INTERACTIVE TELEVISION OR ENHANCED TELEVISION?
The Dutch users interest in applications of ITV via set-top boxes

1. Introduction

For at least three decades now the promise of interactive television (ITV) as a revolutionary new medium has not been fulfilled. Already in the 1970s several two-way cable TV projects were launched in de US and Western Europe, to be followed by particular two-way cable services under the label of video-on-demand in the 1980s and full-service networks in the 1990s. None of these innovations resulted in the breakthrough of ITV. Up to this time the rise of the Internet and broadband connections using not only cable but also telephone wires and satellite links has not produced popular ITV services either.

   The reasons for these market failures may be technical (lack of standardization, bandwith and applicable hardware or software), economic (lack of investment owing to failing prospects of returns or the present general ICT business crisis) and social-cultural (the habitual use of one-way television consumption in leisure time). But the most important reason might be found in the answer to the key question whether there is a sufficient users interest in practicing some kind of interactivity in watching television. This is the key question from the demand side (the viewers or the actual and potential users of ITV). The equivalent key question from the supply side is whether ITV really offers something completely new as compared to traditional television? The new thing would be interactivity. But what exactly is interactive in interactive television?

   There is no agreement on the definition of ITV (Rafaeli, 1988, Rada, 1995, Steur, 1995, Carey, 1997, Jensen & Toscan, 1999, Stewart, 1999, Van Dijk & De Vos, 2001). The most common and simple definition comes from Jensen & Toscan (1999: 16): '"two-way TV", in which the viewer can make programming choices and produce user input.' In most definitions more user choice and the possibility of user input having more or less direct influence on programme content, that is making a real difference to programmes, are the prominent parts. However, more choices would not be a revolutionary change of the medium of television in the era of the VCR and multiple channels. But user input directly influencing programme content could be such a change. It would mean acting or interacting with the medium of television in stead of only reacting to and zapping on the medium. These four kinds of activity could be labelled as viewing or using ITV and placed on the following continuum. See Table 1.

Table 1 Continuum of indications of interactivity in definitions of ITV

Actor indication	Activity indication	Activities concerned
'Users'	'Exchanging', 'Interacting'	Communicating
	'Acting"	Producing information
	'Reacting'	Choosing from menus and making transactions
'Viewers'	'Zapping'	Choosing programmes and channels

It is evident that for a suitable definition of ITV a definition of interactivity is required. Jensen (1999) has produced an extended account of the search of media and communication scholars for such a definition. From his account it appears that most definitions link the concept of interactivity to the interface of users with media and to the measure of control programmers and users, producers and consumers or senders and receivers reach in using a medium. Van Dijk (1999) and Van Dijk & De Vos (2001) have defined and made operational a broader concept of interactivity that is held to apply to both face-to-face and mediated (face-to-interface) communication and includes more dimensions than the behavioral dimension of control.

The authors mentioned distinguish four cumulative levels of interactivity applying them to the medium of ITV in the following way (Van Dijk & De Vos: 449-451). The first and most elementary level is the space dimension of *multi-lateralness*: ITV is television activity in two or more directions at the minimum. At least two actors and two actions are involved: a supplier or sender transmits signals and a user or receiver returns signals in this way becoming a sender himself or herself. The number of turns varies and depends upon the number of choices the user can make (like programmes, additional information, camera angles etc.).

The second level is the time dimension of *synchronicity*. Most social and communication scientists agree that the immediate succession of action and reaction reinforces interactivity. Asynchronous communication like in using answering devices or e-mail easily leads to a rupture of interaction, a lesser grip on it or misunderstandings. ITV is a fairly synchronous medium. Users see their choices are met relatively fast and they are able to give feedback immediately.

The third level of interactivity is the behavioral dimension of *control,* the most popular among the definitions of interactivity. Viewing ITV the user decides about turns and actions (choice of programmes and subsequent selections), be it within the scope of supply. In addition, the user sets the time, speed and continuation (linear or not) of communication. However, the key question about interactivity for most people trying to define this concept is whether the (inter)actions of users make a difference to the content offered in the running programme.

The fourth level of interactivity is the mental dimension of *understanding* or interpretation. This level is attained when every party of the interaction concerned understands the meaning of all actions. At the present stage of artificial intelligence this is does not apply to combinations of hardware and software; it is limited to humans interacting face-to-face or via a medium, for instance in telephone conversations. Applying this level to ITV it means among other things that human producers of ITV programmes understand the input of users and adapt their programmes immediately.

Using this distinction between levels of interactivity the most important applications of ITV can be put in a row ranging from applications that in fact are non-interactive and to be called digital TV, to applications that offer a complete break with traditional one-way television. See Table 2.

In this paper a distinction is made between digital TV and interactive TV. Digitization of analogue TV-channels offering a bigger and better choice of channels and programmes by the technical means of conditional access systems, electronic programme guides or digital VCRs storing particular programmes, is a precondition for ITV but not ITV in its own right. This would at least require a feedback channel with signals making a difference to subsequent supply for individual users. Here the minimum option is video on demand. All more advanced options in Table 2 signify increasing effects of user input on the forms and contents of TV offered making them more interactive.

A second distinction that is made in this paper is between the different current types of ITV. The type that may be called the most regular one, as it is a direct successor to traditional analogue cable and satellite TV and to digital TV, is *set-top box ITV*. This is offered by an increasing number of vested broadcasters and satellite or cable companies in the field. In this type of ITV subscribers to digital and interactive television services acquire a set-top box with an extended remote control.

Another type of ITV presumably is the currently most popular one in the Western countries in a situation of low distribution of set-top boxes and the immature or non-standardized technology of ITV. It may be called *hybrid ITV*, as all kinds of other channels are added as a feedback channel to traditional broadcasting asking for viewer replies in tell-selling, discussion programmes, game shows, quizzes, popularity contests and choices of music and video-clips to be broadcasted afterwards. The channels added are telephone connections (fixed and mobile, using SMS in particular) and the Internet (using emails). The share of the surprisingly high telephone returns these phone-in and tell-sell programmes yield may be called a real cash-cow for broadcasters, commercial broadcasters in particular.

Table 2 The (Inter)activity of Applications in Digital and Interactive Television (Source: Van Dijk & De Vos, 2001: 452)

KIND OF ACTIVITY	APPLICATION	LEVEL OF INTER-ACTIVITY
Choice of channels and programmes	1. Conditional Access Systems 2. Electronic Programme Guides 3. Decoder VCR	**0** **(Digital TV)**
Choice from menus and transactions	4. Video-on-demand 5. Additional channels (for background information or advertisement) 6. Customization (choice of camera angle, replay, more item display, plots or story lines) 7. E-commerce (goods and services)	**1-3** **(ITV)**
Producing information	8. Reaction /commentary to programmes 9. Participation in programmes (directed)) 10. Contribution to programmes / channels (not directed) 11. Production of own programmes/ channels ('personal TV')	**3** **(ITV)**
Exchange/ Communication	12. Communication about/in parallel to TV programmes (viewer/user communities)	**4** **(ITV)**

The third type of ITV is *Internet ITV*. The use of broadband Internet (with cable, DSL, glass-fibre) enables the distribution of regular television programmes on computer screens (and optional connected television screens) to be selected at self-chosen times and places by viewers. It also allows all kinds of value-added services (such as feedback of email and web-cam messages) and multimedia applications (changing programme forms and contents offered) in this way supplying both digital TV and interactive TV.

These distinctions are important for the investigations reported in this paper. They are about interactive television (not digital television) and about set-top box ITV. Data are confined to the Netherlands where representative samples of subscribers to digital and interactive television services have been interviewed three times in the years 2001 and 2002. Limited use has also been made of data from a laboratory experiment and a number of focus groups testing a particular application of ITV.

2. Research questions

As it has been explained, the key question in the development of ITV is the users' interest for interactive services or applications of television. At the present stage of diffusion of this new medium the users may be called 'early adopters', perhaps even 'innovators'. In the Netherlands there are 80.000 subscribers to digital and interactive cable services using set-top boxes in the year 2002. This means only a bit more than 1 percent of all television-viewing households in this country. As we will see, the big majority of these subscribers uses services of digital television and is not familiar with services of interactive television also contained in the subscription. So we are talking about a phenomenon that still is extremely marginal in present television use. Nevertheless, we hope to find first indications of the users' interest for the early supply of interactive television in this country analysing the data of the surveys among subscribers and using data from other sources. There are two main research questions to be answered in this paper, each of them containing several partial questions. The first main question (A) departs from the demand side (the users' interest). In the second main question (B) attention shifts to the supply side of kinds of applications offered. In both questions the core idea is the interest of suppliers and users for interactive television or enhanced television, as has been made evident in the title and introduction of this paper.

A. What is the interest of the early adopters of ITV via set-top boxes in the actual and potential applications of ITV in the Netherlands?

1. What is the *present (actual) usage* of ITV-programmes among subscribers of digital TV using set-top boxes with access to ITV in the Netherlands?
2. Is the *viewing behavior* (considering length of time and selectivity of viewing) of the early adopters of ITV in the Netherlands changing as compared to the viewing behavior in using one-way television?
3. What is the *user-friendliness and usability* of the hardware and software of present Dutch ITV-applications: the remote control, the design of the screens and the number of potential interactions in the programme?
4. What is the attractiveness of potential *programme genres* of ITV for the present early adopters of ITV in the Netherlands (information, entertainment, opinion and e-commerce programmes and programmes of communication about programmes)?
5. What is the attractiveness of potential *types of activity* in ITV applications for the present early adopters of ITV in the Netherlands (selection, customization, reaction, transaction, production and conversation; see Tables 1 and 2)?
6. Is the interest of the early adopters of ITV via set-top boxes in the actual and potential applications of ITV in the Netherlands significantly related to their *age, sex and educational level*?

B. Do the interests observed represent a new type of television use (to be rightly called 'interactive television') or an ordinary type of television use with facilities added (to be called ' enhanced television')?

    1. What is the level of interactivity of the actual applications of ITV offered by broadcasters and wanted by users? See Table 2 for potential applications.
    2. What will be required to increase the level of interactivity of these applications of ITV?
    3. Which type of ITV offers the best opportunities to increase the level of interactivity of applications of ITV in a short or medium term: set-top box ITV, hybrid ITV or Internet ITV?

3. Methods

To answer the research questions A, 1-6 and B, 1 three empirical methods have been used: surveys, focus groups and a laboratory experiment. The first method was a representative *telephone survey* among a sample of subscribers to the available digital and interactive cable services using set-top boxes in the Netherlands called Mr. Zap, UPC Digital and Casema Digital Television. The survey was held two times, in January 2002 and in July 2002. The data collection was executed by NOS-KLO, the department of the Dutch general public broadcasting organization NOS, daily collecting broadcast ratings among television viewers and radio listeners. (Krüs, 2002, Dragt & Krüs, 2002). To answer the research questions of this paper a secondary analysis of their data was made. The number of respondents in the sample of the first measurement (January 2002) was 586 and in the second (January 2002) it was 676, while for some questions the sample was enlarged to the number of 1890. A random person with a minimum age of 18 in every sample household having a subscription was interviewed.

    The data in these two polls revealed approximately the same results. This was held to be an indication of the reliability of the questionnaire and the interviewing process. However, below we will mainly present data from the first poll as this contained the most questions producing data for our research questions.

    The second method was interviewing a number of *focus groups*. The aim of two focus groups was to measure the attitude of potential users of ITV to the present applications of ITV. One focus group was composed of 8 students in social science; the other was filled by a number of 8 students in technical science. All students were between 20 and 25 years old. A third focus group was composed of 7 pupils in secondary education being between 12 and 14 years old. They were the target group of the special application of ITV tested in both focus groups and laboratory experiments. This was the junior interactive version of a well-known popular science quiz on Dutch television called the *Nationale Wetenschapsquiz*. The aim of this focus group was to test the usability and user-friendliness of the hardware (set-top box and remote control) and the software of this interactive quiz enabling participation to the viewers at home.

The third method was a *laboratory experiment* with a systematic comparison of the effects of the interactive and the standard, non-interactive versions of the junior interactive quiz just mentioned. The interactive version was assessed in the experimental group and the non-interactive version in the control group. These versions were compared for their learning effects and their rating (appreciation). The experimental subjects were 20 students in both

the experimental and control group, matched for sex and kind of study (social or technical science). Both the focus groups and the experimental groups were low in their number of research subjects. Moreover, they were only composed of university students and secondary education pupils. Therefore, only a limited use was made of the data of these two methods. Only a few extremely significant results are reported in the next section. The section of results is mainly based on survey data.

4.Results

A.1 Present usage

What is the *present (actual) usage* of ITV-programs among subscribers of digital TV using set-top boxes with access to ITV in the Netherlands? In order to answer this question, we first compared the group of set-top box owners with the Dutch population (see Table 3). We make a distinction between set-top box owners who use applications of ITV and non-users of ITV. These groups are compared on three demographic characteristics: gender, age and educational level (lower, secondary and high education). Considering the group of set-top box owners the following findings are of interest.

In order to produce a reliable answer to the question of actual usage of ITV a larger sample of 1890 set-top box owners was used for this specific question. Only 7.6 percent of the respondents who owned a set-top box with access to ITV (N = 1890) used it for ITV. The ITV respondents (n = 143) are equal to the non-ITV respondents considering age, gender, number of persons in the household, and household constitution. The ITV respondents only differ from the non-ITV respondents in their educational level: χ^2(2, N = 586) = 6.80, p = .03. ITV users tend to be lower educated than non-users.

During this study, there were several TV programs with an interactive version in the Netherlands. On average the ITV-respondents (n = 143) watched an interactive version 1.73 times (SD = 2.60). A remarkable finding in this respect is that 75.1% of the owners of a set-top box didn't even know that there where interactive versions of the programs available.

Table 3 Total population, set-top box owners and actual ITV-users in the Netherlands, compared on Gender, Age, and Educational Level (in percentages)

	Gender		Age			Education		
	male	female	13-29	30-49	50+	low	sec.	high
Dutch population	48.2	51.8	24.8	38.2	37.0	31.1	37.8	31.1
Set-top Box owners (non ITV users)	56.8	43.2	23.1	60.0	16.8	18.3	38.1	43.6
Actual ITV users	57.5	42.5	25.4	59.7	14.9	15.2	50.8	34.1

A.2 Viewing behavior

Our second research question has to do with the viewing behavior of early adopters of ITV. We asked the group of set-top box owners if they were watching more or less regular TV since they owned a set-top box. A majority of them, 76.7 % of the respondents (*n* = 489), viewed less TV; 5.7 % watched more TV and 17.6% didn't change their viewing behavior. The total group is watching almost every day, with an average of almost three hours per day. However, compared to the Dutch population, the group of set-top box owners watch slightly more television, as the average Dutch viewer spends about 2 hours and 45 minutes in front of the TV set.

  The main reasons why respondents changed their viewing behavior are watching more movies (17,5%) and watching more selectively (13,3%), as is shown in table 4.

Table 4 Reasons for change of viewing behavior set-top box owners

viewed the interactive version	0.8%
view more selective/more focused	13.3%
more movies	17.5%
does more with their TV (music, games)	1.2 %
TV is on all day/ on longer	1.6%
zap more	3.0 %
zap less	1.8 %
view more news, informative programs and documentaries	1.2 %

Among the group of set top box owners we found no difference between ITV users and non-ITV users considering the choice of program genres they like to watch: news, documentaries, infotainment, movies, real life soaps, reality programs. ITV users are greater fans than non-users of games - χ^2(3, *N* = 593) = 13.96, *p* = .00 - and (knowledge) quizzes: χ^2(3, *N* = 592) = 22.71, *p* = .00.

A.3 User-friendliness and usability

Our third question about the *user-friendliness and usability* of the hardware and software of present Dutch ITV-applications can only be answered, when the telephone survey is taken into account, with respect to the design of the screen. The system appears to be user-friendly: 95.2% of the ITV respondents (*n* = 105) understand well how to use interactive modes. Seventy six per cent of the ITV respondents agree that interactive programs are more fun then the same programs in a non-ITV mode; 90.5 % confirm that the information on screen doesn't disturb them; 93.3 % agree that the interactive information is clearly visible on the screen.

As to the other aspects of user-friendliness and usability we may refer to the evidence of the experiences of the participants in the focus groups. They appeared to have no trouble with the remote control. The only trouble they had was the experience of too few interactive moments in the program leading to weakened attention.

A.4 program genres

What is the attractiveness of potential *program genres* of ITV for the present early adopters of ITV in the Netherlands (information, entertainment, opinion and e-commerce programs and programs of communication about programs)? The results show that 51.91% of the ITV respondents (*n* = 150) would strongly like to see more infotainment programs in an interactive mode, 17.56% would moderately like to see more of such infotainment programs. Among these respondents 59.94% would strongly like to see more entertainment programs in an interactive mode; 10.73% would moderately like to see them. Only 3.3% of the ITV respondents would strongly like to see more information programs in an interactive mode,

A.5 Types of activities

What is the attractiveness of potential *types of activity* in ITV applications for the present early adopters of ITV in the Netherlands (selection, customization, reaction, transaction, production and conversation)? For the sake of this analysis the applications mentioned in Table 2 have been transformed into the six clusters of applications just mentioned. Applications 1 up to 5 are brought under the heading 'Selection'; application 6 is called 'Customization', application 7 'Transaction', application 8 'Reaction', applications 9 up to 11 are called 'Production', and application 12 'Conversation'. Respondents were asked to rate these six interactive activities on a scale from 1 (very negative) to 10 (very positive). The results are shown in table 5.

Table 5 Mean ratings for several types of interaction : reaction, transaction, customization, selection, production, and conversation

Types of activity		**M**	**SD**	**N**
Selection	To select one's favorite news items	6,68	2,20	576
Selection	To ask for additional information about subject matter of a program	6,95	1,80	577
Selection	Videotext pages with pictures or video fragments on demand	6,98	2,14	577
Customization	The possibility to zoom in or watch a scene from a different angle	6,68	2,31	574
Customization	The possibility to choose how a story develops (alternative plots)	5,27	2,62	579
Transaction	To order products shown or mentioned in a program	4,98	2,29	579
Transaction	To order tickets for shows, sports games or other events mentioned in a program	6,58	2,31	579
Reaction	Reacting to a program	6,31	2,13	578
Reaction	Fill out a questionnaire	5,88	2,12	577
Reaction	To participate in a quiz	5,80	2,60	582
Reaction	To compete for prices	5,49	2,56	579
Production	To express an opinion to contribute directly to a broadcast program	6,29	2,29	577
Conversation	The possibility to exchange ideas about a program with other viewers	5,02	2,38	578

When we look at the average rating figures for the various types of (inter)activity, the possibilities for Selection are valued most (M = 6.89), followed by Production (M = 6.29). The average scores for Customization (M = 5.98), Reaction (M = 5.87), and Transaction (M = 5.80) are slightly lower, while the average figure for Conversation (M = 5.02) is lowest.

A.6 Demographics

Is the interest of the early adopters of ITV via set-top boxes in the actual and potential applications of ITV in the Netherlands significantly related to their *age, sex and educational level*? The results were analyzed to look for differences between users and non-users of ITV in our sample of set-top box owners. Table 6 shows the results of this analysis for the applications reaction, transaction, customization, selection, conversation, and production.

Table 6 Types of activities related to type of users (ITV, non-ITV)

		M	*SD*	*N*
Reaction	Non-ITV	5,57	1,96	443
	ITV	6,85	1,27	133
	Total	5,87	1,90	576
Transaction	Non-ITV	5,73	1,97	443
	ITV	6,03	1,85	132
	Total	5,80	1,94	575
Customization	Non-ITV	5,75	2,14	439
	ITV	6,75	1,73	133
	Total	5,98	2,09	572
Selection	Non-ITV	6,74	1,63	435
	ITV	7,37	1,28	131
	Total	6,89	1,58	566
Conversation	Non-ITV	4,90	2,38	446
	ITV	5,44	2,35	132
	Total	5,02	2,38	578
Production	Non-ITV	6,07	2,35	444
	ITV	7,04	1,88	133
	Total	6,29	2,29	577

There were significant effects for type of users on Reaction - $F(1, 574) = 50.08$, $p = .00$, Customization - $F(1, 570) = 24.32$, $p = .00$, Selection - $F(1, 564) = 16.48$, $p = .00$, Conversation - $F(1, 576) = 5.28$, $p = .02$ - and Production: $F(1, 575) = 18.90$, $p = .00$. There was no significant effect for type of users on Transaction.
ITV users are giving higher scores than Non-ITV users for Reaction , Customization, Selection, Conversation, and Production.

The ratings for the various types of activities were also related to age. There was a significant effect for Age on Reaction - $F(2, 570) = 8.102$, $p = .00$, Transaction - $F(2, 569) = 21.42$, $p = .00$, Customization - $F(2, 566) = 60.38$, $p = .00$, Selection - $F(2, 560) = 3.48$, $p = .03$ - and Conversation: $F(2, 572) = 3.04$, $p = .05$. There was no significant effect for Age on Production.

The average ratings for age group 15-29 years were higher than for age group 30-49 and for age group 50+, for Reaction - 6.36 vs. 5.82 vs. 5.36 respectively, Transaction - 6.45 vs. 5.82 vs. 4.80, Customization - 6.77 vs. 5.83 vs. 5.41, Selection - 7.07 vs. 6.94 vs. 6.52 and Conversation: 5.42 vs. 4.96 vs. 4.68.

There were no significant effects for gender on the various types of activity.

Finally, we looked into effects of the level of education, making a distinction between lower education, secondary education, and higher education. There were significant effects for Educational level on Reaction - $F(2, 565) = 10.46, p = .00$ -, Customization - $F(2, 560) = 6.32, p = .00$ -, Conversation - $F(2, 566) = 9.23, p = .00$ - and Production: $F(2, 565) = 5.63, p = .00$. There were no significant effects for Educational level on Transaction and Selection.

In general, respondents with lower education gave higher ratings for the various types of activities than did respondents with secondary education and with higher education, the latter group giving the lowest scores.

Only with Customization, the secondary education respondents gave higher scores than both the lower and the higher educated respondents.

B.1 A new type of television use?

The level of interactivity in the actual applications that is offered by the Dutch broadcasters in set-top box ITV is low as compared to the use of telephony, computers and other interactive media. The lion's share of their supply is the offer of additional channels and programmes of digital TV (level 0 in our definition, for this is subscription- or pay-TV with identical broadcasting for every subscriber to a particular package). The next item is video-on-demand (level 1, as it is multilateral and asynchronous for individual subscribers). Applications that are labelled ITV by the Dutch broadcasters themselves reach the general level 3 of interactivity with a very low measure of control by users. In fact, most of these applications are some kind of *reaction* by users to closed questions posed in a programme that is completely directed by the producers.

   From the nine programmes offered as being interactive by the Dutch public broadcasters four are quizzes (having only one right answer), three are discussion programmes with closed opinion poll questions. One of nine is a popular music programme (*Top of the Pops)* offering the feature of popular votes for particular artists or songs and of requests for extra background information about them. Another (sports) programme (*Wimbledon)* also offered selections of games to watch and extra background information. Only two of the nine programmes, the discussion programmes *Stand.nl* and *Helpdesk Live* gave viewers the chance of a self-framed user input in the form of speech or text using channels of hybrid ITV (telephone, SMS and email messages). A selection of this input is presented live during the programme in special lines and boxes on the screen. This means one step further in level 3 of interactivity (equal control): it is a modest type of *production* by the viewers themselves, be it within the confines of the programme direction.

   What are the wishes of the Dutch set-top box users themselves? Do they long for applications with a higher level of interactivity? From their judgements of the potential types of ITV applications – see above – it follows that demand follows supply in this case. It appears that the viewers first of all want better selections and opportunities to react. Customization is only popular combined with selection (e.g. choosing the type of audio in watching football matches, like commentary or the sound of the stadium, and a personalized electronic programme guide). Most striking is the fact that, at least presently,

Dutch subscribers to digital and interactive TV services using set-top boxes do not favour transactions (e-commerce), own productions serving as programme inputs or conversations (communication with other viewers) on this channel.

The most important actual types of ITV applications used are selection (extra channels, video-on-demand) and reaction. Responding to programmes is rather popular, but much more among young people (aged 18-30) than among people over 50. Among the first age group 57 per cent has reacted to programmes once or more using a channel of hybrid ITV (telephone, SMS or the Internet) while among people above 50 only 32 per cent had this experience. Figure 1a and 1b present the actual and the favoured use of return channels to television programmes among users of set-top box ITV in the Netherlands in 2002. These are data from the second telephone survey (July 2002).

Figure 1a. Actual return channels used   Figure 1b. Most favoured return channels
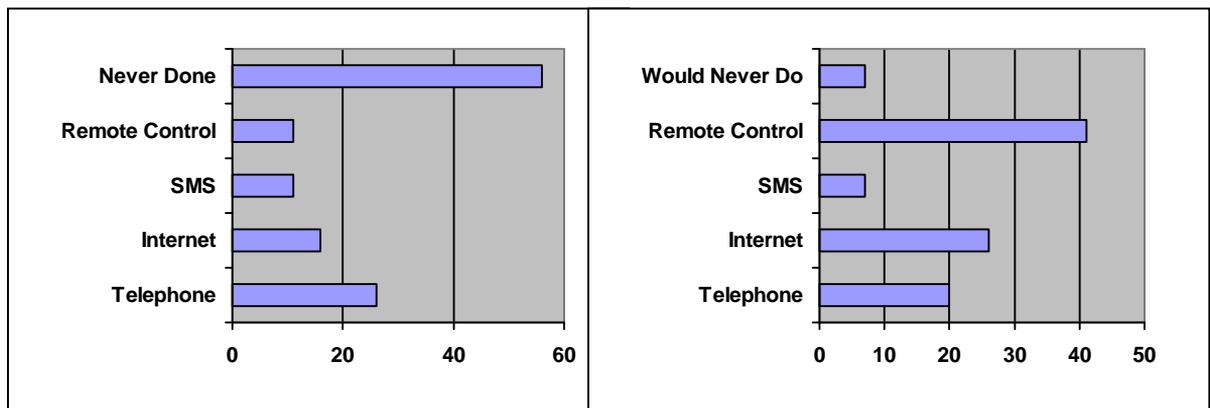
B.2. From enhanced to interactive television

To increase the level of interactivity of ITV applications a fundamental dividing line has to be crossed. All present applications of ITV in the Netherlands simply are extensions of existing television programmes. The direction of every ITV programme remains a linear one. Inputs of viewers are not supposed to break the line of direction of the programme. User input is not allowed to change the scenario or plot of a programme, not even of a discussion or opinion programme (the discussion in the studio or other centre remains in the focus and in the spotlight). User input is only invited to make the programme more attractive to viewers suggesting some kind of participation. It seems better to call this type of television enhanced television than interactive television.

To cross the line to 'real' interactive television new kinds of programmes have to be produced that increase the level of control or the user input of viewers. To start with, this means three things. First of all the number of interactive moments (times or turns at which users are able to react or have their own input) in a particular programme has to be increased substantially. In current programmes usually only two or three of these moments are available in discussion programmes and in quizzes they are confined to the number of questions. In the particular interactive quiz tested in our experiment and focus groups there were only 5 questions in 35 minutes. The research subjects (university students familiar with computer and Internet interactivity) found this number of moments utterly disappointing.

The second step to be taken would be much more user or viewer input processed and presented during the programme. In some genres, like discussion programmes and games,

this would mean that the linear type of direction is lost and that the programme acquires an open ending. The logical third step would be to drop the broadcasting axiom that a programme has a limited time and a particular ending. In high-level interactive environments programmes could be continued by the users themselves or in a co-operation between producers and users, perhaps switching to another channel or application (Web-TV, chat boxes or viewer communities and the like).

B.3. The best channels for interactivity in television

It is very unlikely that broadcasters using set-top boxes to distribute ITV will increase the level of interactivity of their applications in the short or medium term via this channel. This applies for technical, practical and commercial reasons. Higher levels of interactivity or user input would require extended keyboards (more keys than the current remote controls offer), advanced new software and a lot of innovation in the present habitual, routine-like television programme production practice. It requires a switch in the making of television that is at odds with the fundamental structure of present television production (see below in the Conclusions). Current broadcasters will not be very motivated to do so for the decisive reason that the present subscribers to digital and interactive TV services are not asking for such advanced applications of ITV, as we have observed above. It looks like the users or viewers also reason from habitual television practice. It appears that they just want more opportunities to select and react. All this might change in the future, of course, but there is no visible need for higher levels of interactivity in television using set-top boxes at the present stage of development.

Nascent needs of a higher level of interactivity might have better chances of fulfilment in hybrid ITV and Internet ITV. As a kind of prototype of future ITV fulfilling such needs contemporary broadcasters might prefer to experiment with enhanced television using hybrid ITV to start with. Here widely available and accessed channels (telephony, email) might be chosen to give viewers the idea that they have an input using a simple additional channel while broadcasters keep in complete control of their programmes. Besides, this appears to be the easiest way to earn extra money in the short term, while extended innovation over a long period of time requires big investment with insecure returns.

However, the best current channel for high-level interactivity in ITV applications seems to be Internet ITV. Here the maturing practices of human-computer interaction can be extended to multimedia applications, among them applications of ITV. There is much more room for user input and frequent interactive moments on the Internet. Television broadcasters also use this channel offering websites with background information for their programmes, virtual viewer communities, additional programmes or fragments, chat-boxes and files with old programmes. However, presently they invest more in the innovation of (packages of) programmes on their traditional channels of cable, satellite and antenna than on the Internet, in particular after the end of the Internet hype. Yet, the most important current problems with Internet ITV are its technical capacities and the habitual behavior of television viewers. Usually, Internet ITV lacks the bandwith and presentation screens required to watch high-quality television broadcasts. In the mean time, television viewing is moving in the direction of the home cinema, increasing the gap between television viewing on a small computer screen in individual settings and television viewing on the large screen of the living room and the (usually) middle-sized screens of televisions in bedrooms and kitchens. – Rarely, the Internet is connected to television via a computer or Web-TV device. – Moreover, most computer users are not (yet) used to watch regular television on their computers, as these are mainly used for work, study, hobby information, games and email.

5. Conclusions and discussion

The present use of set-top-box ITV in the Netherlands is a very minor phenomenon. Only 7.6 per cent of the 80,000 subscribers to additional digital and interactive television services on cable used one or more applications of ITV in 2002. The remaining subscribers are not even informed about the availability of the interactive services. They subscribed to receive extra channels and movies.

   Subscribers to the new digital and interactive services watch less regular TV. Instead they watch more self-selected movies and additional channels. This means that viewing behavior is becoming more selective. However, total viewing time remains longer than among television viewers not subscribing to these services.

   The respondent subscribers appreciate the user-friendliness of the operating software, the hardware and the programmes of their set-top-box ITV. Three quarters of ITV users find that interactivity makes programmes more attractive.

   The users of interactive programmes like the genres of entertainment and infotainment in particular. They prefer games and quizzes. This comes as no surprise for these genres are the first kinds of applications offered in the Netherlands. An interesting question would be whether this refers to additional gratifications of ITV use as compared to the use of traditional television. The surveys comprised no data to answer this question. This will be an item for future research.

   One of the most important results of our investigation is the observation that the activity of selection is favoured the most by the present users of set-top-box ITV in the Netherlands and conversation was the least popular. Customisation, reaction, production and transaction are mixed in their popularity depending on the particular application mentioned in the questionnaire. Roughly speaking this means that applications with a low level of interactivity according to the definition proposed in this paper are more attractive than applications enabling a high level of interactivity. This leads to the important conclusion that demand matches supply as selection and reaction are the most important *present* applications offered by set-top-box ITV in the Netherlands.

   No significant gender differences were found in the present preferences of set-top-box ITV. However, the age difference in preferences is significant. Young users (15-29) appreciate all kinds of interactivity more than older users (30-49 and 50+). This might be the result of the higher use of the Internet, mobile telephony, computers and computer or video games by the young generation. Most likely, this produces more experience, gratifications and habits in practicing interactivity. As compared to the use of old media interactivity has to be learned (Van Dijk & De Vos, 2001: 463). A second significant difference was found among people with different levels of education. Set-top-box users with low education favour interactive applications more than users with high education. This is a phenomenon that looks familiar when we remember former innovations in the realm of television and audiovisual media. People with low education were the first to adopt VCRs and video (arcade) games.

  The observation that demand matches supply in the preference of applications with a low level of interactivity brings us to the title of this paper once again. Is the present supply of set-top-box ITV in the Netherlands interactive television or some kind of enhanced television? We have seen that all present applications of ITV in this country are extensions of existing television programmes. Programming keeps its linear character. Inputs of users are not supposed to break the line of programme direction. It seems better to call this type of television enhanced television. This would meet the conclusion of Kim (2001) and Kim & Sawhney (2002) that interactive TV is a variant of *television*. They find that "the

fundamental tension underlying interactive TV is a cultural contradiction between interactivity as a communication form and television as an organizing model. It is a paradigmatic clash" (Kim & Sawhney, 2002: 224). To them so-called "interactive TV is a hybrid product which artificially grafts interactivity onto the TV model (*id.:* 227). When we reached the conclusion that to cross the line to 'real' interactive television new kinds of programmes have to be produced that increase the level of control or the user input of viewers, they would say that "the television system cannot accommodate such a control shift. It is simply incompatible with interactive communication or interactivity" (*id:* 223).

   We may agree with Kim and Sawhney that higher levels of interactivity in ITV require the use of additional other media (like the Internet and telephony) as long as the potential convergence between the Internet and television has not advanced much further. We have noticed that hybrid ITV and Internet ITV offer better opportunities for production (own user input) and conversation. But this does not mean that the offer of ITV applications with lower levels of interactivity is no type of ITV or does not offer the chance of developing viable business models based on this type of activity. It appears that these applications are feasible to be grafted in the 'TV model'. Kim & Sawhnee speak very disparagingly about "this machine-like new medium" with its "narrow and repetitive 'VCR-control-type' interactivity or mechanical 'push-button' switching" (*id*.: 224). However, we have found that (at least) present set-top-box ITV users just do prefer such types of interactivity and switching. We do not know whether there are other user groups that like hybrid ITV and Internet ITV better, or who these users are. Anyway, it is not unconceivable that we will observe a future *split* between rather different types of ITV. On the one side we could find ITV with lower levels of interactivity as an extension of present television appearing as some kind of interactive home cinema, and at the other side ITV with higher levels of interactivity as they are experienced in human-computer-interaction and Internet or multimedia use enabling more creative user input, for example like present amateur webcam productions. This conjecture might be an issue for future research.

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