

True Knowledge Circulation: A Small-Scale Case Study of the Use of Wikis within Academic Partnerships

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ABSTRACT

The development of new technologies is giving rise to new models of collaboration. One of these models is “Mass Collaboration” that is based on Web 2.0 technologies and services. Within this context, wikis offer new possibilities to exploit in a more effective way the entire potential of the collaborative work coming from the active participation of all the individuals that are present in dispersed locations. This research study wants to contribute to the current debate on the cultural shift that the introduction of this tool in academic partnerships with even the less developed countries is able to produce.

Key words: RFID, location tracking, wireless interference, indoor localization

1. BACKGROUND

Due to the rapid proliferation of information and communication technologies (ICTs), complexity which is the nature of things today has been extremely increased. In order to manage the interdependence we have to work cooperatively with others; sharing same interests, skills or knowledge. Thoughtful changes in the nature of technology and global economy are giving rise to new powerful models of collaboration. These new models of collaboration are based on community and self-organizing and derived by the technological and internet revolution and Web 2.0 technologies and services that create a new sense of innovation, creativity and ingenuity.

Mass collaboration is a collaboration model which is based on collective actions and which occurs and takes place while large numbers of contributors work independently but collaboratively in a single project (Tapscott & Williams, 2006). Such projects typically take place in the internet via means of web-based collaboration tools. This model of collaboration unleashes the creativity, innovation and knowledge of individuals worldwide by fostering knowledge-sharing. What distinguishes “Mass Collaboration” from other forms of collaboration is that the content being created in “Mass Collaboration”, rather than the social interaction mediates the collaborative process (Tapscott & Williams, 2006). Furthermore, individuals willing to take place in creative acts do require the joint development of shared understandings.

The International Education Consultancy Office within the University of the Arts in London is one of such institutions that tries to make use of this mass

collaboration due to its partnerships established in various developing countries such as Syria, Bangladesh and Turkey to promote the development of the textile sector in these countries by providing voluntary education through projects funded by UNIDO (United Nations Industrial Development Organisation) and the EU (European Union). The researcher’s interest in this case study is mainly due to being from one of these countries- Turkey- in which the newly established institute (Textile Academy) in partnership with International Education Consultancy Office is seen as central to reviving the textile sector hit by economic crises. The researcher tries to investigate whether the use of these collaborative technologies can further contribute to the knowledge transfer between such academic partnerships.

2. DEFINITION

Wiki is the most representative tool that enables the new Web 2.0 philosophy that is defined by user participation, openness and network effects. Derived from the Hawaiian word of “wiki wiki” which means quick this social software is an enabler of social interaction, collaboration and information sharing, promoting the growth of communities as user groups. In order to clarify what wiki publishing is a synoptic table of comparison has been provided (Klobas, J., 2006)



Table 1 – As Quick as a Wiki: Comparison of steps needed for the creation of wiki page and web pages. (Klobas, J. 2006)

Wiki Page	Web Page
1 Go to the page on web browser	Search your Web editor preferred (Dreamweaver, Frontpage...)
2 Click on Edit	Open locally the web page (off-line)
3 Make changes in page	Open the source file
4 Save the page	Make modifications
5	Save the file
6	Transfer the file on the web-server (FTP)
7	Open the browser
8	Check the edited page on the browser

The application of the wiki in the academic partnership projects can be object of a taxonomy following four dimensions:

- Support to effectiveness: This refers to the access of information such as phone numbers or suppliers address. Wiki can be useful to collect and self-update the users' index or other descriptive section.
- Knowledge and collaborative support: This refers to the collaboration inside and among teams and the related knowledge management issues. Wikis are used in this sense for many applications, from the creation and the implementation of the common knowledge base to the several applications that requires the matching of many experience (e.g: co-creation of procedures, handbooks, planning activities, sharing presentation materials...etc.)
- Communication and socialization: This refers to the development of a networked internal communication as well as institutional and intrapersonal. Users are connected using Wiki in order to join the owner of a particular competence or knowledge or real time collaboration with other related parties.

As McMullin (2005) and other social constructivist theorists assert; because of their flexible functionality, wikis afford the opportunity to offer collaborative, constructive learning more extensively by

shaping knowledge through discussion with peers and through reflection. Due to the collaborative nature of wikis knowledge is enacted with a focus on the community rather than on the individual learner (McMullin, B., 2005).

Similarly, according to the theory of the community of practice, learning is an inherently social activity, situated in a social and cultural context (Lave, J. & Wenger, E., 1991). So, in order for learning to occur, there must be a negotiation between an individual's unique experience and the knowledge of the group. The community provides a ground for interaction and so that learners can collaboratively construct shared knowledge (Palloff, R.M. & Pratt, K., 2005).

Wikis are web sites that allow users not only to have access to its content but also to change the content online. As Scardamalia & Bereiter (2003) emphasized wikis are tools for knowledge-building which is important for knowledge-creating competencies in a knowledge society. Wikis don't require software, are easily accessible, and are simple to use for everybody. Their special feature is that hyperlinks can be created and texts can be added, deleted or changed so that groups of like-minded people can work collaboratively on one and the same text about certain topic. Wikis' potential for collaborative learning lies in their ability to facilitate shaping of knowledge (Chong & Yamamoto, 2006). Wikis can be regarded as media that support learning due to their ability to facilitate collaboration, to allow for design-based learning, to enhance inventiveness, to support inquiry learning and the co-construction of learning (Chong &

Yamamoto, 2006). In general, wikis can be considered to support social constructivist learning.

To examine the question of what makes wikis supportive of knowledge building, the researcher's consideration will be based on fundamental perspectives on learning and knowledge building. As Scardamalia & Bereiter (2003) assert a person's individual knowledge can serve as a resource for other peoples' learning. Moreover, Norman (1991) stated that people make use of each others' knowledge through collaborative knowledge building with artifacts and that the learner's active participation should be emphasized.

3. COLLABORATIVE KNOWLEDGE BUILDING WITH WIKIS

According to Luhmann's sociological systems theory, social systems can be distinguished from cognitive systems. This paper will first outline the functionality of a social system, and then address the functionality of cognitive systems. After that, the processes responsible for transitions between the social system and people's cognitive systems will be described. In this context, the process of externalisation will be distinguished from the process of internalization.

Systems are dynamic as they develop over time and consist of operations. A system ceases where its mode of operation ceases. Such operations are defined as the production of elements. This definition implies that systems are autopoietic and self-referential. They produce their own elements. According to Luhmann (1984), systems continuously develop and recreate themselves so that the system's permanent continuance can be guaranteed. In other words, the systems exist due to operations that are followed by further operations of the same kind and so on. Subsequent operations always build on the results of the preceding operations.

Luhmann (1984) distinguishes three different kinds of systems: Biological systems operate by means of biological processes. They are autopoietic in the sense that cells create other cells. Psychological or cognitive systems operate via processes of consciousness and cognitive processes, such as retrieval of knowledge from long-term memory, elaboration of knowledge, process of externalization and internalization of knowledge. They are also autopoietic as cognitions develop further cognitions. Finally, social systems operate by means of communication. In this context, communication is not intended to be a result of people's activities but a product of social systems.

From a system's perspective, the environment is contingent. This means that the system cannot anticipate what will happen in the environment, and thus, the environment can irritate the system. So, for each system its environment is more complex than the system itself. After being irritated, a system may be able to select a limited amount of information available outside its borders. By operating on this information, it reduces external

complexity, establishes new relations and increases its internal complexity.

Social systems depend on cognitive systems as there would be no communication without cognitions. Luhmann (1984) points out that systems are operationally closed, yet they can influence each other. In order to solve the problem of systems that are open and closed at the same time, Luhmann (1984) applies the concept of structural coupling. Social systems are structurally coupled with cognitive systems via language. Since systems are sensitive to irritations from their environment, and since irritations can be incorporated into system-immanent operations different systems can make use of other systems' complexity. So, a cognitive system can take on the social system's elements and the social system can take on the cognitive system's elements if they irritate each other. So, structural coupling allows for co-evolution of both systems. Both systems, the cognitive and the social system can become more complex over time.

Clearly delineating the border between the social system (the wiki) and the cognitive systems (the users) is crucial for understanding how collaborative knowledge building works. What is happening when people work mutually on one common artefact, thereby introducing their knowledge to the community and building new knowledge collaboratively?

In this paper, two processes are proposed as the basis for the crossing of the border between the social and the cognitive system: we refer to these processes as externalization and internalization respectively.

Externalization

For contributing to the development of a wiki, people first have to externalize their knowledge. They do this by introducing information that reflects their own knowledge (Cress & Kimmerle, 2007). For that purpose, a person's own knowledge has to be conveyed into a wiki article in a form that maps the person's knowledge.

The wiki artefact exists independently from the people who created it and it develops in a way that is determined by people's knowledge. The information in the wiki relates to the contributor's individual knowledge; therefore the person's cognitive processes are represented by and reflected in the wiki (Cress & Kimmerle, 2007). A user is only able to contribute something to a wiki if she or he has corresponding knowledge about that topic. Of course, the information in the wiki and the knowledge in a person's mind are not identical, but they are equivalent to a certain degree (Cress & Kimmerle, 2007). After the process of externalization, the wiki exists independently from the person's knowledge.

Contributing to the wiki does not only allow the creation of an artefact, but it can also lead to individual learning processes in the contributors. The mental effort necessary for the externalization of knowledge can extend people's individual knowledge, because externalization requires deeper processing and clarification (Cress &

Kimmerle, 2007). Normally, people who contribute to a wiki can't externalize their own knowledge without some changes in their individual knowledge. Through the externalization process, people often deepen their knowledge and clarify their understanding. So, externalization can lead to individual learning processes and people who contribute to a wiki article can expand their own individual knowledge (Cress & Kimmerle, 2007).

Once a person has contributed to a wiki, then each individual group member can have access to the

wiki's information. This process of externalization does not require the interaction with other people in a narrow sense. People can externalize their knowledge without necessarily addressing other people in the first place (Cress & Kimmerle, 2007). These processes are also tentatively presented in Figure 1.0 in the form of the three cognitive systems (CS1 to CS3) and the social system wiki. The grey symbols represent novel aspects of knowledge as a result of learning through externalization.

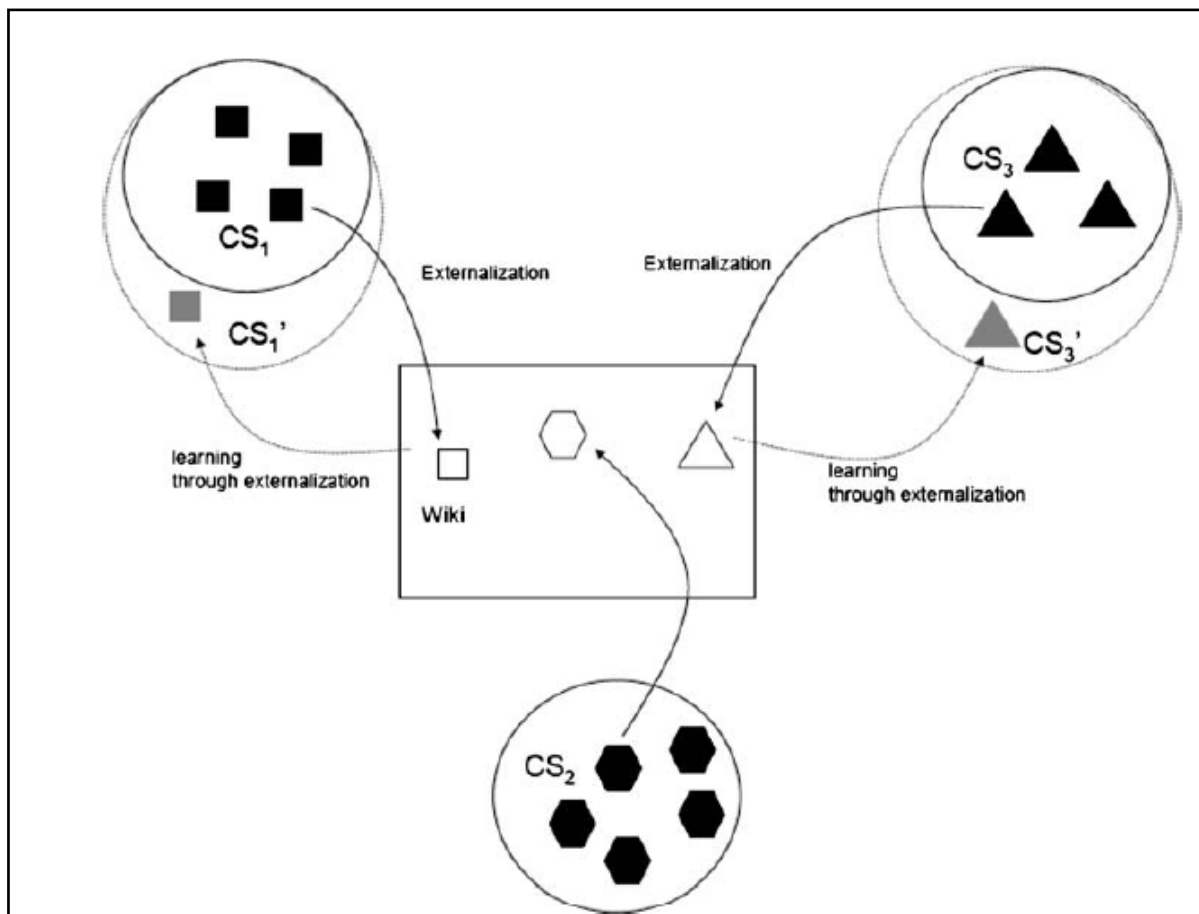


Fig. 1.0 : The Process of Externalization

Internalization

Inter-individual knowledge transfer and collaborative knowledge building take place when people have the opportunity to work with a wiki and to internalize the information available in the wiki. So, people have to process the information and integrate it into their individual knowledge (Cress & Kimmele, 2007). New knowledge may be developed in this way. Besides, an additional knowledge-creating process can occur. If people internalize information from the wiki, knowledge can develop which was formerly neither part of their personal knowledge nor part of the wiki (Cress & Kimmele, 2007).

This can occur if new knowledge internalized from the wiki interacts with the prior individual knowledge in a way that enables people to create new knowledge. In other words, new knowledge is inferred to out of the knowledge internalized through the work with the wiki and the prior knowledge (Cress & Kimmele, 2007). This knowledge can be described as emergent knowledge (Cress & Kimmele, 2007). This is a result of the collaboration and as such represents collaborative knowledge building which is more than mere knowledge sharing. Something qualitatively new has developed (Cress & Kimmele, 2007). The process of internalization has been depicted in Figure 2.0 in which

the cognitive system 3 has developed such emergent knowledge.

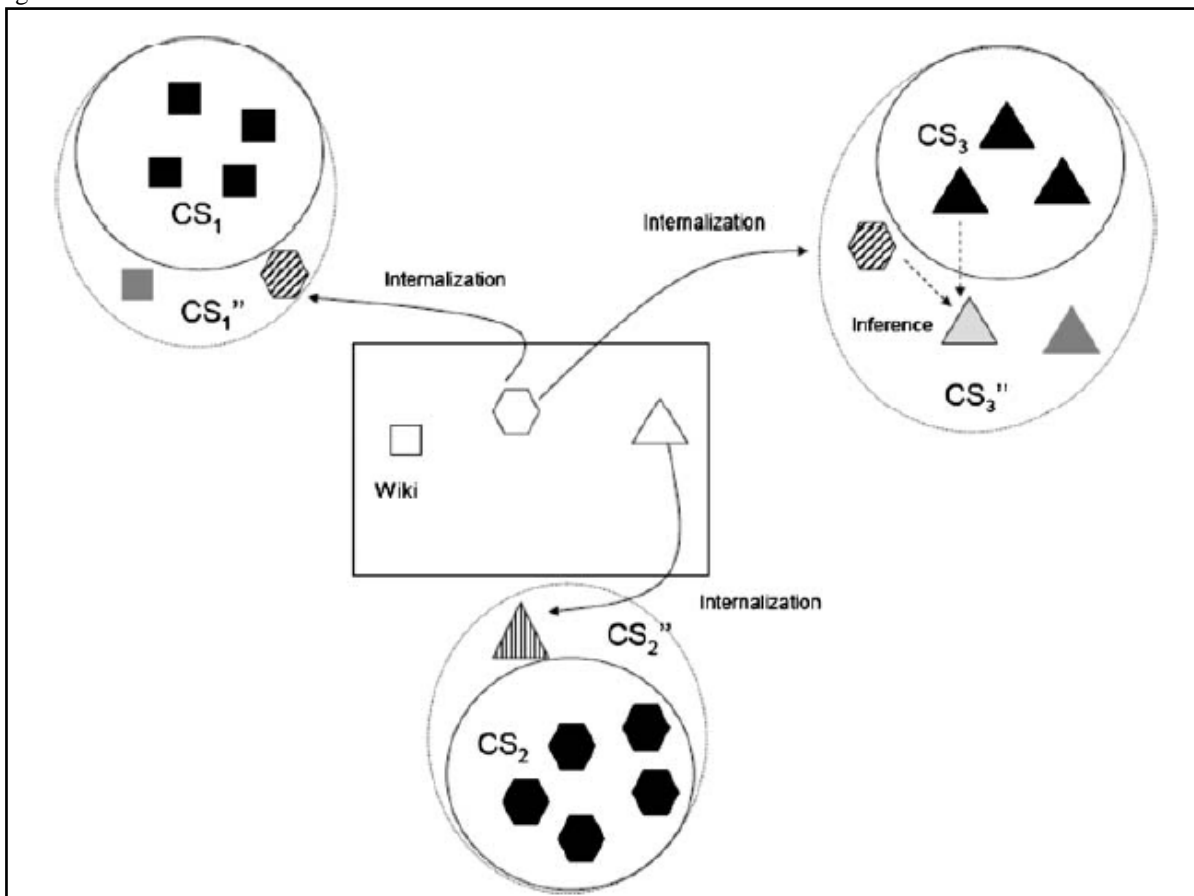


Fig. 2.0: The Process of Internalization

4. FOUR PROCESSES OF LEARNING AND KNOWLEDGE BUILDING

To explain the co-evolution of the users' knowledge and the wiki's content, one should also refer to the theories that describe cognitive processes of individual learning (Piaget, 1970). A prominent approach that describes how people deal with new information is Piaget's model of equilibration (Piaget, 1970). This model explains how people take in new information from their environment, how they perceive and encode it from outside and integrate it into their own knowledge (Piaget, 1970). The equilibrium theory describes the way people try to maintain a balance between the environmental information on the one hand and their prior knowledge on the other (Piaget, 1970). If information is new and not in line with existing knowledge this incongruity causes a cognitive conflict (Piaget, 1970). When information cannot be promptly decoded and integrated into existing knowledge people have to adapt to the new environment. Piaget points out that such cognitive conflicts can lead to new knowledge. There are two possibilities to solve a cognitive conflict: by assimilating the new information or accommodating the knowledge to make it compatible with

new information (Piaget, 1970). Assimilation refers to the process where an individual understands new information on the basis of existing knowledge and integrates it into prior knowledge. Assimilation describes the quantitative aspect of individual learning as only additional pieces of information that fit into existing knowledge are added (Piaget, 1970).

The other process of adaptation is the process of accommodation where people interact with new information in a way that changes their knowledge. They don't simply assimilate new information into existing knowledge, but actually change knowledge in order to better understand the environment and its information. This creation of new knowledge refers to the qualitative manner of learning.

Within this context, when interacting with the wiki, people can learn as a result of externalization or internalization. Learning can take place by assimilation or accommodation. Accommodation and assimilation don't necessarily take place internally (in people's cognitive systems), but also externally (in the social system wiki). If information is contributed to the wiki without being linked to previously existing information, the wiki is only extended by the addition of some information. If information is contributed in this way, the wiki assimilates

the new information and its organization remains the same. On the other hand, accommodation happens when new information is not only attached to the existing information, but the information in the wiki is organized in a new way.

In sum, in collaborative knowledge building with wikis, four different forms of learning and knowledge building can be distinguished: internal assimilation (quantitative individual learning), internal accommodation (qualitative individual learning), external assimilation (quantitative knowledge building) and external accommodation (qualitative knowledge building) (Cress & Kimmele, 2007). What is essential is that cognitive and social systems develop mutually. This co-evolution of systems constitutes the foundation of collaborative knowledge building (Cress & Kimmele, 2007). While through external assimilation the wiki consists of increasingly more information, through external accommodation processes it enables new understandings, allows for new emergent knowledge and facilitates collaborative knowledge building (Cress & Kimmele, 2007).

Moreover, cognitive conflict can also be described as irritation. When people work with a wiki they have to see if their own individual knowledge matches with the information the wiki provides. If people feel that the wiki's information is congruent to their individual knowledge then there is no need for external or internal accommodation or assimilation (Cress & Kimmele, 2007). In contrast, if people feel that the wiki's information differs from their own knowledge there is a need for internal or external assimilation or accommodation (Cress & Kimmele, 2007).

If people realize that important aspects of their knowledge are missing in the wiki they may perhaps externalize these and add them to the wiki (external assimilation) (Cress & Kimmele, 2007). If people find that their knowledge and the wiki's information are incongruent, they will accommodate their knowledge (internal accommodation) or revise the wiki article (external accommodation) (Cress & Kimmele, 2007). So, if a user's knowledge corresponds to the information in the wiki the user will neither learn anything nor will she or he revise the wiki. If the incongruity is very large, the information in the wiki and the individual's knowledge will hardly be perceived as describing one and the same topic. This situation will reduce the need for making both congruent (Cress & Kimmele, 2007). Only a medium – level incongruity causes a cognitive conflict which motivates people to engage in one of the equilibration processes described above (Cress & Kimmele, 2007).

Purpose of Research

Institutions looking forward to adopting mass collaboration are mainly seeking implicit change in their organizational structure that leads to more effective use of individual talents, the stimulation of creativity, the transfer

of knowledge and skills and the supplementary of intellectual companionship (Loan-Clarke & Preston, 2002). Despite the fact that management is extremely essential for the success of the mass collaboration's adoption (Libert & Spector, 2008) most of the studies and researchers are tackling the effects of collaboration (Tapscott & Williams, 2006). The purpose of this research study is to answer the question of; "How can projects based on mass collaboration be organized in higher education institutions?". The research will be of particular interest to higher education institutions looking to adopt mass collaboration and the related stakeholders such as students, academic personnel, as well as consultants involved in similar projects. Due to the fact that mass collaboration is a new concept and the related literature is limited there are no clear methodologies that focus on the realization of mass collaboration. As the research topic has not reached its full potential, the researcher's aim is to illustrate a case study where the driving force behind the stakeholders' collaboration practices are development of better knowledge-sharing practices.

5. RESEARCH STRATEGY

The methodology employed in this research is distinctly qualitative. Denzin and Lincoln (2003) highlight the debate that exist over the robustness, validity and reliability of qualitative studies. They underscore that the very word 'qualitative':

"implies an emphasis on the qualities of entities and on process and meanings that are not experimentally examined or measured in terms of quantity, amount, intensity or frequency. Qualitative researchers stress the socially constructed nature of reality, the intimate relationship between the researcher and what is studied, and the situational constraints that shape inquiry. Such researchers emphasise the value laden nature of inquiry. They seek answers to questions that stress how social experience is created and given meaning."

In terms of validity, the emphasis is not on a single standard of truth using the terminology of Ellis and Bochner (2000) but rather a verisimilitude that evokes in readers a feeling that the experience described is lifelike, believable and possible. Ellis and Bochner (2000) claimed that the introduction of naturalistic and qualitative methods into education has caused the traditional notion of validity to be redefined as trustworthiness or accuracy.

In terms of reliability, Ellis and Bochner (2000) stated that since personal narratives are created from a situated location, trying to make past and present cohere, there is no such thing as orthodox reliability in autoethnographic research.

The case study is a strategy that particularly suits the descriptive nature of research (Yin, 2003). As the researcher does not have any control on the events; case studies are preferable than other strategies; besides the main theme question of the research is "How or/and "Why" (Yin, 2003). This research strategy also facilitates

the use of a descriptive approach as the aim is to describe and analyze a phenomenon non-intrusively. The approach relies on existing knowledge, practices and theories for the formation of the process framework as a way of dealing with the research aim. The descriptive approach aims to gather and illustrate data without any manipulation of the research context (Henrichsen et al., 1997). Conducting a descriptive study makes the research more deductive and requires the use of different data gathering methods and techniques (Miles & Huberman, 1994).

Units of Analysis: The research study is concerned with a single mass collaboration project related to the provision of voluntary education in the less developed world through the partnership with the University of the Arts in London and UNIDO (United Nations Industrial Development Organisation) to promote the development of the textile sector.

Within-case Sampling: Data was collected from stratified informants within the project unit. Informants were selected based on their roles within the project. This within-case sampling is an important strategy to achieve content validity in qualitative research (Goodwin & Goodwin, 1984).

Data Collection

Interviews, observations and documentation (Miles & Huberman, 1994) were used to improve the construct validity of the research and provide opportunities for triangulation during the analysis of the study as a whole (Creswell, 2007). The documentations helped to understand the project more in –depth. Four interviews were undertaken with the related two Project Managers from the unit of International Education Consultancy, the Head of E-learning and the Web Coordinator in the University of the Arts in London.

Data Analysis

Data reduction is one of the qualitative analysis phases of Miles & Huberman (1994), it consists of various processes: selecting, simplifying, abstracting and transforming the data in field notes and/or transcriptions (Miles and Huberman, 1994). Data reduction took place when choosing the research question, collecting data and dealing with interview transcriptions. Besides, surveys were also given to the interviewees.

Findings

In order to investigate the attitude towards Wiki use we can show how the new tool influenced the communication with the related parties.

The interviewed personnel confirmed that the relationship with Wiki inside the academic community is very complex and not all the related parties use it.

“When I arrived at our other sites’ in Syria or Bangladesh I realized that most of the academic staff did

not know what Wiki was, but then, the tool became a known tool inside our community (UNIDO project group) and other groups started to use it.” (Head of E-learning) Others interviewed confirmed their intensive introduction of Wiki into the workflow process: “I use Wiki almost every day, to for instance put the reading materials and related case studies with regard to textile sector, to give links to free brainstorming and visualization tools that the other party- partnerships outside of UK- otherwise might not be aware of.” (Project Director). The tool seems to satisfy mostly the needs with regard to documentation. Its perceived value is in the easiness of the publishing system and in the simplification of the traditional documentation repository. “It is quicker and simple than the html if you want to publish something on the web.” (Web Coordinator). And more: “It is a sure place where to find your draft documents. Indeed, this way to work reduced the e-mail traffic with the other parties.” (Head of E-learning). These words also prove that wiki influences in a very positive way the quality and effectiveness of people work: they share ideas and collaborate on teaching materials- that can be seen and checked practically in real time- in order to release daily up-to-dated documentations.

Furthermore, statements such as “the fact that we can’t be always present in these distant locations is compensated by the related parties’ autonomy in finding information without the needs to ask to others” (Head of E-learning); “Effectively, the use of Wiki slims the workflow, it is great when you are able to share knowledge” (Project Director), “I am sure, now I can see whether the students in other countries are collaborating; yes the horizontal communication is improved!” (Project Director).

The definition of the wiki and the importance of the eight cultural key drivers, found with a deductive method from starting theory- quickness, flexibility, sharing, collaboration, social networking, peering, openness and trust are supported by an empirical experience at the UNIDO project held in partnership with the University of the Arts in London. According to the interviews, the main three key drivers for the use of wiki across the international academic partnerships are: collaboration, sharing and quickness.

This case shows extremely positive evidences that the deductive insights here presented can be considered as a starting point towards further studies that can research how to support a Wiki impact on academic institutions with regard to voluntary education.

6. CONCLUSIONS

This research intends to propose just a personal and not yet validated manner to assure a right adoption of Wiki inside an educational partnerships’ context. A scientific validation here proposed may further be contributed via further studies and structured empirical researches in this direction, promoting systematic survey activities in similar contexts of academic partnerships.

One of the main points agreed in this study is that the use of Wiki permits not only a knowledge stocking or the sum of prior information, but a true creation and circulation of new knowledge. The results from the interviews and surveys can be useful to the related stakeholders (project managers, teachers, e-learning staff) who want to verify whether Wiki can be successfully used for academic partnerships in different cultural contexts.

Wiki is not just a technology, but a true philosophical way of intending work. Although in this study, wiki has been mainly used for documenting activities and sharing internal resources in an autonomous way it can also be used for other collaborative activities such as meeting arrangements.

APPENDIX: INTERVIEW QUESTIONS

Cultural Key driver	
1. Quickness	Do you find up-to-dated data useful for your daily work?
	Regarding to booking common resources, Is it possible to make it by yourself?
	Do you find in an easy way and quickly up-to-dated information – or knowledge-owner – useful for your work?
	Do you find up-to-dated information about organizational activities?
2. Flexibility	Are you free to dedicate a percentage of your time to your own projects?
	Is it possible to get information about the whole project work progress and direction?
	Is it possible to re-configure and handle others' contributes?
	Are you active in different teams?
3. Sharing	Are the common resources accessible to all and can these be booked in an autonomous way?
	Is it possible to access or find results and insights inside and outside the community?
	Is it usual to implement others' work or co-create documents?
	Is the real time circulation of ideas among the community supported?
4. Collaboration	Do you know which people are involved in your same projects?
	In your team, are individuals plans often compatible with the group activity?
	Is it usual to participate to other group projects?
	Is it usual to discuss with others about their work, solving problems together?

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