

## Optimal Approaches for Estimating Agile Software Development Processes in Nigeria

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### Abstract

*The study examined the most effective methods for estimating Agile software development processes in Nigeria. The purpose of this multiple case study was to identify the best technique for estimating effort during Agile software development in Nigeria. This paper performs a systematic Literature review aiming to identify the most used technique or method during the development of agile software and the most used size metrics regarding effort estimates deadlines and costs inplanning of Agile software project. Both inferential and descriptive statistic were use in analysing the data. A total of 62 (Sixty-two) respondents from four (4) southern states and seven (7) northern states in Nigeria participated in the survey. Most of the respondents were from North-West followed by South-West. Therefore, the number of respondents per state, the majority came from North West (54.8%) followed by South-West (32.2%), North-Central (11.3%), And South-East (1.6%). The results show that Planning Poker is the most popular technique for Agile teams, followed by Story point. For suitability and accuracy, Planning Poker should be encouraged in projects involving estimation and software developments.*

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**Key words:** Effort Estimation, Optimal Approach and Agile software development

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### INTRODUCTION

**Agile software development** is an umbrella term for a set of frameworks and practices based on the value of principles expressed in the manifesto for Agile software development with 12 principles behind it. “Basically, it emphasizes the value of customer, iterative, incremental delivery process, powerful collaboration, small combined teams, and self-organized, as well as minor and ongoing progress. **Effort estimation** plays an important role in all projects. Software estimation helps in calculating software size, development efforts and schedules for any software project approximately. Many survey studies have shown that nearly one-third of software projects overrun their budgets, while the remaining overshoot original estimates (bhaskaran and jayaraj, 2019). Accurate determination of efforts for a project is critical to stakeholders also. Project estimation is one of the most important steps in project management irrespective of the project size. Estimations gain their importance as software development schedules are directly dependent on them (Bhaskaran and Jayaraj, 2019). **Optimal Approaches** refer to the most efficient or effective methods, strategies, or ways of accomplishing a particular task, achieving a goal, or solving a problem. In this paper, different

techniques were revised to identify the Optimal approach during Agile software development. In various contexts many further factors like development time and cost are based on effort estimations. Good project estimations can make project execution easier as a project's success or failure depends on proper estimations.

### Target Group

This research work includes two types of target groups, first one is theories and academics group which has been investigated by literature reviews and the second one involve people who are working with this methodology in variety of organizations. The theoretical target groups are the researchers who are researching in software development area. In fact, this thesis work can be helpful for the people who are looking forward to understand some basic information about agile methodology in software development process. In addition, this research work can be considered as a reference for researchers in business and management area as well. Since it gathers information and data about Agile methodologies from management point of view to end users. The practical target group of this thesis work are the people involve in organisations from end users to head managers. More in detail, this research can be used as a source for the organizations who are working on system development especially the ones who are Agile based. In fact, these organizations can use this reference to evaluate the reason of failure or calculate the chance of success and increase their chances of success in any Agile base project regardless of the technical features. All the organizations in software development project can take a look at this research to have stable and much effective work in their projects.

### Materials and Method (Country/Location and sampling procedures)

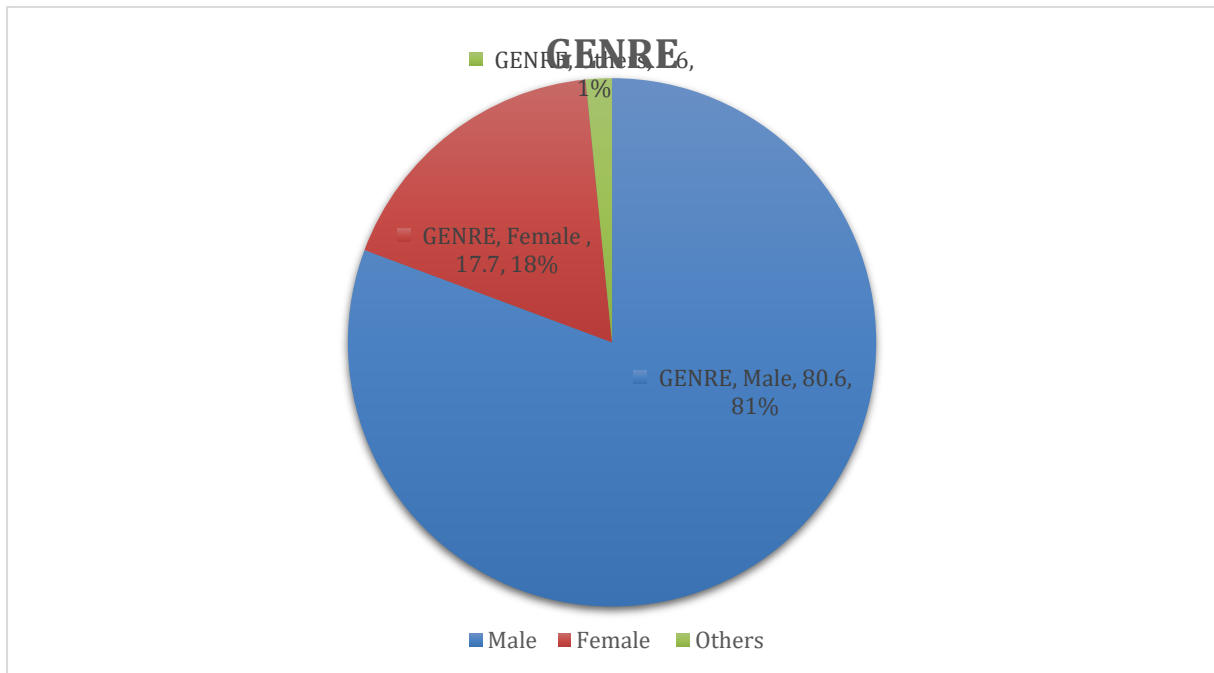
A total of 62 respondents from 4 southern and 7 northern states in Nigeria Participated in the survey (see table 1). Most of the respondents were from North-West followed by South-West. Therefore, the number of respondents per state, the majority came from North-West (54.8%) followed by South-West (32.2%), North-Central (11.3%), and South-East (1.6%).

Table 1. Respondents by States

Regions	States	Frequency
North-West	Kebbi (26), (7), (1)	34 (54.8%)
South-West	Lagos (18), (2)	20 (32.2%)
North-Central	(7)	7 (11.3%)
South-East	(1)	1 (1.6%)

Figure 1 depicts the information about the respondents' genre along with the frequencies and percentage. A total of 80% were male who takes part in this survey. Remaining 17.7% are female, and only one participant (1.6%) does not reveal their gender.

Figure 1.

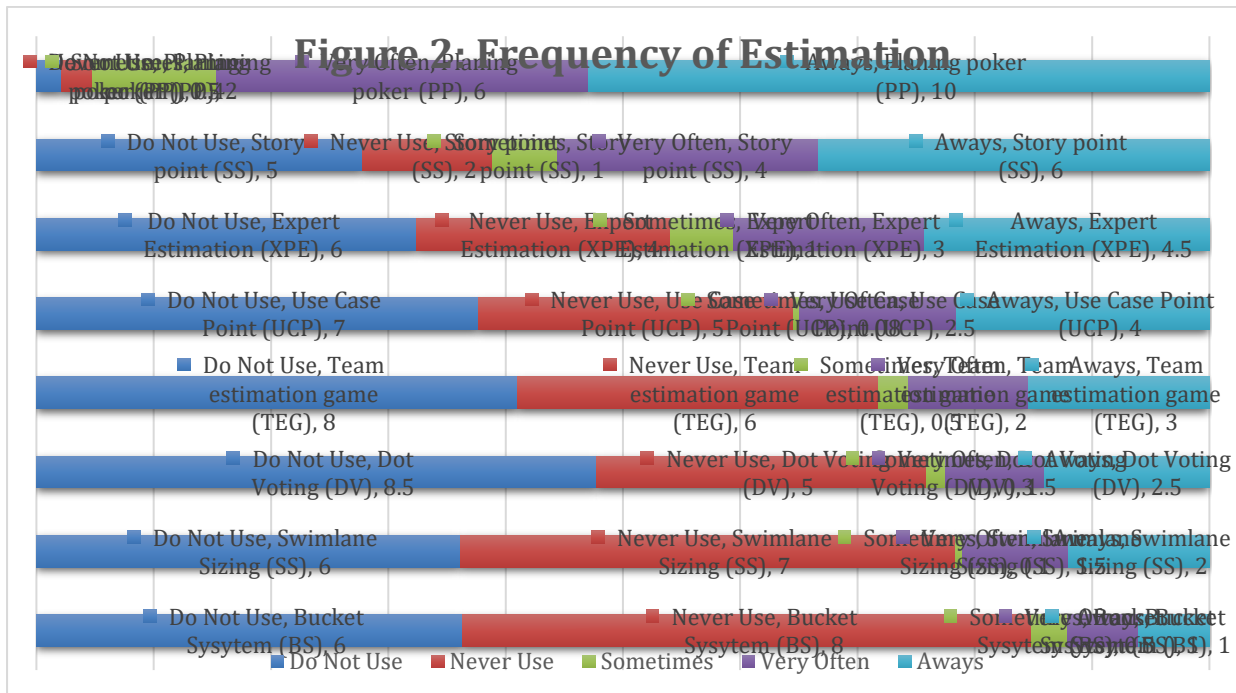


### Data Collection

Once the data collection process was completed, then data filtration was done and 53 out of 62 responses were considered as valid responses. Secondly, as the responses were collected by using a likert scale, conversion of the scales to numbers was done. Thirdly, frequency and percentage were calculated followed by descriptive statistical analysis.

Table 2: Descriptive Statistical Results of effort estimation techniques

Groups	Count	Sum	Mean	SD	variance	Range	Statistics
Dot Voting (DV)	37	64	1.730	1.146	1.314	1 – 5	0.806
Expert Estimation (XPE)	45	123	2.733	1.321	1.746	1 – 5	0.914
Story Point (SP)	50	150	3.000	1.355	1.837	1 – 5	0.904
Planning Poker (PP)	50	226	4.520	0.814	0.663	1 – 5	0.604
Swimlane Sizing (SS)	35	49	1.400	1.006	1.012	1 – 5	0.681
Team Estimation Game (TEG)	38	79	2.026	1.386	1.920	1 – 5	0.819
The bucket system (BS)	38	56	1.1474	0.922	0.851	1 – 5	0.775
Use case point (UCP)	41	83	2.024	1.275	1.624	1 – 5	0.854



Dot voting (DV), Team Estimation game (TEG), Use case point (UCP), Expert Estimation (EE), Planning Poker (PP), and Story Point (SP), Finally, Total and percentage (%). The first review of the result in Table 2 shows that Planning Poker (26.1%), is the most used estimation technique as it has the highest percentage, followed by, Story point (20.7%), Expert Estimation (17.6%) and Use Case Point (10.1%). Whereas the least used estimation techniques are Team Estimation Game (9.0) followed by, Dot voting (7.4%), the Bucket System (5.3%), and Swimlane Sizing (3.7%).

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## Discussion

The result shows that not only mixed software development approaches are used but also different effort estimation techniques. The most commonly used are Planning Poker, Story Point, Expert Estimation, and Use Case Point. The findings presented in this report are organized according to the highest mean value, with the factored exhibiting the highest mean value being identified as the most widely accepted. Our results show that effort estimation methods have been used in different Agile method. Planning Poker Has become the estimation method that is currently the most widely used method in the primary studies, and it is very closely related to the most frequently used size metric (Story Point) and the way in which the software requirements are specified in this Agile methods (User Story). Despite the fact that Expert-Based Estimation methods continue to play an important role, there is a prominent trend towards studying techniques studying techniques based on the intensive use data

## Conclusion

The study concludes that, Planning Poker (26.1%) is the most used estimation technique as it has the highest percentage, followed by, Story Point (20.7%), Expert Estimation (17.6%), and Use Case Point (10.1%). Whereas the least used estimation techniques are Team Estimation Game (9.0%) followed by Dot Voting (7.4%), The Bucket System (5.3%), and Swim lane Sizing (3.7%). Finally, among the 9 Participants who did not participate in effort estimation, one Program/Product manager and one Developer have more than 5 years of agile experience and they reported the use of Devops, Scrum, and Extreme Programming. Therefore, it would be interesting to get insight about the no participation in the estimation of these types.

## Recommendation

1. For suitability and accuracy, Planning Poker should be encouraged in projects involving estimation and software development.
2. The most obvious opportunity for further research in the context of this study is to collect more responses to increasing the scope of this study.
3. Further studies should focus on future development of agile software as it relates to its speed and ease of study.

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