EUGLENA SUPPLEMENTS WITH NO STRONG INFLUENCE ON FOOD CULTURE

Sapporo Kaisei Secondary School

August 30th

Abstract

The lack of nutrients and starvation are serious global issues which quick solutions are needed. To solve this problem, this research tries to find the method to make nutritious supplements with Euglena. This research includes three experiments which are a method of making supplements and as a result, experiments show that cultivating in p.H 3.8 solution made of acetate buffer,urea and metals, making powder with experiment gear dryer is suitable. This research is still in progress and few important experiments such as nutritional measurements remain.

Introduction

Current circumstances of food related problems are very serious. 810 million people in the world are starving now. This is one tenth of the world population. Also, it could get worse if society does not act on it. Because of world population growth, world demand for the food resources will be 35% up from current levels. It is clear that when world demand increases, the food system is going to collapse. So rapid solving is demanded.

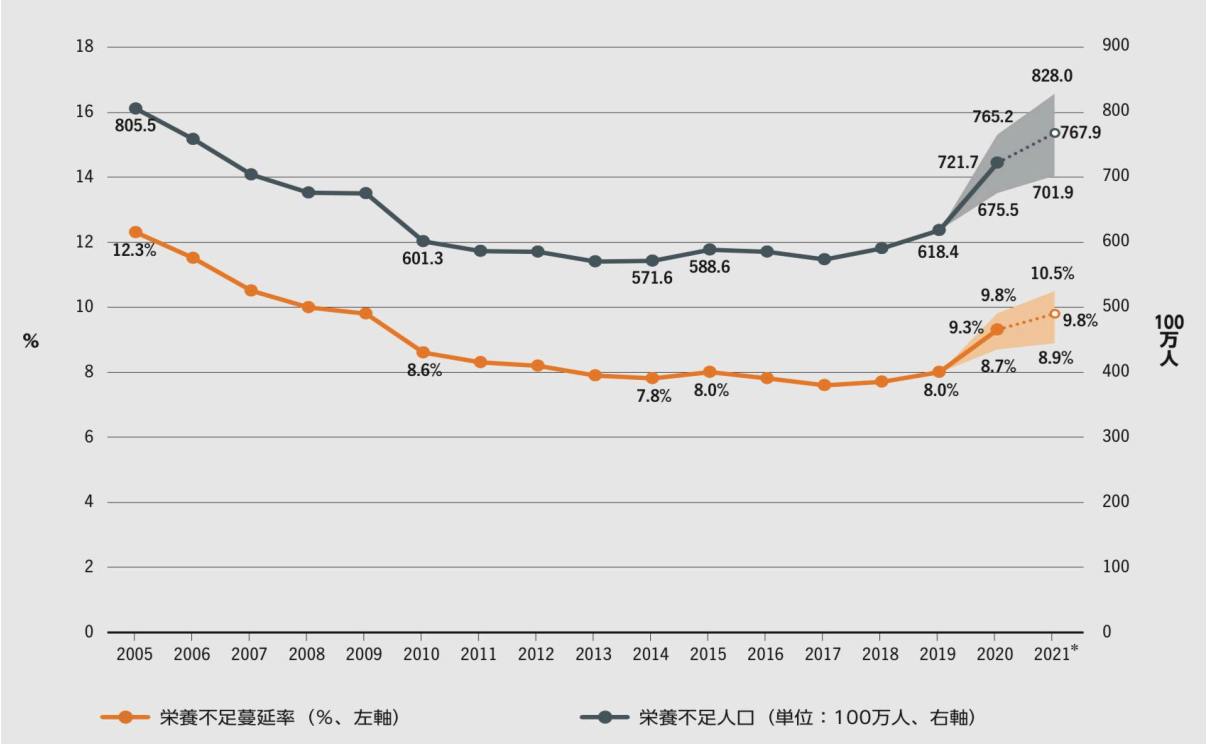


Chart 1 Undernourishment Prevalence and Undernourished Population.

From https://www.jaicaf.or.jp/fileadmin/user_upload/publications/FY2022/SOFI2022_InBrief_JP.pdf(see 2023.10.21)

According to chart 1, because of the COVID-19 pandemic, the number of the people who suffer from undernourishment increases quickly. As outlined above, demand for food is expected to increase in 2030. So the number of them could also increase.

Hypothesis

Euglena can be a nutritional supplement which is inexpensive, eco-friendly and harmless to the food system.

Materials

Experiment 1

- 500 mL distilled water
- 500 mL Euglena
- 500 mL acetic acid (0.1M/L)
- 5 100mL beaker

- 1 Glass stick
- 5 plastic bottles
- 1 pH meter
- 1 100mL Graduated cylinder

Experiment 2

- 50 mL Cultivated Euglena
- 1 gas burner
- 1 aluminum dish
- 1 hair dryer
- 2 filtration paper
- 1 glass stick
- 1 5mL Komagome pipette
- 2 100mL beaker
- 1 funnel
- 1 tweezer
- 1 experiment gear dryer
- 1 evaporating dish
- 1 dispensing spoon

Experiment 3

- Acetate buffer solution (0.2M/L, 2x200ml)
- Urea (0.1M/L, 2x3ml)
- Cultivated Euglena (2x50ml)
- Magnesium chloride (0.1M/L, 2x2ml)
- Iron oxide(Ⅲ) (0.1M/L, 2x2ml)
- 1 pH meter
- 1 100mL Graduated cylinder

- 1 Glass stick

Procedure

Experiment 1

1. Measure 50mL of Euglena with 100mL Graduated cylinder and put in the 100mL beaker
2. Mix the euglena and acetic acid and distilled water
3. Adjust ph value to (3/3.5/3.8/4.5/4.8) by adding acetic acid and distilled water
4. Put each solutions into plastic bottle
5. Put these bottles on a place where they can get enough sunlight
6. Open once in a day to refill fresh air

Experiment 2-1

1. Set up the Gas burner
2. Measure 5mL of cultivated Euglena with a komagome pipette and put on the aluminum dish
3. Evaporate water around Euglena
4. Scrape together the left Euglena

Experiment 2-2

1. Set up filtration system (beaker , funnel and filtration paper)
2. Put cultivated Euglena about 10 mL in 100mL beaker
3. Put them in filtration system through a grass stick
4. Gather Euglena with a tweezer

Experiment 2-3

Euglena supplement with no strong influence with food culture

1. Measure 5mL of cultivated Euglena with a komagome pipette and put on the aluminum dish
2. Blow and evaporate them
3. Scrape together the left Euglena

Experiment 2-4

1. Measure 5 mL of cultivated euglena with a Komagome pipette and put on the evaporating dish.
2. Put it into the experimental gear dryer
3. Set temperature of the dryer to 100 degrees celsius and turn on it
4. Leave it 4 to 5 hour
5. Scrape together the left Euglena

Experiment 3

1. Make acetate buffer
2. Add 3mL of Urea and 2mL of Magnesium chloride or Iron oxide(Ⅲ)
3. Put them in plastic bottle and put on the sunny place

Result

Experiment 1

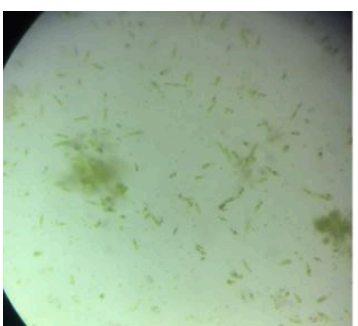
Photo 1 : Euglena cultivated in p.H 3.0 solution (on top left)

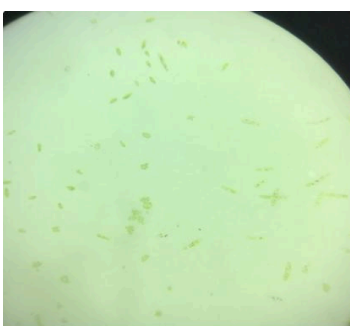
Photo 2 : Euglena cultivated in p.H 3.5 solution (on top middle)

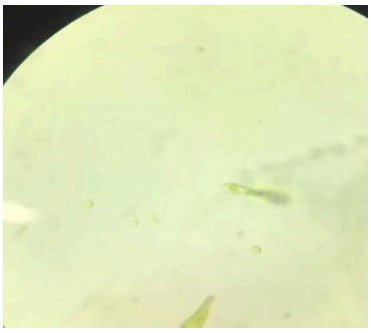
Photo 3 : Euglena cultivated in p.H 3.8 solution (on top right)

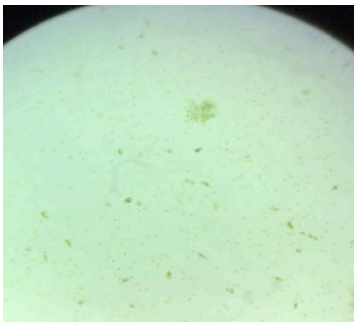
Photo 4 : Euglena cultivated in p.H 4.5 solution (on bottom left)

Photo 5 : Euglena cultivated in p.H 4.8 solution (on bottom middle)









These are photos of Euglena through the microscope. According to the photo 1 to 5, compared to the others, there is a much larger number of Euglena in the medium 3.8. That data wasn't derived from the counting. However it's derived from the statistical data by repeatedly observing it. So this experiment shows the solution which controlled pH to 3.8 is the most suitable to cultivate Euglena.

Experiment 2

Chart 2 Result of experiment 2

Method	**Result**
Gas burner	Failed
Hair dryer	Failed
Filtering	Failed
Dryer	Succeded

As the chart 2 shows, powdering with a dryer is the only way to make euglena powder. Evaporation with a gas burner was difficult to control temperature and it got over a

hundred degrees celsius. So euglena was burnt. Hair dryer made strong wind and scattered powder. FIltering is a basic method to gather solid from liquid. However it was not for gathering powder. Powder stuck on a filter paper.

Experiment 3

Both methods were proved to be suitable.

Discussion

Experiment 3 was planned with advice from Prof. Ishizuka from University of Hokkaido. The advice is about adding metals which are necessary for chlorophyll and adding Nitrogen resources which are nutrients for Euglena.

Experiment 1 shows pH3.8 is the most suitable environment to cultivate euglena. However this result has limitations. It is that the pH value was not fixed. Euglena does photosynthesis and produces oxygen. It can affect the pH value. So in the third experiment, an acetate buffer which can fix the pH value was used as the main material. Experiment 2 shows evaporation with a dryer is the best way. In this experiment, dryer means Economy Gravity Convection Ovens for LabWare Instrument Drying Oven. It can control temperature inside. Experiment 3 shows Urea, Magnesium chloride and Iron oxide (Ⅲ) can be added to the medium.

This experiment is still in progress. So there are various experiments that have to be done. For example nutritional measurement has to be done because it must be proved that cultivated euglena has various kinds of nutrients. It is important because this research set the goal to approach food related global issues such as undernourishment. So euglena powder must have various nutrients.

Refarences

・EVALUATION OFFICE（April,2017）. unicef . https://www.unicef.org/cambodia/media/1141/file/Reducing%20Stunting%20Full%20Report.pdf（refer 2023,10,21）

・Euglenaユーグレナ（2021,05,26）. Euglenano seibun wo shiritai! donoyōna kōkaga kitaidekirunoka kaisetu! ユーグレナの成分を知りたい！どのような効果が期待できるのか解説！. kenkō koramu 健康コラム . https://www.euglab.jp/column/euglena_clm/000461.html（refer 2023,10,21）

・HOPE-JP（2017,10,13）. Totsugeki! sekainobangohan ~hope international kaihatsukikou~ 突撃！世界の晩ごはん～ . ホープ・インターナショナル開発機構 . https://www.hope.or.jp/2017/10/13/world-food-day（refer 2023,10,21）

・Japan Heart（2020,06,23）. Cambodia no syokubunkato eiyōkadai カンボジアの食文化と栄養課題 . katsodō report 活動レポート . https://www.japanheart.org/reports/reports-cambodia/nutrition_issues_200623.html（refer 2023,10,21）

・Kabushiki Gaisya well-being 株式会社ウェルビーイング（n.d.）. Shokuhinhyōzihō ni motoduku eiyōsēbunhyōzi ni taiōeiyōsēbunzidōsokutēki “calorie answer” 食品表示法に基づく栄養成分表示に対応栄養成分自動測定器「カロリーアンサー®」. https://c-answer.jp/（refer 2023,10,21）

・Kokusainōringyōkyōdōkyōkai 国際農林業協働協会（n.d.）. yōyakuban sekainosyokuryōanzenhosyōtoeiyōnogenzyō 2022nennhōkoku 要約版 世界の食料安全保障と栄養の現状2022年報告 . JAICAF . https://www.jaicaf.or.jp/fileadmin/user_upload/publications/FY2022/SOFI2022_InBrief_JP.pdf（refer 2023,10,21）

・Kurashi no Ryōhin Kenkyūzyo くらしの良品研究所（2014,12,17）. Midorimushi ha tikyū wo sukūka? ミドリムシは地球を救うか？ .Muzirushi Ryohin 無印良品 . https://www.muji.net/lab/living/141217.html（refer 2023,10,21）

・Nutrition Division (OSN) (March,2017) . Fill the Nutrient Gap Cambodia SUMMARY REPORT . World Food Programme . https://docs.wfp.org/api/documents/WFP-0000070325/download/（refer 2023,10,21）

・UNICEF / WHO / World Bank Group (n.d.) . Levels and trends in child malnutrition. https://data.unicef.org/wp-content/uploads/2023/10/JME-2023-United-Nations-regions.pdf（refer 2023,10,21）

・World Health Organization (n.d.) . Data. . https://data.who.int/countries/116（refer 2023,10,21）

・(2020,03,16).Eiyō profile Cambodia 栄養プロファイル カンボジア . jica . https://www.jica.go.jp/Resource/activities/issues/nutrition/ku57pq00001pa078-att/nutrition_profile_cambodia.pdf（refer 2023,10,21）

・(2020,08,24) . 3hundewakaru Cambodia ~Cambodia tte donnakuni?~3分でわかるカンボジア ～カンボジアって、どんな国？～ . World Vision . https://www.worldvision.jp/news/works/202008_cambodia.html (refer 2023,10,21)

・(n.d.). Bisaisōrui (Japanese:Euglena toha?) 微細藻類（和名：ユーグレナとは？）. Euglena ユーグレナ https://www.euglena.jp/whatiseuglena/（refer 2023,10,21）

・(n.d.) . Biryōeiyōso微量栄養素 . SHARE . https://share.or.jp/health/knowledge/micronutrients.html（refer 2023,10,21）

・(n.d.).59syuruino eiyōsowo motsu superfood “ishigakizima Euglena” 59種類の栄養素を持つスーパーフード『石垣島ユーグレナ』.Euglena ユーグレナ . https://online.euglena.jp/shop/contents/pg/1euglena/（refer 2023,10,21）

・(n.d.) .Kakkokuno eiyōprofile Cambodia 各国の栄養プロファイル カンボジア . GLOBAL NUTRITION .

https://globalnutritionreport.org/resources/nutrition-profiles/asia/south-eastern-asia/cambodia/（refer 2023,10,21）

・(n.d.) . SECTOR BRIEF CAMBODIA: Health Care . Business Scouts for Development. https://www.giz.de/en/downloads/SectorBrief_Cambodia_HealthCareSector.pdf（refer 2023,10,21）

・(n.d.) . Seimeikagakukanrentokkyojōhō 生命科学関連特許情報 . LIFE SCIENCE DATABASE CROSS SEARCH . https://dbsearch.biosciencedbc.jp/Patent/page/ipdl2_JPP_an_2010163370.html（refer 2023,10,21）

Use Nudge Theory to Improve Supermarkets!

Kaisei Sapporo Secondary School, Cosmo Essay

August 23, 2024

1.Abstract

Nudge theory is a theory that encourages people to naturally make better choices rather than forcing them to choose. In this experiment, we attempted to solve various problems in supermarkets by effectively using nudge theory, a behavioural economics theory. Among supermarket problems, this time we conducted four experiments for two months in a supermarket to reduce the food loss of bread and to improve the usage rate of the supermarket's own checkout carts. The results showed that the nudge theory was effective in reducing bread food loss, but not in improving the use of the checkout carts. The experiments were also applied to the AIDA model of marketing, and it was found that the desire/action of this model is effective when nudge theory is used in a supermarket.

2.Hypothesis

Nudge Theory with its “prompting” effect will cause people to take Action simply by using Nudge Theory, which focuses only on Attention/Interest.

3.Introduction

Nudge theory is a behavioural economics theory that says that when people make decisions, they are naturally encouraged to make good choices rather than forced to do so. For example, if there is a footprint in front of a checkout counter in a supermarket, people will naturally line up along the footprint. This theory, which encourages people to make the choice they want to make naturally through diagrams and words, is called nudge.

The AIDA model (picture 1) is a concept that analyzes the psychological processes of consumers in advertising, consisting of the first letters: attention, interest, desire, and action. It consists of the process of attracting attention with something conspicuous, interest in the advertisement, desire for the advertisement, and finally action. In the checkout cart experiment, since checkout carts had just been introduced, we were conscious of attracting the interest of people who did not know of their existence. In the bread experiment, we were also conscious of attracting interest by using a character to explain the existence of the action of taking the bread in front of the cart.

Picture1 AIDA model

※1 Temaedori is choosing food products that are near their sell by date.
※2 Regi cart is trial’s original checkout cart

4.Materials

・5M wide poster(including regi cart's benefit)　×1

・Poster (Explaining the effect of front of the bread using characters) ×4

・Chart poster (Make sure people understand regi cart with posters)　×100

・two type of recipes (Presenting two types of recipes using trial bread) each ×2

・Laminate firm ×110

5.Procedure

Experiment done for a month each in September and October.

In September

(1)Regi cart experiment

A 5-meter poster describing the benefits of the regi carts would be created and posted over the area where regi carts are located.

The data used to create the results was obtained by asking the trial to tell us the number of users and new users of the register carts, and the new user rate calculated from this information was used to confirm the effectiveness of the nudges.

(2)Temaedori experiment

Posters incorporating the character (Temae bird) were displayed above the bread section.

By including the sentence "Thank you for your cooperation in reducing food loss" on the poster, it was made to look as if consumers were already cooperating with the food loss reduction program.

The data was provided by the trial on how much bread was discounted per day, which was then totalled monthly and compared to verify the effectiveness of the nudges.

In October

(1)Regi cart experiment

Put an interactive poster like the one in Photo 3 in your shopping cart.

By doing this, people who do not use checkout carts can be made aware of the presence of a reliable checkout cart.

Data continued in October, using the number of new users of the checkout cart to confirm the effectiveness of the nudge.

(2)bread experiment

Prepare two different recipes for arranging the bread using items that can all be purchased at the trial. The recipes were adapted from a recipe website called Kurashiru, and the ingredients were replaced with those available at the trial. As in the September experiment, four posters were displayed, two for each of the bread sections, for a total of four posters.

Data were continued from September to confirm the effectiveness of the nudges in terms of total monthly discounts on bread.

Picture 2:5m poster.

Picture 3: chart poster

Picture 4: character poster

Picture 5: recipe

6.Results

Graph 1 was created by asking respondents to tell us how much they discounted bread per day, and then summing the total for each month. As can be seen from this graph, there was a decrease of about 80,000 yen from August, when no experiment was conducted, to October, when all experiments were conducted. From this point, the hypothesis was supported.

Graph 2 shows the data on the number of users of the checkout cart, which Trial had independently surveyed. From this data, the rate of new users was derived. The graph shows that the number of new users decreased by 1.5% from August to October. The hypothesis was not supported by the fact that we wanted to increase the new user rate.

Figure1:The total discount of bread (monthly)

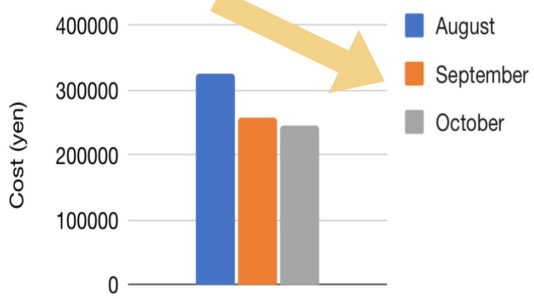
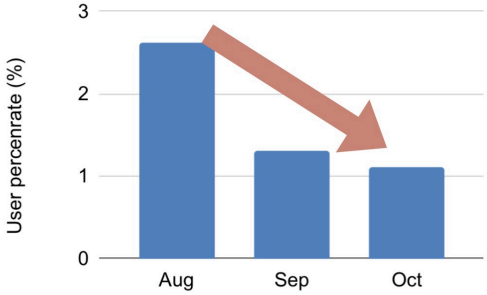


Figure2:“Regi cart” new user percenrate



7. Discussion

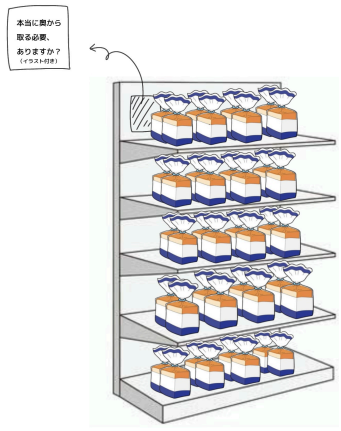
Since the bread experiment was successful in this case, considered the reasons for the success of that experiment. The hypothesis was that the experiment was more effective than the regi cart experiment because it clearly stated that it would lead to an improvement in environmental issues, which drew stronger attention leading to a decision, which in turn led to a change in behavior. In addition, while using a regi cart requires a number of steps to be taken, the temaedori experiment only requires taking it from the front, making it an easy condition for taking action.

On the other hand, the experiment with the regi cart resulted in a decrease in the number of new users, but this could be said to mean that the number of users of the regi cart has been established. Just because the number of new users decreased does not mean that the overall number of users was sought this time. Therefore, if the overall number of users had increased, it could be said that the nudge was effective even though the rate of new users decreased.

However, since the data from the temaedori and regi cart experiments included a variety of factors, it is not possible to say that they were a success or failure in general.

Based on the results of this experiment, a plan for improvement was developed. For the bread experiment, as shown in picture 6, we proposed to install a message that appeals to the mind, such as "Do you really need to take it from the back? The idea was to place a message that appeals to the customer's mind, such as "Do you really need to take the bread from the back?

For the regi cart experiment, proposed that the instructions for use and the prepaid card that must be registered be given together at the time of checkout.



Picture 6: improving bread experiment

We would like to test these improvement ideas in practice to verify what kind of nudges would be effective for supermarkets.

7. References

・特別区長会調査研究機構, (n.d.),食品ロス削減に向けた ナッジをはじめとする行動変容策, https://www.tokyo23-kuchokai-kiko.jp/report/docs/9420a8432b793e93cf30833eac0efccd55f4e535.pdf, 2024.3.5

・販促の大学, (2016.12.01), 「AIDA」「AIDMA」とは？消費者心理の法則を広告に応用しよう！, https://hansokunodaigaku.com/koukoku_post/1030/

THE EFFECTS OF THE USE OF LANDMARKS IN URBAN SIGNS

Group 24

June 28, 2024

THE EFFECTS OF THE USE OF LANDMARKS IN URBAN SIGNS

Abstract

The goal of this study is to reduce the number of people who get lost in “SATSUEKI” and make “SATSUEKI” a more desirable place to go. Therefore, an experiment was conducted to explore the possibility of Landmarks as non-literal information. Two experiments were conducted using the original maps. However, no results showed that landmarks were useful.

The Introduction

According to previous study, there are 24 factors by their characteristics that determine where people feel they are most likely to get lost. According to this study, stations account for more than half of these factors. In other words, this study suggests that stations are spaces where people tend to get lost easily.

From this previous study, Some say more signs should be installed, but it is not right.

Other previous study say the more information that needs to be viewed, the more time it takes to decipher it, and the more difficult it becomes to understand.

Figure 1
Cluster analysis of places where it is easy to get lost according to Masui and Imada (1993).

A station is a place to get lost. Masui and Imada (1993) identified four types and 24 characteristics of places where people feel they are likely to get lost. According to this study, stations satisfy 12 of these characteristics, or half of the total.

This study may lead some to suggest that more signage and maps would be a good idea, but this is not correct.

Other previous studies have shown that the more information there is to see, the longer it takes and the more difficult it is to understand.

Exploring the possibility of providing graphic information as an alternative to cumbersome textual information will lead to fewer people getting lost at stations.
To this end, it is necessary to explore the possibility of providing graphic information to replace cumbersome textual information.

PURPOSE1
The “SATSUEKI district” is expected to see a
further growth of tourism demand. But, the complexity of the area is increasing.
→ Explore the possibility of providing graphic information as an alternative to textual information.

PURPOSE 2
Reduce the number of people who getting lost in stations and other urban space

Hypothesis
People will not get lost to use landmarks for signage and maps.

Definition of “get lost”
SUBJECTIVE: Subjects themselves feel lost.
OBJECTIVE: Subjects take a long time to move.
research both subjectively and objectively.

Landmark
Buildings that recognizable at a glance.
(Department store, Monument, School, etc.)

The Materials Section

The following four were used in the experiment.
1.iPad
2.PC(Google my map)
3.Original map
4.questionnaire
5.cardboard　(to make signage)　w20cm×s30cm six flat objects

The Procedure Section

Two experiments were conducted in this study.

Experiment 1
Verify definition 1 from signage and
map distribution at school events.

This is a so-called controlled experiment.

<Method>
1.Randomly distribute marked and unmarked maps to visitors at Kaisei school festivals and Kaisei school open houses.
2.The visitors were asked to move around the school using the signs linked to the maps.
3. The results of this experiment will be collected by means of a questionnaire.
4.Find out what UX differences there are between each map.

Variable in Experiment 1
Independent Variable / Availability of landmark listing on distributed maps.
Dependent Variable / Subjective experience of whether they were lost.
Control Variable / Examines are 10's - 80s'.

The hypothesis is supported when the number of people who feel lost using the map with Landmarks are significantly shorter.

Experiment2
Experiment 2 is focused on definition two.
Difference in travel time depending on the presence or absence of landmarks on the map.
<Method>
1.Randomly displays a map without a map with Landmarks to a specified destination.
2.Measure the time it takes to walk through the street view and arrive at that destination.
3. The results of this experiment will be collected by means of a questionnaire.
The map used for this experiment was created by Google My map.
A map with a picture of the destination and a picture of Landmarks were created by the group with a map without those pictures.

Variable in Experiment 2
Independent Variable / Whether we include landmarks on map or not.
Dependent Variable / Time elapsed before moving to destination.
Control Variable / A way from starting point to destination (500 meters).
We chose some cities. Population of these is similar as Sapporo.

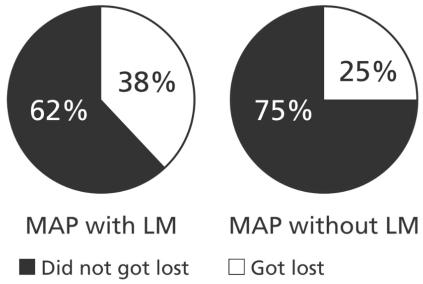
The hypothesis is supported if the travel time is significantly shorter for those using the map with Landmarks.

The Results Section

Experiment1
Hypothesis was not supported.

At first glance at the graph of the results of Experiment 1, it appears that people are less likely to get lost using the unmarked map.
A hypothetical test of statistical significance of less than 0.05 would support the hypothesis.
However, the value of the hypothesis test for this graph is 0.6.
Therefore, it indicates that the hypothesis is not supported.

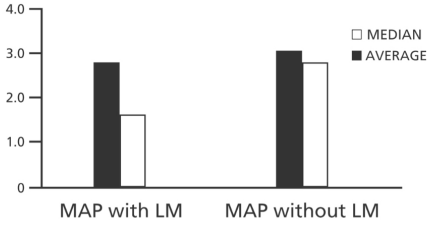
Figure 1
Percentage of visitors they were lost.



Experiment2
Hypothesis was not supported.

At first glance, the graphs in Experiment 2 appear to show that the travel speed is faster when using the map with Landmarks and that it is harder to get lost.
A hypothetical test of statistical significance of less than 0.05 would support the hypothesis.
However, the value of the hypothesis test for this graph is not less than 0.05.
Therefore, it indicates that the hypothesis is not supported.

Figure 2
Difference in travel speed with or without LM



The Discussion Section

There are many possible reasons why the hypothesis was not supported in Experiment 1, but the first reason is that the number of data was small. This was addressed in Experiment 2. On the other hand, if the hypothesis is not supported even without this issue, it may be that the inclusion of landmarks on the map inundated users with information, making it more difficult for them to understand.

Conclusion

It could not be objectively shown that landmarks prevent people from getting lost.
It does not necessarily follow that graphic information is superior to textual information.

References

[1] 増井幸恵, 今田寛(1993). A situational structure of becoming lost and its relationship with sense of direction. 人文論究, 43, 45 - 58. https://kwansei.repo.nii.ac.jp/records/15518

[2] AKASE Tatsuzo(2009). Demonstrative study on systematizing sign system design theories with public transportation spaces as the catalyst. 東京大学博士論文, https://ci.nii.ac.jp/d/link/500001440064