Sapo Campus Schools as a Disruptive Innovation Tool: Could it be the Educational *Ba*?

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Abstract. Sapo Campus, a project developed by the University of Aveiro, SAPO and TMN within the labs.sapo.pt/ua program, is a web 2.0 service platform specifically designed for Higher Education. Some time after implementing SAPO Campus at the University of Aveiro, the team responsible for the project accepted the challenge of adapting it to educational settings beyond Higher Education institutions. The institutional adoption of the Sapo Campus Schools (SCS) platform, in which openness, sharing, integration, innovation and personalization converge, will prompt changes in the school setting, not only in the way people relate to one another, but also in the teaching and learning process. Considering the epistemological principles that underlie the use of technology in the teaching and learning process is as important as it is necessary. In this setting, two equally relevant issues related to the adoption of SCS emerge: technology and knowledge. As a result, it becomes necessary to study how knowledge is generated within SCS, from individual, collective and organizational perspectives. If, sensus lato, one can assume an immediate change for schools joining the SCS platform, one cannot infer that the impacts it generates are indeed innovation. Based on these propositions, this paper aims at 1nalyzing SCS, identifying the elements that aspire to reach the knowledge creation Ba, and provide a way to a disruptive innovation.

Keywords. Personal learning environments, innovation, knowledge management, Sapo campus schools, BA, creativity

1 Introduction

Sapo Campus, a project developed by the University of Aveiro, SAPO and TMN within the labs.sapo.pt/ua research lab, is a web 2.0 service platform specifically designed for Higher Education. According to Santos & Pedro (2009, p. 1104) this project's main goal is:

[t]o develop, launch and assess an integrated Web 2.0 services platform based in SAPO core technologies that may promote the aforementioned skills [communication, sharing and collaboration] in Portuguese HEIs students in order to ease and to support these services use in Higher Education contexts.

Some time after implementing SAPO Campus at the University of Aveiro, the team responsible for the project accepted the challenge of adapting it to educational settings beyond Higher Education institutions. More than just adjusting the platform from a technological point of view, this redesign entails a rhizomatic dimension, con-

sidering that it will be used by a diverse audience of students from all school levels (ages 6 to 18).

Nowadays, Portuguese schools are not sufficiently aware, prepared and equipped to bring the outside world into the classroom and, as we believe, potentially enhance and enrich the teaching and learning process. Frequent users of social networking sites, most students are concerned about keeping their social presence on the web separated from formal learning processes (Observatório do Plano Tecnológico de Educação, 2010).

The institutional adoption of the Sapo Campus Schools (SCS) platform, in which openness, sharing, integration, innovation and personalization converge, will prompt changes in the school setting, not only in the way people relate to one another, but also in the teaching and learning process. It will also and foremost reveal the built-in dimension of Personal Learning Environments (PLE), making it possible to create and manage personal spaces with all the PLE features within the institutional whole that makes up a school. The focus on the platform should not, however, be viewed from a technicist standpoint that instrumentalises the PLE, but rather from an humanist perspective that values the individual or groups of individuals and their control over their learning activities – both formal and non-formal (Fiedler & Väljataga, 2010).

Considering the epistemological principles that underlie the use of technology in the teaching and learning process is as important as it is necessary. In this setting, two equally relevant issues related to the adoption of SCS emerge: technology and knowledge – this discussion constitutes the first section of this document. Going back to the principles behind the design of SCS, the following section discusses the concepts of innovation and knowledge management and creation. In this context we considered two main theoretical approaches: disruptive innovation, based in the work of Clayton Christensen, and knowledge creation by Nonaka and Takeuchi. Adding to these approaches, the concept of creativity should also be taken into account as something that plays an essential role in innovation processes and that occurs in everyday educational contexts. The last section revisits the SCS with the lenses of the previous theoretical corpus, trying to show how it can be the place, the BA, of knowledge creation, towards a disruptive innovation.

2 Technology *versus* PLE

The relationship between technology and PLEs can be understood in two distinctive spaces: the first concerns the definition of PLE and the second, which is directly related to SCS, concerns the institutional adoption of technology.

Attwell (2009, p. 57) favors the approach of PLE as a concept "(...) PLEs can be seen as the spaces in which people interact and communicate and whose ultimate result is learning and the development of collective know-how". Downes (2010) also essentially sees PLEs as a concept, recognizing it as the web presence of an individual: "PLE is a concept, rather than an application – it is the idea that a person's web presence can be distributed." Westenbrugge (cit. in Kompen (2009, p. 34)) emphasizes this personalization feature in his PLE definition:

"…the ideal PLE will vary from person to person, as each individual will add different elements to his or hers Personal Learning Environment. Subsequently I believe that the ideal PLE for an individual should not be created by someone else than this person".

Siemens (2007) summarizes the conceptual approach arguing that “PLEs are the concept-entity.”

On the other hand there are authors that lean towards a more technical approach to PLEs. (Kompen, et al., 2009; Hongyu et al, 2010; Anderson, 2006; Qian, 2010; Žubrinic & Kalpic, 2008). Anderson (2006) also presents a distinctive technological definition of the concept when he argues "The PLE is a web interface into the owners' digital environment". Kompen et al. (2009, p. 35) also present a technological dimension in their PLE definition: “Defining what a PLE is usually proves a difficult task; but in the end, there seems to be general agreement on the fact that it is something unique to each individual; a set of tools that support that person’s learning experience.”

As mentioned before, there is still no consensus around the definition of PLE. Some authors place the PLE at a level of (re)instrumentation of teaching and learning. All questions related to customization, selection, adaptation, separation of form and function, tend to be discussed almost exclusively in relation to the current state (or emergent) patterns of Web services or even applications. On the other hand, other perspectives explore a more humanistic approach, showing concern for the individuals (or groups of individuals) gaining control over their learning activities (formal and non-formal). S. Fiedler & T. Väljataga (2010) who carried out a study on this dichotomy conclude that:

For educational theorizing and research this second reading of the term seems to be more appropriate and fertile. Firstly, basing the further development of “personal learning environments” as a concept on the current, and certainly transient, state of the Web, as an emerging leading medium, appears to be rather shortsighted. Secondly, in order to develop and maintain any lasting generative power for theorizing and carrying out empirical research in education, any concept needs to be rooted in an explicit (human) change perspective. (Fiedler & Väljataga, 2010, p. 6)

On this particular issue it is considered that PLE is a concept that lacks the technology to support it. In terms of theoretical framework the references to technology are volatile, considering the pace new ones are emerging. Nevertheless, technologies underpin PLEs and should therefore always be present at the implementation level.
SCS assumes itself as an integrated Web 2.0 services platform and, from this point of view, relies on technology. Nevertheless, the potential use underlying SCS, and the principles that followed its conception and design, significantly change this approach, moving across and focusing on the pedagogical dimension.

As stated before, an interesting debate has been stirring on the neutrality of technology and its impact on knowledge building. Kanuka (2008, p. 4), assuming a non-neutral stance, describes opposing perspectives: "[McLuhan] also made the famous aphorism, ‘The Medium is the message’ giving pause to the assumption of the non-neutrality of technology”. Siemens & Tittenberger (2009, p. 15) openly state that "[t]he choice to use a particular technology also reflects an accompanying world view or existing mindset ". When it comes to educational issues, Attwell (2007, p. 3) adds to this non-neutral premise by arguing that “[t]here is no such thing as pedagogically neutral software”. SCS’s technology doesn’t break away from the previous pattern and, considering its possible impact and the message it conveys in and outside the institution, cannot be deemed neutral. When assuming institutional adoption this non-neutrality becomes even more evident: it’s not about isolated initiatives by/from teachers or students but about a commitment made by the school organization.

3 Innovation, Creativity and Knowledge Management

The recent technological explosion has radically changed the behaviors and postures related with technology. Even though a large number of researchers analyze this relationship from a generational perspective, according to White (2008) even though a polarization between technology and users' age may be established, the attitude towards technology is more important than one's generation.

However, our stance on this issue is closer to the "Visitors and Residents" concepts proposed by David White (2008). White (2008) goes even further by stating that the connection between the generational argument and the use of technology might even have a perverse effect, making up for an arid and simplistic explanation for some of the constraints on the use of technology. Due to their close relationship with technology residents have developed special characteristics like multitasking and respond better to non-linear pathways of learning also having a shorter attention span. Traditional and conservative teaching, 1 to N approaches and linear strategies do not achieve the expected results.

There is a gap between the personal environments where technology plays a very important role either through the presence in social networks or through the ubiquity of Internet access, and the student's environment at school, especially in formal learning environments. These living scenarios and the ways students learn in formal versus non-formal contexts is different. In an informal context what is natural to a resident - multitasking, being wired all the time, freedom to participate and to choose the next steps (Christensen et al., 2010; Ferrari et al., 2011) is allowed. In a formal context, a global and pre-established formatting requires standardized skills and knowledge.

The assumption that knowledge generates knowledge through network interaction, heralds a dynamic and highly personalized process (G. Siemens, 2006). Learning has become a social act in which the network education concept emerges or, as put by Dias (2008, p. 6) "only meets its true potential when servicing the collaborative construction of learning as a creation and innovation process". As a result, it becomes necessary to study how knowledge is generated within SCS, from individual, collective and organizational perspectives. It is, therefore, necessary to look for references regarding knowledge management models and understand the prospective innovation processes. A literature review shows that most research in knowledge management does not come from Education, but rather from the fields of Management and Innovation applied to business, markets and companies. Within knowledge management models, the work of Nonaka & Takeuchi (1995) has inspired companies around the world to adopt clear knowledge creation strategies, understanding the role they play and how they can be applied to innovation processes. Referring to knowledge management and reviving the work of the Japanese philosopher Kitaro Nishida, Nonaka & Takeuchi (1995) put forward the concept of Ba. Ba means place and is defined as "a shared space that serves as foundation for knowledge creation" (Nonaka & Konno, 2005, p. 40). Ba is a space for debating, exchanging and promoting ideas, from which new knowledge emerges. This knowledge can be physical, mental or virtual in nature (Clarke, 2010). In this perspective, SCS can become one of these places from which new knowledge emerges, becoming Ba and generating knowledge within, through the engagement and the networks that are created.

Peter Drucker (2002) refers to the creation of knowledge as an innovation source that has undergone change. If, sensus lato, one can assume an immediate change for

schools joining the SCS platform, one cannot infer that the impacts it generates are indeed innovation. Innovation implies changes in action, valued by all those intervening.

3.1 Innovation

The concept of innovation is linked to other concepts like change, creativity, value, management, invention and knowledge. Peter Senge (cit. in (Tawhiti, 2005, p. 29) who distinguishes invention and innovation, argued that innovation only takes place when an invention can be "replicated reliably on a meaningful scale at practical cost". Fernandes (2000) states that innovation expresses an intention to change but the contrary does not apply.

One can find different definitions for innovation in the literature. One research direction underlines the novelty of an idea, as others stress the subjective recognition of novelty. A third direction emphasizes the first introduction of novelty and there are also those who focus on the new combination of needs and solutions (Seidler-de Alwis & Hartmann, 2008). In this specific setting it is considered that innovation is a process that implies novelty and has added value, which is consistent with Dawe's ideas, when he states that:

"innovation as ranging from 'high-profile scientific discoveries to low-profile changes in processes or practices. The two common elements are that they are doing something new or differently which adds value to a business operation [and] is useful to the community in which it is applied".

In the literature several types of innovation can be identified, which have a clear dichotomy as a common denominator. Tawhiti (2005, p. 35) identifies two types of innovation - incremental and radical - describing them as:
"Incremental change is a of more on-going nature, with improvements being undertaken within the existing resources so that equilibrium is maintained. Radical change can disturb equilibrium because is more concerned with altering the status quo and breaking new territory".

In 1997, Clayton Christensen, one of the most influential theorists in the field of innovation, introduced the concept of disruptive innovation in his book "The innovator's dilemma". Later, in 2008, H. Horn and C. Johnson wrote the "Disrupting Class", a book which approaches the possibility and the necessity of applying this concept to the educational field. Christensen et al. (2008) distinguish two types of innovation: sustaining and disruptive innovation. To put it very synthetically, we can say that sustaining innovation is about making something better and disruptive innovation is about making something new.

The most common form of innovation is sustaining innovation which is exemplified by Christensen et al., (2008, p. 46): "Airplanes that fly farther, computers that process faster, cellular phone batteries that last longer, and televisions with clearer images are all sustaining innovations". Despite the importance of this type of innovation that is continuous, systematic and meets a special need, Christensen et al., (2008, p. 57) argue that this kind of innovation is not the one that brings about significant changes since "All that would seem to make for a boring and orderly world." On the other hand, disruptive innovation "is not a breakthrough improvement" (Christensen, et al., 2008, p. 47). For disruptive innovation, Christensen et al. (2008) refers to a type of innovation that is not only concerned with the improvement of a product (sustaining innovation) but also with a radical change of paradigm and principles that underlie the product or process. Christensen et al. (2008) present the personal computer as a classic example of disruptive innovation. In the 70s and 80s, DEC had become one of the

most important and profitable companies in the world, investing in continuous improvement of mainframes and minicomputers. The shy appearance of the first personal computers did not change the strategy defined by the company, deeply imbued in a paradigm of sustaining innovation. The consequences of this strategic alignment are synthesized by Christensen et al. (2008, p. 47) "[DEC] was ultimately destroyed by the personal computer."

Although these innovation concepts come from industry and management, Christensen et al. (2008) claim that they can and should be applied to education. Nevertheless it is necessary to make the appropriate changes to the metrics used, bearing in mind the school's mission. Therefore, the metric used in education cannot be profitable but rather have a political and social importance. Notwithstanding this possibility of applying innovation theory to schools, there is a broad consensus around the fact that schools are organizations not open to innovation. Schools are not flexible germinators of ideas, do not encourage synergies or promote motivation (Christensen, et al., 2008; Anna Craft et al., 2008; Ferrari, et al., 2011). Christensen et al. (2008) found that the introduction of technology in education was an essential contribution to disruptive innovation following the line of personalized education. Since all students learn differently, based on the Gardner´s (Gardner, 1993) theory of multiple intelligences as well in the different learning styles, Christensen et al. (2008) contrasts the standardization that now exists in schools with customization, which is necessary for an innovative education that empowers students as well as education for innovation. The introduction of technology in education was not a catalyst for change and hasn´t had the impact it was supposed to have (Christensen, et al., 2008; Ferrari et al., 2009; Hargreaves et al., 2003; Redecker et al., 2009). Christensen et al. (2008, p. 12) justify this status quo by pointing out that technology has been used to support old practices: "They have “crammed” the new technologies into their existing structure, rather than allowing the disruptive technology to take root in a new model and allow that to grow and change how they operate".

Nevertheless and as mentioned before, technology can help to bring change. The development and implementation of student-centric technology will need to bring a shift to student-centered pedagogy (Ferrari, et al., 2009) and to the ownership of learning by learners, in which PLEs can play a key role. It is necessary to foster creativity at all levels, since that can contribute to sustainable and disruptive innovation. Ferrari et al. (Ferrari, et al., 2009, p. 29) refer: "Innovation cannot happen without creativity." Because creativity is a key component of innovation, it is important to distinguish between the different concepts it can represent. Over a decade ago, a team led by Sir Ken Robinson produced a report suggesting ways to innovate education for creativity. This document presented three different views of creativity: sectorial, elitist and democratic (Creative & Education, 1999).

In line with Robinson, Craft et al. (2001) present a bipolar view of creativity, distinguishing the big and little C´s. The first C, Big Creativity, is the one most commonly associated with creativity and stands for social and scientific genius, recognized on people like Da Vinci, Mozart or Einstein. Little C, on the other hand, is the creativity of everyday life, i.e. the ability of finding alternative ways of solving problems (A. Craft, 2001).

There are some similarities between Craft´s Little C approach and Robinson’s concept of democratic creativity (Creative & Education, 1999), in the way they support the existence of a non-elitist type of creativity that steps away from the idea of genius and is associated with small actions in everyday life. It is with this creativity

that students challenge teachers every day to also be creative. These daily teaching challenges that promote the Little C are located on two levels. On the one hand, there is education for creativity and stimulation of divergent thinking, and on the other hand, the need for prior knowledge in the area being reflected on. Ferrari, et al. (2011, p. 350) express the relationship between knowledge and creativity:

"The relationship between creativity and knowledge could therefore be seen as a virtuous circle, where creativity stimulates knowledge acquisition and new knowledge permits new and creative thinking paths."

This approach contains a constructivist view within itself. Going back to Piaget & Roberts' (1976) idea that "To understand is to invent" or according to Figueiredo (2009, p. 26) " Children should learn to explain what exists but also they should learn to create what never existed. That´s creativity and innovation!"

For some time, the question of innovation, coupled with the development and democratization of technology, infected educational discourse. There was even a certain trivialization of the terms innovation and innovative practices that often exhausted their meaning. This was also the case in Education where, as put by Hargreaves et al. (2003, p. 1): "Educational change is rarely easy to make, always hard to justify and almost impossible to sustain". However, there have been recent improvements and changes regarding innovation, particularly when understood /applied on a small scale and also in schools, with society progressively urging institutions to educate better, using fewer resources, while considering the specificity of each individual student. Christensen, et al. (2010, p. 1) summarize this societal shout when they observe that "We have high hopes for our schools"

3.2 Knowledge Creation

In 1995, researchers Takuchi and Nonaka presented the book "The Knowledge Creating Company" trying to explain the process of knowledge creation in an organization. With the provocative subtitle "How Japanese companies create the dynamics of innovation" (Nonaka & Von Krogh, 2009), the authors looked at the Japanese companies experiencing an unprecedented success on a global scale. Since then, Nonaka and other researchers have come to establish the initial view of the theory of organizational knowledge creation, widening the spectrum of theory with the backdrop of innovation as a result of knowledge management (Nonaka & Peltokorpi, (2006), Nonaka & Von Krogh, (2009)). According to this theory, "knowledge is justified true belief" (Nonaka & Von Krogh, 2009, p. 636). Thus, true of knowledge is justified through interaction with the world. Knowledge is also understood as dynamic as is created through social interaction between individuals and organizations. As referred by Nonaka & Takehuchi (1991), knowledge is also dependent on the context, dated, or framed in space and time. Takehuchi & Nonaka (1991) distinguish information from knowledge considering that information only becomes knowledge when it is contextualized, i.e. information must be interpreted and joined in/tied to individual beliefs and commitments. Deeply inspired by the work of Polanyi, Nonaka & Takeuchi (1995) distinguish two types of knowledge within a continuum: tacit and explicit knowledge.

Explicit knowledge is universal and supports the ability to act consciously in different contexts. Seidler-de Alwis & Hartmann (2008, p. 134) synthesize this kind of knowledge, emphasizing its public and intentional nature, conscious of the formal and explicit knowledge:

Nonaka et al. (2000) and other authors such as Kikoski and Kikoski (2004) describe explicit knowledge as what can be embodied in a code or a language and as a

consequence it can be verbalized and communicated, processed, transmitted and stored relatively easily. It is public and most widely known and the conventional form of knowledge which can be found in books, journals and mass media such as newspapers, television internet etc. It is the sort of knowledge we are aware of using and it can be shared in the form of data, scientific formulae, manuals and such like.

At the other side of this knowledge continuum lies tacit knowledge, which is rooted in practical action, routines, but also on experience, skills and ideals (Clarke, 2010). Tacit knowledge is deeply related to the individual and is consequently difficult to communicate encompassing an unconscious dimension. Unlike explicit knowledge, tacit knowledge is not associated with a coding system that facilitates transmission/dissemination. Polanyi (1966, p. 4) refers to this kind of knowledge by synthesizing "We can know more than we can tell" and concluding that "most of this knowledge cannot be put into words".

These two types of knowledge, tacit and explicit, are complementary and knowledge creation is only possible through the interaction between them/ achieved through their interaction. Nonaka & Takeuchi (1991, p. 164) subtly synthesized the need for this interaction: "The essence of innovation is to re-create the world according to a particular vision or ideal". Innovation understood as the creation of knowledge is only possible through the social interaction of tacit and explicit, in a process that Nonaka and Takeuchi describe as knowledge conversion (Clarke, 2010). The interaction between the different forms of knowledge conversion is "the spiral of knowledge" (Nonaka & Takeuchi, 1995) and establishes the SECI process (Socialization, Externalization, Combination internalization) shown in the image in figure 1.

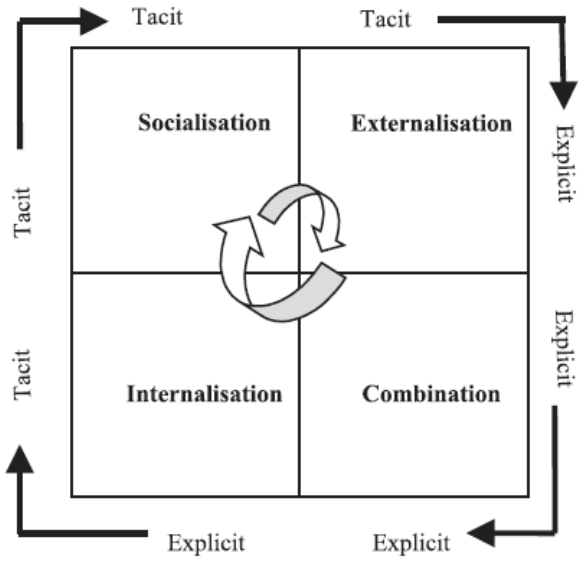

Fig. 1. Source: (Nonaka, Toyama, & Nagata, 2000, p. 12)

Socialization - From Tacit to Tacit. Socialization involves the sharing of tacit knowledge between individuals. In this case, sharing is understood in an experiential context. Nonaka & Takehuchi (1991, p. 99) exemplify this process by comparing it to

a master-apprentice relationship, stating that, although extremely important, it is not enough to ensure knowledge creation: “True, the apprentice learns the master’s skills. But neither the apprentice nor the master gain any systematic insight into their craft knowledge. Because their knowledge never becomes explicit, it cannot easily be leveraged by the organization as a whole.”

Externalization – From Tacit to Explicit. As implied in its name this phase corresponds to the externalization of tacit knowledge by making it explicit. When this happens, knowledge crystallizes turning to a state that can be shared with others. In this regard Nonaka, Toyama, & Konno (2000, p. 9) state that “When tacit knowledge is made explicit, knowledge is crystallized, thus allowing it to be shared by others, and it becomes the basis of new knowledge”. Sharing makes the externalization process easier and involves two key factors. The first refers to techniques that can be used to make the tacit explicit: pictures, diagrams, mind maps, metaphors and narratives (Nonaka & Konno, 2005). The second factor is related to logical reasoning / inductive and even abduction (creative inference) to accomplish knowledge formalization (Nonaka & Konno, 2005).

Combination - From Explicit to Explicit. The combination involves the conversion of an explicit knowledge into a new explicit knowledge, more complex and structured. In this process one can identify two key factors: the first is related with communication and dissemination; the second one is systematization. Nonaka, Toyama, & Konno (2000, p. 10) recognize the importance of technology in this process: “Creative use of computerized communication networks and large-scale databases can facilitate this mode of knowledge conversion”.

Internalization - From Explicit to Tacit. As new knowledge is diffused in/within the organization, individuals begin to internalize it, identifying what they consider to be most relevant for their role, both in personal and organizational dimensions. As stated by Nonaka, Toyama, & Konno (2000, p. 10) “When knowledge is internalized to become part of individuals' tacit knowledge based in the form of shared mental models or technical know-how, it becomes a valuable asset”.

Knowledge is then created in a spiral process allowing expansion. The critical phases of the SECI model are those that involve conversions of knowledge between tacit and explicit. According to Takehuchi & Nonaka (1991, p. 99), the whole process relies on factors intrinsic to the individuals. Because they are highly uncontrollable and move beyond mental models, including beliefs and values, these factors require the involvement of the self, i.e. personal commitment, articulating the vision of each individual in a very fragile balance between what is and what should be.

3.3 The Ba Explainded

Nonaka & Takeuchi (1995) retrieving a concept introduced by the Japanese philosopher Kitaro Nishida propose the concept of BA framed in knowledge management. BA can be translated as place and is defined as “a shared space that serves as foundation of knowledge creation” (Nonaka & Konno, 2005, p. 1).

The Kanji character for BA refers to the philosophy of Yin and Yang emphasizing the continuing transformation into a/of dynamic process (Bejinaru, 2011). The relationship between BA and knowledge is evidenced by Nonaka & Konno (2005, p.

41): "If Knowledge is separated from BA, it turns into information, which can then be communicated independently from BA. Information resides in media and networks. It is tangible. In contrast, Knowledge resides in BA, it is intangible". BA is therefore a space for the promotion of ideas and debates where new knowledge emerges (Clarke, 2010).

BA is characterized by the involvement of people interacting in a given space, what sets it apart from ordinary human interaction, the main difference relying on the goal of these meetings: BA aims at creating knowledge (Nonaka, Toyama, & Nagata, 2000).

Previously it was considered that knowledge is context-dependent and must be framed in a certain place and time: BA is the privileged space where the information takes on meaning by becoming knowledge. Nonaka, et al. (2000) support the absolute need for BA when they claim knowledge cannot be understood without framing the thought into action. Another feature of BA is that, despite being considered a place, it does not mean a physical place/it doesn't necessarily have to be physical: it can be mental or virtual. Von Krogh et al. (2012, p. 242) reinforce this feature by stating that: "Ba can take the physical form of business space and offices; the virtual form of mailing lists, intranet, meetings and social events; and a mental form, such as ideals or ideas". For Nonaka et al.(2000, p. 8), BA is profoundly dynamic, "provides energy, quality and places to perform the individual conversions and to move along the knowledge spiral", renewing itself as needed.

The relationship between BA and the SECI model is presented by Nonaka & Konno (2005) according to the following figure (figure 2).

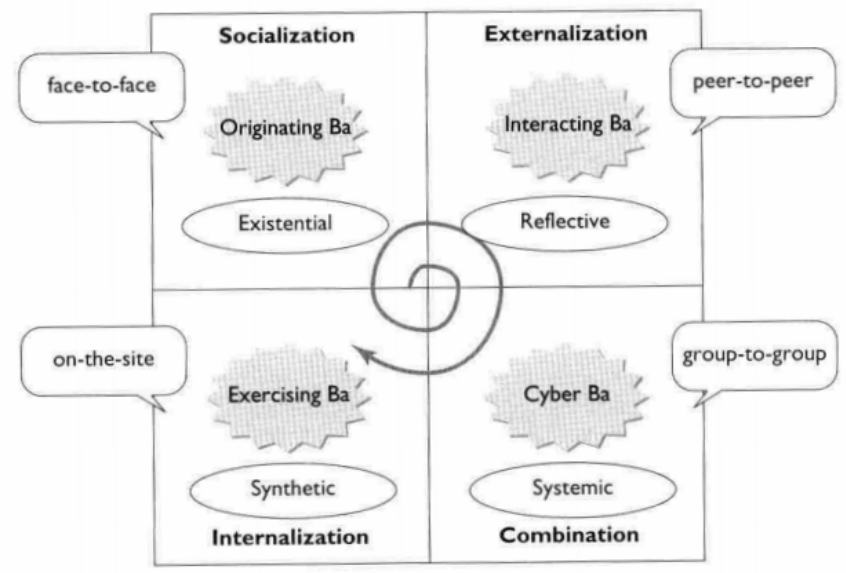

Fig. 2. Source: (Nonaka & Konno, 2005, p. 44)

"Originating BA" is the starting point for knowledge creation (Clarke, 2010) where individuals share the emotions, feelings and mental models (Nonaka & Konno, 2005). It corresponds to the more emotional and personal space, leaving the Cartesian

rationalism of the "cogito ergo sum" to the Nishida vision "I love therefore I am" (Nonaka, Toyama, & Nagata, 2000). From the "Originating BA" emerge not only feelings but also commitment and trust, key issues in the creation of knowledge. The correspondence between the socialization phase of the SECI model and the "Originating BA" arises spontaneously, focusing on physical approaches to potentiate the knowledge conversion from tacit to tacit.

The "Cyber BA" is where explicit knowledge is combined with other explicit knowledge to create new knowledge overlapping the combination phase of the SECI model. Nonaka & Konno (2005, p. 46) gave "Cyber BA" a virtual dimension recognizing the potential of online environments in this process: "The combination of explicit knowledge is most efficiently supported in collaborative environments using information technology. The use of on-line networks, group-ware, documentations and databases has been growing rapidly over the last decade, enhancing this conversion process."

The "Exercising BA" is the place where explicit knowledge is transformed into tacit knowledge, through the implementation of new ideas and experiences, corresponding to the internalization phase of the SECI model (Nonaka & Konno, 2005)
The "Interacting BA" is the place where tacit knowledge is transformed into explicit knowledge, through dialog and formalization of information (Clarke, 2010).

The understanding of the different types of BA and the close relationship with the SECI model may potentiate the creation of knowledge. Nonaka introduces yet another variable in the process of knowledge creation - knowledge assets, which are defined as a set of resources (tangible or not) that are indispensable to create value (Von Krogh, et al., 2012). Knowledge assets include the results of the articulation of explicit knowledge through images, symbols and language: "(…) knowledge assets are outputs, inputs, and moderating factors of the knowledge creation process" (Von Krogh, et al., 2012, p. 3). There is another dimension of knowledge assets (Seidler-de Alwis & Hartmann, 2008; Von Krogh, et al., 2012) with a tacit and intangible nature as trust, commitment, skills, values and norms.

4 SCS as a Possible Educational *BA*

Christensen et al. (2010) argue that combining change and innovation, and using technology as a catalyst for a disruptive, student-centered process, can be the key to have a school fitting the values of today's knowledge society. The same authors also suggest that the personalization of teaching accommodates students' multiple intelligences, as postulated by Gardner (1993) and can play a pivotal role in this process.

In SCS, each school establishes its own network, using elements of their community. This option appears as a limiting aperture, but is related with privacy issues mostly due to the age of the target audience. Nevertheless, users are given the opportunity of building their own personal network including people from other schools, using their school's network. SCS thus opens the possibility for open innovation, which advocates the establishment of intra-organizational networks in the search and construction of new knowledge. SCS adds a set of typical web 2.0 services that enhance communication, sharing and collaboration and create conditions for knowledge creation and innovation to emerge, as stated by Angehrn, et al. (2009, p. 207):

It thus appears that innovation is progressing to an open model as the latter is better able to face current challenges (e.g. repository and passivity syndromes) by better

fulfilling community members' social needs, and by stimulating the access, re-use and transformation of diverse knowledge assets by harnessing collective creativity thanks to new authoring tools which go beyond text-based communication.

Angehrn, et al. (2009, p. 207) identify some characteristics that a platform that supports and sustains innovation process should incorporate:

"Collaboration, knowledge sharing and exchange, reciprocal trust, recognized ownership, reinforcing and enlarging innovation stakeholders' networks, clear network visualization, simple and reliable technology (…): all these factors need to be taken into account to develop effective IT tools aimed at supporting and boosting innovation processes."

Even though some of the characteristics mentioned by Angehrn, et al. do not depend on the technological platform on itself but rather on use, SCS can be viewed through these lenses in order to verify if it meets the conditions thought necessary for innovation.

Each member of the school community registered in SCS has access to a wide range of services that allow them to store, organize and share resources in different formats. The publication of images and videos (the latter service still under implementation) is free and has no limitations. The creation of blogs and wikis (the latter still in implementation) is not controlled and any authenticated user can create as many blogs as he/she wants or invite others to manage them, not needing technical or institutional approval.

Within the group of potential users of SCS, most will be under 18. There are issues related to the use of the platform by minors that require that the concept of openness be based on a legal framework that cannot be ignored. Access to content published by minors will only be possible by authenticated members of the school and, in certain circumstances, for authenticated members of other schools. This philosophy has direct implications on how "openness" is understood in this context. Within a school, hierarchies and other members of the school community have the same privileges and therefore the same responsibilities. On the other hand, by allowing content to be produced by all members of the school community, enabling broad participation, the school opens itself.

Associated with the sharing and openness, key concepts of SCS, there are two compelling questions: one related to copyright and other, more sensitive, with privacy, which particularly relevant taking into account the fact that the platform will be used by children and young people. With regard to copyright, it is considered that this issue is partially protected, since all users at the time of registration, must accept the "terms of use" which include a "Creative Commons" license where it is made clear that, by default, all content will be freely available except for commercial purposes. Another beneficial effect of this license fits in with the mission of the school as a promoter of education for digital citizenship. As stated Pitler (2006, p. 4) " by talking about Creative Commons in both K-12 and college classrooms, teachers can engage students in a much-needed conversation about online ethics. " As mentioned earlier, the concept of openness is adapted to the specific target audience with regard to visibility between schools. Nevertheless, within each school, full and open participation and collaboration are encouraged either by the dilution of the hierarchies or through a common place - the wall - where all the activity gains a public dimension.

The possibility of interconnection/interaction between different schools' networks is preserved, making it possible to expand the network to users of other schools. This will make it possible to cross between different networks, fostering a climate of trust,

essential for the development of innovation processes. The possibility of each user seeing who has established relationships and the nature of the interaction between members of different networks has also a clear visualization. SCE is based on simple and reliable technology. The assumption that the technology is reliable is supported by the fact that some of the core services result from the partnership established with the SAPO, the biggest web portal service in Portugal. The interface design of the SCS, integrating some of the typical services of Web 2.0, was designed so that the user experience could be both familiar (since many users already use this type of environment) and also appealing and distinctive, trying to make it even easier to use of the technology, thus increasing the rate of utilization.

The features underlying SCS have from early on, made it a tool where new knowledge and creativity can emerge, giving rise to an innovation process.

5 Final Remarks

Based on these propositions, this paper analyzed SCS, identifying the elements that aspire to reach the knowledge creation Ba, and provide a way to a disruptive innovation.

Having schools promoting the mechanisms of knowledge management through the creation of institutional learning spaces where everyone can share and create knowledge, making it visible, may be an approach of innovation. Cheng & Chen (2008, p. 383) illustrate how this process can occur in an implicit reference to the processes of conversion between tacit and explicit knowledge.

For instance, if the teaching methods (implicit and personal knowledge) of the best teacher can be identified and converted into written documents (explicit) as a reference for other teachers, they can be used to improve or be internalized as other teachers' teaching skills (implicit) and enhance the overall effectiveness of the school (organizational knowledge).

A prerequisite for transformational processes that occur between tacit and explicit is the existence of an open space that can serve as the ground for innovation (Seidler-de Alwis & Hartmann, 2008). The four types of BA proposed by Nonaka and Tackechi mentioned before were revisited, considering BA as something flexible and to be considered in other contexts Frédéric (2001, p. 15):

"Plusieurs formes de «ba» existent; qu'ils soient de nature «générique», «spécifique», voire «dominante», certains de leurs fondements semblent toujours être similaires. A l'intérieur de ceux-ci, plusieurs catégories de connaissances sont identifiables et peuvent émerger; plusieurs phénomènes se dégagent également."

With a tangible or intangible nature, physical or virtual, BA provides other approaches, like the "Connecting BA" proposed by (Bejinaru, 2011, p. 221)
Originating and exercising 'ba' are physical spaces, interacting 'ba' is mental, and cyber 'ba' is virtual but "connecting 'ba'" is a positive mix of these and technology.

SCS can provide the foundation and support for this space; BA may be what schools are looking for to create new knowledge, giving rise to sustained processes of creativity. As Cheng & Chen (2008, p. 383) state "schools are the cradles of innovative knowledge, and they have a rich collection of intangible assets".

Hargreaves (cit. in (Ferrari, et al., 2009, p. 29) points out that the idea behind disruptive innovation is the opposite of that of sustainable innovation. Figueiredo (2009) doesn't share this vision as he states that despite the high level of failure associated

with sustainable innovation in education, it can be explored. However, "[t]he promising path to innovation in education systems is through disruptive innovation that quietly grows in the margins of the system, unobtrusively until starts changing it, irreversibly" (Figueiredo, 2009). SCS can perhaps be a vehicle for this innovation combined with institutionalization. Miles (1998) presents institutionalization as a change to be taken as normal, as something part of organizational life; and has unquestionable resources of time, personnel and money available. The apparent paradox in the SCS conception - dualism institutional versus personal - may actually be another catalyst for change.

Throughout the paper, the importance of innovation in education was widely shown. Providing a space where knowledge, information and experiences can be shared by eliminating the barriers of an institutional hierarchy is, from a technological standpoint, the easier task. Making this space, in which Ba leads to a disruptive innovation, is the challenge that the team of the SCS and all schools that will be part of this network of networks are facing.

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