A CRITICAL DISCUSSION ON THE USE OF THE NOTION OF CONVIVIALITY FOR DIGITAL CITIES

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ABSTRACT

Conviviality is usually considered a positive concept however, as it becomes an instrument at the service of power relations, a darker side emerges. In this survey paper we raise the question: Which definition of conviviality can be used and operationalized for digital cities? We propose a two-fold definition of conviviality as (1) a condition for social interactions and (2) an instrument for the internal regulation of social systems. Furthermore, for digital cities, we propose to use conviviality as a mechanism to reinforce social cohesion and a tool to reduce mis-coordination between individuals, groups and institutions.

KEYWORDS

Conviviality, multi-agent systems, normative systems, social computing, digital cities.
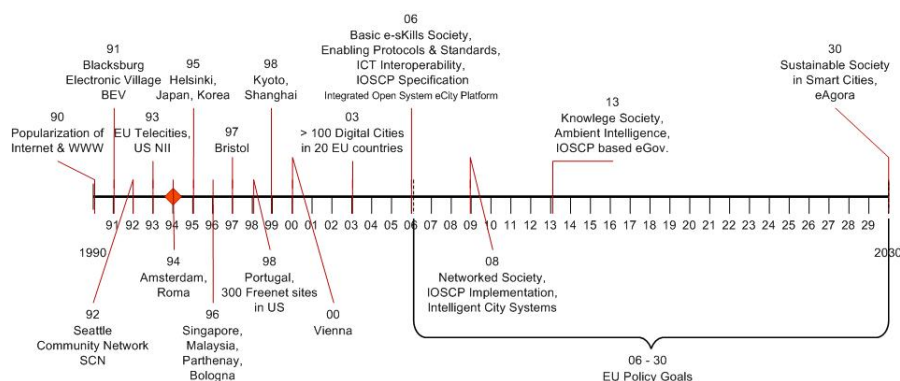
1. INTRODUCTION

The concept of conviviality often comes up in the context of web communities to describe *sociable* and *forthcoming* relations but it also arises in institutional contexts to generically denote the more specifically *human* qualities of communication: fun, easy going, friendly, cheerful, lively or polite. Looking at the term frequency on the Europe Information Society Thematic portal, if one enters today "convivial" in the search box, the result pages list 65 different documents. Indeed, in 1998 the European Community developed its strategy to promote *conviviality* as shared social value and selected it as research theme, one out of four, for its 5th Framework program for research (1998-2002): *Societe de l'Information Conviviale, User-Friendly Information Society.* It first called for large scale projects and programs that promoted user empowerment, human interactions, ambient intelligence and distributed services, for the elaboration of projects ranging from Content4All *(*2004-2006), to Humaine (2004-2008) to Companions (2006-2010) and programs such as the Convivio Net Consortium (2003-2005) developing *convivial* technologies, that is people-centered; All these initiatives seek to address the growing challenges in digital cities: need to support new interaction and communication paradigms, to bridge the increasing digital divides between social groups and remedy nascent social fragmentation and isolation by increasing social cohesion and community identity.

Generally speaking, a convivial place or group is one in which individuals are welcome and feel at ease [Ackermann, 2005; Sipitakiat, 2001; Schechter, 2004] but definitions in literature spread from *individual freedom realized in personal interdependence* [Illich, 1973] to *rational and cooperative behavior* [Sadek et al, 1997] to *normative instrument* when in the hands of power at play [Taylor, 2004].

In this survey paper we raise the following question: Which definition of conviviality can be used and operationalized for digital cities? By means of information and communication technologies, digital cities are virtual presences and extensions of our physical cities. Started in 1990 (see Figure 1) they divide into five broad categories [Ishida, 2000]: Non-profit grass-root community initiatives from the early days, municipal information and communication networks now referred to as e-governments, commercial city-oriented web sites such as AOL Digital Cities and MSN Citisearch, virtual environments for virtual communities for example communities of interest and finally information and communication technology (ICT) experiments.

Although initially an American phenomena, the European Community quickly caught up in '93 with Telecities Network and in 2000 a 30-year plan encouraging member countries to build their own digital cities based on common vision. Each step of the plan corresponds to a technological level: the current stage focuses on establishing systems interoperability, the following one on Intelligent City Systems (2009), then Ambient Intelligence (2013) and finally Smart Cities (2030). The principal objectives are to "transform and modernize local administrations in order to improve the level and quality of life of the population at both individual and community levels" [Ishida, 2000], for example providing 24/7 access to services and content to reduce waiting lines and traffic congestion, or multilingual functionalities to reflect the linguistic diversity, facilitate inclusiveness process and reinforce social cohesion.

Figure 1. Digital cities timeline

06
Basic e-sKills Society,
Enabling Protocols & Standards,
ICT Interoperability,
IOSCP Specification
Integrated Open System eCity Platform

91
Blacksburg
Electronic Village
BEV

95
Helsinki,
Japan, Korea

98
Kyoto,
Shanghai

30
Sustainable Society
in Smart Cities,
eAgora

90
Popularization of
Internet & WWW

93
EU Telecities
US NII

97
Bristol

03
> 100 Digital Cities
in 20 EU countries

13
Knowlege Society,
Ambient Intelligence,
IOSCP based eGov.

91 92 93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

1990

2030

94
Amsterdam,
Roma

98
Portugal,
300 Freenet sites
in US

08
Networked Society,
IOSCP Implementation,
Intelligent City Systems

92
Seattle
Community Network
SCN

96
Singapore,
Malaysia,
Parthenay,
Bologna

00
Vienna

06 - 30
EU Policy Goals

Our main question breaks down into the following research questions: what kinds of notions of conviviality exist and how can these notions be used for digital cities. The methodology we follow for this paper is a literature review in the areas of semiotics, philosophy, sociology, computer science, agent theory and human computer interaction. We then proceed with critical discussions.

Our success criteria are the generality of our model and the evaluation and measure of conviviality. As stated by Sadek et al. [Sadek et al, 1997], conviviality is "the essential and global characteristic of services (…) it emerges from the intelligence of the system and not from a set of local characteristics". Indeed, the local characteristics or criteria that determine conviviality "vary depending upon the application context and the types of users" [Sadek et al, 1997]; consequently a list of criteria will not add up to a conviviality value. The critical factors are on one side the relation that binds the criteria together and on the other side, the way this relation is perceived by individuals. Furthermore, criteria are defined for specific contexts: security for banks, trust for relationships, flexibility and adaptability for web interface, scalability, efficiency and speed for systems, user density for given locations, group stability for communities of interest and so on.

In this paper we do not review the aspects of belief, desire and intentions of agent theory. Also out of scope are game theoretical approaches, the notion of equilibrium inherent to the temporal dimension of group behaviors and cost-benefits analysis from economics theory.

The layout of this paper is as follows. In each section we first give an overview of the kinds of notions of conviviality existing in the field and then discuss how these notions can be used in digital cities: In Section 2 socio-cognitive approaches, in Section 3 computer science, agent theory and multi-agent systems, in Section 4 Human Computer Interaction and in Section 5 we look at related works.

2. SOCIO-COGNITIVE APPROACHES

2.1 The role of conviviality in social systems

Conviviality describes a relation not only between the individuals of a group but also between groups. As power shifts between groups so does the way groups and individuals relate to each other. Conviviality then

addresses the relations between groups of different characteristics, minority and majority groups and consequently the concepts of exclusion, the outsiders being kept away, and intrusion, the intruders forcing their way into the excluding group. This process reveals the dynamic aspect of conviviality and its temporal dimension and raise the questions of how is conviviality created, how it evolves and what makes it fail.

2.1.1 Definitions of conviviality

Looking at some definitions shows that the meaning of conviviality depends from the context of use (table 1). For example, a convivial technology applies to the relation human-computer and refers to how easy, efficient and intuitive it is for a human to use this technology; whereas in sociology it applies to the relation human-human and refers to the equally beneficial quality of the relation.

Table 1. Definitions of Conviviality

Etymological and domain specific definitions of conviviality
Origin: 15th century "convivial", from Latin, convivere "to live together with, to ea together with". (French Academy Dictionary)
Adj. Convivial: (of an atmosphere, society, relations or event) friendly and lively, (of a person) cheerfully sociable. (English Oxford Dictionary)
Technology: Quality pertaining to a software or hardware easy and pleasant to use and understand even for a beginner.(Adj.)User friendly, (Noun) Usability. By extension also reliable and efficient. (Grand Dictionnaire Terminologique)
Sociology: Set of positive relations between the people and the groups that form a society, with an emphasis on community life and equality rather than hierarchical functions. (Grand Dictionnaire Terminologique)

A less common view of conviviality is when it becomes an instrument to exercise power and enforce one point of view over another. Conviviality is then experienced as a negative force by the loosing side. We summarized from different sources the positive and negative aspects of conviviality and as example present excerpts (table 2). Clearly, the positive aspects of conviviality emphasize the sharing of common grounds whereas the negative aspects emphasize division and coercive behaviors.

Table 2. Conviviality: Positive and negative aspects

Positive aspects (enabler)	Negative aspects (threat)
Share knowledge & skills	Crush outsiders
Deal with conflict	Fragmentation
Feeling of "togetherness"	Totalitarism
Equality	Reductionism
Trust	Deception

2.1.2 Individuals vs. groups

Being the first in 1964 to use conviviality in a scientific and philosophical context, Polanyi [Polanyi, 1964] describes it as synonymous with empathy "which alone can establish knowledge of other minds". Empathy allows individuals to identify with others hence provides a way to understand other individuals by experiencing their feelings, thoughts and attitudes thereby acquiring personal knowledge. Polanyi further describes a community as convivial when it aims at sharing knowledge: members trust each others, share commitments and interests and make mutual efforts to create and preserve conviviality.

In his 1971 critical discourse on education, *Deschooling Society* [Illich, 1971], Illich defines a convivial learning experience as one based on role swapping: teacher role alternates with learner role and vice versa, thereby emphasizing the concept of reciprocity as key component to conviviality. It is however with Illich's 1973 publication of *Tools for Conviviality* [Illich, 1973] that the concept really acquires a new dimension as it is defined as "an intrinsic ethical value". For Illich, conviviality is synonymous with "individual freedom realized in personal interdependence", it is the foundation of a new society one that gives its members the means, referred to as tools, for achieving their personal goals: "A convivial society would be the result of social arrangements that guarantee for each member the most ample and free access to the tools of the community and limit this freedom only in favor of another member's equal freedom.".

However it is Putman and his colleagues who in the 80's take the concept of conviviality further as an enhancement to *social capital* and in 1988 refer to conviviality as a "condition for *civil society*" [Putnam et al, 1993]. Putnam later argued then later in 2000 that in a civil society "communities are characterized by political equality, civic engagement, solidarity, trust, tolerance and strong associative life" [Putnam, 2000]. These are the values found today in e-governments charters that aim at increasing social cohesion and inclusiveness, by putting citizens at the centre of technological change.

In 2004 Schechter, taking part to a semiotics symposium on conviviality, takes another look at the concept adding that "in a basic sense, conviviality is a social form of human interaction" [Schechter, 2004]. She binds interaction to experience and recognizes the social dimension of conviviality as a way to reinforce group cohesion through the recognition of common values. "Thus the sharing of a certain kind of food and/or drink can be seen as a way to create and reinforce a societal group through a positive feeling of togetherness (being included in/or part of the group), on which the community's awareness of its identity is based." Schechter transforms the physical experience of conviviality into a learning and knowledge sharing experience. "To know is to understand in a certain manner that can be shared by others who form with you a community of understanding".

2.1.3 From groups to institutions

One cannot impose conviviality to a group claims Lomosits, it is a "consultative process that can only be recommended" [Lomosits, 2004] and reached through a consensus.

However, Hofkirchner explains that it is the "normative idea of *unity-through-diversity* that deserves attention when applying *conviviality* to the level of world society" [Hofkirchner, 2004]. The author then examines the unity-diversity relation. He first replaces the terms unity-diversity with identity-difference and then describes the four resulting scenarios: (1) "establish identity by eliminating difference at the cost of the differentiated side" yielding reductionism and universalism or (2) "of the undifferentiated side yielding unity without diversity", that is particularism, totalitarism and homogenization; (3) "establish difference by eliminating identity yielding diversity without unity", that is fragmentation and (4) "establish identity in line with difference yielding unity and diversity". The achievement of conviviality is in this *integration of difference* and *differentiation of identity.* Among other examples, it yields transculturalism.

Somov precises the normative aspect of conviviality in that it belongs to the regulation of human interrelations: "Conviviality (just like conflicts) is based on agreements or contradictions" [Somov, 2004].

According to Lamizet, conviviality was elaborated to describe both *"institutional structures that facilitate social relations* and technological processes that are *easy to control and pleasurable to use*" [Lamizet, 2004]. Conviviality emphasizes individual expression facilitated by personalized interface and customized content, while it also contributes to media standardization and the uniformization of representation systems.

2.1.4 The darker side of conviviality

"Conviviality is achieved for the majority, but only through a process by which *non-conviviality is reinforced for the minority*" states Ashby [Ashby, 2004]. This aspect of conviviality rarely considered brings negative results along with the expected positive ones. Ashby further reveals the instrumentalization of conviviality to favor one group at the expense of another: "*truth realities* about minorities are built from the perspective of the majority via template token instances in which conflict is highlighted and resolution is achieved through minority assimilation to majority norms" [Ashby, 2004].

Taylor [Taylor, 2004] goes further: "Conviviality masks the power relationships and social structures that govern communities." The author explores the contradiction between institutions and conviviality raising the question "whether it is possible for convivial institutions to exist, other than by simply creating another set of power relationships and social orders that, during the moment of involvement, appear to allow free rein to individual expression". In Taylor's view community members "may experience a sense of conviviality which is deceptive and which disappears as soon as the members return to the alienation of their fragmented lives."

2.2 The use of conviviality for digital cities

Users go to city web portals to fulfill needs for administration documents, official information, and entertainment. When trying to accomplish their tasks, users have to struggle with a number of constraints and must continuously compromise. Constraints come from other users competing for resources or imposing their

behaviors, from city administrations information and identity controls, or technical reasons such as system overloads or lack of functionality. Groupware, communityware and other research areas explore collaborative tools and systems however, there is to date no formal model for integrating notions like conviviality.

Conviviality affects coalition formation among humans by motivating individuals to associate with each other: it allows more efficient learning and reinforces social cohesion. Conviviality affects knowledge sharing and encourages cooperative behaviors, both constitutive values for digital cities. Moreover, conviviality contributes to reducing mis-coordinations that result from breakdowns in shared knowledge.

Some open questions are for example how to avoid reducing conviviality to one of its components and how to preserve its core value and meaning? A problem with formalization and implementation is that the concept of conviviality itself is inherently non-formal, when for instance you formalize it, the result may be a set of rules, norms, notions such as trust, reputation, bonus points, or other economic notions that miss the point. On analysis, conviviality may disappear and be reduced to other notions.

3. COMPUTER SCIENCE APPROACHES

3.1 The role of conviviality in Multi-agent systems (MAS)

In multi-agent systems an agent is defined as "a computer system that is situated in some environment, and that is capable of autonomous action in this environment in order to meet its design objectives…Agents are capable of flexible (reactive, proactive, social) behavior" [Wooldridge, 2002]. This capability is crucial since it allows agents to cooperate, coordinate their actions and negotiate with each other.

3.1.1 The use of conviviality for Intelligent Tutoring Systems

The system proposed by Gomes et al. [Gomes et al, 2004] provides a recommendation service of student tutors for computational learning environments. "Each agent pupil represents a pupil logged onto the system. One of the functions of the system is to be the client for an instant message service. Through its agent pupil, any pupil can communicate with other pupils in the system". Another function of agent pupils is to pass information, inferred by the agent or adjusted by pupils, on the pupils' affective states.

The authors' claim that "*convivial* social relationships are based on mutual acceptance through interaction" hence on reciprocity, here students helping each other. A utility function takes as input students' social profiles, computes students' affective states indicating their need of help and then recommends tutors. Remaining challenges are to define inputs for utility functions computing recommendations, presently random values, and automated inference of students in need. These critical tasks show the importance of further research in evaluation methods and measures for concepts such as mood, sociability and conviviality.

3.1.2 The use of conviviality for Conversational Agent

"All service offerings must integrate conviviality to the interaction between user and system as an essential preoccupation" [Sadek et al, 1997)]. To fulfill this goal, Sadek et al. define a convivial agent as *rational and cooperative*, consequently an interaction is convivial "if the agent presents, jointly and at all times, one or all of the following characteristics: Capacity for negotiation, contextual interpretation, flexibility of the entry language, flexibility of interaction, production of co-operative reactions and finally of adequate response forms." These communicative capacities and social intelligence based on emotional intelligence are crucial to enhance agents' ability to interact with users.

Building on this work Ochs et al. [Ochs et al, 2005] distinguish felt emotions from expressed emotions noting that "a person may decide to express an emotion different from the one she actually felt because she has to follow some socio-cultural norms". We believe this direction to be very relevant to the evaluation of conviviality as it dissociates personal from social expression.

3.1.3 The use of conviviality for reputation systems

Reputation is defined as "the overall quality or character as seen or judged by people in general and the recognition by other people of some characteristic or ability" (MWOD, 2006). When Casare and Sichman

state that "reputation is an indispensable condition for the social conviviality in human societies" [Casare and Sichman, 2005] they emphasize this *overall* quality that both reputation and conviviality share. The authors' system insures that everyone is aware of anyone that complies or not to the rules of the group. The authors define a functional ontology of reputation for multi-agent systems whereby "roles are played by entities involved in reputative processes such as reputation evaluation and reputation propagation."

The authors' claim that "concepts of the legal world can be used to model the social world, through the extension of the concept of legal rule to social norm and the internalization of social mechanisms in the agent's mind, so far externalized in legal institutions". The agents actual behaviors are therefore compared to the social norms observed in their world. The process however presupposes an initial reputation profile of users that agents can then update in real time. Reputation acts as a communication tool ensuring complete social transparence throughout the system. The strict application of norms to reputation however may be difficult and suffer from rigidity. Of course, the same holds for conviviality.

3.2 The role of norms in multi-agents systems and how it applies to conviviality

The role of norms is increasingly getting attention specifically in multi-agents systems (MAS) where the most common view is that "norms are constraints on behavior via social laws" [Boella et al, 2005]. Boella et al. describe action models where "agents are goal directed and try to maximize their choice of means to obtain a goal". Moreover, it is assumed that an agent belongs to a group and must follow the norms like all members of that group. Similarly, using conviviality for a digital community maximizes the community benefits, for instance by reducing conflicts during communications allowing efficient interactions and cooperation. Indeed, conviviality, like politeness, uses the group rules to regulate members' interactions.

Boella et al. enunciate the three different functions of norms as follows: "we have norms that are of a constitutive nature, they define the agent's membership in a system of action, and the system of action at large. Another function of norms is regulation, describing what members of a social system must and must not do. Thirdly, norms may have a distributive function that is how rewards, costs and risks are to be divided among the social system's members" [Boella et al, 2005]. Similarly, conviviality reinforces social cohesion by reflecting its core values internally as well as externally. It also contributes to optimize performances within communities as well as between communities, improving coordination in the city. Finally, conviviality is enforced through mechanisms such as the expression of feelings: praise and encouragements for members who conform to the rules, anger and blame for the ones who do not.

4. HUMAN COMPUTER INTERACTION (HCI) APPROACHES

4.1 Ambient spaces and playthings

In her study of animated toys, Ackermann, looking at the relational qualities of playthings notes that beyond humanoid traits, it is an AniMate's *manners of interaction* that matter: "Beyond smarts, it is its *conviviality*. Beyond obedience or bossiness, it is an AniMate's relative autonomy and ability to *share control*" [Ackerman, 2005]. Ackermann emphasizes the exploration of partial and shared control as critical quality of conviviality. Merging digital and physical elements, she now experiments with ambient places, *Piazzas,* defined as convivial spaces and that function as *transitional zones* or third-space, between work and home.

4.2 Pedagogy

According to Sipitakiat, conviviality establishes a "dynamic equilibrium in the interplay between different modes of learning and teaching" [Sipitakiat, 2001]. In his research, based on constructionism and on Illich theories, the author asserts that "people learn with particular effectiveness when they are engaged in constructing personally meaningful artifacts (such as computer programs, animations, or robots)." The author stresses that conviviality encourages people to produce information and content rather than just consume it.

4.3 User-friendly vs. convivial

In HCI until recently, the terms user-friendly and convivial were often synonymous. However, the distinction increased as factors such as emotional experience and enjoyment were taken into consideration, user-friendliness referring now more to qualities such as ease-of-use, compliance to ergonomics standards and usability rules whereas the notion of conviviality finds new meaning with HCI developments in areas such as adaptive systems, augmented cognition, multi-modal interactions and ambient intelligence. Ackerman's research trying to define the qualities that make convivial spaces is just one of many examples relevant to the user of conviviality for digital cities.

5.   OTHER RELATED WORKS

5.1 Artificial sociable companions

The *Companions* that Wilks envisions [Wilks, 2004] are permanent software agents attached to single users. They act as *intermediaries* for all information sources that users cannot manage. For instance, Companions for seniors provide company to senior citizens who feel lonely, they act as technical task assistant to search the web for travels or keep track of events their owners forget. Conversely, Companions for juniors provide assistance with teaching, explanations-on-demand and advices.

5.2 Mixed-Initiative Interaction

In a rather new area of research called mixed-initiative interaction "people and computers take initiatives to contribute to solving a problem, achieving a goal, or coming to a joint understanding" [Horvitz, 2004]. A critical element is how users focus their attention: "Attentional cues are central in decisions about when to initiate or to make an effective contribution to a conversation or project" [Horvitz, 2003]. Mixed-initiative research aims at developing software that filters *appropriately* incoming information to shield users from incoming disturbances such as emails and phone calls. The filtering of incoming information is achieved through measuring user's keystrokes and scrolling activities, recording the number of opened windows, analyzing content, checking events in calendars, location and time of day and so on.

5.3 The cognitive dimension of conviviality

Research on sociable companions, information filtering, interruption and distraction clearly exemplifies the cognitive aspects of conviviality. It also suggests wide ranging uses for digital cities: from individual social assistant, to group communications, to regulation of emergent behaviors.

6.   CONCLUSION

We summarize by first noting that conviviality is usually considered a positive concept but that a darker side emerges when it becomes the instrument of power relations. Secondly, to the question we raised: Which definition of conviviality can be used and operationalized for digital cities? We answer with this two-fold definition of conviviality as (1) a condition for social interaction and (2) an instrument for the internal regulation of social systems. Consequently, we see the most important uses of conviviality in digital cities as a mechanism to reinforce social cohesion as well as a tool to reduce mis-coordinations between individuals.

   In the near future we aim at formalizing the notions of conviviality to determine the most appropriate model of conviviality and to define criteria for specific contexts. Future developments are to evaluate our model experimentally and apply test cases from the city of Luxembourg.

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