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Social TV System
for Public Broadcasting Services
-Analysis of User Behavior in Large-scale
Field Trial of "Teleda"

By Koji OGAWA* and Ritsu YONEKURA**

Introduction

NHK, or Japan Broadcasting Corporation, has developed an experimental website equipped with both VOD (video on demand) and SNS (social networking services) functions. Since 2009, NHK Broadcasting Culture Research Institute and Science & Technology Research Laboratories have jointly carried out field trial of the "teleda" social TV system, which allows participants to watch TV programs through the Internet anytime they want and share their opinions about the programs with other participants.

Three rounds of the field trial have been conducted so far. The first one ran for about a month from February to March in 2010, with 123 participants. The second round was held for three months, from December in 2010 to March in 2011, with 1,032 participants. The third trial, in which 1,063 people participated, ran for three months from December in 2011 from March in 2012. The trial participants were asked to use the teleda website freely, and their behavior was analyzed on the basis of system logs and questionnaires.

Focusing on the results from the second and the third trial, this paper introduces the "teleda" system, including its possibilities, as well as issues to be solved, as a new public service in the age of the Internet and SNS. The name "teleda" is a coined word combining the word "television" with the Japanese word "eda," or "branch." It expresses the image that communication between television viewers grows like the branches fanning out from the trunk of a tree.

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Background and objective of the trial
Background

In the late 1990s, the Internet started to spread rapidly in major countries in the world. It has become an indispensable infrastructure for information-distribution and communication. The rapid spread of the Internet, along with the increasing number of channels and the digitalization of broadcasting, has greatly changed the media environment surrounding people.

Following such changes, public broadcasters in the countries began to redesign their business forms and service models around the year of 2005. Many of them have made some shifts in common.

First, the public broadcasters have decided on the active usage of the Internet as their transmission line to distribute their programs, instead of solely relying on conventional, terrestrial broadcasting. Secondly, they have decided that their programs should be viewed not only through television sets but also on personal computers, cellphones, smartphones and other new information devices. In the third place, the delivery includes not only "broadcast programs" but also program-related videos, data and texts. The implication of such shifts is directly shown, for example, by the then BBC director-general Mark Thompson in his statement in 2006, as follows:

"The BBC should no longer think of itself as a broadcaster of TV and radio and some new media on the side. We should aim to deliver public service content to our audiences in whatever media and on whatever device makes sense for them, whether they are at home or on the move.

We can deliver much more public value when we think across all platforms and consider how audiences can find our best content, content that's more relevant, more useful and more valuable to them." [1]

Japan's public broadcaster NHK is not an exception. NHK declared in its management plan for the three years from 2009 that it would fulfill its role as a public broadcaster by offering new services in response to the merger between broadcasting and communications. It explained its intention as follows:

"In the full-fledged digital age when broadcasting convergence with communications, NHK will center on broadcasting and also deliver reliable information and various contents through the Internet, cellphones and other media that are most familiar to its audience, so that NHK can serve them anytime, anywhere and more closely." [2]

NHK's management plan, released in October of 2011, for the three fiscal years from April 2012 through March 2015 states the broadcaster's key objectives. It says NHK aims to deliver information and contents by linking various media, including television, PC, mobile phone and tablet device by promoting research and development of such services. It also aims at building a basis of new technologies

and services to offer information and contents through the convergence of broadcasting and telecommunications, by taking into account the trend of the media environment both at home and abroad.

Many public broadcasters in the world have positioned the rapidly prevailing Internet as a key infrastructure for transmission, out of a sense of crisis.

With their traditional business idea and management style based on "terrestrial broadcasting," public broadcasters find it difficult to fully carry out their social responsibility and function of offering programs in various genres to reflect social diversity, or running a "public square" for members of the cmmunity who have various opinions and stances. They realize they cannot survive without drastically redesigning their business and service models to adjust themselves to the new media environment. They also expect the Internet, various digital media and archive technologies to help them find a solution to their common problems, such as falling share of audience, diminished presence and influence, young people turning away from them, and insecure source of funds.

Objective: Building multidimensional communication model mediated by broadcast programs

Having positioned the Internet as an essential infrastructure, the public broadcasters are still looking for an answer, by trial and error, as to how specifically they should develop "public services" using the Internet.

As of this moment, public broadcasters' Internet-based services are mainly video-on-demand (VOD) services that deliver video contents, including TV programs, for free or for charges. Prime examples are Britain's BBC iPlayer (2007~), Germany's ZDF mediathek (2007~) and ARD Mediathek (2008~), and France Televisions' involvement in Francetvod.

NHK has also offered a pay VOD service called "NHK on Demand (NOD)" since December in 2008, enabling users to watch via the Internet (1) current programs for 14 days after their initial broadcast, and (2) popular programs in the past from "NHK Archives Selection." Commercial broadcasters in Japan have also started their VOD services since around the same time, offering popular programs for free or for a price.

Interactivity of VOD services has given users great convenience by freeing them from the restriction of broadcast schedule. But in light of the sender-receiver relationship, the services remain the same "mass-media type" communication model as traditional broadcasting, in which a broadcaster sends programs to a large number of unspecified viewers. In that sense, existing VOD services are not be defined as a model that makes good use of the traits and technical potential of the Internet.

To make the most use of the Internet's potential, broadcasters should use it to create program-mediated communication between viewers, or "horizontal" links between them, instead of regarding the media as "vertical" links to unidirectionally send a package of programs and contents to a large number of unspecified viewers. By offering a communication service by using the Internet as "social media," twitters, facebook and other social networking services (SNS) have spread rapidly in recent years.

As it has already been proven in various forms that "buzz" by SNS users has a great influence on the people's communication behavior, "word of mouth" via the Internet has become an indispensable marketing factor in many industries. Word-of-mouth online communication is also drawing attention from broadcasters who see a great possibility in such communication to raise people's awareness of their programs and encourage more access and viewing.

A combination with an SNS or "word-of-mouth" factor could remove the limitations of existing VOD services. The VOD-SNS combination makes it possible for broadcasters to build multidirectional communication space on the Internet with both vertical and horizontal links, where their programs mediate links between viewers. This could provide an opportunity for their programs to be recognized by various people in various ways, resulting in increased access and viewing. The new type of Internet-based service is also expected to help public broadcasters attract young viewers. Almost all public broadcasters across the world have been suffering their unpopularity, mainly with young people, for the past two decades.

Teleda's function and the outline of large-scale field trial

a) Program viewing by VOD

Teleda has a video-on-demand function, similar to many existing VOD services. In the trial, about 2,500 programs were available, including both "catch-up" ones that were aired during the trial period and archived ones that are free of copyright violation. [3] Users can search for programs in ways including program listing, keywords and genre.

b) Posting opinion/review about programs (=program community)

Users can post their opinions and reviews on programs they watched, with no limitation on the number of characters. They can evaluate programs on a 5-level scale of satisfaction. Users can also comment on other users' posts. This creates communication links between users through programs.

c) Theme community

In addition to "program communities," users can also form communities on themes of their own choice and exchange opinions with other community members. In the trial, communities emerged spontaneously on various topics, such as "comparison between NHK and private broadcasters" and "classical music."

Figure 1   Front page of the teleda website program

Figure 2   Page for posting comment on

d) Program recommendation function

The system recommends programs and communities by using user viewing histories and other data. In the trial, teleda made several types of recommendations, including the rankings of highly evaluated programs, frequently viewed programs, communities with the large number of posts. The recommendation function allows users to easily access to programs and communities that interest them.

e) Customization function ("My shinchaku," or "what's new" page for each user)

Teleda enables users to "follow" each other and register programs as their "favorite." Each user has their own "what's new" page on teleda, named "My shinchaku," where they can check the latest posts of others they are following, as well as posts to their "favorite" programs. On their "My shinchaku" page, users can also check the profiles of other users they are following, the list of their followers and the correlation chart within teleda.

In addition to the functions mentioned above, several devices were added to teleda in this trial, with the aim of invigorating communication between users.

a) Moderator

The site has a resident moderator, named "teleda-kun," which is designed to help users and facilitate their communication by responding to users' posts and questions and conveying messages from the operation side. Users who have technical questions about teleda, including those who don't know how to use the site or those reporting malfunction, are answered by another online character named "gijutsu-kun."

b) Columnist

We asked seven influential individuals to participate in the trial as "columnists" and write for the site about programs and broadcasting. During the trial period, each of them contributed, from their expert standpoint, 4 to 5 columns to be posted on their teleda communities for general users to read. Users can access to programs mentioned in the columns, as well as comment on the columns through the communities. As a result, communication between columnists and users, as well as exchanges between users, was created.

c) Event

We held an event for users to interact with directors and producers of some of the programs that drew attention at the time of broadcasting, which includes "Time Scoop Hunter," "Today's Close-up," and "NHK Special." The event was favorably accepted by users, who said it made them interested in previously unfamiliar programs and that it gave them a good opportunity to directly convey their opinions about the programs to the producers.

The field trial ran for three months, from December 13, 2010 to March 13, 2011, with 1,032 participants who signed up for teleda. They were recruited from the "NHK Net Club," an Internet service provided by NHK. [4] The basic attributes of these participants are shown in Table 1. The breakdown shows male participants outnumbering female ones at 63 percent. By age group, the ratio of participants in their 40s stood at 26 percent, followed by those in their 50s (23%) and 30s (17%).

During the 3-month period, the participants were asked to freely use various functions of the teleda website, including viewing of programs and posting of opinions and reviews. At the end of the trial, they were asked by questionnaire about the user-friendliness, design and interface of the teleda site, as well as

whether their viewing behavior and attitude toward television have changed through the trial participation. [5] The participants' behavior on the teleda site was logged as data for analysis.

Men	63%
Women	36%
10 – 20s	5%
30s	17%
40s	26%
50s	23%
60s	17%
Over 70s	9%

Table 1   Basic attributes of the participants (gender and age)

The results of the trial

Here are some results obtained from the trial-end questionnaire and the analysis of the log data on user behavior, showing how teleda was used by the participants and how they changed by using the social TV system.

Figure 3 shows how often the participants used each of the two key functions of teleda – "communication function" and "program-recommendation function." On the usage of the "communication function," 37 percent of the respondents said they "often or sometimes" "posted comment and opinion on programs they viewed." The percentage was also high for those who said they voted for other users' posts by clicking "Like!" -- a function seen in facebook and other SNS services. Meanwhile, as to the utilization of the program-recommendation function, a high ratio of 38 to 48 percent of the respondents said they "often or sometimes" viewed programs ranked in the "highly evaluated programs," "programs attracting many posts" and "programs recommended by teleda."

In the questionnaire, the participants were also asked about the impacts of their "teleda" experience on them. 68 percent of the respondents said "they became more interested in NHK programs," while 66 percent said "they developed a sense of closeness for NHK." 61 percent of the surveyed said "watching NHK programs became more enjoyable," and 57 percent said "the experience added more fun to TV-watching" (Figure 4). The result shows that the teleda social TV system changed the participants positively, making them feel an affinity for NHK and its programs and become more interested in both of them.
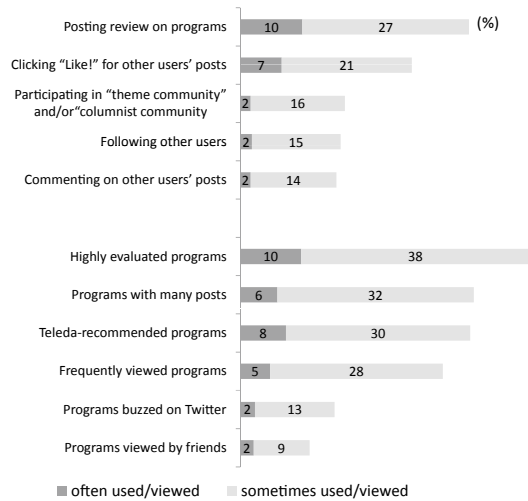
Posting review on programs | 10 | 27 (%)
Clicking "Like!" for other users' posts | 7 | 21
Participating in "theme community" and/or"columnist community | 2 | 16
Following other users | 2 | 15
Commenting on other users' posts | 2 | 14

Highly evaluated programs | 10 | 38
Programs with many posts | 6 | 32
Teleda-recommended programs | 8 | 30
Frequently viewed programs | 5 | 28
Programs buzzed on Twitter | 2 | 13
Programs viewed by friends | 2 | 9

■ often used/viewed　　■ sometimes used/viewed

Figure 3　Frequently used functions on teleda site

Becoming more interested in NHK programs | 24 | 42 (%)
Feeling close to NHK | 26 | 40
Enjoying NHK programs more | 24 | 37
Enjoying watching television more | 19 | 38
Watching NHK programs more frequently | 20 | 33
Starting to watch previously unfamiliar programs | 18 | 35
Watching NHK programs for longer time | 18 | 33
Talking about NHK programs with family and friends | 10 | 32
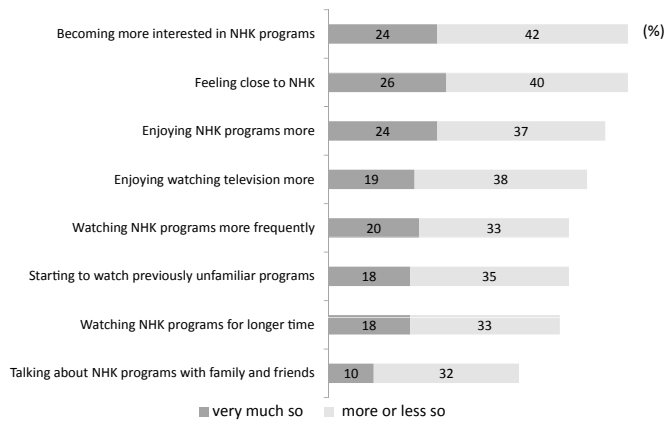
■ very much so　　■ more or less so

Figure 4　Changes caused by participation in teleda trial
(in awareness and behavior)

A total of 2,509 programs available for the trial on teleda were viewed a total of 19,087 times, or 7.61 times per program. The largest number of viewing was recorded at 207 by an entertainment-type travel show, "Buratamori -- Ginza," which features a famous TV personality strolling in areas in Tokyo. Meanwhile, 224 programs were never viewed during the trial period.

Table 2 lists the 20 most viewed programs, with the number of viewings and posts, and the audience rate at the time of broadcasting. The list indicates some characteristic ways in which the programs were watched on teleda.

First of all, programs viewed on teleda cover a broad range of genre, in contrast to the fact that NHK's existing VOD service -- NOD (NHK on Demand) -- sees its list of best viewed programs dominated by "mainstream" programs, including the yearly "taiga" historical drama series and the year-end "kohaku," or New Year's Eve music gala. [6] On teleda, viewers chose a wide variety of programs ranging from drama, variety show to documentary and travel show.

Secondly, programs viewed by many teleda users did not necessarily achieve a high viewer rating at the time of broadcasting. For example, "Konya-mo-nama-de-sadamasashi," a live show hosted by a musician, ranked ninth on teleda, despite its moderate viewing rate of 5.1 percent. Some among the top 20 on teleda even saw their viewer rates at the time of broadcasting at less than one percent. They include travel show "Sekai-fureai-machiaruki (Mokpo, South Korea)" and documentary "HV Feature: Meisa Kuroki's travel to Spain and encounter with flamenco, soul dance," which ranked 14th and 19th respectively. Such programs were viewed by many users on teleda, after the programs became a topic among users and drew many posts.

This shows that the SNS function on teleda worked well and created a new viewing trend among the users, different from those seen in the usual VOD services.

Ranking	Title	Program genre	Viewing frequency	Number of posts	Viewer rating*
1	Buratamori "Ginza"	Entertainment-style travel show	207	49	8.0
2	Today's Close-up "Danshari – people cleaning up their lives"	News, Information program	179	47	12.8
3	Drama10 Second Virgin #8 "Love triangle"	Drama	136	30	8.2
4	Today's Close-up "A girl's choice between life and death	News, Information program	133	66	12.6
5	Special Drama Saka-no-ue-no-kumo #1 "Boy's country"	Drama	98	40	17.7
6	Asaichi "Cleaning tips from super housewife"	News, Information program	93	13	12.0
7	NHK Special: Century of images -fragments of history caught by camera	Documentary	80	10	9.0
8	Buratamori "Yokohama Port"	Entertainment-style travel show	78	16	8.0
9	Konya-mo-nama-de-sadamasashi: The New Year of 2011	Music program	70	16	5.1
10	NHK Special: 50 years of Japan-US Security Treaty #2 "Okinawa, price for peace"	Documentary	66	12	8.1
11	News FU.KA.YO.MI. (new) "What's happening in North Korea?"	News, Information program	62	23	6.8
12	Drama10 Shijukunichi-no-reshipi #2 "Footprints"	Drama	60	14	6.7
13	Time Scoop Hunter Special "Panic! Comet is approaching!"	Entertainment program	58	21	4.5
14	Sekaifureai-machiaruki "Mokpo, South Korea"	Travel show	57	9	0.6
15	Goh – himetachi-no-sengoku (new) #1 "Princess in lake country"	Drama	55	20	21.7
16	Special Drama Saka-no-ue-no-kumo #7 "Shiki dies"	Drama	51	13	15.0
17	Drama10 Second Virgin #1 "Disloyal finger"	Drama	50	3	5.5
18	Hi Vision Feature "Meisa Kuroki's travel to Spain and encounter with flamenco, soul dance"	Documentary	49	11	0.2
19	Drama10 Second Virgin #7 "Peep"	Drama	49	6	8.3
20	Science Zero "Labyrinth of the five senses #6 Science probes a sixth sense"	Science program	48	9	0.5

*Viewer rating by Video Research Ltd. (Kanto district/ households)

Table 2   The top 20 most frequently viewed programs on teleda

Figure 5 shows time-series movements in the number of posts and views, regarding the most-viewed program "Buratamori -- Ginza" (entertainment-style travel show) and the third-ranked drama "Second Virgin #8." The number of views for both programs peaked immediately after they became available on teleda and fell sharply afterward. Following the decrease in viewing, the number of posts also dropped. After about two weeks from their peak, the number of both viewing and posts became static. The same pattern was observed in other entertainment programs and dramas.
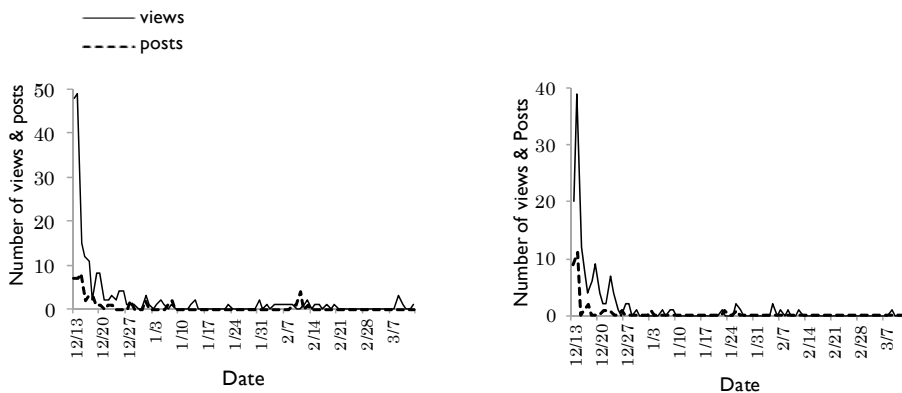
Figure 5   Time-series changes in the number of views and posts
Left "Buratamori – Ginza" (entertainment-style travel show/ most viewed)
Right: "Second Virgin #8" (drama/ third-most-viewed)

Meanwhile, Figure 6 shows the data on the second-most-viewed program, "Today's Close-up: Danshari, or getting rid of clutter" and fourth-ranked one, "Today's Close-up: A girl's choice" (information program). Although the initial peak of viewing of these two programs was not as high as the two programs shown in Figure 5, the views and posts for the programs continued for a longer period of time. The waves of views and posts for the two programs continued for more than a month.

On the whole, documentaries and news programs on politics, economy and social problems tend to arouse discussion among viewers through their posts, resulting in the increased number of posts, probably because the programs deal with topics, over which people are often divided. Heated discussion on a program among viewers by their posts prompted more participants to view the program, resulting in the creation of a cycle of viewing and posting that helped the number of views increase gradually.
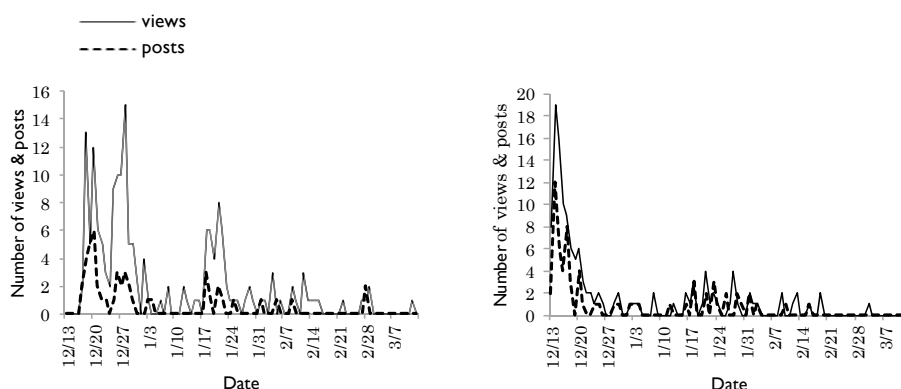
Figure 6   Time-series changes in the number of views and posts
Left "Today's Close-up: Danshari" (News,Information program/ second-most-viewed)
Right: "Today's Close-up: A girl's choice" (News,Information program/ fourth-most-viewed)

Generating encounters with TV programs by expanding community space and adding real-time functions

Our attempt was aimed to create a communication space on the Internet through TV programs of a public broadcaster by combining the functions of VOD with SNSs. This effort was confirmed to be effective or have potential in achieving the goal to some extent. But, communication spaces mediated by twitter, facebook and other actual SNSs are so dynamic that what we could verify in a closed space like our experiment is naturally limited. To address the closeness issue, a new function was attached to teleda to link with twitter, facebook and other outside SNSs in our third demonstration experiment. Another function for chatting was also added to teleda for letting participants exchange their reviews and opinions about not only TV programs being aired real-time but also those viewed on VOD. In other words, the purpose of the third experiment was to verify various abilities of teleda under the dynamic circumstances similar to real spaces on the Internet.

The previous experiment highlighted the closeness of communication only among NHK Club Net members. To cope with such closeness, a function to connect teleda with outside SNS websites (twitter, facebook and mixi) with enormously extensive networks among people was added in our latest experiment. Whether it was possible to create opportunities for encountering TV programs by expanding teleda's community space through connections with other SNSs was tested. The overview of the links between teleda and external SNSs is shown in Figure 7.
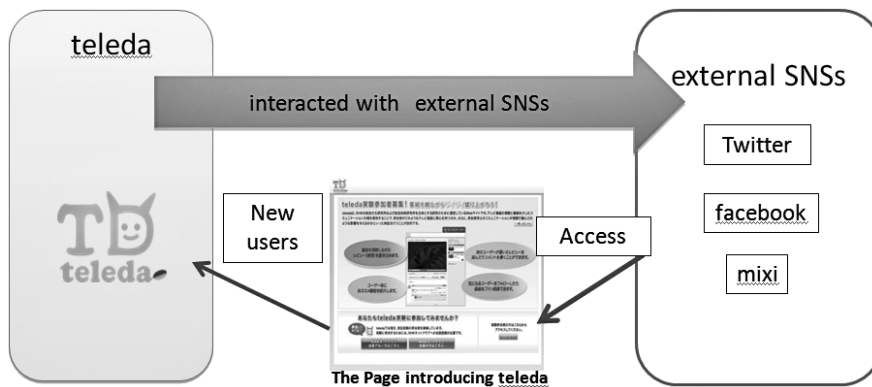
Figure 7　Conceptual diagram of links between teleda and external SNSs

In the latest experiment, a new function was attached to teleda to see whether users of teleda, who are also members of outside SNSs, posted their reviews about programs both on teleda and their SNSs simultaneously. For example, in the case of the linkage between teleda and twitter, a user posts his review on teleda and checks the checkbox to twitter below the review, the review is posted on both sites at the same time. The URL of teleda is displayed jointly with the review on twitter. Twitter users interested in the review can have access to the introduction page of teleda, through which they can become members of teleda. We verified how many new members joined the Net Club by installing this link function and whether new members invigorated communications among all the members.

Potential of linkage with external SNSs

Of the total participants in the experiment (including newly registered participants), 22% or 232 respondents used the function to link with outside SNSs. A total 1,371 program reviews were posted on outside SNSs, and 62% or 851 of them were on twitter, followed by 28% or 381 on facebook and 10% or 139 on mixi. The 1,371 reviews attracted 2,779 accesses to teleda's introduction page through these SNSs. Eighty-point-four percent or 2,235 of them were through twitter and 18% or 495 via facebook. Mixi contributed 2% or 49. Ninety-nine persons ended up registering on teleda as new members through external SNSs. Of the total number of the accesses to the teleda introduction page, 3.6% became new members of teleda.

Then, who are these 99 new members? As shown in Figure 8, the ratios of users in their 20s to 30s among the new participants were higher than those

among the already registered users (the original participants). The average age of the new participants was 42.4 years old, compared with 45.6 among the original participants. Links with outside SNSs attracted many younger people than the core users of teleda who are mainly in their 40s and 50s.
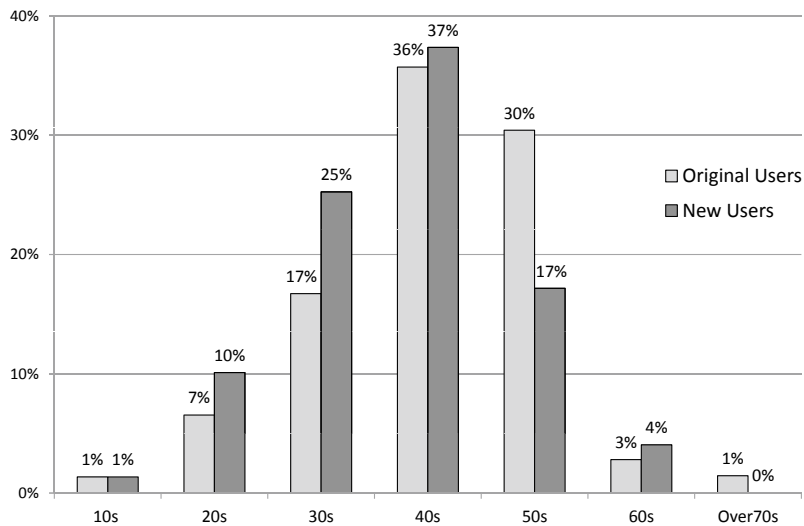

Figure 8   Original participants and new participants by age

Regarding the frequency of posting, the original participants posted their comments once every three viewings of programs (the posting ratio – the number of postings per program viewing - is 0.34), while the ratio among the new members stood at 0.66 as shown in Table 3. The new participants contributed their postings about programs they had watched more often than the original members.

	Number of Views (per user, per day)	Number of Posts (per user, per day)	Posting Rate (No. of Posts per view)
Original participants	0.16	0.054	0.34
New participants	0.08	0.056	0.66

Table 3   Effectiveness of linkage with external SNSs
~ Comparison between original participants and new participants ~

The new participants relied more on using the social channel to reach programs, as Figure 9 indicates.

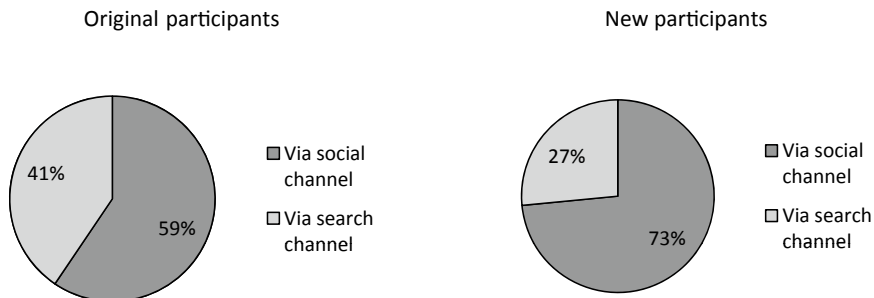Original participants   New participants

Figure 9   Comparison of original members and new ones in channel to reach programs

This suggests that new participants who are used to using social functions of outside SNSs can relatively quickly get used to the social function of a new service like teleda.

Young people had access to teleda through its links with external SNSs, promoting exchanges of opinions among a wide variety of generations. As a result, the number of users who actively posted rose. These findings can be said to indicate the possibility not just to vitalize communication among users but provide program encounter opportunities through connections with other SNSs.

Outlook for linkage with external SNSs and challenges

As we already showed, 99 people or about 10% of the total participants registered at teleda as new members through external SNSs during the three-month experiment period. The number of the new members was lower than we had expected. Some barriers must have discouraged people from joining teleda as new members. Challenges that we need to consider in promoting connection with outside SNSs can be summarized as the following three points:

① **Reluctance to make user registration**

In this experiment, participants were required to be the "premium member" of the NHK Net Club in order to view TV programs or make postings on the teleda site. The premium members are obliged to disclose their addresses and names. We speculate that this disclosure requirement may have discouraged many people from joining teleda.

② **Privacy issue**

We conducted a survey among the participants at the end of the experiment. It found that 23% of them said they had used the function to link with outside SNSs. While 30% of the male respondents answered so, only 15% of the female participants did so.

Of the non-users of the function, 33% said, "I did not know the function itself or how to use it," and 32% answered that it had the privacy issue such as disclosure of name, age and other personal information. There is the possibility that personal information on teleda site may be connected with such data already revealed on external SNS sites although teleda users can choose to reveal or not their personal data on the teleda site. To an open-ended question, a 55-year-old woman says, "I am worried that my privacy may be laid bare," as a reason not to use the function. "I feel that I may be identified through a full linkage of my information," a 44-year-old woman says. A 46-year-old man said that he does not want his TV viewing preference to be disclosed.

③ **Difference among SNS sites in characteristics**

Of the total members, 18% said as a reason not to use the linkage function that their postings are not the type of comments suitable for the outside SNSs that they usually use. Facebook is a site where people use with their real names for exchanging private information among friends. The operator of the mixi site encourages people to use its service by anonymity. So, it is mainly an exchange site for total strangers. Many people use twitter on an anonymous basis and it is popular among total strangers for simple information exchanges. Some people use multiple SNS sites for communication with others, making use of differences in characteristics among these sites. Many participants of the experiment are believed to have shied away from linking teleda with outside SNSs against this background. Twitter has a limit to postings for up to 140 characters per comment. With this limit, TV program reviews posted on teleda, which has no such a limit, were not always showed fully on twitter. Some test participants made complaints about this to an open-ended question in our survey. We need to consider how to make use of differences among external SNSs in our service.

Social viewing among users ~ real-time functions
Outline of real-time functions

We attempted to not only provide a space for users to share the same viewing experience but also generate encounters with TV programs and other users by adding the following three real-time functions.

① **Chatting about program on air**

This function is designed to let viewers chat on the teleda website as they are watching a program on TV. A chat page was set up for NHK's general TV channel, education TV channel and two satellite TV channels (BS1 and BS Premium) each to allow users to chat anytime they like during the experiment period. Participants were also allowed to enter the chat pages through the program display screen for "programs on the air".

② **Simultaneous viewing events on VOD**

As indicated in Figure 10, this function is aimed at allowing participants to watch a specific program on VOD and to chat about it at the same time. The experiment organizer asked them to view a certain program at fixed time and date in advance. These events were, for instance, named "Let's watch Buratamori together". Although they were carried out on VOD, the users viewed the same scenes at the same time and chatted about them.

Figure 10   Chat page for simultaneous viewing event on VOD

③ **Function to display what other users are watching**

This is a function to see what programs other participants are viewing on teleda and who are participating in chats. Users can choose on the profile setting screen whether this type of information should be open to others or not. Participants can watch a program viewed by others or join their chats if they like through this function.

Social viewing experience and encounters through real-time functions

In the experiment, 537 users (those who viewed the chat pages) or 51% of the 1,063 teleda participants joined chats. 106 or 10% of them actually chatted. In chats during programs on the air, 3,489 postings were made, and 1,441 chats were posted in the simultaneous viewing events on VOD. A total 4,930 postings were made.

Table 4 shows the top 10 TV programs, which attracted highest numbers of chats posted during on the air. Their channels and broadcasting time and dates are also indicated, in addition to the average numbers of characters of their chats. Most of the programs were non-serious shows to which viewers can respond easily and spontaneously. They were broadcast mostly from 9 PM or later on NHK's general channel. "Kohaku Utagassen or a New Year's Eve music gala" was at the top of the list. It was followed by "Buratamori" episodes, which were ranked from second to sixth places. The seventh to ninth programs were aired either just before or after "Buratamori". "Buratamori" is a slow-paced show travel in a relaxed atmosphere. As already described, its episodes were ranked high in the number of viewings on VOD and as a result, they were often displayed in the ranking on the top page. We believe that the program was so well-known and drew so much attention from viewers that participants always expected that some other viewers must be taking part in chatting.

Ranking	Title	No. of chats posted	Average no. of characters	Channels/ broadcasting time
1	62th NHK Kohaku Utagassen, "New Year's Eve music gala"	466	16.9	General 12/31 19:15
2	Buratamori special "Edo Castle's outer moats"	285	18.3	General 12/22 22:00
3	Buratamori #2 "Canals in Edo"	194	15.8	General 2 /23 22:00
4	Buratamori "Birth of Shinjuku area"	142	15.6	General 3 / 1 22:00
5	Buratamori "Shinjuku – New downtown of Tokyo"	141	16.5	General 3 /15 22:00
6	Buratamori #1 "Canals in Edo"	113	16.5	General 2 /16 22:00
7	Selection	110	27.9	General 3 / 1 22:55
8	News Watch 9	98	16.0	General 12/22 21:00
9	Business/sports news	85	26.8	General 3 / 1 23:25
10	Time Scoop Hunter "SOS from Civil War Age: Chasing down the crow-billed goblin"	81	19.6	General 12/21 22:00

Table 4   Top 10 programs with highest chat no. during on air

Table 5 shows the number of chats posted during 11 simultaneous viewing events (10 VOD viewings and one viewing on the air), in addition to other data. For entertainment-oriented or non-serious slow-paced programs such as "Oyasumi Nippon - Nemuine or Good night to Japan - Sleepy" and "Buratamori", a large number of short and easy remarks were made.

Ran king	Title	No. of chats posted	Average no. of characters	No. of chats per minute	Event date and time
1	Oyasumi Nippon Nemuiine	359	21.6	2.60	2012/ 3 /10 22:00
2	Buratamori (new series) "Waseda"	300	23.8	7.14	2012/ 2 /11 22:00
3	NHK Feature "Revival of Lady C571 - Last overhaul of a steam locomotive"	139	18.6	2.84	2012/ 3 / 4 21:00
4	Project X - Challengers "Japan's 1st family cars, the ladybug running on the streets: motorization of Japanese families"	134	20.4	3.19	2012/ 3 / 4 22:00
5	NHK Special -March disasters " Defending a fishing town: 200-day struggle of a credit union"	131	31.6	2.18	2012/ 2 /24 22:00
6	NHK serial TV drama, Carnation #122 "No regret in my youth"	79	23.5	5.27	2012/ 3 /20 21:20
7	NHK serial puppet show #1 " Shin-hakkenden"	68	17.7	4.53	2012/ 3 / 4 20:00
8	NHK serial TV drama "Chiritotechin" #1, 1st week - Waraukadoniwa Fukuikitaru	65	17.2	4.33	2012/ 3 /20 21:55
9	NHK serial TV drama "Chiritotechin" last episode in final week - Waraukadoniwa Fukukitaru	65	18.7	4.33	2012/ 3 /20 22:15
10	NHK serial TV drama, Carnation #111 "Want to protect you"	54	29.8	3.60	2012/ 3 /20 21:00
11	NHK Special "Simultaneous live broadcasting from devastated areas on the night of the disaster" *This program was used in the experiment when it was on the air.	47	40.9	0.63	2012/ 3 /11 21:00

Table 5　Results of simultaneous viewing events

Two programs covering the massive earthquake and tsunami on March 11, 2011 – "NHK Special: Simultaneous live broadcasting from devastated areas on the night of the disaster" and "NHK Special: March disasters "Defending a fishing town: 200-day struggle of a credit union" attracted relatively long chats. The number of chats per minute was ranked low for the two programs. But, their average chat characters were more than the average. Their remarks include the following comments:

- "I cannot easily write comments because I need to consider various things."
- "This program is dedicated to the March disaster just one year ago. But, I think it is important to continue reporting the voice of survivors."

It appears that it tends to take some time for viewers to comment on serious themes like the natural disaster and that they also tend to contribute longer remarks made based on their consideration of various things deeply.

Figure 11 shows the number of viewers of and that of chats posted about programs on the air by genre. They include multiple counting of the same viewers. While the numbers of participants in news and documentary/education programs were high, the number of their comments remained low. These areas may not be fields where viewers can contribute chats relatively easily. The number of chats about variety shows, including "Buratamori" was higher than those of the other genres.
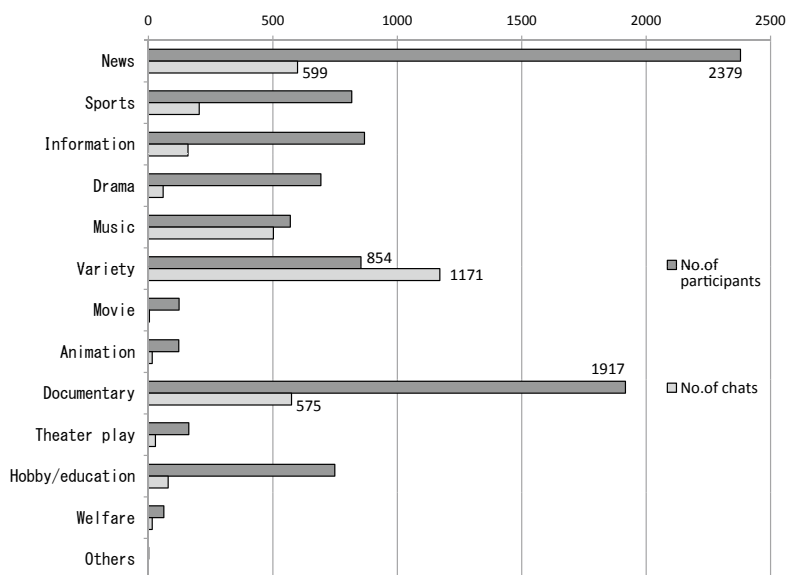

Figure 11　Numbers of participants in and chats about programs during on air by genre

This trend can be applied to our selection of programs when we promote linkages not only between teleda and twitter but also between programs on the air and twitter.

As for "the function to display what other users are watching", participants moved to chatting for 144 times out of a total 1,880 page-viewing times and then to VOD program viewing watched by others for 108 times. This indicates a potential of this function to provide users with opportunities for encountering other users and programs, based on real-time information on other viewers. But, only 21% of the participants used this function, less than half of the chat participation rate. Of the participants, 23% changed their viewing status from "open" in the default setting to "non-open". Some users were very conscious about protecting their privacy.

Potential and challenges found in survey conducted at end of experiment

The challenges regarding teleda's real-time chat functions can be summarized through participants' answers to an open-ended question of the questionnaires used at the end of the experiment. Respondents made many remarks about their expectations for communication among them, which can be made during program viewing. Some of them encountered programs that they hadn't watched before through taking part in the simultaneous viewing events on VOD. Chatting with other members led some participants to watching specific programs on a regular basis. These results suggest the possibility that the real-time chat functions may motivate people to watch TV programs more actively.

- A 50-year-old man says, "The event to watch Buratamori was fun. After that event, I began to watch the program on TV."
- A 24-year-old woman says, "An event like this is interesting. I think that the event motivated me to watch the program more actively and interestingly."

At the same time, many participants could not join the VOD events, despite their interest in them. They said that they could not participate in the events due to their scheduling. Some wanted to increase the number of such an occasion. Others said that they did not join the events as the number of participants in the events was small. A small number of participants did not join them to concentrate on watching programs.

- A 60-year-old man says, "I wanted to concentrate on watching programs and so, I did not participate in the events."
- A 46-year-old man says, "Following chats distracts me from watching the program and so, I cannot enjoy viewing it fully."

The results of our log analysis and those of the survey confirmed a certain level of demand for sharing experience watching the same program simultaneously among participants. They also clarified some challenges that need to be dealt with. They include event scheduling, the limited variety of the events offered and the need for an interface with high operability to help people unfamiliar to this type of services use the system more comfortably. More detailed privacy protection setting function will also be considered to limit the extent of opening what users watch and other private information only to close friends, for example.

Conclusion

As described above, we have explained the outlines and results of our demonstration experiment (second and their tests) of teleda, which is our experimental website equipped with the functions of VOD and SNS. The key findings of the experiment can be summarized as follows:

• Various changes occurred among many participants as a result of their communication between themselves mainly about reviews and opinions on TV programs. They made use of teleda's various functions for such communication. The changes include heightened interest in NHK programs, increased affinity to NHK, encounters with programs that they had never watched before and rediscovery of how to enjoy watching TV shows.

• No correlation was observed between programs watched frequently on the teleda site during the test and their audience ratings when they were broadcast. A number of programs were often watched on the teleda site, although their ratings had not been high at the time of their broadcasting. Moreover, a small number of programs did not dominate most frequently viewed programs among the participants, and a typical trend known as the "long tail" was identified. These facts indicate that word-of-mouth communication through SNSs worked effectively.

• But, it needs to take note of differences in viewing and posting chats among types of programs. Mostly documentary, news and other programs covering political and social issues induced active and persistent debate. Their lively debate often prompted other participants to view the program in question, generating a spiral of viewing and posting.

• Participants who are accustomed to using twitter, facebook and other external SNSs tended to actively post their reviews and opinions about programs that they had watched on teleda. They also smoothly became used to various social functions of teleda in general. This suggests the possibility that changing teleda to a more opened communication space could invigorate communications among teleda users.

- The present qualifications and conditions for becoming teleda users require people to sign up for NHK's Internet organization and input their real names, ages and other personal data. This will probably discourage users of outside SNSs from joining teleda. Problems with starting to provide teleda's actual service would include how to design teleda functions based on differences among SNSs. Their present differences are that members are required to use their services on a real name or anonymous basis. Some SNSs have also a limit on the number of characters per posting.
- As for the chatting function while viewing a program being on the air or a show being broadcast on VOD, participants posted a much larger number of chats about light and entertainment-oriented shows than serious programs like those covering the March 11 Disaster. But, comments on such serious programs were generally much longer.

As the Internet gets more popular, routes through which people recognize TV programs and begin to watch them are drastically changing and diversifying. Before the advent of the Internet, people "encountered" TV shows mainly through the TV/radio schedules on newspapers or audience rating rankings in magazines. Since the arrival of the Net, it has become possible for people to meet with programs through "searching" and "VOD". Recently, "recommendations based on behavioral history" and "social functions like 'Your friends are watching this'" are also emerging as new routes for encountering shows. Our demonstration experiment with teleda this time can be said to have shown a part of these dynamically changing routes. We strongly believe that these changes will continue at an unforeseeable speed as new technologies of personal digital devices, information and communication are being developed at a faster pace.

What will be crucial in the future is how to make use of the above-mentioned technological potential for enhancing the role and functions of public broadcasting. One of its role and functions is creation and maintenance of a "public square" where various groups of people can exchange a variety of communication among themselves through expanded and multi-tiered encounters between people and TV programs. Sharing roles and activities between broadcasters and other service providers such as telecom carriers is expected to be a serious issue as well amid the ongoing rapid "convergence of broadcasting and telecommunications". It may include what broadcasters need to provide out of all possible services that could be offered by teleda and other similar service sites. More empirical research and verification will be necessary based on the findings of our experiment and problems identified in order to flexibly cope with the changing information and media environment.

NOTES

[1] BBC "Creative Future –BBC addresses creative challenges of on-demand"
(http://www.bbc.co.uk:pressoffice/pressreleases/stories/2006/04 april/25/
creative.shtm)
By this press release, BBC unveiled plans to renew its website and improve its
via-broadband content services.

[2] NHK management plan for fiscal 2009-2011
http://www9.nhk.or.jp/pr/keiei/plan/plan21-23/index.html (November 7, 2011)

[3] The lineup is almost the same as offered by NHK's VOD service called NOD,
or "NHK on Demand," that are cleared of copyright issues.

[4] A questionnaire was conducted on 1,776 applicants to screen out those who
"don't use or haven't used SNS at all." Among 1,180 applicants who passed
the screening, 1,032 registered for teleda. When the recruitment took place in
November of 2010, the NHK Net Club membership was about 900,000.

[5] The trial-end questionnaire was responded by 412 participants, with men at
67 percent and women at 33 percent. By age group, respondents in their 50s
topped the list at 26 percent, followed by 60s with 22 percent, 40s with 21
percent and 30s at 14 percent. The relatively small number of respondents is
attributed to the Great East Japan Earthquake, which struck on March 11, 2011,
only three days before the end of the trial.

[6] Nine out of the 10 best viewed programs of NOD around the same time of the
trial were "*kohaku- utagassen*" and "*taiga drama*."

REFERENCES

NHK Broadcasting Culture Research Culture Institute (2012). *NHK data book: The
World's Broadcasting 2012*, NHK Publishing, Tokyo