Knowledge artifacts within Knowing communities to foster Collective Knowledge

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1. INTRODUCTION

In the context of the phenomenon that Bruns denotes as *produsage* [4], every person can bring her own contribution to any matter of affair, especially when she is an expert in some domain of interest: at the very least, everyone can bring in the community her own view or perspective, as well as interpretations and values (cf. the concept of *equipotentiality*). If people with different background and values gather together, they bring along their knowledge, that is not yet "a way to know" (a knowing), as this latter is always a social practice [17].

A *knowing community* can be defined as a community of individuals that share not only what they (have come to) know, but also a way to know (i.e., a practice) and that are motivated towards sharing their own understandings (personal experiences and memories, folk knowledges like folk biologies, practices, expertises etc.). While this can be done for diverse aims, like the aim to solve concrete problems (of nature whatsoever, from technical to social), in the process of sharing "knowledge", the identity of a social community builds up. Analytically, a Knowing Community lies at the intersection between other typologies of community proposed in the literature, i.e., the community of interest [16], the community of practice [27] and the knowledge community [22]. More precisely, a Knowing Community can be seen as the social identity [3] that preserves itself, or even gets more and more consolidated over time, when a community of interest, which gathers around a project soliciting the contributions of the members, first coalesces into a Knowledge Community (in developing a specific language, like a jargon, and in making sense of the same "discourse", that is when its members agree upon how to interpret linguistic representations that are specific of the community discourse), and then evolves into an engaged Community of Practice [28], whose characterizing practices regard how knowledge is circulated (cf. the knowledge-flow model below) and how one or more Knowledge Artifacts are used in this process. While many researches focus on single kinds of communities, and few others consider the local phenomenon of the evolution of a certain typology of community along different phases [28][19][15], our research focuses on the dynamics by which a community changes along a spectrum of different community (ideal)types, i.e., on what we refer to with the expression "community epimorphism".

The design of computer-based technologies (IT Artifacts [2]) supporting a knowing community takes advantage from the analysis of the involved dynamics. To this aim, we propose a novel model, the knowledge-flow model [11], which is grounded on three analytical levels: the individual, the society (both in the micro and the macro scale) and knowledge itself. Processes belonging to the three dimensions show a different intrinsic nature. At the *individual* level we typically find daily life processes with a biographical time-scale dynamics (roughly speaking, socially relevant cognitions and actions and what else is supposed to have, after Aristotle, both a ontological and methodological primacy in a scientific inquiry). At the (strictly speaking) *social* level, we find roles configurations within the reference community and interactions among communities (i.e. negotiations and both symbolical and economical exchanges). At the *knowledge* level, we find the motley world of knowledge productions, that is representations related to the processes of knowing.
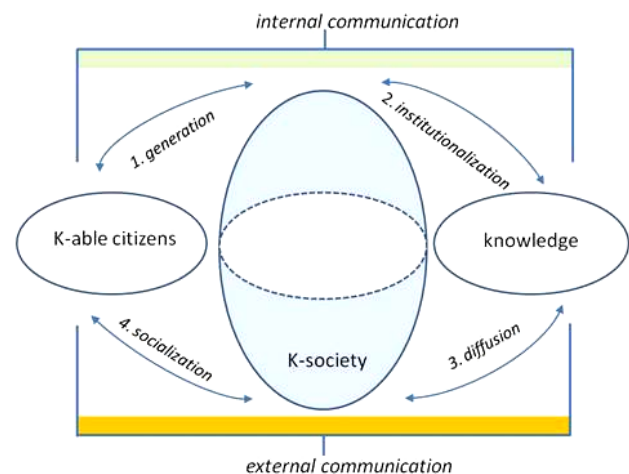

Figure 1: the knowledge flow model.

We can model *knowledge circulation* as four logical phases between processes between close levels (see Figure 1) [12]. In so doing, *Generation* regards the production of a knowledge-claim in some representation language by an individual and its proposal to her own reference-community (within the global society). *Institutionalization* allows, then, the identification, selection, corroboration, organization and design for diffusion of the

knowledge-claims shared in that community. *Diffusion* refers to the percolation of such knowledge, in any form (Intellectual, Practical, Objectivated), through communicative processes, also to outsider with respect to the original community. Finally, *Socialization* deals with internalization, introjection, education and regulation processes, through which the emerging knowledge (claims) acquire a reference value both publically sanctioned (rule of law, technical regulation, accountable behavior) and privately interiorized (the Self, professional ethos, her/his own responsibility). After having considered a whole logical cycle, we can see an innovation jumping out as a non-closure of the cycle. Moreover, what emerges from such a circulation is a Knowledge body, strictu sensu, i.e. neither information nor just an understanding (whatsoever) [13], being shared both in theory and in practice by a community of citizens, that is individuals with rights & responsibilities within a Knowledge Society [25][5].

In the light of this model we can then address the research question: How can IT artifacts be designed to foster the circulation of knowledge within a knowing community (which belongs to the society at the micro scale) and across its boundaries into the global society? The idea is to conceive an IT Knowledge Artifact (ITKA), which, as rightly and recently emphasized by Markus is but a socio-technical artifact [23]. The outcomes of empirical studies we reported in [6] led us to propose a concept of Knowledge Artifact (KA) that extends and also complements other definitions found in the literature [7] as follows: a Knowledge Artifact is a material artifact, not necessarily tangible (in case it is digitized), which is either participatorily designed or purposely used to enable and support knowledge-related processes within a community, like the cycle mentioned above and *produsage*, like idea expression and exchange, content and structure negotiation, meaning reconciliation, collective deliberation, new product and process co-design, knowledge representation at various degrees of (under)specification, problem framing and solving, mutual learning, and novice training. As such, KAs play in communities the role of both a "memory" [1] and a "scaffolding" [21] that enables and affects the Creation, Institutionalization and Diffusion phases within a community and, more indirectly, when it acts as a boundary object and immutable mobile [18,24], the Socialization phase outside the community itself.

The knowledge circulation that is modeled by the four phases constituting the model takes its "energy" from the *active participation* of the members of the Knowing Community and taps in the potential lying in the principle of *equipotentiality* mentioned above. Experiments in participation of individuals (either experts or lay) in various settings (educational, informative, policy making, entertainment etc.) are quickly growing in number and diversity [10], as studies in civic epistemology and citizens science. From our perspective, participation is a true challenge to let society come into science and science into society in order to empower both democracy and science of the *Knowledge Society*.

From a pragmatic stance, participation requires efforts to achieve and maintain it and different kinds of community-specific leadership roles who are in charge of specific tasks regarding community life and survival [28][20]. These roles however are not primarily in the focus of this contribution. Our perspective is

on how they can be supported and made more effective by an ITKA.

We are currently engaged in the implementation of a Web based platform that offers functionalities supporting the internal as well as external knowledge circulation, that is the enabling and promotion of a produsage-oriented collaboration within a Knowing Community. These functionalities encompass (but are not limited to): Collaborative writing and content provision; Discussion Fora and Wikispaces; Idea Management and Voting systems; Collaborative annotation and social tagging; Group and team management (including the management of complex content access policies and rights). A first version of this platform is going to be adopted in a project where citizens (encompassing a large number of members of some cultural associations of the Northern Milan City area, as well as any other interested citizen) are called to collect, share and organize any kind of multimedia content (like pictures, drawings, video and recorded interviews, recipes) on the food- and cooking-related customs and habits of their ancestors, and of the older inhabitants of their same neighborhoods and streets. This project, to be inserted in the number of cultural initiatives delivered for public education and heritage preservation at the next World Expo to be held in Milan in 2015, is aimed at building a collective knowledge body and collective "city" memory on how our relationship with food and the ways to cook it has changed over time. For this project of Citizen Science (where the scientific element ripples from the human sciences of Anthropology, Ethnography, Urban Sociology and History mainly), we are aware that it will be necessary to feed in the community with resources that in most of the cases will come from the "outside" (if not from the "above") with all the related risks: i.e., a general project idea (food-related customs and memories), the leadership roles mentioned above, consolidated experts guaranteeing scientific legitimacy, some existing associations that support the idea and mobilize and motivate the first participants, equipped spaces and articulated time schedules to be agreed on a constant basis, and technological means, including relatively high bandwidth connectivity for the interested population, and the online platform mentioned above.

In particular, the use of this platform in such a composite project poses several socio-technical challenges: one of these regards how to integrate the functionalities mentioned above in a coherent service supporting content produsage and fruition so that the whole technology can be easily appropriated [14] by the members of the community, and still be flexible enough to fit different needs and levels of participation, as well as the current state of the community in its evolution from being potential to fully engaged [15].

Our basic idea is to stimulate participation through both the co-design of the normative structures (i.e., what to collect, how to structure it) and the co-production of content and its layout structures (i.e., how to present it [9]). To this aim the platform will allow for the collaborative definition of the ways and means by which to collect the members' contributions: for instance by allowing for the collaborative writing of the protocols of content contribution (e.g., the recipe templates, the question route of the semi-structured interviews, the wiki-based tutorials on how to take and edit pictures and audio/video interviews); and for the definition of how content is lately fruited by the outsider users (e.g., the thematic pathways of presentation of the contributions),

for instance by allowing the collaborative editing of some parts of the site structure. Moreover, to minimize the risk that the Web site will end up by being seen as a collection of decontextualized pieces of information (i.e., a passive repository), rather than a living "memory" supporting collective knowing, the platform will adopt a "situated actions" paradigm [26], and therefore it will allow to associate contents with the communicative interactions that have supported the negotiation of their production (and classification); and it will also allow for the annotation of any sort of content, in order to keep trace of the social process (discourse) that generated them, as discussed in [8].

The project outlined above will be aimed at providing a proof of the ITKA concept, and the assessment of the effectiveness and usability of the Web based platform used to this aim will inform its further evolution, also on the basis of the observation of the impact it will have on the target community. This will also allow to put the knowledge-flow model presented in this paper to the test of life as a design-oriented construct, and to investigate how the notion of Knowing Community can play a role in the more general framework of the processes underlying the building of collective knowledge bodies and the success of citizens science initiatives.

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