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The development of the affective value in the entertaining interaction

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The companionship robots are they susceptible to bring an affective look?
The term robot comes from the Czech robota mean slave/work, thus to introduce the concept of companionship at the robot, would thus return to the friendly design of the robot at Rossum' S father in the play, the R.U.R. (Capek, 1920). It is then a question of meaning the sensitive relations between the man and the robot of companionship. This study aims questioning general public facing robot Aibo dog, and at raising its first feelings -let us recall for this matter that the 1st "friendly robot" was the hero of the animated series, Testuwan Atum, or Astro Boy, (Osamu Tezuka, 1952)-.

In this way the designer of Aibo's software questioned themselves rightly "will like we AIBO as we like Mickey? (Kaplan, 2001)" This questioning brings to check if the feeling of attachment can be corollary with the function of entertainment, directly resulting from an amusing presence. The objective of the experimentation carried out in May 2006 to the Sciences' Center of Montreal then consists in releasing from the formal and relational properties of an affective nature usable again in the design of a new object species, the sensory assistants filling our emotional lacks.

The experiment suggested to a panel of thirty three people is composed of three parts of twenty minutes each. Initially the people observe inert Aibo. During the second part, the master of Aibo presents the robot: its functionalities multimedial, its plays and its dances. Finally in the third time, the people play directly with Aibo. Aibo is able through mechanism of feedback to produce gestural, a behavior and even a

barking which modulates its emotional state. On each part, the people evaluate their feelings on differential semantic proposed. Their free feeling is evaluated at the beginning and in the last part in order to notify if there is a real change of attitude of the inert object to the animated object. It is thus a question of detecting the attributes of the entertainment and of checking the correlation with the universe of sensitive and of the affect.

The question remains neutral and open: "What do you think of Aibo? Describe your feeling in relation with it." Five principal concepts were raised from the data on this opened question: play, sensation/feeling, interest, animality, indifference. The sensitive feeling remain majority (57%) facing the other annotations of morphological or functional type. Moreover 36% of the people questioned in first part raise an agreeable feeling which moves towards a feeling of attachment after the interaction (24%).

The concept of recreation remains present through the evolution of the experiment, it is divided into two categories: the toy and entertainment. Also it appears interesting to notified that terms used around the toy (child) and by the animal substitute decrease by 30% at the end of the experiment, after having interacts with the object, what means that the characters liking and amusing weaken the technological and alarming slope literally robot in this question. When the term "toy" appears in first phase, it refers to the object and/or the child ("super toy for child", "is addressed to the children"...) while the terms concerned with the lexical field "diverting" do not define the infantile target specifically "attracting", "funny", "insane laughter", "amusing". In third phase the term "toy" is always used but the panel necessarily does not associate it to the child, it is not followed by the term "child" contrary to the beginning of the experimentation. A toy is a "object intended for the entertainment of the children". The definition even of the term included the child, but an adult can't (or even) have toy, a toy for adult? From where this essential distinction between entertainment and toy, the first being strictly indicated by the recreation. This differentiation is all the more interesting when the people describe Aibo like "capable of feeling and human capacity" or compares it with a being acting like a baby by bringing the ludic slope of the animal imitation until the human feeling.

If the interest is obviously caused by the awakening of the directions in first phase facing with the inanimate object, "envies of touching", "seeing", "to look at", "curiosity", it is exceeded by the slope diverting at the end of the experiment.

As for the adjectives describing the aspect of Aibo, they remain present in a way equal of one phase to the other: "nice", "pleasant" or "cute". They indicate at the same time the esthetics of the artifact in itself but also its behavior in the time of the interaction.

Thereafter only 54,5% of probed answer "yes" at the question "are you sensitive to Aibo, does it affect you? Why? "against 78,8% in third phase. This question is immediately put after the open question " What do you think of Aïbo? Describe your feeling compared to it ", it aims at pointing the characteristics bringing to a sensitivity, that is to say to define qualities of sensitive but also these lacks.

In first phase one finds terms qualifying the function and the utility of Aibo, the relative adjectives to his appearance and with the felt feeling, then a series of qualifiers based on the caused interest. Indeed, the appearance of Aibo has strongly evolved/moved in six years and this last version is not innocent it takes again the physiology of the dog, the most faithful animal of the man. The design of Aibo employs strategic aesthetic codes specifically supporting the attachment: a round muzzle, a quite round head, a small body and large legs similar with that of a puppy. Konrad Lorenz (1970) speaks about the physiological human characteristics bringing an emotional glance in an innate way. They are mainly the features similar to those of a child which sensitize the man instinctively, for example a face chubby-checked fellow, short and thick members, awkward, characteristic gestures ideally stereotyped by Aibo.

Phase 1 Are you sensitive to Aibo? Why?	Function 36%	Appearance and feeling 21%	Uninteresting 18%	Interesting 12%
Terms used by the panel	« toy » 20%	"nice", "attaching", "smile", "stylistic success"	"useless", "does not do anything", "that does not interest me"	"it pricks my curiosity", "surprising", "impresses"
Phase 3 Are you sensitive to Aibo? Why?	Human 24%	Technological / mechanics : 24% of which generated complexity 12%	Entertainment 21%	—

Fig. 1 Are you sensitive to Aibo? Why?

The concept of humanity remains the response most present and most unexpected in this last part [Fig.1] : "it makes me feel a reaction", "it tries to resemble, imitate the attitudes and characteristics normally attribute it to a living being", "it appears alive", "reactions which approach human", "just like human", "more human like", "it produces sounds anthropophonic". The interactivity engaged with the robot thus lets hear a certain human "attaching, attracting", "significant" sensitivity, "it is necessary to pay attention to him". The human character extends even until the sounds emitted by Aibo, of the assertions or the requests expressed near the user according to significant and understandable phonetic codes.

The importance of the comparisons to human associated the interest of an esthetics cute forms the principal characteristics of sensitive and make it possible to increase the potentialities of attachment towards Aibo. Such qualities are improved besides by an entertainment and unexpected reactions.

The unforeseeable slope and even disobeying thus seems to allure in a positive way (for 30% of the people) even if technology take a part of a consequent share in the effect of surprised: "it has never be seen before". The concept of entertaining presence is also evoked behind the idea of interaction "one can easily waste time with it. It is interesting to it ", " it makes us temporarily forget what it occurs [...] ", " its presence convenes the game and attraction ", "one can speak to it and encourage it [...] ". "Positive affect arouses curiosity, engages creativity, and makes the brain into an

effective learning organism (Norman, 2002).” 33% of probed acknowledge to appreciate the shared interaction, more particularly the expressions and the movements of Aibo.

The distraction facilitates the interaction and the reproduction of the human and animal expressions makes it possible the panel to converse on the same mode. A sensory language which wants to be more instinctive by privileging the contact - the instructions of Aibo do not index all its expressions -. The more so as H. Ahn and R.W. Picard (2006) « [...] showed that the integration of the affective anticipatory reward could be used for enhancing the efficacy of learning and decision making. » The concepts of animal imitation and mechanics disappear then to leave place with an attraction about the surprise and of unexpected through the reactions of Aibo, completely antagonistic quality to the image of the robot to the repetitive gestures. Thus according to 93,9% of the questioned people, Aibo is diverting.

Aibo thus does not leave indifferent and after this analysis two qualities are distinguished: to attract the attention and to surprise the user. These characteristics increase the entertainment potential the more so as an unexpected element increases indeed the challenge in the interactivity and thus the interest according to the optimal flow experiences (Cziksentmihalyi, 1990). A feeling of the order of sensitive was already present in the concept "of interest" specified in the question "are you sensitive to Aibo? ".

To maintain the attention is a factor of attraction but to express a certain brittleness as certain people could evoke it "it is necessary to take care of it", "it is small thus it seems to need protection" preserves not only the attention of the user but express a need on behalf of Aibo towards the user. In addition 9% evoke a non responsibility facing in Aibo ("for people not having the capacities to take care of a true pet [...]") with the difference of a true dog, and thus claim as an user a need for responsibility to this new object.

This implication on behalf of the user would then make it possible to develop a new relation with the artifact and to be felt there useful. In this manner Aibo flatters its interlocutor by responsabilisant it as for his companionship. It expresses like it needs human being to move it and to become even more human as wishes it some of the probed people "I will like that it can think more and become more human (it's seen what they wish)".

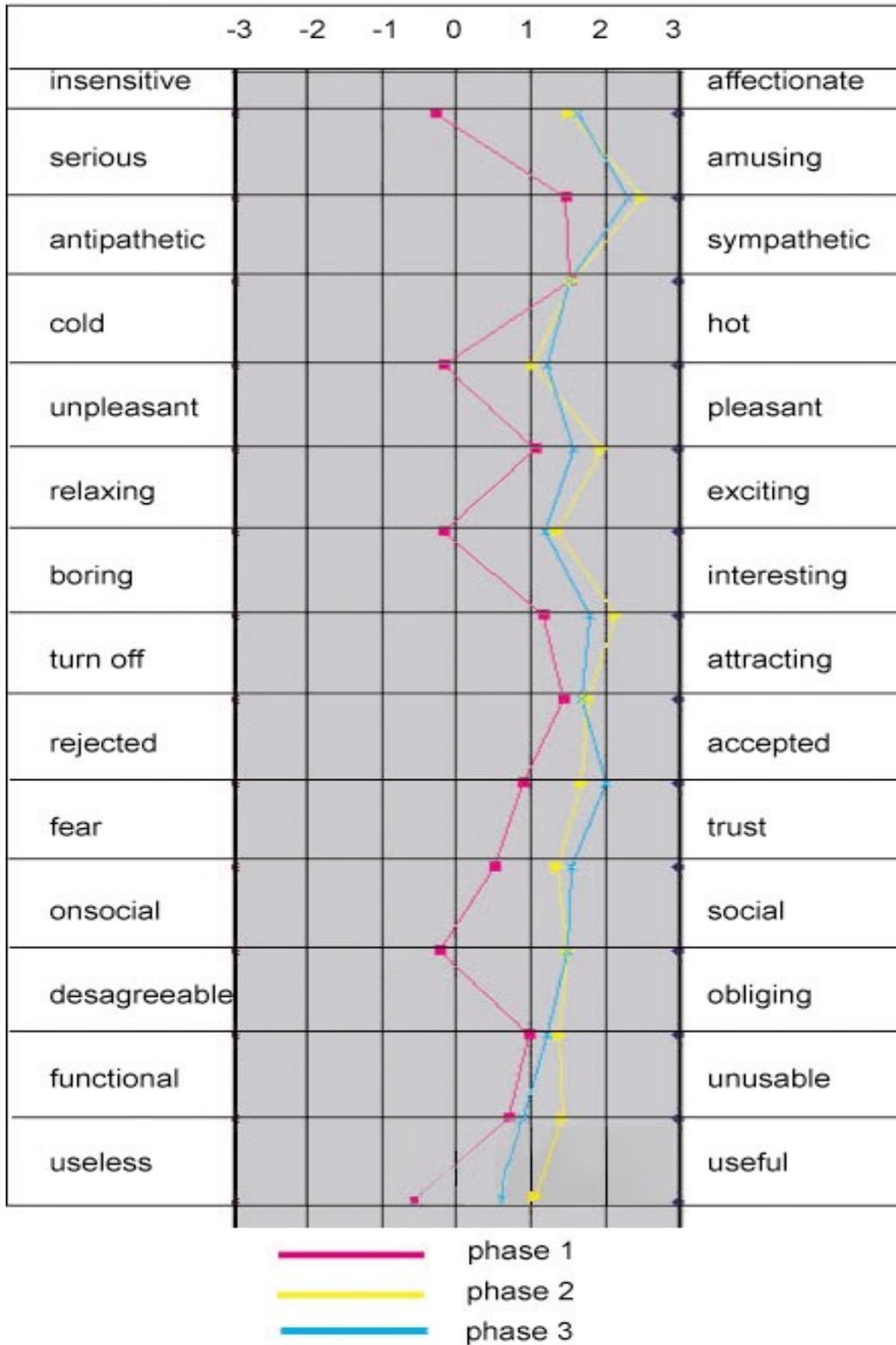
Aibo takes all its humanity only in the presence of the panel, it grants this metaphor beyond the animality, towards an expression of life, a certain humanity. Aibo thus becomes human among the human when they want to allow it this status.

Thus, the results presented in the differential semantic validate the progression of the positive values after the interaction .

The examination and the analysis of the results of the semantic grid [Fig. 2] were selected and scheduled according to our questioning, according to the profiles connected to affectivity, the function and the entertainment. The concepts considered as "positive" in this study, ie those which answer concepts of sensitivity and play, were rocked on the right. Kind, the comparison of the three phases checks the increase in the positive values well after the interaction with Aibo.

Semantic differential

Fig. 2



Besides phase 2 where the master of Aibo explains the functions and the use of the robot shows values more important than in phase 3 in the positive one. That can mean that by observing the interaction between Aibo and its master, the panel perceived

Aibo to the maximum of these capacities. The panel can certainly have felt the fact of being much less familiar with Aibo than its master. Then the panel as the feeling of being disappointed a little by their interaction filled with wonder or clumsy, according to cases. This remark is valid for example for the concepts "interesting" and "exciting". When one have been asks at the end of the investigation "what do you retain from this experiment? ", the question of the time of interaction is frequently mentioned. "A wired expiriment, the amazement makes that we more lok at it then giving it orders", "we want to do an other experiment more intimate, to be at this rythm", "it assigns to me, it is entertaining, but in the long time, do I'll stick to it?" The feelings gattered are based in the same time on the spontaneousness and the reaction but also on a short period of time. The most positive appreciations remain "amusing" and "interesting", however in last part the term which comes to join these positive values is: "accepted". Even if this concept were positive throughout the experiment, this result shows that the panel seized the object well and that they associate it to a challenge. The concept of "useful" and "useless" remains more the "negative one" during the three phases. The useful of Aibo thus appears debatable at this stage of the questioning.

The concept expressing the most difference between the first and the last phase remain "affectionate", "exciting", "social" and "useful". The slope animated of Aibo appears then like an essential element in the attribution of these characteristics.

By creating sound and movement, Aibo affirms its presence. For 12% of the probed people Aibo is an object diverting able to fill a presence thanks to its animation as well as a game or a television. 72,7% ensure that Aibo would be likely to fill a presence according to certain conditions.

Indeed, with round and pleasant curves, an esthetics with at the same time technological and ludic, with "these hollow ears", Aibo invites the public with the entertainment. The perceived utility is thus of the order of the entertainment [Fig.3]. However the collective imaginary of the robot slave remains, here through the domestic tasks, "to pass the vacuum, to make the bed", "to bring my newspaper in the morning"....

Phase 1	To entertain 51%	Domestic tasks 36%	To supervise/ to alert 9%	Companionship / presence 9%	Multi-media 6%	No tasks 1%
Phase 3	To entertain 60%	To supervise/ to alert 24%	Companionship / presence 15%	Multi-media 12%	–	Several tasks 3%

Fig. 3 "Which tasks would you entrust to Aibo? "

At the end of the experiment, the interaction between the panel and Aibo have a direct impact on the cognitive relation on the subject and thus enhance the experiment. The tasks related to the idea of watching the hose come to consolidate the concept of companionship and presence. The use of the term "to supervise" means that the people grant a concept of control or of defense with Aibo but also which they integrate the fact that it can watch over them and grant it a function of benevolent and reassuring. The more so as 12% also estimate that it is intended to fill a presence at the people alone, old, sick or deficiencie.

The panel finally associated an object of entertainment a concept of supervision to come from there to a concept of presence distracting and benevolent thus increasing the emotional value of the robot at the point to wish to entrust the most fragile people to him. "Users may generate perception of affective quality of an IT very quickly, usually before its functionality and usability are appraised. An uncomfortable feeling at first glance can easily drive a potential user away. To attract and sustain more users and enhance user experience, IT practitioners should build IT that only works well, but also elicits favorable perceptions in terms of affective quality. (Zhang, Li, and Sun, 2006)." 15% of the people who consider it able to fill a presence, perceive it as an entire being with a "living aspect", "a proper conscience". The degree of interactionnelle intimacy with Aibo moves gradually during the experiments, Aibo is "able to bringing people together", "it could (fill a presence) if it develops a single relationship with its master". Behind some reserves and apprehensions on behalf of the panel compared to the robot and the place which it could take in the society, the results reveal a concept of "artificial presence" as soon as Aibo is in direct interactivity. Aibo initially starts a certain sensitivity by its morphology, this sensitivity then developed by a behavior completely coherent with its esthetics, ludic, powerful and nice.

While directly integrating the user in these interactive functions, Aibo thus comes to wake up affectivity. During the experiment, a person asks the question with Aibo: "do you love me?" The activity created by Aibo returns to a feeling of artificial presence. The design of Aibo favours a convivial and entertaining interaction. So Aibo does not remain in the category of the robot imitating a dog to amuse the children, it is not an object on which one projects his affectivity as a football player would give to his fetish ball. Aibo puts in scene a new type of relationship with the user.

At term, this type of robot could completely adapt to the user such as a print, negative, in order to identify its states and to meet its emotional needs; this could bring to develop an object species intended to fill our sensitive and emotional lacks. Consequently, it seems necessary to preserve distracting qualities as well as morphological or behaviorist in order to support a relation of affectivity towards an artifact which can become a transitional object (Winnicott, 1951) for adult. The winnicottien concept of "transitional object" indicates an object supposed to make the transition between the maternal protective universe and the external world, in the children. This kind of robot could then become a sensory assistant creating an individual sphere and a close friend charged to support the user all while maintaining a certain humanity and releasing a sensitivity able to gather the people. This new object species ergonomiquement adapted to the psychological universe of the user would function like emotional support.

The omnipresence of the entertainment to each phase seems a direct factor then that affect the sensitivity of the user. If the cute esthetics of Aibo plays on the innate releases, the omnipresence of a distraction and the direct interaction with the object then seem as an element of exponential growth of the emotional value and understandable by soliciting the individual in a ludic and personal way.

The committed experiments show through the phases 1 and 3 that started affectivity is primarily consolidated by an animated interaction which lets see the operation of an artificial life completely autonomous. The movements, the expressions and the

sonorities of Aibo described "as human" hang the sensitivity of the user. The unexpected surprise and reactions create by Aibo remain a corollary quality with the created entertainment, supporting the interest more and more. Its entertaining presence associated a benevolence largely appreciated by the panel, amplifies the socio-emotional value of the robot until more humanizing it by trusting it to the point of giving it the care of the weakest people in the society. By maintaining this new type of very singular relationship with the user, his role could be extend well beyond the company until the sensory assistance and then fill the feeling of presence by reviving the sense. Thus a socially codified esthetic and an intelligent interactivity causing at the same time the participation of the user but also the need on behalf of Aibo towards the user, develop the object as this one raises the human in an interdependent relationship.

These characteristics soften and sensitize the interaction until humanizing it. The design of the robots takes as a starting point the nature but it remains however to be known in a forthcoming experimental work if the creator can move away from the figurative forms while preserving in a readable way these codes and these characteristics which make of Aibo a socially acceptable robot. Would the abstraction of the animal or human characteristics maintain this sensitivity relational almost immediate?

REFERENCES

Ahn, H., and Picard, R.W., (2006), "Affective Cognitive Learning and Decision Making: The Role of Emotions", *The 18th European Meeting on Cybernetics and Systems Research*, EMCSR, Vienna, Austria, April 18-19, p. 6.

Cziksentsmihalyi, M., (1990), *Flow : The Psychology of Optimal Experience*, Harpers Perennial, New York.

Kaplan, F., (2001), "Un robot peut-il être notre ami ?", *L'Art, la pensée, les émotions*, Orlarey, Y., editor, Grame, p.102.

Lorenz, K., (1970), *Trois essais sur le comportement animal et humain*, Seuil, Paris.

Norman, D.A., (2002), "Emotion and design : Attractive things work better." *Interactions : new visions of human-computer interaction IX*, 4, pp. 36-32. <http://www.jnd.org/dn.mss/CH01.pdf>, p. 6.

Winnicott, D.W., (1958), "Transitional objects and transitional phenomena (1951)", *Collected papers. Through paediatrics to psycho-analysis*, Tavostock Publications, London.

Zhang, P., Li, N., Sun, H., (2006), "Affective Quality et Cognitive Absorption", *Proceedings of the Hawaii International Conference on System Sciences*, p. 11.