

ADOPTING THE XP GAME: A HANDS-ON LEARNING EXPERIENCE

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ABSTRACT

Engaging and motivating students is always a challenge particularly when teaching subjects that do not have a high practical content. In this situation it was also necessary to present an overview of the subject to be studied while at the same time introduce new members to the existing class. The XP Game is a simple and interactive set of activities that simulates the eXtreme Programming (XP) development process. This paper reports on the use of the XP Game with a group of final year degree students taking a module on Software Process Implementation.

Keywords

XP Game, eXtreme Programming.

1. INTRODUCTION

The subject to be delivered was Software Process Implementation. Part of the objectives of this subject was to adapt an existing process and implement it from beginning to end. The majority of students had been together for the three previous years but for this module a number of new students joined the group. Challenges included; introduce new and reinforce existing concepts related to the process (XP [1]) to be investigated, provide a snapshot of the course, integration of new members into the class group, increase student motivation and promote teamwork.

The process to be used on this module was XP as it is one the most widely adopted and best described Agile Methods (AMs). AMs provide an alternative to traditional approaches to software

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development by promoting individuals and interactions, working software, customer collaboration and the ability to respond to change. XP has been successfully delivered as part of many software engineering courses. Examples include [2][3][4][5]. However, it does need to be carefully adapted for each situation [6][7].

Subject materials, in this case, to be delivered included requirements specification and management and project planning as used in XP. The students had completed some directed preliminary reading on XP.

The XP Game is a simple game, lasting between two and three hours, that is often used in industry to introduce the XP process. It involves groups of individuals planning and carrying out simple tasks in competition with other groups.

This paper describes the application of the XP Game and feedback from the participants. Section 2 presents an overview of XP with the XP Game explained in section 3. The session with observations from it are described in section 4. Section 5 summarises feedback from the participants.

2. EXTREME PROGRAMMING

eXtreme Programming (XP) emphasises communication, flexibility, regular releases of working software and close collaboration with customers. XP allows software organisations to get fully-functioning software to the customer faster and with increased customer satisfaction. An onsite customer is responsible for all 'business problems', leaving developers free to focus on technical decisions [1]. The role of the customer centres on the development of the system's requirements and starts during the *Planning Game*. These are written in non-technical terms on cards as *user stories* each of which describes the requirement, its associated acceptance test, and an estimate of the time and effort needed to implement the requirement. Next, stories are sorted and prioritised, and allocated to a development iteration. In the subsequent *Release*

Planning phase, a decision is taken on which stories to include in each release. Each release is divided into a number of short (1 – 4 weeks) iterations, each of which will complete a number of stories. A key additional strength of agile processes is their ability to cope with changing requirements, allowing new stories to be added and existing stories altered or removed from proposed iterations.

To increase the likelihood of the system meeting the sponsor's requirements, AMs advocate that the customer should be co-located with the development team throughout the project. In this way, the customer is available to advise on development decisions, and ensure that delays on key development issues are avoided.

The next section presents an overview of the XP Game.

3. THE XP GAME

The XP Game [8] is a simple and highly interactive game that simulates the XP development process. (The instructions and props are freely available at <http://www.xp.be/xpgame.html>). It is used in industry to introduce development teams and their customers to XP. No technical knowledge or skill is required to participate. An element of competition helps the players bond and remain focused. By the end of the game, everybody has experienced how user stories, estimation, planning, implementation, and functional tests are used.

The players are divided into teams of between four and eight. A coach helps each team explaining the rules and clarifying each aspect. For each task completed the team collects business points with the team accumulating the most winning. The team is given a set of prewritten story cards and the props required for the first iteration. These cards describe simple tasks, such as "Build a two-story house of cards," "Blow Up Ten Balloons," or "Find a missing card from a pack of cards".

The team members, acting as *developers*, estimate the time required to implement each task. Values between 10 and 60 seconds, or *impossible*, are chosen. The next objective is to consider the *customer* perspective. It is necessary to create a release plan by prioritizing the stories to implement to achieve the highest amount of business points. The total implementation time is 3 minutes. Once an activity begins the clock starts and only stops when that activity is achieved or cancelled. To achieve the business points for an activity it must pass the acceptance test validated by the coach. For example, the acceptance test specified for the task "Blow Up Ten Balloons" might have been that each should be of 30 cm diameter. The clock restarts when the next activity

starts. At the end of the iteration the points are counted and there is time for discussion. Concepts introduced during the game can also be explained. The second and third iterations proceed in a similar manner.

4. THE SESSION

An isolated room was used to reduce disruption on other classes. This had minimal facilities – standard projector, free-fitting desks and chairs. Large tables were brought in to accommodate teams of up to eight members. Students were allowed to form their own teams but those who were new to the class were distributed evenly so that they could be introduced to the others. In total twenty eight students participated with seven per team. A short 10-minute presentation was given to highlight the topics covered, present the objectives and an overview of the game and introduce the coaches. Post-graduate students, with previous experience of XP in general and the XP Game in particular, acted as coaches. Each team had one coach.

Each coach introduced themselves, gave the team their pack of stories and allowed the team to settle. At this stage it is made clear that the coaches role is to clarify tasks described on the story cards and to validate that the acceptance tests have been satisfied. It is the responsibility of the team to perform the other activities.

4.1 Observations

Each team's approach to the task at hand differed. For example, with one team, one individual took the cards, read each in turn and everyone else discussed it. With the other, all of the cards were distributed and each member considered separate tasks before discussing it. Generally the activities were inclusive, boisterous, at times appeared chaotic, with students laughing, debating, and arguing.

The first stage required the participants to think like a developer and to estimate the difficulty of each task. As each was investigated it was discussed in detail. Some of the comments heard included "I can do that – it's easy", "We'll never get 10 done in time", "You would have to be lucky to get 3 heads in one go", "the table is too wobbly to build a house of cards". The teams were given about twenty minutes to perform this exercise. One group estimated that each task would take the maximum time allowed as they were uncertain. Group 2 were more confident and sought consensus on the shortest time required to satisfy the acceptance test.

The second activity required the participants to think like a customer scheduling the stories, based on achieving the most business value. Again,

different approaches were observed. These included

- taking all the high value stories first,
- taking all the *easy* stories first,
- grouping all similar stories together.

When the game was in play each activity was timed, with a total of three minutes, communication was intense during the *development*. Preparation included members moving around the table to take up their designated position and each participant standing as if ready to take off in a sprint. The scene at times was frantic with balloons inflated and tied at maximum speed. Feedback was prompt. For example, the coach could quickly judge if the house of cards was satisfactory.

At the end of each story the clock was stopped and progress could be monitored. Participants had time to reflect and discuss the true difficulty of the task and how they would approach a similar one in the future. Also, there was time to consider the rest of the schedule. The coach recorded the actual time elapsed and the points accumulated.

At the end of an iteration the participants could relax and reflect. This was also time to have some fun considering how individuals and the overall team had performed. The coach tallied the points and calculated the project velocity (pace at which the team works). When the results were declared it was an opportunity to gloat, despair, reflect and prepare.

5. FEEDBACK

The general response, summarised in Table 1, from students was positive and their participation appeared energetic. (In each of the tables 1 represents the least favourable outcome and 5 the most favourable). The general feedback that it was enjoyable (an average of 4.4 out of 5) and easy to play (4.1). It was reasonably good at reinforcing material previously covered (3.9) was of assistance in understanding XP in general (4.0). Most (average of 4.6) felt the game should be incorporated as a standard part of the course and that similar games should be used to support other course material (4.5).

Question	1	2	3	4	5	AVG
How enjoyable is the XP Game to play?			2	12	13	4.4
How easy is the XP Game to play?	1	6	11	11		4.1
How well does it reinforce material previously covered?		2	6	11	7	3.9
How well does it improve your understanding of XP in general?	1	4	15	5		4.0
Should this game be incorporated as part of the standard course?			3	5	18	4.6
Should similar games be used to support other course material?			2	9	15	4.5

Table 1: General Feedback

The different roles explored were also examined with responses summarised in Table 2. The programmer and customer roles were reasonably

well understood (3.6 and 3.7 respectively) with the coach's role best understood (4.0).

Question	1	2	3	4	5	AVG	
To what extent do you believe that the XP Game helped you understand the following:							
• Programmer Role in Planning			5	4	14	4	3.6
• Customer Role in Planning			4	7	9	7	3.7
• The Coach's role	1		7	10	10		4.0

Table 2: Feedback on Role

As the students had some prior knowledge of XP it was desirable to find out how beneficial the activities were in reinforcing and clarifying that material. The replies, in Table 3, indicate that performing the XP Game helped them to understand the Planning Game (4.1) User stories (3.9) and Acceptance Testing (3.9), Project

Velocity (4.0) and Business Value (4.0). In general terms the problems associated with effort estimation (4.2) and business value (4.0) were better explained. It was less successful at helping to explain Sustainable Pace (3.6), Progress Tracking (3.5) and XP Project Management (3.6).

Question	1	2	3	4	5	AVG
To what extent do you believe that the XP Game helped you understand the following:						
• The Planning Game			5	14	8	4.1
• User Stories		1	10	8	8	3.9
• Requirements development in XP		3	9	11	5	3.6
• Estimation effort		2	4	8	13	4.2
• Acceptance Testing		2	7	11	7	3.9
• Sustainable Pace	1	3	6	14	3	3.6
• Progress Tracking	1	6	3	13	4	3.5
• Velocity		2	6	9	11	4.0
• XP Project Management		6	3	12	5	3.6
• Business Value		1	8	8	9	4.0

Table 3: Other Feedback

In addition to structured questions open-ended questions were also presented.

Promoting teamwork was an important objective. Responses to “*How would you describe the team interaction?*” included; “Shared responsibility”, “quick feedback”, “relaxed and friendly”, “problem of individual assuming role of leader”, “everyone involved”, “dominated by some”, “too much discussion on certain tasks”, “slightly undisciplined”, “chaotic”. Although some appear contradictory this can be explained by the different dynamic that existed in each team. Despite the differences this did seem to be beneficial.

In response to *What was the best part of the XP game?* Comments included “fun”, “communicating with each other”, “estimating tasks”, “everybody involved”, “adrenalin rush – pressure of getting task done in a specified time”, “learning and improving from iteration 1 to 2”, and “relying on different strengths from each member”.

When questioned on the *worst part* responses included “prioritization”, “ignoring an opinion that is outside the general agreement”, “rules not clearly defined”, “more control needed – everyone talking at the same time”, “overheated discussion” and “being hit in the face”.

Problems were encountered highlighted by “lack of clarity in stories”, “too much communication”, “sticking to the time”, “estimating”, everyone did not have an equal say, everyone did not know all the skills, everyone talking – no one listening.

In addition to promoting teamwork it was important the exercises were beneficial as a learning tool. Responses to “*what were the benefits of the XP game as a learning tool?*” included “helps understand XP values and practices”, “understand difficulties of planning”, “better understanding of XP after this session”, “learn through play”, “learning outside the traditional classroom”, “insight into estimates”.

Generally, presenting the skills and characteristics that teams require to succeed is difficult. From the exercises conducted it was interesting to find out what skills the students felt were required to succeed in project development. To “*what you think were the main reasons that your team won/failed to win ‘The XP Game (Attributes that helped/hindered your team from winning)’ they responded;* “estimation skills”, “good planning”, “teamwork”, “skill”, “good communication”, “improved in second iteration”, “worked as a team”,

“cooperation”, “focus on business values”, but also that the “other team cheated”.

6. CONCLUSIONS

In all using the XP Game was beneficial in overcoming most of the challenges faced. The participants certainly engaged and seemed motivated, although this may have been due to the competitive nature of the exercises. New concepts associated with the XP process were introduced and previously visited ones were clarified. An overview of the remainder of the course to follow was presented and could be explained in the follow up session. It was particularly beneficial in integrating new members into the existing group. Despite this some limitations were observed. The room needs to be better laid out with round instead of rectangular tables used and particularly to provide more clarity on the story cards. At the end of the module in class feedback it emerged that the XP Game was the most popular part of the course. It is intended that we will continue to use the XP Game.

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