for completing login functionality will take 20 person days (10/0.5)

Prepare the high-level or approximate estimate for product catalog and distribute the associated FPs to each Scrum, Sprint and User Story. List down all WBS tasks for the development and allocate a specific % of mix for each WBS task

Agile Project Estimation Using Function Points

There are different estimation factors we should consider before preparing an estimate, including:

- Non functional requirements
(Reliability, Reusability, flexibility, maintainability etc.)
- Development flexibility
- Training requirements
- Development environment
- Team's competency etc.

Each of these factors should be assigned specific weights



Agile Project Budgeting Using Function Points

Once we arrive with an estimate then we have to identify different required roles for the development

- Each unique identified role could be assigned with hourly rate
- Identify the required resource combination for each project management task
- Assign the % of availability for each role
- Factor out the required cost for each combination of resources

Example:

To develop a specific Investment Banking application will take 1000 person hrs. The required roles for the development are:

- Program Management team of 5 PPL contributes 20% of total work and has hourly rate of 200 USD,
- Project Management team of 5 PPL will contribute 20% of work and has hourly rate 180 USD,
- Designer team of 10 PPL contributes 20% of total work and has hourly rate of 100 USD,
- Development team of 20 PPL and will contribute 30% of total work and has hourly rate of 80 USD.
- Testing team of 10 PPL will contribute 10% of total work and has hourly rate of 50 USD.

The FP estimate could be used as a reference to derive the % of contribution for each Agile project development phase.

Agile Project Budgeting Using Function Points

Cost of the project could be identified as below in a very high level approach

Phase of the Project	% of Contribution	Number of PPL associated	Cost per person	Cost of the Phase in USD
Program Management	20	5	200	1000
Project Management	20	5	180	900
Design	20	10	100	1000
Build	30	20	80	1600
Test	10	10	50	500
Total				5000

Agile Function Points-Based Decision Analysis and Resolution Technique

Decision Analysis and Resolution Technique (DART) is used to make a build-vs-buy decision

Using FPA we could indentify the number of business transactions that it would not be possible to develop in-house. Those function points could be outsourced to third party vendors.

We could identify the associated cost of developing such business functions and compare the cost of developing such functions with one or more third party vendors.



Agile Function Points-Based Decision Analysis and Resolution Technique

Example:

A fortune 500 client decides to develop a new portal for logging issues from the client.

- The FP Analysis is completed at the proposal stage and arrived with FP size as 100 and estimated cost to develop the application is USD 40,000. Client expected to develop the application using FP.
- Accenture identifies such kind of product that is already available in market and its cost of purchase is USD 25,000.
- The supported FP size of the product is 200 FPs and 95% of the business transactions are matching as per client's requirements.
- A little customization is required to make the product completely workable as per the client's requirement. The cost of customization is not more than 2000 USD.

Managing and Prioritizing Product Backlog Using Function Points

Managing and prioritizing Product Backlog using Function Points.

In Agile a product catalog is a list of requirements that are arranged in a group from highest priority to lowest priority. The highest priority product catalog requirements will be delivered first.

In FPA we are identifying the business transactions in the form of EIs, EOs and EQs.

The steps to prepare product backlog using FPA are as below:

1. Complete the FP Analysis for entire set of requirements. Identify all business transactions and their complexities.
2. Group similar transactions together and assign priorities to those groups.
3. Sort the groups as per the priorities to create our product catalog.
4. Drill down into each product catalog requirement/business transaction and consider each individual or subgroup of business transactions as defining the scope of a Scrum or User Story in the product backlog



Preparation of User Stories using Function Points

A User Story is the short description of user requirements. Sometimes it is explained in a single line. It's required on more efforts on brainstorming and refining the user stories provided by the end client. Each User Story in Agile consists of one or more business transaction so the user story is the primary input for identifying the business transactions.



The recommended steps are as follows:

1. Get the high level user requirements in terms of user story
2. Drill down the user story for identifying coarse requirements
3. List the transaction function points w.r.t. low level requirements
4. Assign priority to the business transactions with consideration of dependency on other business transaction
5. Identify the DET's and FTR's to assign complexity of each transaction function
6. Identify associated logical data files associated with each transaction function which are maintained or referred by the transaction functions

Preparation of Test Cases for Agile-based Testing Using Function Points

The list of transaction function points could be the best input to preparation of test cases. Once the listing of transaction function points is complete then we could write down the test scenarios for each group of associated business transactions. The test cases could be written for each transaction function identified in function point analysis list.



Capacity Planning using FPA

The high level steps in doing capacity planning are as follows

1. Complete the FP Analysis for entire project or software development
2. Identify the technology split for the project development
3. Assign the appropriate business transactions to identified technology split
4. Identify the expected labor mix expected for each technology and product backlog
5. Prepare a project plan w.r.t. product backlog and reshuffling of labor including precedence
6. Look at the labor rate and expected duration of each skill.

Agile Metrics

The following Agile metrics could be prepared using function points

Metric	Agile Metric
Velocity or Size	total number of function points delivered per User Story or per iteration.
Productivity of the team per iteration	total number of function points delivered per iteration / actual effort spent by the team in PHrs or PDays
% Change in Velocity	$((\text{actual velocity} - \text{initial velocity}) / \text{initial velocity}) * 100$
Defect Density	total weighted defects / size in function points.
Requirements Volatility	available function points in a project / total function points of the project (including add, change, delete FPs)
Cost per Iteration	cost per function point X total function points delivered on a project

Impact Analysis Using FPA for Agile Enhancement Project. (Add, Change and Delete Agile Requirements)

- It's a usual practice in Agile to accumulate new change requests or changes in current requirements as Enhancements as per the business priorities
- Agile methods are flexible to accept these changes at any point of project execution in SDLC phases
- The major challenge is to perform impact analysis on such requirements

The recommended steps are as follows.

- 1) Complete the FPA for all enhancements as enhancement FP count.
- 2) Identify the business transactions (Transaction FP count) those are Added, Changed and Deleted. Make a separate list of those transactions.
- 3) Identify associated business transactions those has dependency on step 2. Add those in a list.
- 4) Look at the test cases prepared and validate the coverage of the list prepared.
- 5) Count the associated function points in a list and compare the same with original or development function points.

Impact Analysis using FPA for Agile Enhancement Project (Add, Change and Delete Agile Requirements)

Example:

A major telecom provider decides to change the current order management process with enhancements to order details screen and payment processing method

- The original system has 100 FPs in production
- An enhancement project FP count is 20 FPs (Add, Change and Delete FPs)
- The other associated business transactions FP count is 30. Those are not a part of enhancement project but linked with enhancement project business transactions.
- The new test cases cover the all business transactions identified in enhancement project.

The total impacted FP size is 50 FPs compared to the original production size of 100 FPs. The impact analysis shows there is a 50% impact on current system.

References

- 1)IFPUG CPM Version 4.2.1.
- 2)GoodAgile CSM training material.
- 3)Agile Values from Scrum Alliance.

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Declaration

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