

Mapping User Experience of Internet Television and Video: A Study of Unidirectionality and Interactivity

L'experiència d'usuari en la televisió i el vídeo per internet: un estudi de la interactivitat i unidireccionalitat

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This paper presents a quantitative analysis of a sample of six hundred audiovisual initiatives targeting the web as a distribution platform.

The main purpose of this study involves using our sample to establish what we call unidirectional and interactive dimensions, based on the description of several indicators that will determine the nature of the services implemented and applications used in all the items analysed. These dimensions will be compared with two variables in order to analyse, firstly, the content lines, and secondly, whether or not the items represent the extension of conventional communication media (unidirectionality) on the web. The resulting data will show and specify the main differences between the dimensions of unidirectionality and interactivity with regard to

En aquest article es presenta un estudi quantitatiu sobre una mostra de sis-centes iniciatives audiovisuals destinades al web com a plataforma de difusió. L'objectiu principal de l'estudi consisteix a establir en la nostra mostra el que anomenem dimensions unidireccionals i interactives, basant-nos en la definició d'una sèrie d'indicadors de funcionalitat que marcaran la naturalesa dels serveis i aplicacions implementats en els casos d'anàlisi. Aquestes dimensions són contrastades amb dues variables que determinaran, en primer lloc, si el cas d'estudi representa l'extensió a la web d'un mitjà de comunicació convencional i, en segon lloc, les línies de contingut. Les dades resultants precisaran les diferències entre les dimensions unidireccionalitat i interactivitat respecte de les varia-

the variables mentioned above. The findings here show that software development capacity informs the coexistence between conventional mass media functions and new participation options, but the results obtained lead us to conclude that interactivity is not considered the most representative quality of our study sample.

Key words: *WebTV, internet video, internet TV, interactivity, unidirectionality, social.*

bles esmentades prèviament. Els resultats obtinguts mostren com la línia de desenvolupament del programari permet la coexistència de funcionalitats pròpies dels mitjans de masses (convencionals) i de noves opcions de participació. Si bé, en la determinació final de l'experiència d'usuari, "social" representa la paraula clau.

Paraules clau: *WebTV, internet TV, internet vídeo, interactivitat, unidireccionalitat, social.*

Recent years have seen video over the Internet become a reality. According to Cisco,¹ Internet video traffic in 2011 exceeded half of all global consumer traffic; and in a specific study on online video, Cisco highlights that 13.8% of the time spent watching professional video in 2012 was taken up by streaming and downloaded internet video, more than viewing DVDs or Blu-ray discs, VoD content or live premium cable. Consumers alone spend more time viewing live TV (42.91%) and PVR systems (14.53%) than Internet video in the United States.² Cisco expects global Internet video traffic to increase to 45,280 petabytes (PB) per month in 2016 (34% CAGR³ from 2011 to 2016), while in 2011 it registered a figure of 10,423 PB per month. So we may safely say that Internet video has become the fastest growing audiovisual service in communication and entertainment.

Some definitions break Internet video down into short-form and long-form video providers, live Internet video, internet-video-to-TV (connected TV) and also webcam viewing and web-based video monitoring.

Simpson and Greenfield (2009) classified web-based video services into two categories: Internet TV and Internet video. Both categories use public networks, unmanaged QoS and HTTP key protocols, and their user experience is similar to web surfing over a PC or mobile devices.

The most significant difference between the two categories is that Internet TV provides channels of continuous television, usually professionally produced, while Internet video publishes discrete video files produced by users (user-generated content, UGC).

Paradigmatic cases like YouTube provide a seed-version of information, entertainment and communication interactive systems based on audiovisual Internet

technologies. Probably, we could consider YouTube as an initiative of Internet Video (user-generated content), following the definitions proposed by Simpson and Greenfield.

However, in many cases, these media adopt one-way transmission models (mass media models) simultaneously to interactive options, in a two-way communication structure (Van Dijk and De Vos, 2001: 445).

So the concept of interactive television takes a new impetus. In accordance to Cesar and Chorianopoulos (2008: 125) “researchers tried to shape the future of interactive digital television using traditional development techniques from the PC and the Web”. Related to this affirmation, we defend the general hypothesis that personal computers and Web constitute the embryo of the real solutions of interactive television. And based on this hypothesis, we will analyze the interactivity on web-based video services considering the definitions proposed by Simpson and Greenfield to select de study cases.

INTERACTIVITY ON INTERNET TV AND INTERNET VIDEO

The convergence of computer and telecommunications technologies allows new media to combine a mass media communication process involving social cooperation with production, distribution and management content, and thereby develop a user’s experience.

There have traditionally been two theoretical models for understanding interactive communication processes: the “communication” approach and the “mediated environment” approach (Kim and Sawhney, 2002: 219).

According to Kim and Sawhney, the communication approach understands interactivity to be a framework in which the players in a communication process can swap roles, in a “no-broadcast” structure (Burnett and Marshall, 2003: 10), and the messages are related to each other. In other words, interactivity is considered to be information sharing and exchange (Kim and Sawhney, 2002: 220).

On the other hand, a mediated environment provides an approach focused on technological features, which “determines the nature and scope of interactivity it offers”, as manifested by Kim and Sawhney (2002: 220) in accordance with Steur (1995).

The current understanding of interactive television has many facets. The use of technology will also be essential for defining the media. In this sense, collective intelligence helps to define the form and content of new media due to the results of all individual uses (Malone, Laubacher and Dellarocas, 2010). Therefore, interactive communication also depends on the level of control users have over the information system. In this respect, Kim and Sawhney extracted four core elements that work like the *genes* of interactive platforms (2002: 221):

- Communicability: Enable different communication models within the platform (multidirectional communication).
- Malleability: Provide a broad combination range of video, data and voice in a communication process.

- Programmability: The medium serves for producing and managing information.
- Creativity: The user has many options to send messages in any format.

Related with Kim and Sawhney, Chung (2007: 45) recognized two types of interactivity: *human interactivity* and *medium interactivity*. In other words, interpersonal communication approach and user-to medium interactivity approach.

Human interactivity is considered as a communication process between two or more users through a same media. On the other hand, medium interactivity is based on the relation between users and machine, what the media “allows users to do, such as using hyperlinks to jump from one story to another”.

García (2011: 177) explores the concept of interactive television from different approaches: reception, production, distribution and financing.

From reception field, feedback is the key word of the process. Users or audiences can send ratings, opinions and other comments. From distribution scope, users can share contents to social networks, bookmarks and embedding video in others blogs or websites. Also, users can participate in the production of content or in other tasks related to design or post-production. Finally, from financing approach, initiatives like crowdfunding allow users to financially support several projects.

According to Cesar and Chorianopoulos (2008), from a technological point of view, the interactive television defines a “user experience that involves at least one user and one, or more audiovisual and networked devices”. This definition of interactive television ignore the potentially interactive aspect even in traditional television — emotionally reaction to television content, for example.

In a survey conducted by Van Dijk and De Vos (2001), television and Internet producers from across the world were asked about the main platforms for the introduction of interactive television. Only 18% of respondents considered the PC to be the main platform for the introduction of interactivity in audiovisual services (2001: 456). They were not wrong. In fact, since 2005, television and video via the Internet have grown exponentially both in traffic volume and in interactive options. Furthermore, another similar study conducted by León and García (2008: 13), after surveying 78 interactive television producers from Europe and the United States, concluded in relation to viewer needs that it is important for the success of interactive programmes to create an incentive system that encourages viewer participation. Therefore, how to motivate viewers and users is a key issue. Thus, interaction with other users or the chance to win prizes or reputation (Malone, Laubacher and Dellarcas, 2010) may be the way to design the model of interactivity (interfaces and communication concepts). In this sense, social video platforms (YouTube, Dailymotion, Vimeo...) have tendered these possibilities to users, and our aim in this paper is to provide a measure of this interaction level simultaneously to unidirectional communication models.⁴ According to Van Dijk and De Vos, “interactive television has both a hardware and a software aspect” (2001: 446). The hardware allows developing a multi-way system over the Internet. On the

other hand, software permits us to access different mediated operations in the communication process.

Thus, in this paper, we seek to measure and describe the level of interactive nature provided by a medium, namely, our case study, via the web as an audio-visual channel, according to the definitions provided by Simpson and Greenfield (2009) for Internet TV and Internet video. The association of Internet TV and Internet video in a single concept, it could define as Web television platforms (WebTV), considering software to be the key to the interactive options.

In this respect, we analyze empirically the WebTV to compare the dimensions related with mass media communication process (one-way transmission model) and social communication structures (two-way or multi-way transmission model). Thus, in this manuscript we define the one-way transmission model as *unidirectionality dimension*, and, the multi-way transmission model, as *interactivity dimension*.

This study specifically seeks to examine the following research question: What are the WebTV content lines of the sample selected? Does it come from the mass media or are native on-line media (source)? What are the relations between unidirectional and interactive dimensions with content lines and source?

METHOD

PROCEDURE AND SAMPLE

The proposed methodology, specially designed for this study, measured quantitatively both interactive and unidirectional dimensions on the selected study sample. And allows us to draw conclusions based on the programming line and the source (mass media or native web) of each case study. The first step, carried out prior to the empirical study, led us to a detailed exploration of the audiovisual initiatives devoted to the web. The result of this phase, using the techniques of observational methodology, was the definition of the analysis variables, which are described below:

- *Function indicators*: Functions indicators were obtained from a thorough observation of our object of study. In accordance to the criteria applied to interactive television that we explained before, we selected the most significant capabilities from the PC and the Web, and those capabilities typically from mass media, which we observe are including in the selected cases of study. They determine the services and the applications of all the WebTV platforms included in our sample. Besides, they will establish unidirectional and interactive dimensions, which are the main purpose of this paper. Every indicator are described in the table below:

Table 1. Function indicators and their acronyms

| Function indicator | Definition | Acronym |
|---|---|---------|
| <i>Constant broadcast</i> | Selection, coordination and previous organisation of programmes with a certain time duration | CB |
| <i>Video download</i> | This refers to content download in different formats, such as Windows Media, QuickTime, RealPlayer, or for different mobile devices. | VD |
| <i>Channels</i> | Independent programmes that create and manage their own content (live and/or recorded) within the general framework of WebTV | C |
| <i>Content list</i> | The user will find near the player a video list related to the main topic of the original document | CL |
| <i>Live video</i> | We refer mainly to the live broadcast of a digitised television signal and to video broadcasting via webcam | LV |
| <i>Theme categories</i> | They classify their contents according to well differentiated themes | TC |
| <i>Video upload</i> | It allows users to include their own video productions in the WebTV offer | VU |
| <i>Tags cloud</i> | It implies the establishment of a ranking (presented as a cell) of all the keywords used by users as their search terms | TCL |
| <i>Comments</i> | It allows inserting comments on the platform either in posts or in videos | CO |
| <i>Recommend to a friend</i> | It allows recommending a video content to other users via email | RF |
| <i>Evaluation</i> | Voting for a user's experience with regard to the content or other parameters | E |
| <i>Content search</i> | Search tools for finding documents related to the terms used in the descriptors | CS |
| <i>Evaluation and voting ranking</i> | Once all the users' votes and opinions about the videos have been gathered, certain tools create lists with the most voted and rated. With these tools, the content video organization is based on the appraisal of the users themselves. So net surfers will take part in determining its value. | EVR |
| <i>Sharing content over social networks and via bookmarks</i> | The main purpose is to publish and refer certain information (written or audiovisual) in group services or social networks | SSB |
| <i>RSS subscriptions</i> | RSS formats allow retransmitting the content by means of the systems defined as <i>adders</i> | RSS |
| <i>Links or related links</i> | Redirecting by means of an active link from one website to another that is related or of interest to the first one | L |
| <i>Groups</i> | Implementing the possibility of creating groups for users' association according to a common topic | G |
| <i>Chat</i> | A space created for real-time collective conversations | CH |
| <i>Forums</i> | All those websites devoted to asynchronous dialogue and debate on a common topic | F |

| | | |
|---|---|-----|
| <i>Tags</i> | Videos can be tagged using keywords related to the central and secondary topics | T |
| <i>Embedding</i> | The aim is to insert or embed a video in a website from a source other than the delivery location | EM |
| <i>Options for reproduction control</i> | The main purpose is to favour the options for video pause, forward and rewind | ORC |

The interactive and unidirectional dimensions will be determined by the nature of the function indicators, which are grouped according to their interactive or unidirectional quality. The data obtained will determine the structure, nature and scope of the interactivity offered (Steur, 1995; see the table below):

Table 2. Functions indicators grouped according to their interactive or unidirectional quality

| | |
|--------------------------|---|
| <i>Unidirectionality</i> | CB – VD – C – CL – LV - TC |
| <i>Interactivity</i> | VU – TCL – CO – RF – E – CS – EVR – SSB – RSS – L – G – CH – F – T – EM - ORC |

- *Source:* We have defined two levels of classification:

Table 3. Subcategories in *Source* variable

| | |
|---------------------|---|
| <i>Native WebTV</i> | It refers to all the initiatives created exclusively for their distribution over the Internet, so their contents are accessed solely via the web. |
| <i>Conventional</i> | It refers to all those WebTV services promoted by mass media (television, press and radio), or those WebTV services representing the previous ones on the Internet. |

- *Content:* It defines the lines and the programme objectives of all the WebTV platforms collected for our sample. In other words, it could be defined as the manner in which the medium is conceived, as well as its subsequent programme activity, that is, its communicative intention.

Table 4. Subcategories in *Content* variable

| | |
|--------------------------------|--|
| <i>Institutional</i> | WebTV focuses on the activity of public and private organisations as tools for information and/or internal or external communication |
| <i>Business</i> | This subcategory represents corporations or private companies |
| <i>Events</i> | WebTV created exclusively for the coverage of different kinds of events |
| <i>Social</i> | This subcategory includes all the services fed by the content provided at the same time by the users themselves and which allow their interaction in the media |
| <i>General information</i> | This subcategory is entirely devoted to current general information |
| <i>Specialised information</i> | A subcategory promoted to offer specific information about a concrete topic |
| <i>General interest</i> | This subcategory is an extension of conventional television (either national or regional) on the Internet. The design of the programmes targets the whole population |
| <i>Local</i> | This subcategory, as well as the previous one, involves the distribution of traditional local television channels over the Internet |
| <i>Varied content</i> | A subcategory providing multiple and varied content with the clear purpose of entertaining |
| <i>Platforms</i> | This subcategory offers the audience an online TV aggregator |

The main purpose of the statistical analysis is to quantify the variables *source* and *content* and establish their potential relations with the dimensions. On this basis, a binary coding system –with 0 and 1 as possible values- has been used to indicate if the item included in our sample belongs to a certain subcategory of the variable *source*: Native WebTV, coded 1; Conventional, coded 0.

Regarding the variable *content*, we assign values ranging from 1 to 10 to classify the items of our sample: Institutional, coded 1; Business, coded 2; Events, coded 3; Social, coded 4; General information, coded 5; Specialised information, coded 6; General interest, coded 7; Local, coded 8; Varied content, coded 9; Platforms, coded 10.

We have assigned nominal values to each category, so that a quantitative meaning to the objects could be provided with the aim of using these values for statistical computations. To carry out this statistical analysis, a table containing all the data has been created through the use of the software SPSS Statistics 17.0.

In order to analyze differences in mean values between the dimensions and variables, an ANOVA procedure has been performed with *contents* and *source* as independent variables, and the dimensions (unidirectionality and interactivity) as dependent variables.

With the aim of obtaining the results in the unidirectionality and interactivity dimensions, we have added up the frequencies of function indicators in each WebTV selected for our sample. The total number of function indicators (frequencies) will provide a quantitative value, allowing us to analyze the differences amongst the items gathered for our study. For *con-*

tent and *source* variables, the mean scores were calculated for each one of the dimensions in order to show the inclusion level of the indicators considered as unidirectional or as interactive for each subcategory. The dimensions are not mutually exclusive; that is, WebTV services obtain scores in both unidirectionality and interactivity, since they have functions in both dimensions. However, the higher the score obtained in one characteristic, the easier it will be for us to define the website's interaction capacity. Therefore, these two dimensions cannot be taken as the extreme ends of a continuum, but instead as independent characteristics that could have a greater or lesser presence.

Lastly, with a view to comparing the dimensions *unidirectionality* and *interactivity* in each one of the subcategories of *content*, weighted average values had to be calculated for both dimensions, since their measurement scales are different. Once the values had been transformed, a T-test for related samples was conducted.

Now that we have briefly described the general approach followed in this study, the specific aims pursued for this research are listed below:

- Comparing content and source variables
- Comparison between the unidirectionality dimension and the content variable.
- Comparison between the interactivity dimension and the content variable.
- Comparison between the unidirectionality dimension and the source variable.
- Comparison between the interactivity dimension and the source variable.
- Comparison of weighted means in both dimensions with regard to the content variable.

We may infer differences in variables source and content (programming lines), so the data obtained will show us how are mapping user experience in web-based video and television initiatives.

THE SAMPLE

The first phase involved an explanatory observation in which the study sample of six hundred audiovisual initiatives was randomly collected, considering the criteria proposed by Simpson and Greenfield (2009) to define Internet TV and Internet video (WebTV): initiatives that use HTTP protocols in public networks without QoS Systems; users can access from their PC or mobile device and the user experience is similar to web surfing. Therefore, all audiovisual initiatives that met these requirements, became part of our study sample. The selection was made by searching the Internet during the period from 12.20.13 to 03.02.13, moment in which was carried out the data capture and analysis.

RESULTS

Following the specific aims set out at the beginning of this paper, the results obtained in this study are shown and described below:

COMPARING CONTENT AND SOURCE VARIABLES

As we can see in the table below, there are three subcategories of contents that show no conventional items: *Business*, *Events* and *Platforms*. In the other hand, *General interest* and *Local* cannot register any native case by definition.

Table 5. Contingency table between Content and Source variables: Contingency coefficient = .578; Sig. = .000. Phi = .708; Sig. = .000

| | | Source | | Total |
|----------------|-------------------------|--------------|--------------|--------|
| | | Conventional | Native WebTV | |
| Contents | Institutional | 4 | 79 | 83 |
| | | 4,8% | 95,2% | 100,0% |
| | Business | 0 | 30 | 30 |
| | | ,0% | 100,0% | 100,0% |
| | Events | 0 | 12 | 12 |
| | | ,0% | 100,0% | 100,0% |
| | Social | 1 | 109 | 110 |
| | | 0,9% | 99,1% | 100,0% |
| | General information | 23 | 26 | 49 |
| | | 46,9% | 53,1% | 100,0% |
| | Specialised information | 23 | 135 | 158 |
| | | 14,6% | 85,4% | 100,0% |
| | General interest | 31 | 0 | 31 |
| | | 100,0% | ,0% | 100,0% |
| | Local | 14 | 0 | 14 |
| | | 100,0% | ,0% | 100,0% |
| | Varied content | 6 | 89 | 95 |
| | | 6,3% | 93,7% | 100,0% |
| | Platforms | 0 | 18 | 18 |
| | | ,0% | 100,0% | 100,0% |
| Total 17,0% | | 102 | 498 | 600 |
| | | 83,0% | 100,0% | |

General information shows an equality with 46.9% (23 items) for conventional compared to 53.1% (26 items) for native WebTV. The highest number of native WebTV is registered in *Specialised information* with 135 items, followed by *Social* with 109 items. Both of them add up 244 items, that is, 49% out of the total percentage of native-source WebTV. Lastly, *Varied-content*, with 89 native-source WebTV, is shown as the third most relevant subcategory of Content variable in our study sample.

COMPARISON BETWEEN THE UNIDIRECTIONALITY DIMENSION AND THE CONTENT VARIABLE

According to the data extracted from the comparison between unidirectionality and content, the group called Platforms has obtained the highest mean for this dimension, while Varied content is the subcategory that has recorded the lowest value for this type of characteristics. The score difference between both subcategories is 1.6983 points. Namely, Platforms are configuring a media strictly unidirectional while Varied Content is opening to solutions that include new forms of delivering and accessing.

Table 6. Mean values in the unidirectionality dimension for the Content variable: ANOVA F=9.203; Sig.= .000

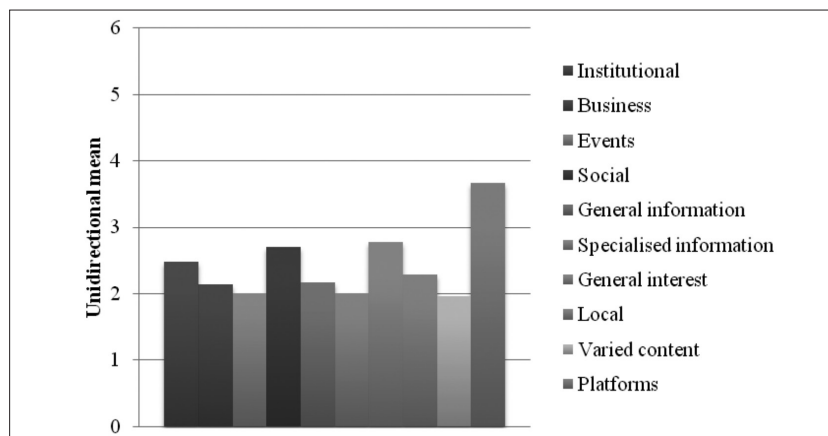
| | | N | Mean |
|-------------------|-------------------------|-----|--------|
| Unidirectionality | Institutional | 83 | 2.4819 |
| | Business | 30 | 2.1333 |
| | Events | 12 | 2.0000 |
| | Social | 110 | 2.7091 |
| | General information | 49 | 2.1633 |
| | Specialised information | 158 | 2.0127 |
| | General interest | 31 | 2.7742 |
| | Local | 14 | 2.2857 |
| | Varied content | 95 | 1.9684 |
| | Platforms | 18 | 3.6667 |
| | Total | 600 | 2.3117 |

General interest has the second highest score with 2.7742, followed by the Social subcategory, which recorded a result of 2.7091, with a slight difference of 0.0651 points. The Institutional subcategory has recorded a result of over 2.4 points, closing the main group for the unidirectionality dimension.

The unidirectional qualities, which have been defined in this study on the basis of the function indicators, are more or less similar in all the subcategories (see Figure

1). However, Varied content is the only subcategory recording a mean below two (on a scale ranging from 0 to 6 points). Specialised information, with 2.0127, is the following group with the least inclusion of the unidirectional functionality.

Figure 1. Unidirectional mean values obtained for the content variable



COMPARISON BETWEEN THE INTERACTIVITY DIMENSION AND THE CONTENT VARIABLE

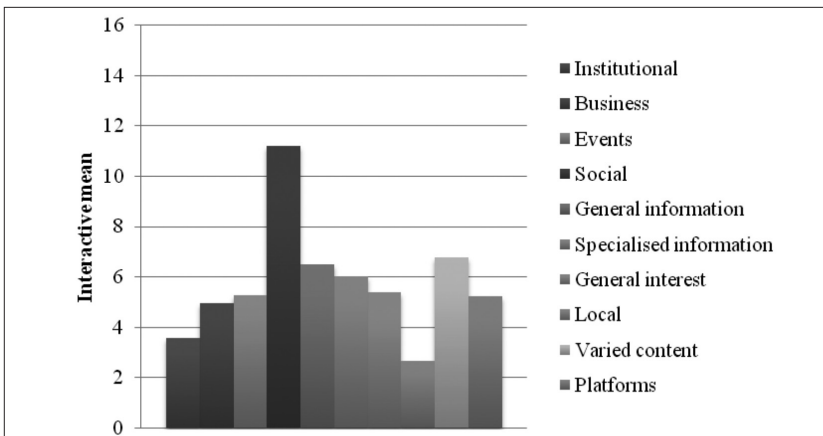
Regarding the interactivity dimension, the Social subcategory stands out with a mean of 11.1909 (on a scale ranging from 0 to 16 points) for the inclusion of interactive indicators. At the other extreme, Local web TV has registered the lowest score of 2.6429. The score obtained in Varied content is also significant, since this subcategory has recorded a mean of 6.7579. The results for the other subcategories have ranged between 5 and 6 points, except for the Institutional subcategory, which recorded 3.5783 points.

Table 7. Mean values in the interactivity dimension for the content subcategories: ANOVA F=50.567; Sig.= .000

| | | N | Mean |
|---------------|-------------------------|-----|---------|
| Interactivity | Institutional | 83 | 3.5783 |
| | Business | 30 | 4.9333 |
| | Events | 12 | 5.2500 |
| | Social | 110 | 11.1909 |
| | General information | 49 | 6.4898 |
| | Specialised information | 158 | 6.0063 |
| | General interest | 31 | 5.3871 |
| | Local | 14 | 2.6429 |
| | Varied content | 95 | 6.7579 |
| | Platforms | 18 | 5.2222 |
| | Total | 600 | 6.5767 |

Generally speaking, all the web TV services in our sample include a mean level of interactive indicators (see Figure 2). There are significant differences amongst the subcategories grouped under Content. Nevertheless, the most significant differences are between Social web TV and all the other groups, which have obtained 4.4411 points less than the Varied content subcategory (second subcategory of the major index of interactive functions, with a mean of 6.7579 points).

Figure 2. Interactive mean values obtained for the content variable



COMPARISON BETWEEN THE UNIDIRECTIONALITY DIMENSION AND THE SOURCE VARIABLE

In relation to the source variable, we have observed that the mean of unidirectional indicators for the 102 items included in the “conventional” subcategory is 2.5588, while for the 498 native web TV services the mean has fallen to 2.2610. These figures tell us that the use of the conventional web TV source has some features that are similar to traditional television. Although the difference between both means does not seem overly great (0.2978), the result of that difference is statistically significant ($F=6.348$; $sig.=.012$).

Table 8. Mean values in unidirectionality for the Source variable: ANOVA $F=6.348$; Sig.= .012

| | N | Mean |
|---------------|-----|--------|
| Conventional | 102 | 2.5588 |
| Native web TV | 498 | 2.2610 |
| Total | 600 | 2.3117 |

COMPARISON BETWEEN THE INTERACTIVITY DIMENSION AND THE SOURCE VARIABLE

In the case of interactive functions, the results are more enlightening. The mean for the conventional web TV source is 5.5196, while the results for native web TV have reached 6.7932, so the difference is statistically significant. For the sample as a whole, the interactive functions have recorded a mean of 6.5767; that is, at least six interactive indicators have been included per web TV service.

With regard to the source variable, the interactivity dimension is the section in which there is a more noticeable difference between the two factors or subcategories (conventional and native web TV): 1.2736 points. This figure is the most striking comparison in the study, whereby source is a crucial factor when interactive functions are included in the web TV of our sample.

Table 9. Values in the interactivity dimension for the Source variable: ANOVA $F=10.278$; Sig.= .001

| | N | Mean |
|---------------|-----|--------|
| Conventional | 102 | 5.5196 |
| Native web TV | 498 | 6.7932 |
| Total | 600 | 6.5767 |

COMPARISON OF WEIGHTED MEANS IN BOTH DIMENSIONS ACCORDING TO THE CONTENT VARIABLE

The Social subcategory has recorded the highest score of all the subcategories grouped under the Content variable for the interactivity dimension ($M=0.6994$). What's more, it has one of the highest values for the unidirectionality dimension ($M=0.4515$), so the difference is statistically significant (means diff.=0.24792; $t=12.245$, $sig=.000$).

On the other hand, "Platforms" is the subcategory with the highest number of unidirectional indicators ($M=0.6111$). This group of content has achieved a weighted mean value of 0.3264 for the interactivity dimension. The difference is statistically significant (means diff.=0.28472; $t=4.656$, $sig=.000$).

In the case of the Institutional subcategory, data collected from the analysis confirm the predominance of unidirectional indicators in most of its items (means diff.=0.19001; $t=8.070$, $sig=.000$). The Business subcategory has recorded a higher score for the unidirectionality dimension ($M=0.3556$), even though the difference with regard to interactivity ($M=.3083$) is not statistically significant (means diff.=0.04722; $t=1.295$, $sig=.206$).

A similar situation is registered for the content group called Events, and the difference between both dimensions is even less than the difference recorded for the previous case (means diff.=0.00521); it subsequently has no statistically significant values ($t=.068$; $sig=.947$).

The interactivity dimension has recorded a weighted mean value ($M=0.4056$) that is higher than the weighted mean for the unidirectionality dimension ($M=0.3605$) in the General information subcategory, although their comparison shows no statistically significant differences (means diff.=0.04507; $t=1.402$, $sig=.167$). Nevertheless, the Specialised information subcategory has registered some statistically significant values (means diff.=0.03995; $t=2.132$, $sig=.035$) in the comparison of the means; therefore, most of the items belonging to Specialised information include a higher number of interactive applications.

The General interest subcategory has recorded a mean value of 0.4624 for the unidirectionality dimension and a mean of 0.3367 for the interactivity dimension. The difference is statistically significant (means diff.=0.12567; $t=2.532$, $sig=.017$) and confirms this subcategory among the group of unidirectional initiatives. The Local subcategory records the minimum value for the interactivity dimension ($M=0.1652$) and stands in second position among the subcategories of the major unidirectional level, as it is surpassed solely by the Platforms group (means diff.=0.21577; $t=4.521$, $sig=.001$).

Lastly, the Varied content subcategory has recorded a higher score for the interactive function indicators ($M=0.4224$), and the comparison with the unidirectionality dimension is statistically significant (means diff.=0.09430; $t=3.904$, $sig=.000$).

In conclusion, Social, Varied content and Specialised information are highlighted as the subcategories of the content category with major development in the application of interactive functions. In contrast, the Platforms, Local, Institutional and General interest subcategories are the most traditional items using the web environment for the creation of audiovisual channels. The

subcategories called Business, General information and Events hold a neutral position, since they represent items showing a balanced combination of functions from both dimensions.

Table 10. Weighted values in each dimension for content variables

| Content | | Unidirectionality weighted value | Interactivity weighted value | Dimensions difference Contrast t |
|--------------------------------|------|----------------------------------|------------------------------|----------------------------------|
| Institutional | Mean | .4137 | .2236 | <i>t=8.070, sig.=.000**</i> |
| | N | 83 | 83 | |
| | SD | .16740 | .12618 | |
| Business | Mean | .3556 | .3083 | <i>t=1.295, sig.=.206</i> |
| | N | 30 | 30 | |
| | SD | .13655 | .18346 | |
| Events | Mean | .3333 | .3281 | <i>t=.068; sig.=.947</i> |
| | N | 12 | 12 | |
| | SD | .17408 | .21507 | |
| Social | Mean | .4515 | .6994 | <i>t=12.245, sig=.000**</i> |
| | N | 110 | 110 | |
| | SD | .18110 | .13924 | |
| General information | Mean | .3605 | .4056 | <i>t=1.402, sig.=.167</i> |
| | N | 49 | 49 | |
| | SD | .15346 | .18928 | |
| Specialised information | Mean | .3354 | .3754 | <i>t=2.132, sig.=.035</i> |
| | N | 158 | 158 | |
| | SD | .16398 | .19466 | |
| General interest | Mean | .4624 | .3367 | <i>t=2.532, sig.=.017*</i> |
| | N | 31 | 31 | |
| | SD | .23058 | .19208 | |
| Local | Mean | .3810 | .1652 | <i>t=4.521, sig.=.001*</i> |
| | N | 14 | 14 | |
| | SD | .10187 | .16915 | |
| Varied content | Mean | .3281 | .4224 | <i>t=3.904, sig.=.000**</i> |
| | N | 95 | 95 | |
| | SD | .18427 | .18898 | |

| | | | | |
|-----------|------|--------|--------|-----------------------------|
| Platforms | Mean | .6111 | .3264 | <i>t=4.656, sig.=.000**</i> |
| | N | 18 | 18 | |
| | SD | .15125 | .17357 | |
| Total | Mean | .3853 | .4110 | |
| | N | 600 | 600 | |
| | SD | .18206 | .23021 | |

DISCUSSION

Software development capacity informs the convergence between conventional mass media functions and the new participation options that modify the traditional scheme of the communication process. Significant compatibility has been proven between factors promoting users’ active participation in the media, and those factors that are more typical of conventional television communication.

Although the source constitutes a crucial factor when describing the unidirectional and interactive dimensions of the items gathered for our sample (let us recall that the native WebTV subcategory recorded a mean of 6.7932 interactive indicators per item, while conventional WebTV registered a mean of 5.5196 interactive indicators per item, so their difference was statistically significant, being confirmed with the following values: ANOVA $F=10.278$; $Sig.=.001$), WebTV services considered to be conventional have started a major updating of their media over the net towards initiatives with greater interactive capacity.

Regarding to the *content* variable, *Social* subcategory is the third group with the highest mean for the unidirectionality dimension. This result has been surpassed only by the *General interest*, as expected, and by *Platforms* subcategory (it is worth mentioning again that both dimensions are not mutually exclusive). Therefore, the *Institutional* subcategory (which stands out because it represents an emerging audiovisual production segment), whose items are mostly native source (79 items; see Table 5), registers a high mean for unidirectional indicators. Consequently, it is considered the fourth most representative subcategory for this dimension. It can therefore be confirmed that unidirectional indicators are also very widely used by native WebTV services, as has been proven with the data obtained from the comparison between unidirectionality and source.

However, according to the data here, interactivity arises mainly from the initiative of native media. The weight in the interactivity dimension falls mainly on those items favouring the association and generation of communities within the framework of their platforms.

The weighted mean obtained for the interactivity dimension is greater than the one obtained for unidirectionality in the whole sample analysed in this study (Int.=0.4110; Uni.=0.3853). However, it should be taken into account that of the ten subcategories of content, six obtained a higher weighted score for the unidirectionality dimension, that is, *Institutional*, *Business*, *Events*, *General interest*, *Local*, and *Platforms*. The differences were statistically significant

in four of these six subcategories: $t=8.070$, $sig.=.000$, for Institutional; $t= 2.532$, $sig.=.017$, for General interest; $t=4.521$, $sig.=.001$, for Local, and $t=4.656$, $sig.=.000.$, for Platforms. However, the other two subcategories recorded no significant values for their differences: $t=1.295$, $sig.=.206$, for Business, and $t=.068$; $sig=.947$, for Events.

By contrast, two of the most representative subcategories of content, that is, *Social* and *Varied content*, obtained a higher weighted mean for the interactivity dimension, so their results were statistically significant. These results explain the greater level of interactivity in the whole sample, despite the fact the weighted mean registered for unidirectionality is higher than the weighted mean obtained for interactivity in up to six subcategories of content.

CONCLUSIONS

We have witnessed the convergence between conventional functions of mass media and new participation options, since WebTV services considered to be conventional have begun to significantly update their media on the web towards initiatives with greater interactive capacity, although unidirectional indicators are also widely used by native WebTV services. However, the most significant outcomes of our research are related to the results that lead us to conclude that interactivity is not considered the most representative quality in the WebTV, above all when we have defended this concept as the one most representative of new communication media.

We have inherited the classic concept of television. As noted before, only the subcategories Social and Varied Content recorded a statistically significant result on interactive functions, the 30% of the study sample. We find out the variable Source is crucial in defining this conclusion, perhaps the main reason, because we still observe a high influence of the conventional television to design user experience. The convergence between Internet, television and video are promoting services like VOD and TVCatch-Up more than other interactive solutions. Thus, new forms of delivering content constitutes the priority aim for agents in the sector of on-line video and television, considering TV Everywhere concept as the future of broadband television.

Finally, we suggest the need for further studies to broaden and deepen the aims we propose here. Studies to complete the definition of the user experience on these media as well as show its evolution in time.

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Notes

¹ *Cisco Visual Networking Index: Forecast and Methodology, 2011–2016*. 30 May 2012. Available on: <http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-481360_ns827_Networking_Solutions_White_Paper.html> [Retrieved on 05/02/13].

² *"It Came to Me in a Stream..." The Upward Arc of Online Video, Driven by Consumers*. December 2012. Available on: <[http://www.cisco.com/web/about/ac79/docs/sp/Online-](http://www.cisco.com/web/about/ac79/docs/sp/Online-Video-Consumption_Consumers.pdf)

[Video-Consumption_Consumers.pdf](http://www.cisco.com/web/about/ac79/docs/sp/Online-Video-Consumption_Consumers.pdf)> [Retrieved on 05/02/12].

³ Compounded annual growth rate.

⁴ See Victoria, J.S. "Interactivity through the kaleidoscope of communication: Presentation", *Icono14*, 15, 2010, pp.1-8, <<http://www.icono14.com>>, (retrieved on 09/10/13); for a detailed explanation of the concept "interactivity" we have applied throughout this paper in order to establish our own interactivity dimension.

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