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## ► To cite this version:

Alain Derycke, José Rouillard, Vincent Chevrin, Yves Bayart. When Marketing meets HCI: multi-channel customer relationships and multi-modality in the personalization perspective. HCI International 2003 10th International Conference on Human-Computer Interaction, 2003, Heraklion, Greece. pp.626-630. hal-02442165

**HAL Id: hal-02442165**

**<https://hal.science/hal-02442165>**

Submitted on 16 Jan 2020

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# **When Marketing meets HCI : multi-channel customer relationships and multi-modality in the personalization perspective**

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## **Abstract**

This paper presents a first investigation on new forms of interaction not yet approached broadly by the HCI community. It's the study of the convergence and divergence between the personalizations of interaction seen under two complementary angles: direct marketing, with its multi-channel customer relationships, on the one hand, and HCI view on the other hand. Our aim is to understand this, both theoretically and experimentally in order to design new interactive system for E-Commerce that exhibit a better relationships, such as continuity, between the organisation and the customers. This is achieved by developing a theoretical framework for the analysis and design of such systems and by designing and experimenting a first prototype exploring the potential of integrating voice and Web interactions.

## **1 Introduction**

The multi-modality has been studied since many years in the HCI field, and personalization has been used and studied in marketing for a long time, but seldom, both were studied jointly. However in spite of some similarities between multi-modality, as seen in HCI, and multi-channel, as seen in interactive marketing, there are still differences that are not only due to the viewpoint put of the stakeholder (interactive user or customer) but also due differences into temporal aspects and interaction strategies which are underlying. This field of investigation is relatively new for the HCI community so we decide to start pragmatically by proposing a first framework for the analysis and design of new prototypes using the potential of the multi-modality of the Web technologies such as VoiceXML. This work is rooted into the large experience gained by one of the organisation supporting it, a large Direct Marketing company, 3 Suisses International, which have experimented, or maintained in production, various channels and interactive technologies in its relationships with its customers. This experience have leaded us to study this domain with the goal to have a better understanding of the interaction process through a combination of channels and to derive some new approaches for the future of interactive systems, more integrated and “intelligent”.

## **2 E-commerce, multi-channel customer relationships and personalization**

In direct marketing focused on the individual customer, it is not true that development of E Commerce means the exclusive use of the Web channel. Indeed there are already well established relationships with the customer through a diversity of communications channels (or medium) such

as Call Centres for phone, Audiotel and videotext servers, Web, WAP, SMS... Nevertheless Direct Marketing companies have developed also some forms of personalised relations with their customers, and are going toward a One-to-One marketing strategy (Peppers & Rogers, 1997). This has been amplified by the support of the personalization processes into ECommerce solutions where, thanks to the technologies (Fink & Kobsa, 2000), it is more easy now to apply this kind of personalization, not only based on the direct knowledge of the customers (through her/his passed purchases or actions and from direct filing of some forms) but also indirect knowledge, for example by inferring from user interactions through the HCI. Our view of the E-Commerce reflects the central place of the knowledge about the customer not only as a user of the interface, with his/her preferences and skills, but also as a long term customer relationship, in order to augment or to maintain her/his loyalty or fidelity. We are closed to the definition of the E-Commerce given by (Holsapple & Singh, 2000) “*E-commerce is an approach to achieving business goals in which technology for information exchanges enables or facilitates execution of activities in and across value chain as well as supporting decision making that underlies those activities*”. In putting emphasis on the decision process, informed by knowledge learned from the past relations and interactions with the customer, the history, those authors shown also that this knowledge management process is not concerned only by traditional information (*know that*) but also by more procedural knowledge (*know how*) or inferential knowledge (*know why*). It appears to us that this knowledge capture must use all the opportunities of interaction with the customer whatever the channel he/she uses for that purpose. So all the relationships can be seen as a “learning relationship” where both the parties (seller and customer) co-operate, more or less, in order to maintain a mutual understanding of the transaction and to achieve their respective satisfaction.

Our experience, gained from a large base of user relationships with a multi-channel and personalization approach, have shown us, however, two main problems that our research program want to solve:

- One relative to a poor integration of the different channels into a common “*infostructure*”, an engineering problem avoiding the good articulation of the channels inside a same transaction;
- And a second relative to the quality of the relationship with the customer, viewed from the marketing viewpoint. Especially it appears that, during a business transaction which can last a long time, the commutation between the different channels (i.e. from Web to phone) can lead to a lost of the business opportunity for the seller and to a frustration for the client. In the HCI words the system is not “*Seamlessness*”.

### **3 A theoretical framework for the analysis of the multi-channel marketing interactions**

Our starting point, for our new program of research and the collaboration between HCI and Marketing researchers, is that it exists a proximity between the problem of multi-channel interaction and the multi-modal one, and that the personalization perspective is shared both by the Marketing and HCI communities, even if there are differences either in the aims of this approach or in the temporal grain of the phenomena. The research is done in two directions:

- First, on the elaboration of the theoretical framework in order to analyse and to model multi-channel interactions on a more large view, but still compatible, than those used for the study of multi-modality in HCI. The foundations are taken into the field of the theory of language seen as co-ordination process for the sharing of a common knowledge, and the Grounding concept (Clark & Brennan, 1991). The Grounding provides an analysis framework because it allows characterisation of the various channels in accordance with their temporal and physical constraints. We used also the Activity Theory in order to explain the aforementioned co-

operation process between the customer and the selling company, reusing our previous experience for the design of evolving Groupware systems (Bourguin, Derycke & Tarby, 2001).

- Second, an experimental approach which required the set-up of a technological platform and the design of a prototype for exploring the range of problems, both of usability and implementation, of a combination of multi-channel interactions and multi-modal ones. Multi-modal interaction have had a new interest in the Web technology with the advent of natural language interactions favoured by the adoption of the VoiceXML standard and availability of tools to support it.

#### 4 The Prototype of an E-commerce Multi-modal, multi-channel site

Our first prototype already in operation is limited to near synchronous interactions and the available channels are limited to Web and telephone (equivalent to an Audiotel service). The technologies used and how is solved some problems such as synchronisation and articulation of channels are described in (Rouillard, 2002). “*One of the biggest problems in the way of multi-modal progression is synchronisation.*” (Breitenbach et al. 01). We are currently conducting two investigations with this prototype: one relative to an evaluation of the real use with a light personalization derived from users profiles and some elements capture during the session; the other on the extensions of our prototype in order to enlarge the support of others channels (SMS, WAP) and to support more asynchronous articulation of these channels.

We consider that it could be relevant to use HTML and VoiceXML alternatively, within the same application, and why not, synergicly, that is to say, in the same time. We would like to see if multi-channel and multi-modal interactions are useable on E-commerce systems. Indeed, it is illusory to believe that because a system is multi-modal, it will be inevitably used in a multi-modal way by the users (Oviatt, 1999).

The E-commerce application that we propose to develop is a kind of remote shop that sales clothes and others goods, on the Web. The server machine is a PC equipped with Windows NT and IIS, MS-Access, and IBM Websphere (for VoiceXML). The importance of the multi-modality is easy to understand at this point of the interaction. Indeed, if you are not already a client, and you want to become one, you will be asked to give some information such as your first name, surname, address, etc. If a speech recognition system can more or less recognize what you said (particular grammar and vocabulary are used), it is very difficult, nay impossible, to catch what you said if the linguistic domain is not limited. That's why we decided to propose to the new clients to identify themselves in a traditional web page, as we can see on Figure 1.

The screenshot shows a web form titled "Recording of a new customer in the database". Below the title, it says "Please, provide the following information and click on the submit button". The form contains four input fields: "Client Number:" with the value "43" and a note "(given in the vocal browser)", "Titre:" with a dropdown menu showing "Miss", "Firstname:" with the value "Jennifer", and "Surname:" with the value "Hutchinson". At the bottom right, there are two buttons: "CANCEL" and "SAVE".

Figure 1 : The information given in this web page will be used by the voice browser

From this moment, the information given by the user on the web page are usable in the entire application, including the phone side. This is possible thanks to dynamic grammars. After the welcome message of the computer, in a first step, the user gives her client number to the system, and if this number matches with a number in the database, the machine asks the user for a password. If it's correct, the user is now identified with a title, a first name, and a surname. The Figure 2 shows an example of oral dialogue between Miss Jennifer Hutchinson (which was unknown a few minutes ago) and the machine. In the oral interaction, the machine asks the user to go to a traditional web page and to complete a form (see Figure 1). At this moment, the synchronization process takes place, and the oral side is waiting for the data coming from the textual and graphic side. If the registration number used by the consumer is correct, the interaction continues on an oral mode.

10:32:15.000 C: Welcome on our web site. Are you already one of our clients?  
 10:32:26.671 H: no  
 10:32:26.843 C: We are going to create your client account. In order to register yourself, please give in the Web page value 43 as client number. Did you correctly hear your client number?  
 10:32:41.468 H: yes  
 10:32:41.484 C: Ok. I'm waiting while you are completing the Web page.  
 10:32:41.485 C: (waiting)  
 10:32:47.093 C: Your registration is correct Miss Jennifer Hutchinson. Would you like to buy something now?  
 10:32:56.671 H: yes  
 10:32:56.828 C: What do you want to buy Miss Hutchinson?  
 10:33:06.640 H: some dresses (...)

**Figure 2 : The oral dialogue uses information coming from the textual Web page**

In the same way, output synchronization is possible between graphical and vocal interfaces within the same application.

The screenshot shows a web browser window with a shopping cart and a table of products. The shopping cart is titled 'Your E-Basket' and contains one item: 'Dress Rene' with a price of 53,5, a purchase date of 19/04/02, and a purchase hour of 10:05:26. The total amount of the basket is \$ 53,5. Below the shopping cart is a table of products with columns: Product Reference, Product Description, Picture, Price, Purchase date, and Purchase Hour. The table contains three rows of data.

| Product Reference | Product Description | Picture | Price | Purchase date | Purchase Hour |
|-------------------|---------------------|---------|-------|---------------|---------------|
| 58                | Short Woman         |         | 37,66 | yellow        | 38            |
| 59                | Short Jean Woman    |         | 12,3  | blue          | 38            |
| 60                | Short Cool Woman    |         | 15,88 | yellow        | 39            |

**Figure 3 : The web page gives automatically the results of an oral request**

The Figure 3 shows how a traditional web page gives the results of an oral user's request. This page is automatically refreshed every 5 seconds (for example), and retrieved the current data

useful for the user to choose a product in the virtual shop. So this multi-modal interaction allows seeing on the screen some information that the vocal browser cannot display, like the photos of the goods, in our example.

## 5 Conclusion

We have defined a theoretical framework that is useful for the classification of the different channel or media used in the interaction in the framework of E-Commerce. We have also conducted a systematic comparison of the potential of combining two channels, for example start with a Web interaction alone followed by a phone interaction (in parallel or in sequence), and determine some combination which are good candidate for a multi-modal like interaction. The first prototype, articulating a natural language interaction, based on the VoiceXML technology, and a Web interaction have shown us that technically, it is possible to couple and synchronize heterogeneous channels in order to give similar or complementary information to the customer: “*In the forthcoming years, two factors will jeopardize the deployment of Web applications: supporting multi-device outputs and one-to-one personalization.*” (Bonifati, Ceri, Fraternali & Maurino, 2000). We believe that a generic architecture will allow strong coupling/decoupling processes. It will be possible to begin on a channel, and to switch seamlessly on another one. That's why we are interested in modelling temporal information for this kind of interaction. Our present work is done in two directions: continue to enlarge the model of the channel characterisation in order to support new media such as Multimedia phone, and redesign of the first generation of Audiotel (automatic phone answering machine) in order to support both a better personalization and the possibility to combine this modality with another one such as the Web or the SMS.

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