Wikipedia in Education: Acculturation and learning

in virtual communities

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Abstract

The present study investigates on the learning impact of utilizing Wikipedia's community in education. Today, many instructors assign their students editing Wikipedia's articles as part of their coursework. Participation in a cyber-community during an educational assignment exposes students to a brand new culture and netiquette, to a set of explicit and tacit rules and cultural norms. This requires students to internalize the embedded online culture in order to join the community - a form of acculturation which may cause stress, but which can lead to opportunities for growth, learning and development. By taking advantage of a virtual community, educators can literally bring a whole thriving community into their classrooms. The acculturation of the educational group into the culture of a hosting virtual community, through collaborative actions, conflicts and disturbances, results to the formation of a collective zone of proximal development: what the students' group manages to perform today with the aid of the community's members will be performed independently tomorrow. The formation of a virtual learning community through the procedural and structural coupling of two discrete activity systems opens a new space for participatory learning.

Keywords: Wikipedia, acculturation, education, virtual community, learning, culture

1. Introduction

Behind the scenes of Wikipedia performs a thriving online community, which constantly develops and maintains a pioneering project, the largest online encyclopedia in the world (Shirky, 2008). Wikipedia constitutes a unique and complex virtual cultural system. According to an early (1954) definition by the Social Science Research Council: "An autonomous cultural system is one which is self-sustaining –that is, it does not need to be maintained by a complementary, reciprocal, subordinate, or other indispensable connection with a second system. Such units are systems because they have their own mutually adjusted and interdependent parts, and they are autonomous because they do not require another system for their continued functioning." (Social Science Research Council, 1954, p. 974). Wikipedia meets all these criteria for cultural autonomy. Back in 1954 there were numerous dichotomous ways identified in which cultures could be classified, according to the Social Science Research Council, such as simple-complex, folk-urban, Apollonian-Dionysian. We argue that Wikipedia constitutes a complex cultural organization, a nonlinear system, where many properties and interdependent agents co-exist and interact and where emergent properties appear all the time as the byproduct of these synergies (Brailas, 2013). In this context, Wikipedia's culture can be broadly characterized as participatory (Shirky, 2008) and as a collaboration of good faith (Reagle, 2010).

Many instructors worldwide are using Wikipedia in their educational praxis, by assigning their students to write new articles or to improve existing ones (Brailas, 2011; Farzan & Kraut, 2013; Infeld & Adams, 2013; Roth, Davis, & Carver, 2013). Thus, Wikipedia constitutes a competent case study for investigating the utilization of a virtual community in education. In particular, the case of an educational group (both students and their teachers) joining the virtual space of an online community can be realized as a process of virtual acculturation. We argue that Learning comes as a "side effect" of this virtual acculturation process. Students learn while they try to understand a particular digital culture, to participate into the virtual community life, and to become legitimate members and active agents of the online cultural context.

Instructors assign their students editing Wikipedia's articles in an effort to improve their learning experience (Carver, Davis, Kelley, Obar, & Davis, 2012; Knight & Pryke, 2012; Konieczny, 2012; Wannemacher, 2011). Wikimedia Foundation articulates many educational benefits for instructors to offer Wikipedia editing assignments ("Education/Reasons to use Wikipedia," n.d.). But as the present study contents, the learning benefit in these assignments depends on the demanding process of joining Wikipedia's virtual community. Students and teachers have to get out of their "comfort zones", out of the protected physical space defined by the classroom, into a different cultural setting, where they are offered the opportunity to assimilate new cultural norms: "Given the chance to observe and practice in situ the behaviors of members of a culture, people pick up relevant jargon, imitate behavior, and gradually start to act in accordance with its norms. These cultural practices are often recondite and extremely complex" (Brown, Collins, & Duguid, 1989, p. 34). In this case, the educational group has to cope with the resulting acculturation stress. During this acculturation process, by understanding the cultural norms that are essential for surviving successfully in the virtual social environment, students cultivate a range of skills. In the case of Wikipedia, these skills are closely connected to Wikipedians' culture and include (but are not restricted to) the ability to research in depth the literature about an article, to compare and evaluate conflicting sources, and to communicate arguments clearly and efficiently with other editors in a virtual social environment (Brailas, 2013). This acculturation process takes place outside the "protected", walled and culturally familiar environment of a classroom. Virtual acculturation takes place into a virtual environment of real social interactions and peer-to-peer editing transactions that sometimes can be experienced as a context quite "hostile" or "aggressive", full of virtual dangers, like cyber trolls, flame attacks, editing wars etc. Some of these sociocultural skills are cultivated in every standard academic or school context. However, in Wikipedia these skills are prerequisites for the successful collaborative production of quality encyclopedic content. Some other skills cannot be cultivated outside the cultural context of a community of practice, either a virtual or a face-to-face one.

These skills include the ability to collectively negotiate meaning and content, defense your arguments and try to understand other's point of view.

Successfully entering a new cultural environment necessitates the remodeling of old behaviors and practices and the adoption of new ones leading to personal growth and development: "The problematic nature of cross-cultural adaptation must be viewed in the context of new learning and psychological growth. Both of these aspects of adaptation, taken together, provide a more balanced and complete interpretation of the experiences of individuals in an unfamiliar environment" (Kim, 2005, p. 377). Participating in a virtual community during an educational intervention exposes students to a brand new culture, to a set of explicit and tacit rules and cultural norms that constitute a virtual learning organization and a new cultural context. Through continuous interaction with established community members, individuals adjust their behavior and internalize values and norms in an effort to adapt to the culture of the hosting virtual community and to function appropriately and efficiently: "communication is the necessary vehicle without which adaptation cannot take place, and that cross-cultural adaptation occurs as long as the individual remains in interaction with the host environment" (Kim, 2005, p. 379). Learning in the form of internalization of cultural values and norms and of the consequent adaptation to the requirements of the virtual cultural setting allows newbies-students to interact smoothly with the Wikipedians, the regular members of Wikipedia's community.

2. Background

2.1. Educational technology and Wikipedia community

Educational technology is the deliberate use of technological tools to serve formal or informal educational purposes. Educational technology cannot be separated by its cultural context: "by ignoring the situated nature of cognition, education defeats its own goal of providing useable, robust technology" (Brown et al., 1989, p. 32). For the most part of the 20th century educational praxis was inspired by behavioral and cognitive learning theories. During the second half of the 20th century the constructivist learning theories of Piaget and Vygotsky came to the educational foreground (Harasim, 2012). As a result educational technology in the previous century was mainly linked to these learning paradigms. In the 1990s the notion of learning as something that takes place in communities of practice was highlighted in the work of Lave and Wagner (Lave & Wenger, 1991). Today, people are becoming more and more active producers of knowledge content instead of passive consumers. In this networked social landscape, there is an urgent need for a new pedagogy. People's activity is closely intertwined with the available technologies and learning is always situated into the cultural context of a knowledge community; by ignoring the cultural context of cognition, education defeats its own goal of providing useable, effective

instruction. In the previous century, objectivist approaches to educational technology attempted to provide quite sophisticated systems to model students' learning (Harasim, 2012). However, the realization today that we are complex beings living in a complex world (Mitchell, 2009) compels us to seek no linear pedagogical model (B. Davis & Sumara, 2006). The most sophisticated ITS (Intelligent Tutoring System) ever made cannot address the inherent complexity of a networked individual. Today it is urgent, instead of trying to model students according to outdated educational models, "to provide students with the tools, facilities and communities they need to support the development of models for their own uses." (Sack, Soloway, & Weingrad, 1994, p. 373). Adaptation, enculturation and acculturation are closely related to learning: "From a very early age and through their lives, people, consciously and unconsciously, adopt the behavior and belief systems of new social groups" (Brown et al., 1989, p. 34). Learning as an acculturation process can be a useful metaphor to understand educational interventions in virtual communities.

The concept of community is closely intertwined with human history. Today, the term community is increasingly used in online contexts, often as a way of referring to any kind of social interaction. However, today as before, "In all this talk and text, what actually defines a group of people as a community is rarely, if ever, specified" (Creed, 2006, p. 2). The word community derives from the Latin word *com*, meaning together, and *unus*, meaning one singular entity (Delanty, 2010). Thus, a community can be realized as a complex whole made of a set of constituent parts. Community concept is a complex constitution, "which includes at least three component meanings: a group of people, a quality of relationship (usually with a positive normative value), and a place/ location" (Creed, 2006, p. 2). The term is used to imply two interrelated attributes: "that the members of a group of people (a) have something in common with each other, which (b) distinguishes them in a significant way from the members of other putative groups." (Cohen, 2001, p. 12). The symbolic boundaries between community members and outsiders define their relationship: "The word thus expresses a relational idea: the opposition of one community to others or to other social entities" (Cohen, 2001, p. 12). According to Wikipedia, "The Wikipedia community is the community of contributors to the online encyclopedia Wikipedia. Individual contributors are known as *Wikipedians"* ("Wikipedia community," n.d.). Wikipedia community demonstrates the properties inherent in a community of practice (Hara, Shachaf, & Hew, 2010; O'Sullivan, 2009). Wikipedians, the so called members of this community, are the volunteer editors who write and edit Wikipedia's articles. A minority of these editors participates in community discussions and votes in the community's polls. Wikipedians can interact with students in many ways: by actively getting engaged in discussions within the community forums or in the user's pages, by helping students to add content, or by reverting specific students' edits that do not comply with Wikipedia's policies.

Community discussions between Wikipedians can take place in many specialized Wikipedia forums but for every language project there is a central virtual meeting point. This place is named *Village pump* in English language Wikipedia (https://en.wikipedia.org/wiki/Wikipedia:Village_pump), *Café* in Spanish language, *Agora* in Greek language, *Le Bistro* in French and so on. In most independent languages' projects, the name of this virtual community place is named in such a way as to stand for culturally familiar to participants face-to-face meeting points.

2.2. Learning as adaptation

Adaptation is inherent in all living organisms. Darwin described natural selection in species' evolution, as the process of survival of the fittest organism (Darwin, 1869). Any challenge or destabilizing personal experience in a new social environment, leads to learning and development (Kim, 2001). According to Vygotsky:

> The first such factor is always, as psychological analysis has established, the human need to adapt to the environment. If life surrounding him does not present challenges to an individual, if his usual and inherent reactions are in complete equilibrium with the world around him, then there will be no basis for him to exercise creativity. A creature that is perfectly adapted to its environment, would not want anything, would not have anything to strive for, and, of course, would not be able to create anything (Vygotsky, 2004, pp. 28–29).

The very plasticity of the human brain, that is the ability of neurons to alter their connections and functioning, especially during the period of infancy, depending on the environmental stimuli, is a manifestation at the neuronal level of the human capacity to adapt to the environmental demands. Humans learn and grow as a result of this adaptation process. For example, in the case of a stroke, the brain can compensate the loss of neurons in the affected area using the same mechanism of brain plasticity described above. Neurons in different brain areas alter their function in order to compensate for the functions of the neurons that are lost. Adaptation is closely related to learning and development:

> The brain is not only the organ that stores and retrieves our previous experience, it is also the organ that combines and creatively reworks elements of this past experience and uses them to generate new propositions and new behavior. If human activity were limited to reproduction of the old, then the human being would be a creature oriented only to the past and would only be able to adapt to the future to the extent that it reproduced the past. It is precisely human creative

activity that makes the human being a creature oriented toward the future, creating the future and thus altering his own present (Vygotsky, 2004, p. 9).

The assimilation of a toddler's native culture is reported in the literature as *enculturation* (Kim, 2001). Consecutive cultural changes can happen to an individual, in some cases voluntary and in some other cases enforced (Kim, 2001). Cultural adaptation constitutes a heavy burden that toddlers cannot handle without help. So adults, usually parents, are called to take on the role of cultural mediators. The first behaviors of a newborn, either acting on objects or on humans, are developed not only in the presence of an adult, but through his mediation. An adult can lower the burden of the required cultural adaptations to the level that a specific toddler can handle successfully (Papamichael, 2003).

The process of adaptation of an organism to its environment (natural, technological, social, cultural or educational) is critical for its survival and flourishing. Upon relocating to an unfamiliar sociocultural environment, an individual needs to do all the necessary behavioral adjustments to functionally fit in, and to comply with the values, rules, social norms and requirements of the new cultural context (Kim, 2005). However, a dominant pedagogical approach is to do the sheer opposite, to completely adjust the educational environment to match the level of skills of a child instead of pursuing the cultivation of the child's ability to adapt to the environment, through the use of an appropriate cultural mediator, the school teacher. According to Dafermos (2002):

> The "obvious" and "self-evident" for the "common sense" view, in which the educational process should be tailored to the needs and interests of the child, has become one of the prevalent myths of modern "student-centered" education. Any attempt to contest the above perception is treated as a step back to the old-fashioned authoritarian pedagogical model (p. 192).

2.3. Acculturation and learning

The process by which a person adapts to a new cultural environment is called *acculturation* (Hall, 2005). This process of reciprocal cultural adaptation was already defined back in 1936 by anthropologists Redfield, Linton and Herskovits in a memorandum for the study of acculturation: "Acculturation comprehends those phenomena which result when groups of individuals having different cultures come into continuous first-hand contact, with subsequent changes in the original cultural patterns of either or both groups." (Redfield, Linton, & Herskovits, 1936, p. 149). Previously, the research on acculturation focused on the study of the colonization of America and of other regions introduced by the European immigrants. Later on, following the migration from the third world to the rich north, acculturation focused on immigrants' adaptation

to a new host culture. More recently, due to the emergence of multicultural societies, cultural studies focus on the study of mutual acculturation taking place among different ethno-cultural groups (Berry, 2005). Acculturation always refers to an abrupt change in somebody's cultural environment and to the consequent required adaptation to the new norms, values, customs and language. Therefore, acculturation is experienced as a personal destabilization, moving far away from the usual cultural context of the individual.

Acculturation is a process that evolves in time (Haviland, Prins, McBride, & Walrath, 2010), a dynamic spiral of stress periods, followed by adaptation and growth phases: "The stress-adaptation-growth dynamic does not play out in a smooth, steady, and linear progression, but in a dialectic, cyclic, and continual 'draw-back-to-leap' pattern" (Kim, 2005, p. 284). To thoroughly understand an acculturation process requires a careful consideration and understanding of the historical - cultural context of both the host community and the original community of the incoming group (Berry, 2005).

Understanding the acculturation process of an educational group (teachers and their students) into Wikipedia's community requires understanding two distinct cultures: the culture of the formal educational system and the digital culture of Wikipedia's cyber-community. Formal schooling and academia has been established through centuries of educational tradition based on a binary pedagogical relationship between a group of students and their teacher. The latter usually represents the "sage on the stage" (King, 1993). The culture of Wikipedia emerged in a period of fifteen years of virtual life and is characterized by anonymous or pseudonymous contributions. These contributions are accepted or rejected on the basis of their quality and their compliance to what constitutes the community's netiquette. This is rather what we would say "the crowd is the guide" culture. The gap between these two cultures is enormous. Apart from this cultural gap, subgroups formed within Wikipedians produce their own differentiated sub-cultures within the greater Wikipedia's culture. Contributing to Wikipedia definitely drives students and teachers out of their safe cultural zone.

2.4. Virtual acculturative stress

Disagreements and conflicts between individuals (students, teachers or community members) are sources of acculturative stress (Berry, 1970, 1997) or cultural shock (Ward, Bochner, & Furnham, 2001). Comparing the two terms, acculturation stress highlights the tension but does not necessarily imply a negative outcome (Berry, 2005). The resulting stress can be constructive, leading to consecutive adaptation and development of all the involved cultural groups, even though conflict resolution is sometimes required. Acculturative stress refers to both the educational group (teachers, students) and to the Wikipedians' community. The typical initiation process for becoming a community member in a virtual community, like the one of Wikipedians,

can be realized as a virtual enculturation process. Newbies are becoming familiar with the virtual culture and they gradually turn out to be full community members. On the other hand, the massive and temporary entry of a group of students into the virtual life of Wikipedia's community, in the context of a mandatory course assignment, constitutes a virtual acculturation process.

The acculturation stress as a result of the abrupt or enforced entry of a person into a different and unknown cultural environment is a situation quite familiar to social anthropologists. Cora Dubois (1951) and Kalervo Oberg (1954) first used the term culture shock to describe this phenomenon (DeWalt & DeWalt, 2011). Oberg identified four distinct phases during culture shock: honeymoon, crisis, recovery and arrangement (DeWalt & DeWalt, 2011).The crisis period is a manifestation of the instinctive human desire to maintain homeostasis. According to Kim (2005):

> The natural tendency of an open system is to resist change and to perpetuate the state of maladaptation and work against its own adaptive change. This tendency manifests itself in various forms of psychological resistance. Some people may attempt to avoid or minimize the anticipated or actual "pain" of disequilibrium by selective attention, denial, avoidance, and withdrawal (p. 383).

Although desired, homeostasis cannot be maintained forever, especially when a living system is confronting with a destabilizing condition, far away from equilibrium (Eldredge & Gould, 1972); "If that were so, nothing would come of evolution" (Kim, 2005, p. 283). This is manifested during the recovery period where the individuals try to get accustomed and flourish into their new cultural environment.

During educational interventions, teachers usually ask their students to become familiarized with the virtual cultural environment, to respect the regular community members and to contribute in accordance with the community's rules and policies. Cultural shock is more intense during the initial phase of exposure to a new culture (Kim, 2005). To avoid such an intense cultural shock teachers usually organize Wikipedia's editing workshops for the students to be acquainted with the required technical skills and to be introduced to the editing policies and to the Wikipedia's netiquette.

3. Method and methodology

3.1. Research question and Grounded Theory

The research approach in this study was qualitative with focus on exploring the participants' experiences (students, teachers and wikipedians) and the meaning they attached to these experiences. Through our inquiry we looked for the development of a theoretical model to interpret and understand, from a cultural point of view, the group dynamics in play between community members, students and teachers during educational interventions where students were tasked to write and edit Wikipedia's articles as part of their coursework. The method we chose for this inquiry was Grounded Theory. Grounded Theory is a method of choice where the aim is to develop a new theory, grounded on the empirical data, instead of trying to test an existing research hypothesis. Therefore, research questions in Grounded Theory do not fit positivistic research designs (Charmaz, 2006). According to Charmaz (2006), as positivism in social sciences gained strength after the middle of the 20th century, "Growing numbers of quantitative researchers concentrated on obtaining concrete information. Those quantitative researchers who connected theory and research tested logically deduced hypotheses from an existing theory. Although they refined extant theory, their research seldom led to new theory construction" (p. 5). In the case of our study, opening the classroom to a broader online community, in terms of cultural theory, is an unexplored territory. Our purpose in this study was not to test a preexisting hypothesis but to develop a new theoretical model. In such a case, "an explorer can never know what he is exploring until it has been explored. He carries no Baedeker in his pocket, no guidebook which will tell him which churches he should visit or at which hotels he should stay" (Bateson, 1972, p. xxiv).

3.2. Empirical data collection

In Grounded Theory, Glaser and Strauss supported the simultaneous analysis of texts, publications, statistical reports, and interviews, as well as identifying the underlying concepts through the technique of constant comparisons (Hammond & Wellington, 2012). Traditional empirical data sampling is not required as far as the purpose of Grounded Theory is not to test a hypothesis and to generalize the results to a desired population. The purpose of Grounded Theory is the development of a theory to interpret the empirical data. The fitness of this theory in various settings can be tested later on and an ideal fit would be an important criterion of whether it is a good or a poor theory. Grounded Theory is a totally data-driven method adopting an "all is data" approach (Charmaz, 2006; Glaser, 2001). This assumption makes Grounded Theory method particularly suitable for studying phenomena that evolve simultaneously offline and online and where empirical data are collected in both settings. Glaser argues that the researcher "need only see what incidents come his way as more 'data' to constantly compare, to generate concepts and to induce the patterns involved" (Glaser, 1998, p. 8). Charmaz argues that any information related to the phenomenon under study, that is everything perceived by the researcher at the evolution of the phenomenon, can be used as a source of empirical data

(Charmaz, 2006). However, Charmaz points out that the quality and reliability of the overall research depend on the quality of the empirical data. What makes the difference is the depth and the extent of the empirical data, their relationship with the research interests of the researcher, their appropriateness and adequacy to highlight the social processes: "a researcher can rarely come up with convincing cases of a limited set of empirical data" (Charmaz, 2006, p. 18).

The empirical data for the present inquiry came from interviews with students and teachers participating in Wikipedia assignments, from online blog posts expressing students', instructors' and Wikipedians' reflections on the topic, and from Wikipedia's community online discussion pages where Wikipedians discussed the student's projects. We systematically observed opinions, positions, and thoughts expressed by students, teachers, and Wikipedians involved in various educational activities in English and in Greek language Wikipedia for a period of two years between 2010 and 2012. More specifically, we gathered empirical data from the following sources: (a) Interviews with university teachers and students (9 teachers and 5 students), (b) Publicly available Wikipedia's community discussion pages (more than 300 text pages from Wikipedia's community discussion pages), and (c) Blog posts and online articles by students and teachers reflecting on their Wikipedia educational experience (28 blog posts and online reflective articles).

3.3. Data coding

The first step in Grounded Theory approach is to code the empirical data using codes produced in vivo (open coding) (Glaser & Strauss, 1967). Initially, a quite extended set of codes emerged from the empirical data coding. According to Glaser and Strauss, the next stage in theory development is "a reduction in the original list of categories for coding. As the theory grows, becomes reduced, and increasingly works better for ordering a mass of qualitative data, the analyst becomes committed to it." (Glaser & Strauss, 1967, p. 111). Through the Grounded Theory processes of *constant comparisons*, *theoretical sampling*, and *memo taking,* a final coding scheme set of 33 codes was formed (Table 1). In total, 1552 text data segments were coded using this coding scheme. All the codes in the coding set were interconnected based on their conceptual proximity and co-occurrence (Namey, Guest, Thairu, & Johnson, 2008), resulting in the formation of the coding network shown on Figure 1. The whole process of coding was supported by atlas.ti (version 7), a dedicated software for qualitative data analysis (Friese, 2012).

1	Aggressive Community Editors	18	Open Content Access
2	Assignment Topic Selection	19	Open Content Creation
3	Community Process	20	Policy Violation and Etiquette
4	Community Specific Strategies	21	Ruthless Editing Process

5	Contributing for Common Good	22	Size to be Manageable
6	Encouraged by Context	23	Students as Potential Community Members
7	Exposition to a Virtual Social Environment	24	Support & Workshops
8	Go Public	25	Supportive Community Members
9	Improve Research, Writing and Interaction Skills	26	Technical Difficulties - User Interface
10	Increasing Work Burden	27	They Gonna Mess It Up
11	Innovative Assignment	28	Valuable Content Added
12	Lack of Understanding Teaching Process	29	Voluntary Only
13	Need for Wiki Literate Organizers	30	We Don't Like Free Riders
14	Need for Wiki Literate Professors	31	Wikipedia Literacy
15	Need to be Organized	32	Wikipedia Validity
16	No Interaction with the Community	33	You Are Not Listening & Respecting Us
17	No Special Treatment to Students		

Table 1. A list of the final set of the 33 codes that were developed and used during the open coding process of Grounded Theory.

3.4. Analysis and theory development

In the traditional (Glaserian) approach to Grounded Theory, the conceptual integration of the original codes into a theoretical model is managed by grouping them into theoretical categories of a higher level of abstraction, a stage called theoretical coding (Punch, 2005). In the present study, for the analysis of the network of the interconnected codes, 48 years after the official introduction of the original Grounded Theory method (Glaser & Strauss, 1967) and following the introduction of many other GT versions, we utilized a modern version of the method, Networked Grounded Theory (Brailas, 2014). This version constitutes a methodological remodeling of Grounded Theory by introducing network analysis techniques in the process of developing the conceptual blocks of the theoretical model. Specifically, instead of using traditional to Grounded Theory procedures, such as theoretical sampling, we applied network analysis techniques resulting in the detection of sub-networks or "communities" of codes in the overall graph of the interconnected codes (Figure 2). We then used these emerging code communities as the conceptual building blocks for the construction of the theoretical model (Figure 3).
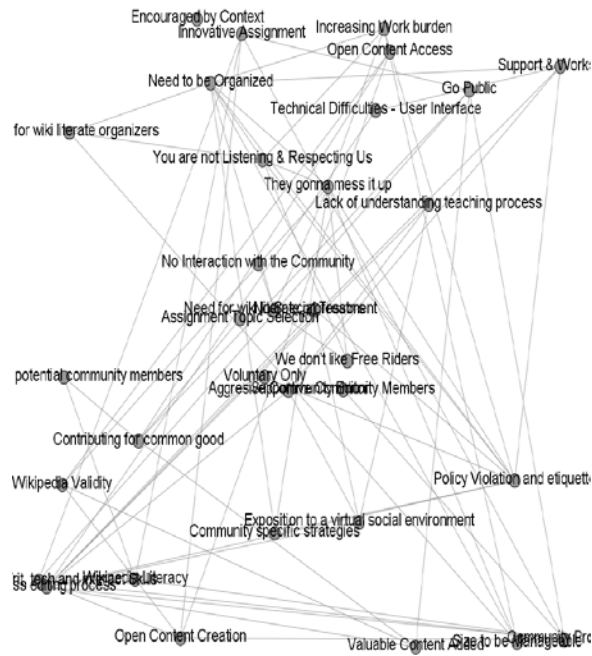
Figure 1. The graph representing the network of the interconnected codes used for the coding of the empirical data
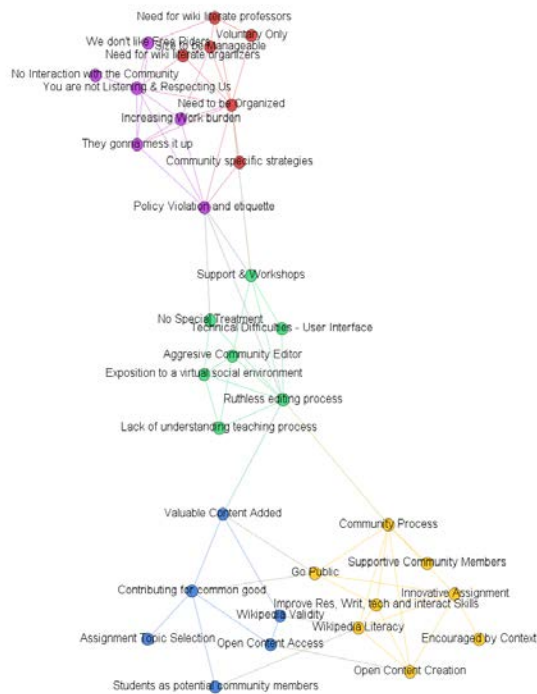

Figure 2. The network of codes after applying network analysis techniques

In the rest of this paper we are going to present and discuss the details of the developed theoretical model for utilizing Wikipedia's community in Education, through the perspective of acculturation socio-psychological theory. Considering the fact that two independent cultural systems are coming into contact and interact, acculturation occurs as cultural change in these systems (Social Science Research Council, 1954). We will also argue that in this case, learning can be realized as an emergent property of the complex cultural system.

4. Findings

4.1. Learning as an acculturation process

During educational interventions in Wikipedia, teachers and students are invited as sojourners to join Wikipedians, the community of editors, even for a short, predetermined, period of time. Cultural adaptation is a bi-directional process. Therefore, the educational group has to adapt to the virtual cultural context, while community members have to slightly alter their practices in order to accommodate the new information introduced into their cultural system by the educational group. The requirement for a mutual adaptation is often manifested in the form of community members' resistance against the educational interventions. As a protesting Wikipedian highlights vividly in a community forum, "Wikimedia Foundation have to decide whether to offend and alienate experienced editors by wasting their time with this massive recruiting of students for the benefit of little worthy content" (Brailas, 2013). An incoming group adapting to a new culture causes changing and cultural shift to the host cultural environment (Haviland et al., 2010). Teachers and students are required to adapt to a new virtual culture; to a culture that would have been different without them. Therefore, virtual acculturation is, inevitably, a reciprocal process: a group of people entering a host culture shapes this culture, while shaped by it (Berry, 2005).

During their course assignments, students have to make contributions to Wikipedia's articles in accordance with its rules and policies. Students internalize the culturally accepted modes of operation inside the virtual community space and ultimately redefine themselves through their active participation. Students take "Lessons about what it means to understand the nature of the evolving information source, how knowledge is generated through debate […], how it is essential we be critical of our information sources, no matter what they are or where we find them." (Obar, 2011). On the other side, typical community members demonstrate increased levels of tolerance toward the inevitable policy violations caused by the students and make the necessary compromises in order to give them more time to adapt to Wikipedia's culture: "The members were very supportive and eventually helped the students in their discussion pages, teaching them to avoid plagiarism and to write with neutrality" (Marques, 2012). Massive

editing contributions by a group of newbies student-editors results into increased workload burden for the typical community members. As an experienced Wikipedia editor argument's in a community forum: "I think that new student-editors not only do they add value, but they also bring support costs along with their editing mistakes" (Brailas, 2013). Mutual understanding can be facilitated by a well-organized and planned intervention. Another Wikipedian advises in a community forum: "Don't underestimate how much experience is needed on Wikipedia. It takes months of regular editing and content creation to become experienced enough to really mentor other editors properly" (Brailas, 2013). Despite the careful planning, cultural conflicts and the resulting acculturative stress is inevitable (Berry, 2005). During an educational assignment, an "infuriated" Wikipedian warns that: "one of the students is planning to edit a well-developed article. That's a very bad idea; any edits that are not justified will immediately invoke hostile responses. The student will find this a quite unpleasant experience" (Brailas, 2013).
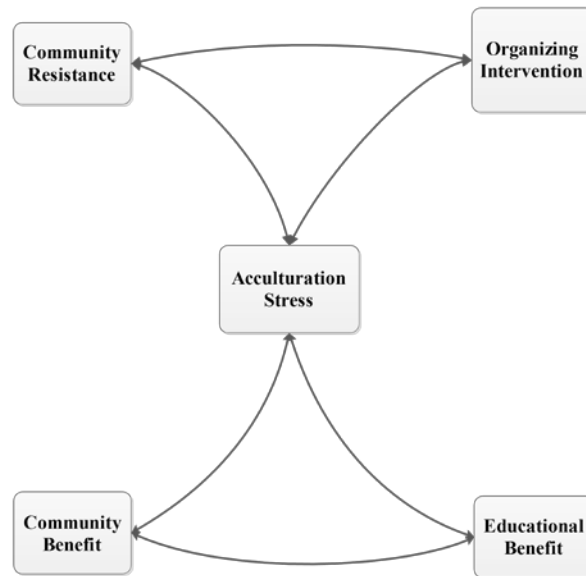

Figure 3. A Grounded Theory model for utilizing Wikipedia's community in Education. Community Resistance, Organization of Intervention, Community Benefit, Educational Benefit, and Acculturation Stress are the conceptual blocks of this model for interpreting the utilization of a virtual community in education as an acculturation process.

During educational interventions in Wikipedia we observed different rates of adaptation among students who have undertaken editing assignments: "Many students mentioned the challenges of learning how Wikipedia works, and how editing an article was a lot more work than they had imagined" (Khanna, 2012). This is consistent with the existing empirical data in offline acculturation settings: "Whether by choice or by circumstance, individual settlers also vary in

the overall adaptation level achieved during any given period, falling at different points on a continuum ranging from minimal acculturation and deculturation to maximum acculturation and deculturation" (Kim, 2005, p. 383). Some students fit relatively easily from the beginning of an educational intervention in Wikipedia, while others are becoming stressed by the editing process. A student in a focus group discussion about her experience in Wikipedia argued: "I felt really bad when they deleted my article, because they didn't give me even a minute time to think about it, and I did not realize what exactly happened, the article just disappeared. And they didn't give me even the right to revise it" (Brailas, 2013).

4.2. Acculturation strategies and virtual communities

Berry (1997) proposed a bi-dimensional model describing four distinct acculturation strategies, depending on the degree of cultural maintenance and the intensity of intercultural contact and participation being sought by the newcomers into a cultural environment (Berry, 1997). The first proposed acculturation strategy in Berry's model is *assimilation*: people totally reject their own cultural identity and they seek full assimilation into the host culture. In the case of an educational intervention in Wikipedia, this strategy would mean that the students are expected to totally neglect their educational identity and join Wikipedia's community as typical members. For example, a Wikipedian in a community's forum called students to be only members: "Students are members here, they must abide by community rules and policies like the rest of us".

The second acculturation strategy proposed in Berry's model is *separation*: individuals try to maintain their cultural identity while avoiding any contact with the host community. This would be equivalent to students being interested only for the accomplishment of their course assignment without paying attention to community members. In such a case, students systematically would ignore Wikipedia's rules, when these rules were against to what was expected by the culture of their classroom and they would avoid any contact with typical community members. In such a case complaints by Wikipedians arise that students make poor article edits and then on they never engage on talk, a fundamental aspect of Wikipedia's culture.

The third proposed acculturation strategy is *integration*: individuals seek to maintain their cultural identity, while they pursue intercultural communication with members of the host community. In the case of Wikipedia, students pursue communication with Wikipedians and try to understand their culture, while maintaining their autonomous identity as students performing an educational assignment. As a professor argues in a Wikipedia's community talk page: "Students need to learn to listen to what the community has to say, and also they need to learn to argue their case where appropriate. It is this interaction with a "real world" public that is among the greatest benefits of using Wikipedia in class. Otherwise, I might as well ask them to write on an in-house Wiki hosted on a local server" (Brailas, 2013).

The last possible strategy according to Berry's model is the *marginalization*: people do not care about the preservation of their cultural identity, while not aiming at any contact with the culture of the host community, so they are driven to community's margin. Between the four acculturation strategies proposed and described by Berry, the dominant in the field of intercultural studies seems to be integration (Berry, Phinney, Sam, & Vedder, 2006). We suggest that in the context of formal educational assignments in Wikipedia, the most appropriate and practically applicable acculturation strategy for the students seems to be Integration. Assimilation is not applicable, since the students contribute to the encyclopedic project in the context of a predetermined educational assignment; a course assignment that in the end will be evaluated and graded by a professor. It is possible for some students to be quite motivated by their assignment and inspired by Wikipedia's culture to finally become Wikipedians, regular community members, but this could happen after the completion of the educational activity. The separation strategy is not desirable, because the purpose of the educational activity is to actively participate into the community's life. Otherwise, instructors would ask students to contribute rather to a private wiki, or to some other "walled" collaborative virtual environment, and not to Wikipedia, an open social environment. The marginalization does not make sense for an educational intervention in a community (this would mean that students are neither trainees, nor community members).

Integration is the only strategy that allows students to become participants of a culture, even temporarily. Wikipedia editing assignments have a limited duration (usually during the period of a semester) and are officially graded afterwards as dictated by the established academic practice (something totally foreign to Wikipedia's culture – community members, although sometimes honored, are not officially graded). Integration is considered the best strategy for minimizing acculturative stress, as it is highlighted by a number of cross-cultural studies (Berry, 2005). According to Kim (2005), individuals "share the experience of beginning their adaptation experience as cultural 'outsiders' and of moving in the direction of cultural 'insiders' over time" (p. 381). In cultural integration, students and teachers maintain their educational cultural identity, while pursue community contact and try to understand and participate into the community life and finally become cultural insiders.

5. Discussion

5.1. The virtual learning community

An opportunity for learning opens when there is a deviation from the familiar, when the cultural outsiders realize that "they lack a level of understanding of the new communication system of the host society, and must learn and acquire many of its symbols and patterns of activities" (Kim, 2005, p. 382) in order to become cultural insiders. Teachers in parallel action with the students and the community members constitute a complex learning environment, a new complex cultural system, a new virtual learning community with its brand new virtual culture. This new virtual symbiotic social formation has a limited life span; it exists as long as the educational intervention takes place. However, its implications last far longer and continue to influence both students and community members; Wikipedia's community is not the same after the educational interventions that took place worldwide the previous years; some new practices are now acceptable, like accepting non volunteers' contributions as far as they are made during an educational intervention. The same applies to the students, their teachers and the educational structures involved in these kinds of interventions. Although it is clear that Wikipedia's articles cannot be used as academic references in research papers, Wikipedia is now even more accepted in academia, at least as a competent educational tool. Teachers involved in Wikipedia assignments have a deeper understanding of the educational potential of Wikipedia and how it can be utilized in a reliable and efficient way.

5.2. Learning far away from equilibrium

The contradictions among the agents participating in the formation of Wikipedia's activity system play a key role in realizing problematic deadlocks as well as transforming and evolving the whole encyclopedic constitution. As Engeström points out: "Contradictions within and between activity systems are a key to understanding the sources of trouble as well as the innovative and developmental potentials and transformations of activity" (Engeström, 2008, p. 5). The conflicts over the content of an article can drive involved agents, either regular editors or contributing students, to a situation that is, in Prigogine terms, *far away from equilibrium* (Prigogine & Stengers, 1997). In order for the activity system of this community to advance and improve, conflicts have to be addressed and resolved through polyphony and dialogue. According to Engeström: "In order to move to a new developmental phase, the team would have needed to take up, discuss, and resolve the issue of the expected and actually achieved outcomes of its work. To step into such a zone of proximal development would have meant opening up a discussion on criteria and indicators of quality and productivity." (Engeström, 2008, p. 47).

5.3. A collective zone of proximal development

Engeström describes "the developmental potential of collective activity systems interacting with other activity systems, both supportive and adversarial" (Engeström, 2008, p. 5). In the case of the educational interventions in Wikipedia, the educational group (both students and instructors) can be viewed as an activity system interacting with the activity system of Wikipedia's editors. In this view, what the educational group can manage to do in the present time, with the support of the editor's group, will be achieved independently in the near future. Engeström visualizes this collective zone of proximal development as an "Invisible Battleground" where disturbances, a.k.a. editor's conflicts and wars in Wikipedia's terminology, occur all the time (Engeström, 2008, p. 62). In the virtual learning community, the complex formation consisted of the educational group and the regular community members, the disturbances that are not a rare exemption but happen quite often, result to the acculturation stress mentioned above. In such a system, disturbances can be fruitful, therefore pushing forward and advancing the competence of the participating actors and the virtual learning community as a whole, or can be blocking and inhibiting factors: "In the ongoing work activity, disturbances occurred continuously. They were dealt with both regressively and expansively. Innovative solutions appeared. But innovations were occasionally blocked by lack of appropriate communicative tools, causing ruptures in the inter-subjective understanding between the participants of the activity system" (Engeström, 2008, p. 62).

In the socio-cultural landscape described above, teachers undertake the role of cultural mediators between students and regular community members. Students need to be acquainted with the cultural norms of the hosting virtual community early enough, or the disturbances would be so intense to cause ruptures in the communication among the involved activity systems. A teacher acts as a cultural mediator between the cultural requirements of the hosting environment and the competences of her students, so as not to be so overwhelming for them. However, a teacher should not totally take over student's agency; otherwise any zone of collective proximal development will be eliminated. By taking advantage of a virtual community, educators can literally bring a whole thriving community into their classrooms. The acculturation of the educational group into the culture of a hosting virtual community, through collaborative actions, conflicts and disturbances, results into the formation of a collective zone of proximal development: what the students' group manages to perform today with the aid of the community's members, will be able to perform independently tomorrow. The formation of a virtual learning community through the procedural and structural coupling of two discrete activity systems opens a new space for participatory learning.

5.4. Acculturation and learning

A critical question to ask is what the students are actually learning through their contact with Wikipedia's community? Are they simply learning to be "good Wikipedians"; does the entry into this outstanding online community facilitate learning about their substantive subject of study? In the present study we focus on the inevitable acculturation stress during educational interventions in Wikipedia and how this stress can be fruitful. During our study we found evidence supporting improvement in learning outcomes on students' substantive subject. However, to answer the question whether assignments in Wikipedia facilitate students' learning about their substantive subject of study, it would require a different research method and design. In the present study, a prominent coding category that emerged from the empirical data during open coding process was "*Improve Research, Writing and Interaction Skills*" (Table 1). We didn't elaborate further to this direction and we didn't try to get more nuanced codes. This reflects our main research interest in the relations between community members, students and educators and learning as a social process, not as an outcome. For example, a student who has participated in a Wikipedia course assignment, reported in a blog post referring to his learning experience: "Wikipedia along with the public policy class has not only improved my research and writing skills, but changed the way I make use of online information" (L. Davis, 2011). This is a paradigm shift from the knowledge as outcome to the knowledge as a process situated in a specific cultural context: "learning is at core a process of enculturation, of entry into a culture of community of practice." (Brown, 1990, p.277). Learning and cognition are culturally situated (Brown et al., 1989);the process of learning can be considered as a culturally situated praxis (Sack et al., 1994). This situated praxis brings to the foreground the need for a new epistemology of learning: "the unheralded importance of activity and enculturation to learning suggests that much common educational practice is the victim of an inadequate epistemology. A new epistemology might hold the key to a dramatic improvement in learning and a completely new perspective on education" (Brown et al., 1989, p. 41). Today, the plethora of online communities and social groups thriving on the social web presents us with a unique opportunity to bridge the gap between educational praxis and culturally situated activity. To a certain extent, article writing and editing in Wikipedia can be undertaken without entering into social discourse with other editors. However, interaction is inevitable even if it is non-verbal: some students' edits in existed articles will be reverted by experienced Wikipedians and extra edits will take place in brand new articles. Writing and editing in Wikipedia is an inherent social process. An interesting question for further research is whether different levels of online interaction between students and Wikipedians influence acculturation and learning.

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