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# KANSEI EVALUATON OF STYLE IN CYBER MAP SERVICE
# -MAINLY BASED ON WEBSITE MAP OF UNIVERSITY OF TSUKUBA-

Wonseok Yang[1] and Sangtae Kim, Toshimasa Yamanaka

[1]Graduate School of Comprelensive Human Sciences, University of Tsukuba, Japan.
sotoo@kansei.tsukuba.ac.jp,pacman@geijutsu.tsukuba.ac.jp, tyam@kansei.tsukuba.ac.jp

## ABSTRACT:

Maps are produced in various forms to guide and provide local information. The Internet has recently begun to offer accurate information in the form of cyber maps. People depend on this technological development, and users demand for more detailed information about the places that they are looking up. That is, people want correct, personalized information. The development of technologies makes it possible to adapt information to the individual user based on strong user profiling. The user experts this technology to go on developing and seeks to use and reuse it beyond text-based searches. Recently, many universities provide map search facilities on their sites.

This study suggests kansei evaluation to analyze the use of maps based on user experience. So far, seven different types of cyber maps, such as Pdf, Html, VR, Flash, 3d and image type, have been developed. In order to compare these forms and evaluate their effectiveness, the user's reactions to each style were

recorded and evaluated. The results were analyzed by focusing on the emotional reaction to each type of maps.

Keyword : Map style, University information, Environment

# 1.INTRODUCTION

This study is to investigate the style of campus maps which universities show on their websites and to suggest new models. For example, to analyze the type, strengths and weaknesses of campus maps and to propose a new campus map style.

Many universities offer an "open campus" for applicants and visitors to experience directly their environments. This is often restricted in place and time, so satisfaction is sometimes low for many users. One of the ways to solve this problem is to utilize a multimedia campus map. It is possible to offer it on the Internet.

A variety of campus map styles are used to help new students find their way on campus. Presently 768 universities provide traffic maps giving access information about their campuses. 561 of these university offer information about their campus environment in the form of a cyber map, a building introduction, a campus map, a campus tour, a cyber tour, campus location, a building location, a building information, a building summary, a campus information, or a campus guide. 438 of these 561offer images of the campus in the form of movies, aeronatic satellite pictures, or plane figures like those used in construction and environment design.

Recently multimedia styles have grown with more developed graphics and internet techniques. University of Tsukuba produced campus maps in 4 styles to provide information about its facility: But Some of these maps overlap with each other. Aerial photography gives too many details to be easily understandable.

20 students and 20 members of the public responded to a questionnaire about the present campus map. Its design, links with the university site, and usability were researched on. First of all, as for the design, the integration of the graphics, the classification of the information, the compatibility of the labeling, the suitability of the color scheme, and the impression of the layout and the top page were researched on. Secondly, as for the links with the university site, thier special characteristics, user-friendliness, and their compatibility with university policy were researched on. Lastly, as for usefulness, the readability and clarity of the web page contents, the graphical compatibility, all the structures on the top page, and the navigations to other university facilities on campus were researched on.

The data was used to propose draft a new campus map for the University of Tsukuba.

Firstly, the graphics were simplified and vector-imaged since the existing 3D pictures give too much detailed information and are confusing. Secondly, as for techniques, VR and 3D maps, provided separately before, were combined into one map. The present map is inconvenient since it connects to other pages when users try to confirm the map style or whether to print. To solve the problem, simplified illustrations about the information can make it easier to confirm immediately and are made easy to understand with multimedia technologies using flash. Thirdly, the University is divided into 4 areas and a centralized space. Each area has gateways connecting to other areas with entrances and exits, and buildings are connected with one another. Users can retrieve detailed information about the 4 areas. User's have personal requirements, and so deep different sets of information are needed. Map retrieval is different from retrieving text. Users can get more useful information. It is expected to progress continually with areas and commercial information. A University needs various services to manage their facilities and campus information. It seems that the most visual and with the most useful performance is the campus map.

## 2. Background and objective of the study

Developments in information and digital technology and the increasing use of computers and multimedia web services have facilitated communication, information usability, information variety and economization. Cyber communication on the Internet improves the images of enterprises and universities and plays an important role in bringing extra benefits. This importance of the Internet and its increasing usability have facilited its common adoption by governmental institutions, corporate entities, and schools, many of which use their website to publicize themselves. Universities all over the world use the strengths of the internet to compensate for the weaknesses demerits of print materials in their aggressive attempts to interest their customers. Universities now are all going through this transition.

The threat of falling student numbers and fierce competition with foreign universities mean universities do not only conduct academic research, but they also provide education related services. Universities are service providers and need to change according to consumers` demands.

They have to show their competitive strengths by providing much information and communicate their visions. Campus maps are one of the best ways to show detailed facilities and currently these maps can be published on websites. The websites of many universities are not updated and most are simply left as they were constructed. Research is needed on systematic ways to publish information on these websites.

## 3. Study process

### 3.1 Inter space structure formation on campus and role of map

A ”map” is a record of information about an area. The whole or a part of a map can be magnified. Universities use maps of various styles to provide campus information.
Personalization of information provision is increasing with internet technology development. Insight from research on this are needed.

Map retrieval is different from text retrieval. Users can get more useful information. A University introduces some of its buildings and areas in a small scale on a map.

| Component factor | Detailed content | content |
|---|---|---|
| Builiding | Educational basic facility | lecture room, practical room, professor's office, clerk's room |
| | Educational support facility | headquarters, library, student union, gymnasium, auditorium, computer building |
| | Research facility | Research center, grad school office |
| | Department facility | dormitory, memorial hall, student public hall, school hospital |
| Flow line | Main entrance/sub entrance | Front gate, sub entrance, gateway |
| | axis | optical axis from entrance to main facility |
| | Outer borderline | Existence of outer borderline |
| Exterior space | landform | landform of block |
| | Present Main natural factor | Lake, mountain, |
| | Facility green, natural green | ground, park, parking/break, space green |

Figure 1: Spatial structuring component factor in University campus

Kevin Lynch classified city space patterns in term of the star, the satellite city, the linear city, the right angle lattice city, the other lattice style, the lacework, the inward city, and the nested city.

Space can be classified in term of its characteristics, structure, entrance, axis and pattern. University of Tsukuba is a linear city from its point of view and divided into dormitory, department administrative area, school hospital, research facility, gymnasium, and natural woods area. It was structured into four concentrated structures, each with its peculiar construction characteristics. Access is open and there are many gateways which go to different directions depending on purpose.

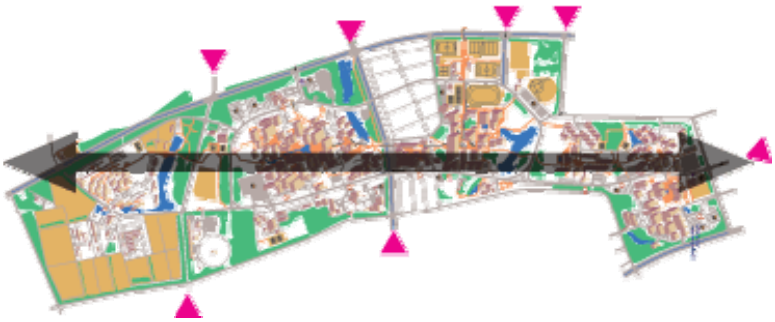

Figure 2: Space structural pattern and gateway of Tsukuba University


Figure 3: Space formation of Tsukuba University

These parts determine the structure and flow line of the campus information. These structural facters are building, flow line and outer space, and are used on the campus map.

3. 2 Characteristics of campus map and conditions of university

1) Characteristics of campus map

The campus map on the university website provides useful information about the university's facilities. A campus map is very useful for people who are interested in the university. Members of the general public get to see the size of the university information about its facilities. Students of the university usually use the map to get detailed information about where they are and where other facilities are on campus. High school students and other students use the cyber map to get detailed information about the departments which they wish to enter. People use it to get information for a visit to the university. The size of the map depends on the university`s size. Recently the concept of open campus is increasing in importance in the promotion of the image of a university and when recruiting new students.

2) University current situation

(Aug, 2006, yahoo base) 438 of 768 offer campus maps.

1. Access info: location information and traffic information

2. Campus map: Information about the campus and the facilities on it are provided by pictures and text

3. Address info: address and contact information are offered in text.

Fig.4 shows 57% or 438 of 768 universities offer images of their campuses in the form of maps. Recently 3D movies and aerial photographs have been used increasing by on these maps. Unlike print, websites can't give satisfaction only with text-style information because they can show detailed information.

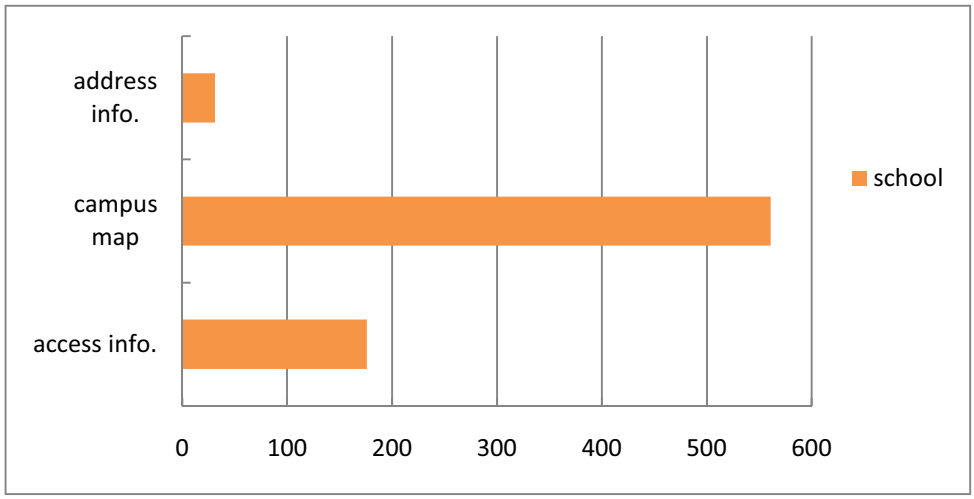


Figure 4: Current state of campus map of university

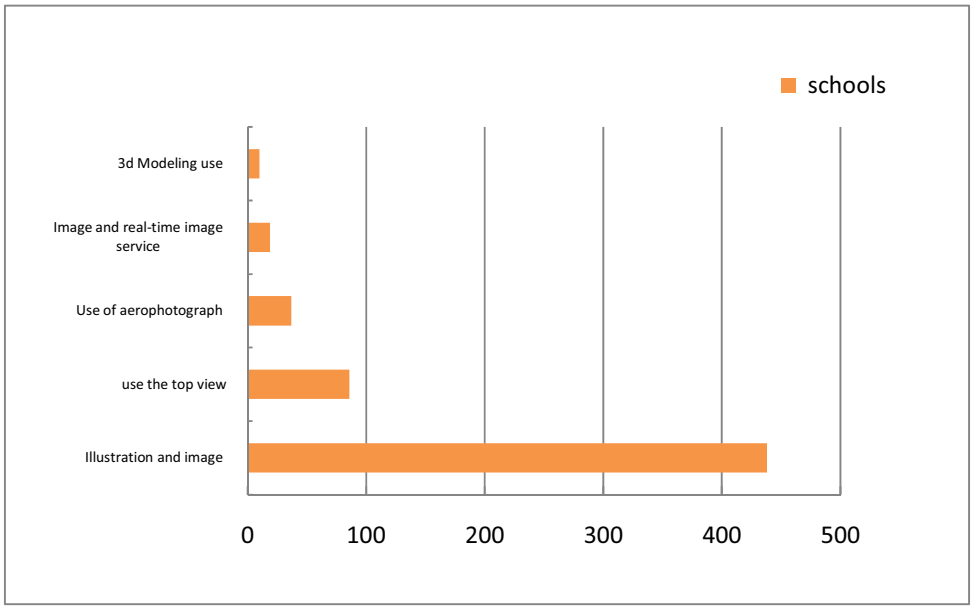


Figure 5: Current state of map style of university in Japan

### 3.3 Campus map as area information introduction

1) Patterns of service styles

①documentary information map style (guidebook)

These portable maps are printed in book form. They are difficult to update. It is also hard to use them to show the information on a wide area. They are used for sightseeing and for providing information on public facilities.

②Road map style (information style of gradual process)

The maps provide area information. They are used for sightseeing and are commercial publications. They are area guides. Most campus maps are provided in this style.

③Interactive map service: users can update map directly.

Online maps change together with the Internet. Present concepts about online map are based on limited technology. Mash-ups in bring commercial possibilities. Fig.6 shows the style of google earth or yahoo's local information service developed as a life-related service to provide local area information using maps and commercial objects. Interests in electronic map service on the internet are, increasing and map retrieval is becoming popular as a new business model.

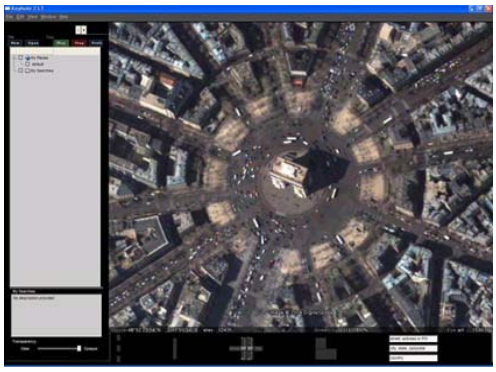

Figure 6: Regional guide in Paris map of GOOGLE

2) Graphics style type

①Retrieval of picture images (37 schools)

This is a method to provide pictures of university facilities. Recent multimedia maps include the use these picture. Its disadvantage is points are that many pages are needed when there are many facilities to show.


Figure 7: Type of retrieval of the main photograph for image map case

②Character styles of three dimensional vector graphics

This provides a bird's eye view of the information and is easy to understand. Presently it is commonly used vector graphics files are smaller than picture files and show cleaser images the web. So this helps to promote the university's image. Access to an actual building and an explanation is provided under each building.

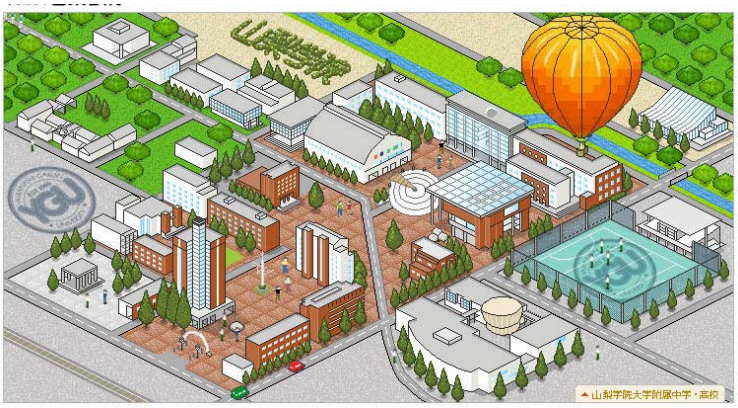


Figure 8: Map case in solid type vector graphic form

③Plane figure information map (86 schools)

This is a print style presentation. It is commonly used for school and building information. It is the most convenient way to decide whether to see with walk or bike since it shows everything at a glance.

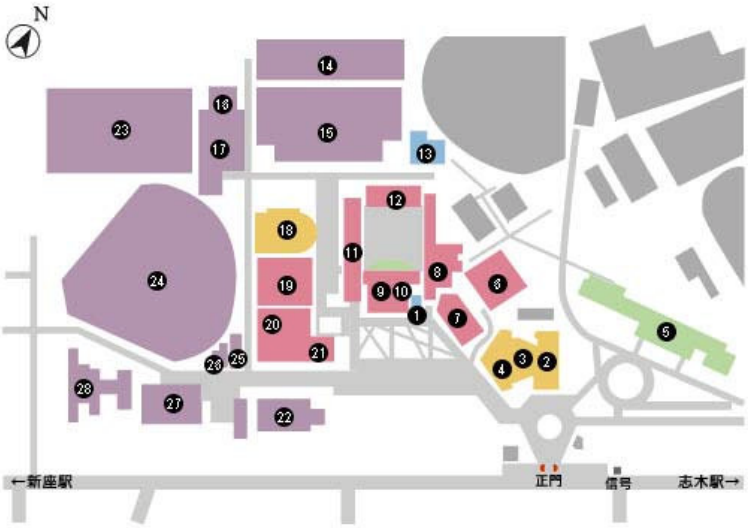


Figure 9: Map case in plan form

④360 degree revolution with VR

This has the strength of showing the place in a 360 degree picture. The pictures can be taken with live cameras all over the world. Ipix or Qtime is sometimes needed as a plug-in. This involves taking panoramic photographs of a place and showing them all as one picture.


Figure 10: Map case in the 360th round type form using vr

⑤Virtual reality with 3D modeling (10 schools)

This is similar to ② style University buildings are shown on a 3D program.

Its strength is the use of 3D production in various ways. Its weakness is high cost if the university is big or complex.

Figure 11: Virtual reality type map case using 3d modeling

⑥Animation with flash

This is the most popular style recently. Illustrated solid maps and VR can introduce much information. Using vector graphics illustration helps users to enjoy and understand the animations. It also helps to reduce the size.


Figure 12: Animation type map using flash

⑦Reduction and enlargement style with aerial photograph

This is to use satellite photographs or aerial photographs to show the whole university, giving details like google earth. Its strength is its ability to show the whole university, but its weakness is its difficulty to understand since it is not clear seen. Also enlargement makes the picture look blurred.

Figure 13: Map case in form using Airlines substance investigation taking a picture

⑧Live camera style

VR is effective since panoramic photographs are connected and can be seen like 360 degree's ones. Cameras instated on roof tops of building can capture information live. Movements of students are an important part of a campus and these movements are seen by people in other areas or foreign countries. Such as website can show children's present situation in a kindergarten or preschool.

Figure 14: Live cam style map case

⑨A map with movie (19 schools)

This is different from image from a live camera. The movies are produced for publication on websites. Editing is needed to produce these movies.


Figure 15: Map case using animation

⑩Access information only (176 schools)

The provide information on access and location. 25 % of all the universities provide only access information. Most of these universities are small in size.


Figure 16: Case with access guide

## 4. Analysis of a campus map in university of Tsukuba

### 4.1 Present campus map of University of Tsukuba

20 students and 20 members of the public responded to a questionnaire about the University map. In terms of 1) usability, 2) satisfaction with graphics, 3)use of color, 4)satisfaction with information distribution , 5) recognition, 6)access to facility, 7)show of characteristics of University, 8) satisfaction with technical expression and style

1) Picture enlargement and reduction style (aerial photograph style)

The whole University area is shown in a satellite picture or aerial picture like google earth. Its strength is its sense of close distance, but it is too complex to describe and difficult to find the facilities.


Figure 17: Evaluation comparison of Tsukuba University attending school life and general person of plan type map

The students already know about the areas. So they are dissatisfied with unnecessary colors of navigation, the graphics and the style.

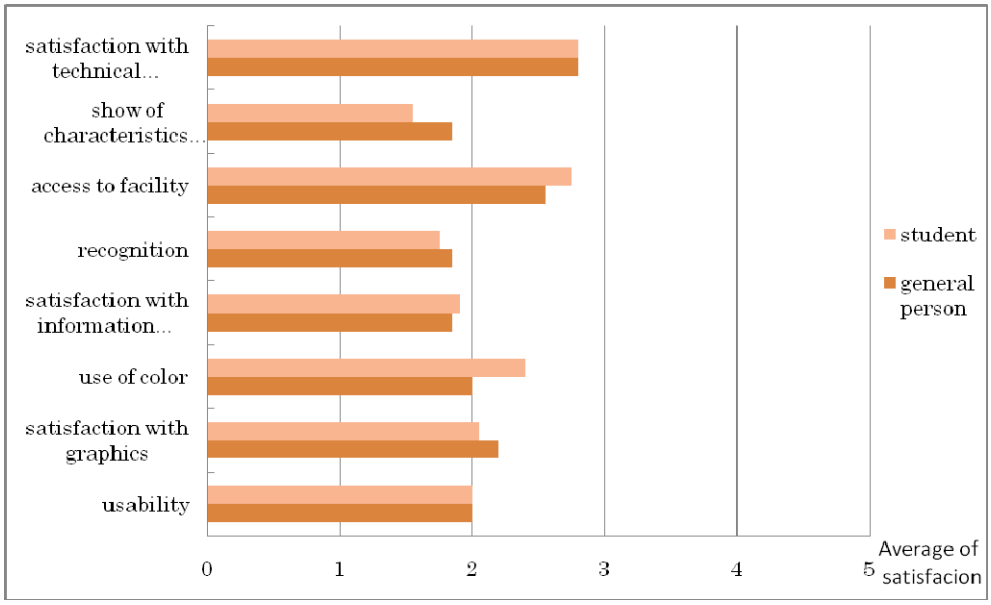


Figure 18: Photograph extension reduction style(aero photograph form)

2) Solid character type (flash base)

As for information distribution, a detailed enlarged map provided by Flash can be seen by clicking a small area map are used. But excessive information causes lots of confusion. Also too many original colors to distinguish the areas. Many people are of the opinions that this is consistent but too complicated for presenting a wide area. Its slow response and detailed description distinct user`s anention.


Figure 19: Body character type(flash base)

Student's satisfaction with the recent map styles is high, but the students are of the opinion that these maps do not highlight the characteristics of the University. Members of the public one of the same opinion.

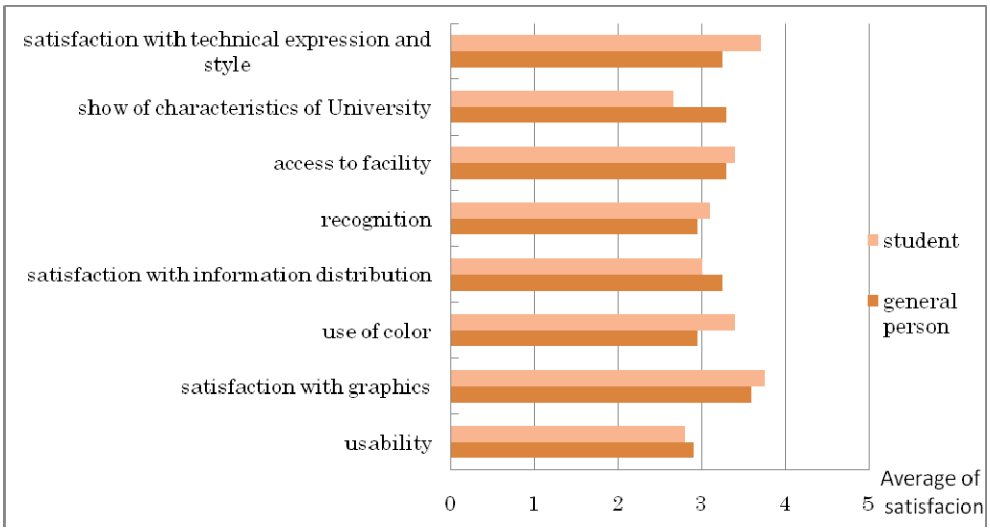


Figure 20: Evaluation comparison of Tsukuba University attending school life and general person of solid character type map

3）Plane figure style

Information is provided through the links to each building and department website. Most universities use this style. So the evaluation shows quite high satisfaction with the graphics. Students feel its usability is low because the map is complicated. Members showed of the public feel that its presentation of the characteristics of the university is inadequate.

Figure 21: Plan form

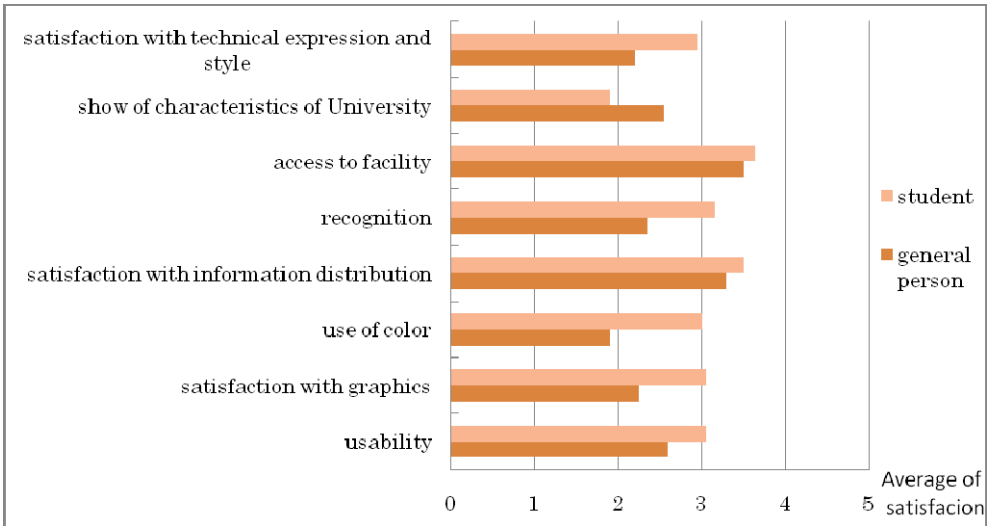


Figure 22: Evaluation comparison of Tsukuba University attending school life and general person of plan type map

4) Panorama VR

VR is offered at University of Tsukuba, but not as a part of a campus map.

Many are of the opinion it is better to introduce details about some parts of the map.

It shows the university's appearance and details of its important aspects, but user`s satisfaction with the information distribution is low.


Figure23: Panorama VR

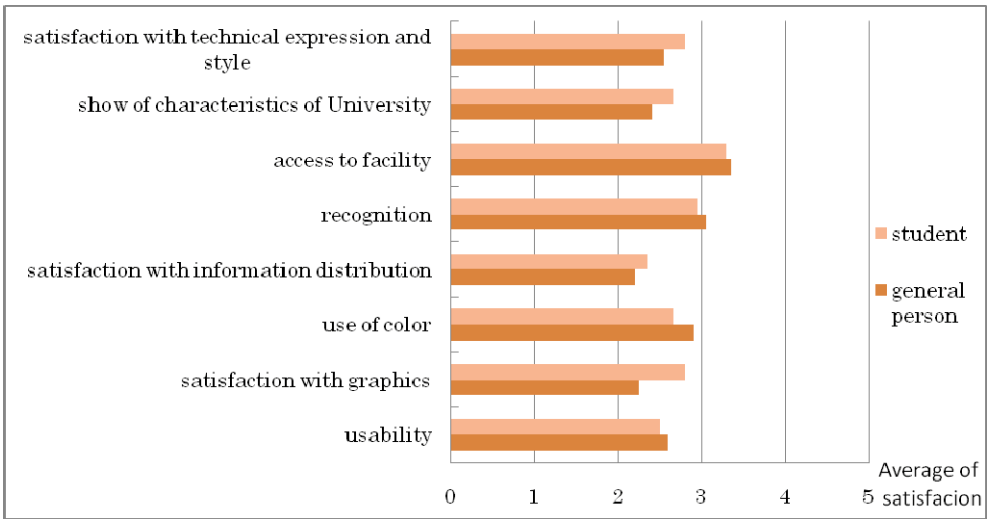


Figure 24: Evaluation comparison of Tsukuba University attending school life and general person of panorama VR type map

## 5. A suggestion and a production of a new map

The strengths and weaknesses of the present map of Univ. of Tsukuba were studied for 2 months from April 2006, and progress on a new map has been made.

A map on 3 pages has many overlaps, and users have trouble understanding it.

1) Content of map production

4 colors are used to divide up the north, center, south, west&kasuga areas to show the characteristic of each area. The detailed names of the buildings in each area are shown on the right side.

A building changes color when the mouse is moved over it.

A print function for the present map and the pdf type plane map is included.

**Screen layout**

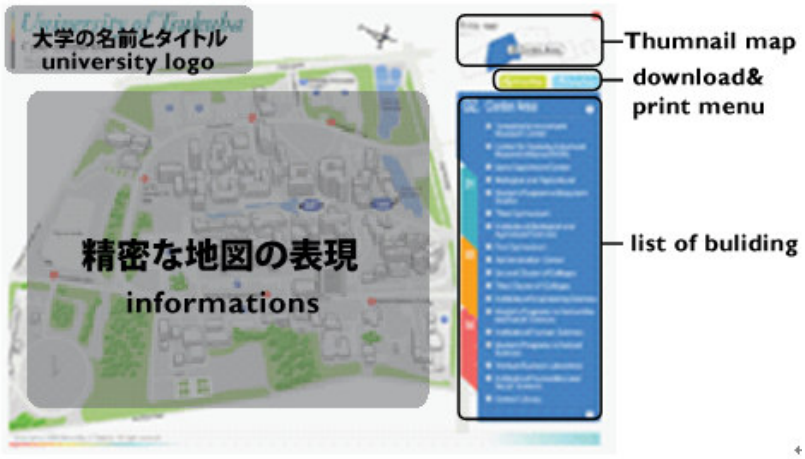


Figure 25: Screen composition of campus map newly proposes

Software used : flash, photoshop, illustrator

1) Navigation: considering the linear campus of the University, the campus is divided into 4 areas

The details of the facilities in each area are shown on a list.

2) Usability: The map can be downloaded. Members of the public often look for the facilities by car.

The buildings change color when the building names the list are clicked.

3) Offer of information: The VR function, which is high by evaluated in the questionnaire surveys and picture images of buildings and explanations are included.

Color plan : Using 15 image patterns from S.Kobayashi, 50 people (students and members of the public) responded to a questionnaire about the image of the present university and the new university.

The result shows that the image of the present university is chic, formal, natural in this order and that of new one is cool, casual, dynamic in this order. Most thought that the university gives classical images. New images show the hopes of active and dynamic images.

It is suggested that soft colors be used to make it less timing when users spend a long time to search for a destination.

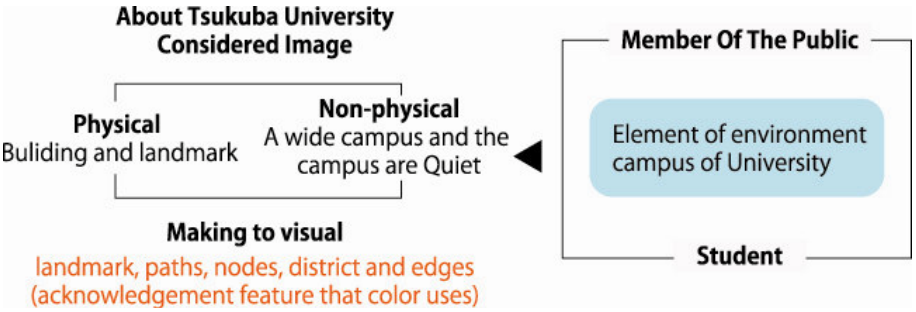

Figure 26. Tsukuba University's environmental image making

- tree and green area: #a7ca80, #60b335 -lake : #8aaedb

-road: #d9d9d9, #eaebe7 - building: #e8e8e8, #636363

①North area : student dormitory area

( dormitory and natural factors areas, like agriculture laboratory)

-color : #45b3c4


Figure 27: Map north region of Tsukuba University

② Center area : arts and engineering department area

(blue is used since it shows an accurate and clean image. Arts and engineering have this image, too.)

-color : #4683c4


Figure 28: Map center region of Hacatscba university

③South area : physical education and anthropology area

(orange color is used to show passion and enthusiasm)

-color : #ffa320


Figure 29: Map south region of Tsukuba University

④Medical science, kasuga area

(Many people use of the opinion that the image of medical science is red since it treats human beings.)

-color : #f36766


Figure 30: Map west&kasuga region of Tsukuba University

## 6. Evaluation for new map

87 people in charge of websites of Hannan University, and Shimane University, University of Tokyo, Yamanashi University, and Kobegakuin University responded to a questionnaire on the usability and design of the new map.

This questionnaire about user satisfaction with and usability of the design and has 5 levels 2 questions below.

1) Check the satisfaction level to see the campus map

5--------4-------3-------2--------1

Very good, good, normal, fair, bad

2) Check the usability to see the campus map

5--------4-------3-------2--------1

Very good, good, normal, fair, bad

Figure 31: Questionnaire about the satisfaction of a new map

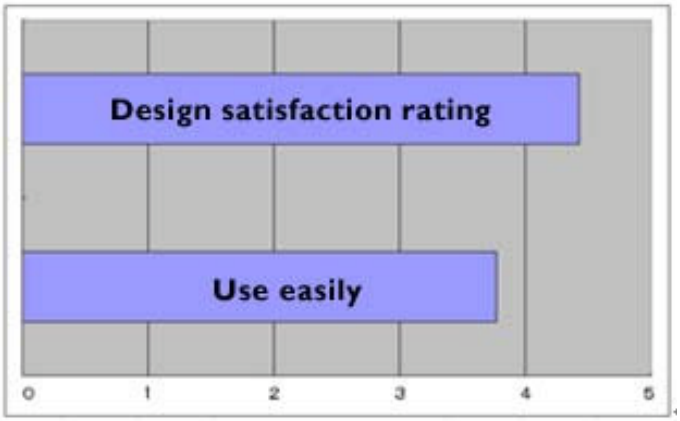


Figure 32: Result of satisfaction rating questionnaire of new map

- Usability is read 3.77, satisfaction with the design 4.43

The design is very good, but its usability is low.

As a result, it is found that the new map is not satisfactory since the new style is not familiar to users..

| | |
|---|---|
| Good points | - Easy to access location<br>- Easy to understand due to sterical one<br>- Easy and light movement<br>- Good division in wide university<br>- Clear to use colors<br>- Interesting and want to use it<br>-Interesting with game |
| Bad Points | - Want a explanation about all the buildings on campus<br>-Text and image size is too small<br>-Download takes too long time<br>-Not many photo explanations<br>-Many directions view is better<br>-Too many letters are annoying.<br>- Clicking buildings and linking to department site is better.<br>- Showing pavement path easily is better.<br>- Retrieval function is better. |

Figure 32: evaluation from questionnaire

## 7. Conclusion

Universities increasingly provide campus information on the web in various ways. As they compete to recruit new students, there is an increasing demand for them to offer quality information. This study suggests image styles to be used for the campus plan based on an image analysis of the campus as a means to raising the competitive strength of the University.

Many research studies on the space forming plan of the university campus are in progress. But these studies are not satisfactory since they focus on only the facility style and space structure and do not analyse websites. Recently universities are making efforts to publicize their special characteristics amid increasing competition between universities. The present campus image strengths and weakness were analyzed and a new image forming plan was suggested. VR and flash are used to present good points on the campus map. A new map style is suggested on the basic of material research and analysis to describe

University of Tsukuba more effectively. The new design of campus map helps student understand and offers visitors information about what the facilities on campus in detail. High school students can visit the open campus and get detailed information, but students in distant areas and in foreign countries seldom do so. It is hard to visit all the facilities within only 1 or 2 days.

The University offers an open campus to specific target group. The side effects are the high cost of flyers and overloading the personnel in charge. A campus map that dynamically gives information about the university will solve a lot of problems. The University campus is devoted to education and research. It affects the local areas around it. As an interspace, it has an important role to play. It brings the new city style of Tsukuba academic city.

The university campus map plays the role in this inter space to introduce campus life and activities, develop an open space style for positive contribution, promote student recruitment and improve the university's image.

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