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Forms and theories of communication: from multimedia to Kansei Mediation

Abstract In this paper we describe a form of communication that could be used for lifelong learning as contribution to cultural computing. We call it Kansei Mediation. It is a multimedia communication concept that can cope with nonverbal, emotional and Kansei information. We introduce the distinction between the concepts of Kansei Communication and Kansei Media. We then develop a theory of communication (i.e. Kansei Mediation) as a combination of both. Based on recent results from brain research the proposed concept of Kansei Mediation is developed and discussed. The biased preference towards consciousness in established communication theories is critically reviewed and the relationship to pre- and unconscious brain processes explored. There are two tenets of the Kansei Mediation communication theory: (1) communication based on connected unconciousness, and (2) Satori as the ultimate form of experience.

Keywords Kansei Mediation · Communication theory · Unconsciousness · Lifelong learning · Satori

1 Introduction

In the 1980s, we witnessed the emergence of personal computing and alongside it pioneering attempts at new multimedia communication. One particular innovation was the French Minitel, an online videotext service. Noticeably, the most popular service was the "messageries roses" dealing with personal, emotionally charged message boards [1]. With the explosion of message boards and online communities in the 1990s thanks to the Internet, more sophistication was observed in communications [2]. Multimedia and sometimes multimodal systems were introduced and communication became richer in terms of content, emotions and personal value. At the same time communication expanded from explicit and impersonal to implicit and emotional. Icons, "smilies", emoticons [3] and other artefacts were used to enrich the communication. In today's mobile phones and handheld Internet terminals, communication is rich in media and modalities and is allowing for some personalisation of the messages. Short Message Service (SMS), and Multimedia Messaging Service (MMS) in modern mobile phones have changed significantly how we communicate in particular for teenagers. The particularity of such communication is not the clarity of the messages these young people want to send, but the evasive nature of the conversations they are having. Messages with logical meanings are seldom exchanged, as if both participants of the conversation were in the same location and were relying on other means to support their messages (i.e. body language [4]). The habit of useful and meaningful conversation is being replaced with chit-chat, smalltalk and gibberish. We are looking forward to investigate the improvement of communication by experience-based learning in a lifelong perspective [5]. What could be the ultimate experience based on lifelong learning and how could we design media technology to support this ultimate experience?

2 What could Kansei mediation be?

Against the conventional means of communications for which the main medium has been the telephone, in [6] it was already asked whether or not a new means of communications should be sought that is suitable for the present and future multimedia era. In what direction should the communication technology of the future be headed for? To learn the answer, we believe that it is necessary to understand global trends and to consider communications by returning to fundamental issues. To look forward a new way of technology supported communication the author of [6] introduced the

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idea of Kansei Communication. In this paper, we want to expand the concept of Kansei Communication into Kansei Mediation which includes lifelong learning and even enlightenment as an ultimate experience. *Kansei Mediation* is Kansei Communication based on and supported by Kansei Media. We make the distinction between Kansei Communication and Kansei Media, because Kansei Communication can already take place *without* any advanced technology (e.g. the Japanese tea ceremony, meditation, etc.). In addition, Kansei Media is the design challenge to enhance and enable Kansei Mediation into a new dimension of personal experiences via Kansei Communication.

Kansei Media technology originates from the concepts of Kansei Design and Kansei Engineering, described as translating consumer feelings and perception for a product into engineering specifications and design guidelines [7]. "Kansei media technology models the subjective information of a specific user, such as a personal knowledge of something, a taste, a feeling on something, an emotion, an intention, an idea, etc." ([8], p 136). Kansei Media is a promising but still challenging solution to establish a new paradigm for new media technology.

We believe that Kansei Mediation stands on a common ground with Buddhism and in particular Zen-Buddhism. Kansei Mediation can be compared to spiritual enlightenment as described in Zen-Buddhism. Whereby one is required to seek better perception rather than cognition, moving away from logical and ideal thinking, into self- and spiritual thinking. Before we can go directly into Kansei Mediation, we have to discuss the state of the art regarding communication and consciousness.

Consciousness helps us understand that there is a world that surrounds us, different from ourselves. The world around us is not only made of things and animals but also of other selves. These others are what make our society. In this society-based world, it is beneficiary to understand, comprehend and empathise with what the other selves are driven by, are intending to do and are experiencing [9]. There are also other advantages of such an understanding. Namely that one can anticipate and manipulate the behaviour of these other selves either individually or collectively (idem).

3 Model of communications

The design of conventional multimedia systems is based on the assumption that only logical information is sent and received in human communications. This is a rather restricted perception of the facts. Non-verbal communication and emotions play a major role in the interpersonal communication that we enjoy everyday. Moreover, the exchange of higher level Kansei information during communication is only attainable in highly sophisticated and mutually enjoyed communication [10]. Communication can be multimedia, multimodal or Kansei. It can be about understanding, about exchanging emotions, moods or sharing experiences. The communication features semantics, syntax construction or a variety of levels perceptibility. The user perception and action are at the sensory and cognitive level, the motor and synesthetic (perception across senses) level or the autonomic level.

Conventional media technologies have been designed to primarily handle multimedia, informative, logical communications based on logic and aiming for the user's understanding of a message. This is a narrow view on the communication capabilities of humans and Kansei Mediation affords new opportunities. It is a style of lifelong learning that possesses a rich combination of communication channels to let *conscious* and *unconscious* information flow freely. We will now discuss how human–human communication can be delivered unconsciously using modalities that are not perceived consciously. The four-ears-model of [11] distinguishes four important dimensions of any message communicated among humans: (1) content ("what are the facts"), (2) appeal ("what does s/he want me to do, think, feel, etc."), (3) relationship ("what does s/he think about me") and (4) self-disclosure ("what kind of person is s/he"; see Fig. 1). In communicating the sender sends messages about the subject, which tell something about him/herself about his perception of the relationship with the receiver and which appeal to the receiver to change in some way. One can say the sender talks with four different 'beaks'. To understand the sender well the receiver should listen with four 'ears' and each 'ear' should be tuned to what the corresponding 'beak'

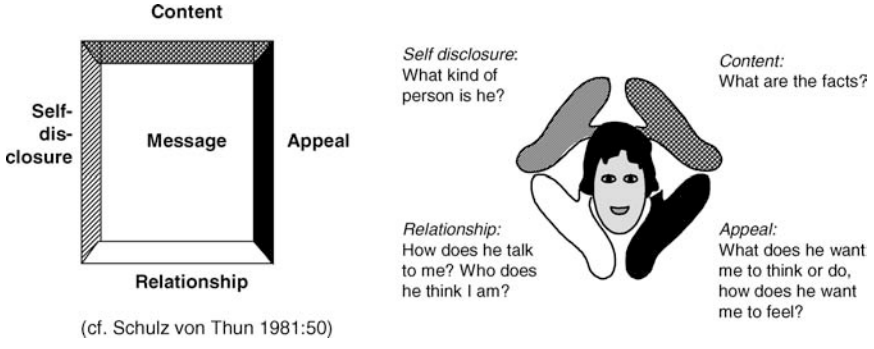

Fig. 1 The communication square and the 4-ears model of [11]

tries to say. If the 'beak' and the 'ear' are not in tune with each other, this is one of the main causes for misunderstandings.

One of the basic assumptions of the communication square and the 4-ears model is that the human behaviour is always influenced by both levels in the communication: *knowledge* ('conscious part' (content) and *emotions* ('un- or subconscious part' (appeal, relationship and self-disclosure). To successfully influence the behaviour of a receiver, one must try to understand each other at both of these levels. To be congruent throughout the communication, one should formulate messages in a way consistent with one's personality, attitudes and values. Merely teachers' tricks on how to influence others will not work. The model of Schulz van Thun is clearly based on the humanistic psychology. The kind of communication should be in agreement with the needs of the situation. Meta communication can help to learn how to communicate more effectively in a given situation and to recover from misunderstandings.

The integration of multiple, multimode and Kansei Media can enable a type of communications that is neither biased towards cognition, nor biased towards awareness. The experience users will have of such combination is labelled *Kansei Communication*. Kansei Communication is mainly based on the inclusion of non-verbal information throughout interaction (e.g., [6, 12, 13]). Recently, the word Kansei has come to be used quite frequently with the emergence of popular telephone services such as SMS and MMS. In Japan, young people of today communicating through mobile phones are said to be using Kansei-transmitting communication devices. Figure 2 shows a typical scene in a Tokyo metro carriage.

Although physically close, youngsters are all absorbed by their own communication via their mobile phones. Furthermore, the usage of mobile phones has drastically changed. While initially mobile phones were used for short telegraphic-like communication, they are now used for lengthy text and other media exchanges. The mobile operators have changed their pricing policies, from charging per minute of usage, to per message sent, and now per bundle of several hundred messages. Soon we should witness the emergence of Voice over Internet Protocol as an alternative to current telephone services. This would result in a telephone communication at no extra cost, with the price included in Internet Service Provider subscription packages.

Fig. 2 A typical scene in Tokyo Metro Carriage (Photo taken by B. Salem)

4 Kansei mediation and consciousness

Our main design goal is moving from semantic and explicit communication to emotionally charged and implicit communication. We strongly advocate that ultimately what is needed is a communication that is beyond the current multimedia and multimodal systems. We call *Kansei Mediation* a multimedia combination that allows for the exchange and creation of feelings, perceptions, experiences and levels of awareness. Kansei Mediation is based on a communication that about exchanging moods, emotions and sharing an instant both in a conscious and unconscious manner. Kansei Mediation is a synergetic combination of conscious and unconscious communication using a variety of media and modalities. It goes beyond communicating a message into sharing a moment and an experience. This is of particular interest for experienced-based learning systems [5].

4.1 From consciousness to unconsciousness

Consciousness is a topic for which either there exist no acceptable description, definition and explanation or, and this depends on one's point of view, there are far too many and far too divergent ones. Most definitions from the Western world are results of two major elements: (1) the emergence of Western religions: Judaism, Christianity and Islam, and (2) Descartes Dualism. The first have established the existence of a *self* and thus of a *soul* as one of the foundation dogmas upon which their doctrines have been built [14]. The second has created a schism between mind of body that does not necessarily exist and that has been a key, not necessarily a correct one, in the Western world understanding of consciousness. Even today's literature is full of reference to the mind and the brain as if it has been established beyond doubt that there was indeed a separation. The illusory Cartesian self is more and more challenged by biological and neurofunctional evidences that point to consciousness as an emergent property of competing and successive brain processes. Not as a separate property or entity that is associated with humans and lies beyond the reach of science and investigation.

Consciousness nevertheless can be defined according to accepted attributes (see Table 1). It is a state of mind, a mental property associated with the perception of self-awareness, subjective experience, the *sentience faculty* and

Table 1 Some conscious and unconscious phenomena and their relevance in Kansei Mediation (adapted from [21])

Phenomena	Conscious	Unconscious
Alert	Wakefulness	Deep sleep
Cognition	Explicit	Implicit
Contents	Focal	Fringe
Control	Planned, strategic	Un-planned, automatic
Events	Novel, significant, informative	Routine, non-significant, non-informative
Information	Attended	Unattended
Learning	Intentional	Incidental
Memory	Immediate, declarative, episodic	Long-term, procedural, semantic
Recall	Remembering	Knowing
Stimulation	Supraliminal	Subliminal
Tasks	Effortful	Spontaneous

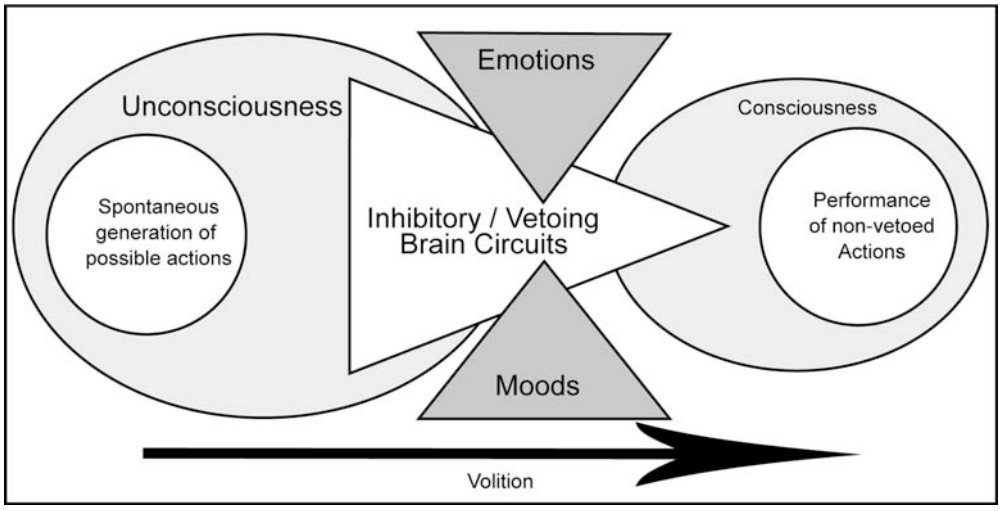

Fig. 3 The process how are voluntary action initiated

the *sapience capacity* [15]. *Self-awareness* is the ability to recognise that one exist, one has a body, a personality and inner thoughts. Subjective experience is about acknowledging how an experience is like. The sentience faculty is related to the capacity one has to perceive and feel. Sapience is the capacity to act with intelligence. Within the context of Kansei Mediation we shall focus on consciousness as an experience and the actual perception of such experience [16]. Consciousness could be divided into two subsets: *access consciousness* and *phenomenal consciousness*. Access consciousness relates to the availability of information for a particular purpose, such as an action. Phenomenal consciousness is the experience of a given state [17]. Thus, in essence 'what is happening' and 'how I feel it' are two faces of consciousness. A conscious experience could be described as the emergence of temporary, partially overlapping and successive global states of the brain. Thus, consciousness could be described as the temporal integration of this continuum of experiences into one single stream.

There are different levels of consciousness experience even within awake individuals. A good example to illustrate this is having two people on a bike. The one holding the handle bar and cycling will have a much richer conscious experience of the ride than the one sitting at the back and not even knowing where the journey is leading. We could describe the first experience as being *active* and the second as being *passive* [18]. It seems that consciousness is more than the sum of some components. Consciousness is needed for at least two high level purposes, the *pursuit of pleasure* and the *establishment of relationships with others* [19]. Consciousness is also the seat of a very important function: *prediction* [20].

Unconsciousness and consciousness play a role in the initiation and performance of voluntary actions (see Fig. 3). Both actions and expression originate in the unconscious. They are then vetoed by emotions and moods. Actions and expressions not vetoed are then performed. Some expressions are not voluntary and are very difficult to consciously vetoed and prevent from occurring, for example, blushing and crying.

In the dualist approach advocated by Descartes, the mind is conscious and the body unconscious. There was and still is a primacy of consciousness over unconsciousness [21]. The unconscious activities of the human mind are hidden under and are controlled by consciousness (the word oppressed is often used). In the emergent view however, there is no such separation between mind and body and consciousness is said to be an emerging property of unconsciousness [10]. It is

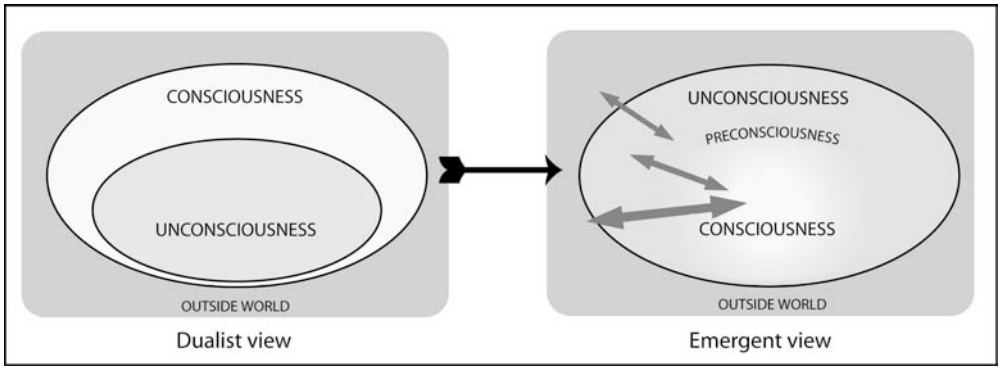

Fig. 4 Dualist and Emergent view of the relationship between consciousness and unconsciousness

moving away from the concept of conscious oppression of perception and expression into the concept of emerging perception and expression. Figure 4 shows a model of the different views of the relationship between human consciousness and subconsciousness, now (dualist view) and in the future (emergent view).

4.2 Ultimate experience: Satori

In our example of teenager usage of mobile phones (Fig. 2), they often indulge in lengthy conversations. These are often funny and light hearted, are rather shallow semantically and frown upon. In combination with the popularity of hand held game consoles, there is some concern about children loosing the ability to discriminate between the real world and the virtual world, and that video games are the cause of recent crimes by such young people [22]. It is possible to answer this question by looking at the relationship of Satori with communications [10].

In Zen-Buddhism, Satori (in Chinese 'wu') is described as the process of creating conditions enabling both consciousness and unconsciousness to be unified and mutually enhancing. There is a significant shift, from understanding consciousness as being capable of oppressing unconscious drives, perceptions and actions, into consciousness as being a continuity of these. In Zen-Buddhism, one type of disciplinary training undertaken to try to reach Satori is Zen Meditation. Zen Meditation involves making the inside of the heart empty by sitting in silence and minimizing the exchange of information with the outside. This can be thought of as a process to suppress the behaviour of the conscious layer and to enliven the behaviour of the subconscious layer. The objective is to integrate the conscious layer and the subconscious layer by suppressing the consciousness and magnifying the subconsciousness (see Fig. 4). The attainment of this condition or integration is the so-called Satori.

However, in following this process there is the side-effect risk of the emergence of unconscious drives and desires that are for example not acceptable socially [23]. The human subconsciousness is generally placed under the control of the human consciousness, i.e. in a suppressed state. Because suppressed desires and urges can surge into consciousness, they appear as forbidden temptations. This condition is clearly not true Satori, but a step along the way towards it. Zen calls this state the 'evil border', and strongly reviles this so that it is not confused with *true* Satori.

It is important that Kansei Mediation is not about a new type of communication via a new type of media that allows for the expression of *all* drives and desires. Kansei Mediation is about developing mediating communication technology that affords *true Satori*. In the sense of letting the user get in touch with his/her unconsciousness, and find a balance between it and his/her consciousness. As well as let the users communicate his/her states through Kansei Media.

5 Routes to Satori supported by Kansei mediation

From the above explanation, it is possible to provide a number of routes to reach Satori. It is natural to think that Satori in so-called Zen is attained by disciplinary training centred on Zen Meditation. The authors of [24] could show how healthy meditation is for the body. In addition, the key point with Kansei Mediation is the existence of interaction with a sense of immersion. Media giving a sense of immersion, such as movies and novels, have existed for quite some time. Adding some functions to communication devices such as mobile phones with SMS, MMS and other services will let people enjoy high-level communication together. Users of the devices will be at the same time the aims and the originators of the communication. Having senders and receivers carry out communications there is a high possibility that the combination of conventional, entertainment, amusement, and communication media will become integrated [18]. But to get into Kansei Mediation and yield a high level or even ultimate experience seems still to be a challenge. Later, we will present first attempts of already existing prototypes addressing this direction. Kansei Mediation will provide an integrated experience of interaction with a sense of immersion. In the world of communications, it is possible to rephrase this as the attainment of Satori. With Kansei Mediation, the social bounds between users will gain in strength and depth. "Thousands of people may live in a community but it is not one of real fellowship until they know each other and have sympathy for one another" [25].

5.1 Consciousness and the senses

The sensibility we have in detecting the occurrence of an event and our willingness to report it is not fixed. If sufficient incentive is given one would be more encouraged to pay attention to the possible occurrence of an event. This implies that there is no fixed threshold of separation between consciously experienced and unconsciously experienced phenomenon [26]. Different media can be used to communicate, for example sound, images, video, music, etc. Within the scope of communication, the human perception can be grouped into five groups: (1) sensory, (2) synesthetic, (3) autonomic, (4) motor and (5) cognitive perception.

The *sensory* perception relies on our senses, such as touch, vision or balance. Today most multimedia systems rely on the sensory perception for communication only. But the *synesthetic* perception is the combination of sensory information into a new perception. An example is the sense of taste that is the result of a combination of taste buds, olfactory sensors and mechanical sensors. The *autonomic* perception is the information that we perceive from our autonomic system, e.g. our guts, heart beat and sweat. The *motor* perception relate to the feedback we perceive from any action we perform. For example, the resistance an object will have to our pushing action. Finally, the *cognitive* perception is the high-level perception we build out of cognitive processing to achieve the assessment of a perception or of an experience, e.g. enjoying oneself, feeling satisfied, etc. (for further discussion, see [16]).

Pre-conscious or even unconscious information processing known as *subliminal* has not been developed further since attempts at subliminal advertising. However, subliminal perception has been investigated, for example, in crowds [27], for some emotions [28], and in self-perception [29]. The authors of [30] summarize that subliminal stimuli can affect individuals' high-level cognitive processes, including attitudes, preferences, judgments, and even their behaviour.

There is much room for subliminal communication, for example, in vision the rods and cones in the human eye possess remarkable amplification mechanisms [31]. They can produce a detectable electrical response to a single photon [32]. Similarly, with sound, in the human inner-ear the tympanic membrane can move to a distance smaller than the diameter of a single atom of hydrogen [32]. In flavours , the perception of taste involve a combination of "(1) direct chemical stimulation of taste buds, (2) stimulation of olfactory receptors by vapours from foods, (3) stimulation of chemical sensitive and somato-sensory free nerve endings" [32].

5.2 The self

For Buddhism, the self, i.e. the 'I' or the 'being' is a temporary ever changing combination of brain and body functions. These functions are working together interdependently in an instantaneous co-occurrence that is neither permanent nor unchanging. Buddhism stands unique in the denial of a soul or a self. In fact, it even considers such a concept as negative since it implies selfishness and attachments [33]. In Zen, it has been explained that the cause of human distress and worldly desires is that the original self and the self in real life are separated. It is possible that Kansei Mediation could be critiqued by the same point of view.

5.3 Technological renewal of spirituality

In 1997, the authors of [34] proposed already a new type of media called 'interactive movies' which can be realized by the integration of conventional medium such as movies, telecommunications, and video games. The interactive movies have the capability of creating a virtual world with various kinds of hyper-realistic scenes and computer characters. The metaphor of 'Inter Communication Theatre' enables people to interact within this virtual world. Therefore, people can experience the stories of the virtual world through interactions with the characters and the environments of the artificial world.

The authors of [13] introduced a means of 'touching the heart' in a new way by measuring the heartbeat of the 'honest' body and using advanced technologies to develop a new code of non-verbal communications [12, 35] from a hidden or subconscious dimension. The authors of [13] call this approach 'meditation art' or 'Zen art' based interactive experience design.

The authors of [36] developed the ZENetic computer that could help recreate conscious selves by calling on Buddhist principles through the inspirational media of ink painting, kimono and haiku. 'Recreating our selves' means the process of making the consciousness of our 'daily self' meet that of our unconscious and 'hidden self' through rediscovering creative resources deep within us that may have been forgotten but still resonate with vital meaning. The ZENetic computer is based on the design to meld the consciousness and unconsciousness in complete harmony. The technological trend of moving from communications handling conventional logical information to communications handling unconscious information is similar to a journey on the path to find the original self and spiritual enlightenment. New media such as third generation mobile phones and online virtual environments that yield an experience of immersion may be the means to achieve Kansei Mediation. When visiting a virtual environment, users are experiencing a simulation of reality with equivalent perception overload. Thus, we will end up with both consciously and unconsciously perceived elements of the virtual environments. What would happen if we combine the ZENetic computer with bio-signal feedback (e.g., brain waves [37]) and/or subliminal visual output [30] to influence the consciousness and unconsciousness of the user?

6 Learning and Kansei mediation

We advocate that Kansei Communication, with a focus on perception will improve and ease learning. While we

have seen an exponential growth of multimedia and multimodal material as helping tools for learning our vision is to further this growth with Kansei Media systems exploring new modalities related to unconsciousness. Effective lifelong learning requires the establishment of a learning culture which is characterized by the following aspects: (1) high learner autonomy, motivation, and discipline, as well as passion, commitment and engagement; (2) technology which include unconscious communication channels; and (3) successful collaboration of all involved parties responsible for the learning experience. "The future of how we live, think, create, work, learn, and collaborate is not out there to be 'discovered'—it has to be *invented and designed*. Mindsets grounded in seeing learning as an important part of human lives will be an integral part of the future" ([5], p. 8840). Kansei Media can support this goal to enhance lifelong learning.

To achieve Satori, the process resulting in spiritual enlightenment is likely, as time passes, to extend in the wrong direction, called the 'evil border', and it is shown that this 'evil border' is an appropriate way of explaining why, as time passes, e.g. children who are addicted to video games may fall into a state of being unable to discriminate between 'reality' and 'virtual reality'. In an integrated experience, many types of perception that are felt give the sensation of inspiration and fascination, but can any such sensation be useful in achieving Kansei Mediation discussed above? Here, it is important to make a key distinction. By carefully investigating immersive situations, it can be found that they can be classified into 'passive immersion' and 'active immersion' [18].

Does the level of consciousness differ between the two types of immersion (passive versus active), although there is no difference between becoming absorbed in passive immersion and in active immersion? Is there a big difference in the condition of fascination between active immersion and passive immersion? The condition where one forgets oneself or the condition where one loses consciousness (i.e. fascination, hypnosis, and trance) becomes a key factor that explains the feeling of passive immersion.

Active immersion, in contrast, is the condition whereby one's consciousness is maintained in a normal manner while becoming absorbed. Conditions of immersion while clearly maintaining consciousness include doing work with concentration and immersion, e.g. in the act of creating art. Even in the case of sports, such conditions are experienced. When such passive immersion or active immersion pays attention to the processes that take place an interesting factor becomes clear, namely, the existence or non-existence of interaction. We feel passive immersion when we are only receiving information, such as when we watch movies. In other words, there is a lack of interaction here. In contrast, active immersion differs in that one is working on the object, such as creating art and participating in sports. In other words, interaction exists with active immersion. Consequently, the existence or non-existence of interaction is the key that distinguishes passive immersion and active immersion. From the above discussion, it is clear that 'active immersion' and 'passive immersion' probably correspond to *ideal* Kansei Mediation and *incomplete* Kansei Mediation, respectively.

7 Drawbacks of Kansei mediation

Also, it is often suggested that the animation movies and video game contents produced in Japan are evidence that the Kansei of the Japanese is of a high level. However, there are also a number of adults who frown upon young people who become engrossed in long conversations on cellular telephones. A lot of voices can also be heard criticizing some types of new media, especially video games, which are said to distort maybe the boundary between 'reality' and 'virtual reality' for children addicted to them. Why have such antagonistic reactions emerged? In this paper, it has been proposed that it may be and hopefully will be possible for interactive media to achieve high-level communications corresponding to Satori. Satori is a condition in which peace of the 'heart' is achieved. However, there are also viewpoints that Satori is something that is achieved only when we are isolated from general life and that it has no relationship with our usual way of life. Interactive media could also be said to relate only to a special part of human life, i.e. to the domains of entertainment and amusement, and not to the practicalities of life. Responding to this argument, we would like to point out that the latter part (stages 5 till 10) of 'The Ten Ox-Herding Pictures', show that there is a process to return once again to real life at the point of Satori. A detailed discussion of this issue has to be made elsewhere (see [10]).

8 Conclusion

Of course, this paper is somewhat speculative and very ambitious by nature, but it provides a long-term and hopefully programmatic orientation for future research from Multimedia to Kansei Media[tion]. We advocate that the design of future communication and learning technology should consider high-level goals by supporting a particular interactive process that could lead to something like Satori. We are fully aware that this is still a long way to go, but we could direct our research in such a way that we can increase the chance to build such technology. Let us try it, it seems to be very promising!

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