How to Find a Recipe for Success of Popular Smart Phone Applications

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Abstract. The number of smartphone appliances is increasing rapidly. However, it is divided into a popular application and an application not so popular. There must be some recipe for success in the application that is gaining popularity and continuously using by customers.

We investigate the recipe for success below 4 steps.

(1) Select multiple application categories and target applications to be surveyed
(2) Each group conducted interviews with users of target applications, Extract hypotheses of value and goodness by comparing multiple selected applications
(3) Perform questionnaire survey for users of target application and compare and verify hypotheses of value and goodness
(4) Perform comparative measurement using the physiological index while using the target application, and extract differences unconscious but feeling.

As a result of questionnaire survey, we can find popular application has value or strength and that is the reason people tend to use continuously.

As a result of physiological measurement, we can find some hint related to value or strength we find from questionnaire survey.

This result comes from half year workshop of Master's Program, so we can find more useful and practical knowledge can get from more deeply study.

Keywords: UX · Smartphone application · Value · Physiological measurement

1 Introduction

The number of smartphone appliances is increasing rapidly. When becoming a popular category, there are many applications of similar usage. Figure 1 shows the growth transition of number of available applications [1].
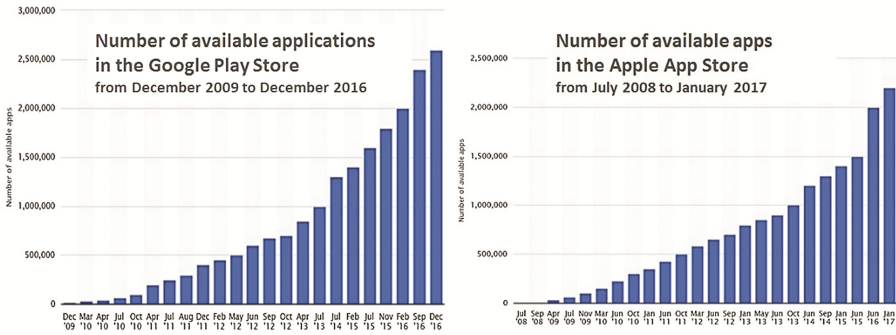
Fig. 1. Number of available apps in the Apple App Store and Google play [1]

[https://www.statista.com/statistics/263795/number-of-available-apps-in-the-apple-app-store/, Feb. 27th 2017]

[https://www.statista.com/markets/424/topic/538/mobile-internet-apps/, Feb. 27th 2017]

However, it is divided into a popular application and an application not so popular. There must be some recipe for success in the application that is gaining popularity and continuously using by customers.

2   Explore the Recipe for Success

To clarify recipe for success, applications could be made more popular by using these recipes.

The objective of this research is to find and clarify the recipe for success. To achieve this, we carried out a subjective evaluation and an objective evaluation. We assume the recipe for success has below 3 aspects, then we research using concrete examples. As a secret that users can keep using,

(a)   user's sense of value (value)
(b)   goodness in goal accomplishment (goodness)
(c)   user's unconscious feeling factor.

2.1   Approach to Explore Recipe for Success

We adopted the approach which referred to human centered design and additionally physiological measurement, then we can define below 4 steps.

(1)   Select multiple application categories and target applications to be surveyed
(2)   Each group conducted interviews with users of target applications,
      Extract hypotheses of value and goodness by comparing multiple selected applications
(3)   Perform questionnaire survey for users of target application and compare and verify hypotheses of value and goodness

(4) Perform comparative measurement using the physiological index while using the target application, and extract differences unconscious but feeling.

2.2 Selected Applications

We select 2 category 5 applications.

(1) calendar category:
  (1-1) preinstalled Google calendar [2]; major apps.
    [https://play.google.com/store/apps/details?id=com.google.android.calendar&hl=ja, Feb. 27th 2017]
  (1-2) Life Bear [2]; popular and customer likes this apps.
    [https://play.google.com/store/apps/details?id=jp.co.lifebear&hl=ja, Feb. 27th 2017]

The reason which selected this category is that customers use it frequently and basic feature and usage is almost same, so we expect each application's value is clear for customer (Fig. 2).

(2) News aggregation category;
  (2-1) Smart News [2]; very popular
    [https://play.google.com/store/apps/details?id=jp.gocro.smart-news.android&hl=ja, Feb. 27th 2017]
  (2-2) Yahoo! News [2]; Very popular
    [https://play.google.com/store/apps/details?id=jp.co.yahoo.android.news&hl=ja, Feb. 27th 2017]
  2-3) HACKA DOLL [2]; not so popular, but customer likes this apps.
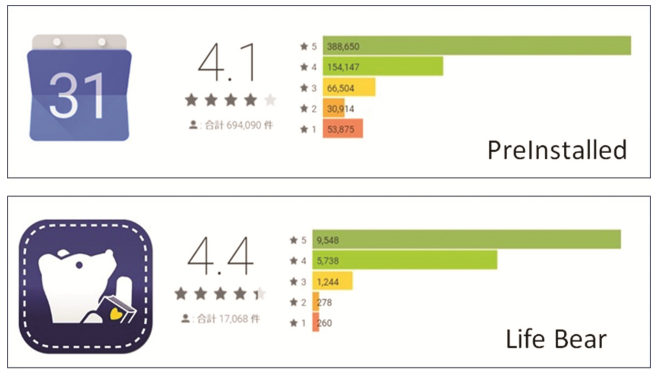   [https://play.google.com/store/apps/details?id=com.hackadoll&hl=ja, Feb. 27th 2017]

Fig. 2. Calendar apps we selected with customer's reviews.

The reason which selected this category is that customers use it frequently and most of customer use them separately. So, we expect customer notice each application's value and strength clear

3   Interviews with Users of Target Applications

To extract hypotheses which users evaluate the applications, we carried out interview investigation for application categories (Fig. 3).
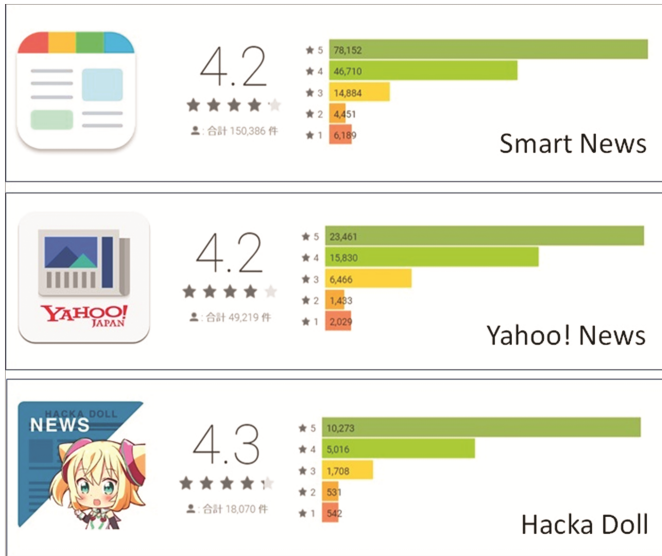

Fig. 3. News aggregation apps we selected with customer's reviews.

3.1   Calendar Category

We found the preinstalled calendar application users from Kanazawa Institute of Technology (KIT) student. We can find 7 person. Then we request them to install Life Bear and use it 1 week for their schedule management.

– They use only daily management and schedule management. During the use, they can use basic function (e.g. memorandum, list function and diary). But, share function among PC or tablet were controlled.

Then we interview them how they usually use preinstalled calendar application and ask comparison with Life Bear, what is good point and what is bad point.

3.2   News Aggregation Category

We select 7 students from KIT and ask below interview flow.

1. Which application do you use about news aggregation category?
2. Why you start to use the app's.
3. When you start to use the app's.
4. Why you select the app's.
5. What information you tend to read by the app's.
6. What is your favorite of the app's.
7. Are there some bad points or want to modify?
8. If you use multiple app's, why? And which one is better.

3.3   Hypotheses from Interview About Calendar Category

Major comment of the interview isbelow.

1. It's troublesome to learn how to use new calendar application.
2. Calendar application difficult to write what I want to write how we want to write, comparison with paper note
3. Life Bear's vertical scrolling operation is very good feeling.
4. Calendar application can write specific schedule quickly.

From those comments, we build a hypothesis, Value for calendar application is (1) simple and (2) useful functions.

3.4   Hypotheses from Interview About News Aggregation Category

We can find 3 applications have different characteristics.

– Smart News; User can get a wide variety of information.
  User can select many expendability is superior point.
– Yahoo News; User can easily use Yahoo! search function.
  User can get local area news they previously select.
– Hacka doll; User can easily select otaku culture & entertainment information.

  This application has convenient learning function.
  Hypotheses about value of this application is below.

– Reliability for an article
– Lightness of application
– Ease to dispose of information
– Ease to get the newest information
– Ease to read an article
– Ease to access deep information
– Ease to customize

4 Questionnaire Survey

4.1 Calendar Category

Questionnaire evaluation was carried out to calendar category. Question items were as follows:

1. Question about media using schedule management
2. Five scale evaluation of media which is the most use in schedule management
3. Free description about advantage and disadvantage of media which you use
4. Total evaluation of media used in schedule management

Detail items in Q2 were as follows:

1. You can write down your plan and memorandum much more
2. You can use like yourself
3. This media could be an opportunity for you to remind a written plan a few days before
4. You can check a plan and a schedule easily
5. You can use various way per your aim
6. You can write down your schedule easily as for any situation
7. A media design which you use is simple
8. You can manage a lot of schedule
9. You can use colors and graphic characters when you write down your schedule using this media

We distribute the questionnaire for the student of Kanazawa Institute of Technology. Then we receive from 135 students.

The results from this questionnaire evaluation were applied to principal component analysis. Figure 4 shows the result of this.

The result from principal component analysis with considering average of usability by total evaluation of application, Life Bear was found to be with usability and multi-function. The result of a notebook of a paper medium was usable though function was not many. A calendar application which installed originally evaluated as low usability and poor function. From these results, Life Bear is found to be more functional and usable than default calendar application.

4.2 News Aggregation Category

About News aggregation category, questionnaire valuation was also carried out during May 20 through 26, 2016. 164 graduate students and undergraduate students were joined in this evaluation. We made a questionnaire based on the result of interview. Items were shown in below.

1. Lower level
   – characteristics of participants
   – Gender, school year
   – About job hunting

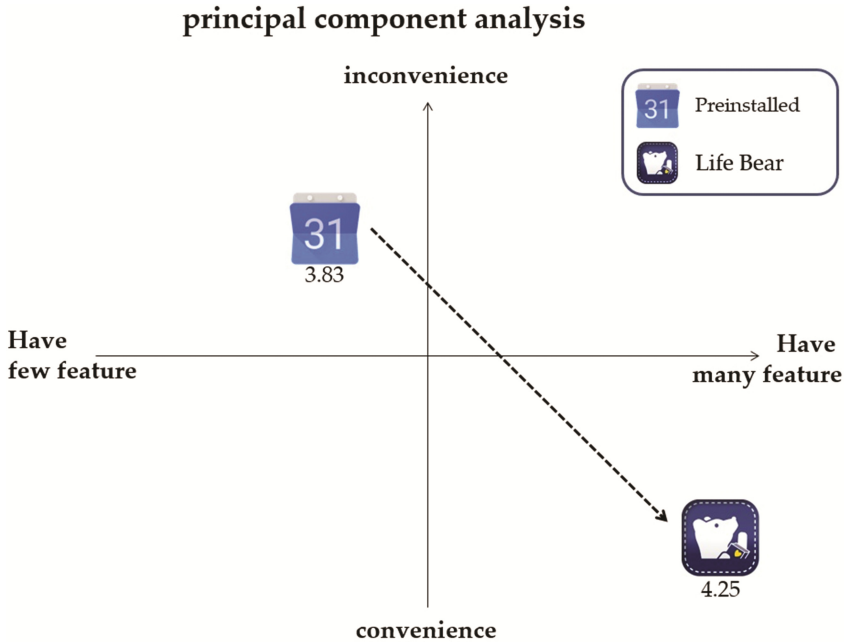## principal component analysis

Fig. 4. Result of principal component analysis

- Aim of usage of this application
- Hobby
- Article in each application
- Width of area covering this application
- Area and category of articles often checked
2. Middle level
    - Function of application (interface)
    - Color
    - Sense of operation of the application
    - Size of image in an article
    - Impression for ad placement
    - Speed of loading
    - Ease of checking the distribution date of an article
    - Frequency of information
    - Sharing an article with SNS
    - Usability of default setting
3. Higher level
    - Value of application
    - Reliability for an article
    - Lightness of application
    - Ease to dispose of information
    - Ease to get the newest information

  – Ease to read an article
  – Ease to access deep information
  – Ease to customize
  – total score

  Average total score of this evaluation were shown in Fig. 5.

– Smart News; High score 78 points because of easy to use and customize function.
– Yahoo News; Low score 72 points because user cannot find good point.
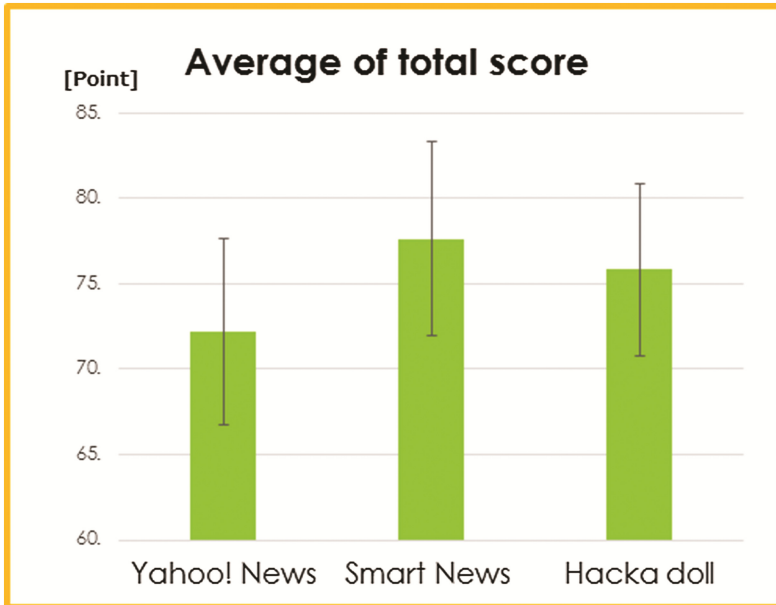– Hacka doll; Middle score 76 points because user can get information they want.

Fig. 5. Total score

From these results, we could find that total evaluation of Smart News was high because this application was popular for students during hunting job, articles dealt with this application were wide area, depth and reliable, and was superior for functions.

About Yahoo!! News, total evaluation was not so high because reliability was low, there was low depth and functionality was no good though articles dealt with this application were wide area and local.

About Hacka doll, total evaluation was high because articles of application itself met information which required by users. However, function about application was not regarded as important.

5   Physiological Measurement

The result shown above were subjective evaluation. To clarify human feeling objectively, physiological data during use applications were measured. For calendar category, oxyhemoglobin and ECG (Electrocardiogram) used by NIRS (Near InfraRed Sensor) and polygraph respectively were used as indices of human objective response and for News aggregation category, eye movement, pupil response and fixation time used by eye camera were measured.

5.1   Calendar Category

We prepared two tasks. One was a write down task and another was a search task. The former was that the task to write down schedules planed before. There were two activities in one event. e.g. back home, join a conference and presentation, go to Disney land and trip to Hokkaido. The latter was that the tasks to search the plans when and where to do. Answering three questions prepared before. Write down the contents to the paper during check application.

Before starting a task, participant wore electrodes of NIRS and had a rest for a few minutes. After the rest, participants started using an application for ten minutes. During this physiological data were measured. After measuring, participants had five minutes' rest. After the rest, participants started to use another application. During this, physiological data were also measured. Same procedure was applied to two tasks.

The results of these experiments which index was oxyhemoglobin were shown in Fig. 6. From these, we can found that there were no significant between two applications. This was similar results to interview analysis.
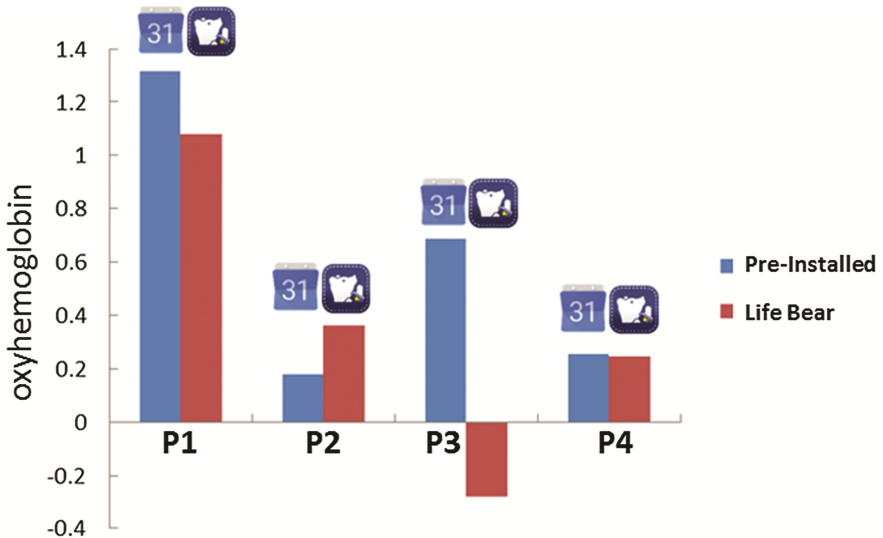

Fig. 6.   Result of NIRS

5.2   News Aggregation Category

About News aggregation category, during use of these application, eye movement, pupil response and fixation time used by eye camera were measured.

Analysis of eye movement for these applications were shown in Figs. 7, 8 and 9.
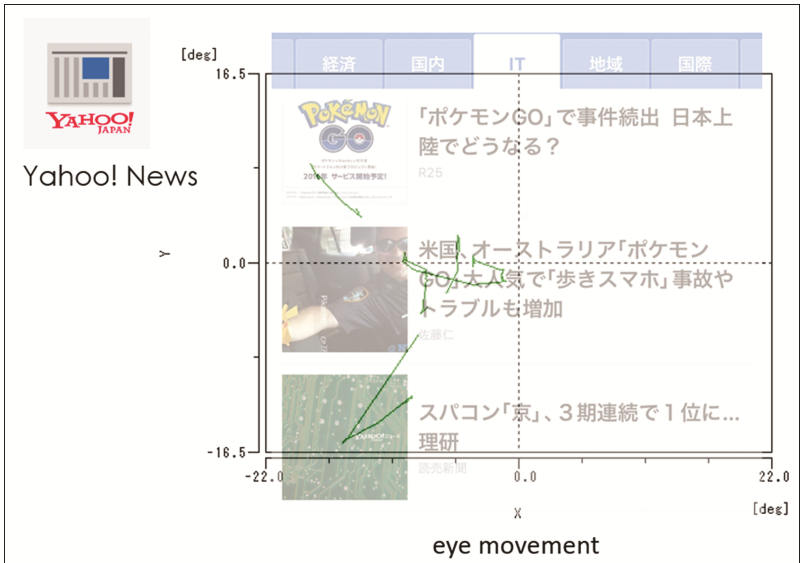

Fig. 7. Smart news
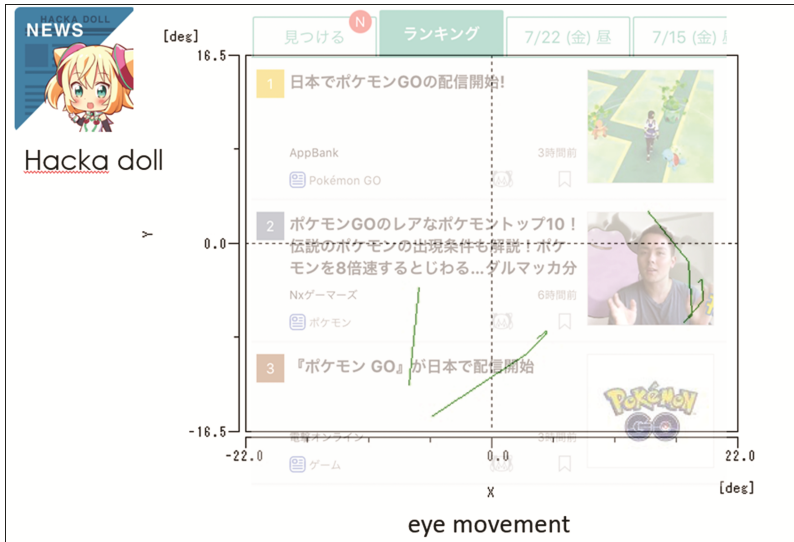

Fig. 8. Yahoo! news

Fig. 9. Hacka doll

About Smart News, eyemark moved to wide area. The reason of this result was that there was not an united feeling for layout and thumbnail.

About Yahoo!! News, eyemark moved the left side to the center. It's because the influence of layout or thumbnail.

About Hacka doll, eyemark did not move. From the subjective evaluation result, Hacka doll has few functions. So, frequent of operation was very low.

The results from fixation point were shown in below.

– Smart News; Weak point; Layout is bad for reading news.
– Yahoo News; Strong point; Unified picture size lead easy to read news.
– Hacka doll; Strong point; User can get deeply interesting information.
  Weak point; User must wait for loading news contents.

This result represented not the condition of reading an article but the condition of searching target articles

As a conclusion of the experiment, the results from subjective evaluation and from objective evaluation were gotten adjustment.

6   Conclusion and Future Activity

In UX design, it is common to design values and goodness as design targets, but parts that you do not recognize unconsciously are not considered for design targets. The part that you feel unconsciously may actually effects the goodness or badness about user experience, for example, Kansei value when using, or the motivation to keep using it.

This time, using questionnaire, we can find some elements for popular applications and these results were supported by physiological evaluation. They were that the recipe for success were usability and width of target area, and function was not so important.

In future, it may be a new research theme such as confirming how unconscious-ness effect user experiences. And next step how intentionally design unconsciousness for achieving valuable and good user experience.

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