CDD: 371.33

THE REORGANIZATION OF TIME, SPACE, AND RELATIONSHIPS IN SCHOOL WITH THE USE OF ACTIVE LEARNING METHODOLOGIES AND COLLABORATIVE TOOLS

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ABSTRACT: Information and communication technologies (ICTs) in our current networked society are a continuing and irreversible process. Therefore, consideration must be given to the construction of a new education and science model that takes into account complementary dimensions of content, form, and relationships between teachers and students. The aim of this study was to evaluate the impact of Design Thinking, PBL methodology and the use ICTs in school routine of the students from the graduate program in Ethics, Values, and Citizenship in School (EVC). The program was conducted in a blended learning format in which three collaboration technologies were experimentally used (BrainMerge™, TERF and Fishbowl™). At the end, we applied a survey to evaluate the use and impact of these technologies. From the 239 participants (second EVC) 96.8% affirmed that the EVC contributed to their learning routine. The first EVC, 142 participants indicated a similar response distribution, 94.4%. These results may indicate that EVC has a transformative impact on participants: while they prototype, they can see better approaches to solve school problems, they are changing their classes turning them into more interactive activities. The basic and higher education are not untouched by the socio-political economic transformations that the world has undergone. Education needs to re-invent to continue the prominent role that societies have granted it over the past 300 years. Paradoxically, this re-invention depends as much on its capacity for continuation as on its capacity for transformation, to adapt to the new demands of society, culture, and science.

KEYWORDS: Citizenship. Virtual University. Challenges to Education. Problem-Based Learning. Access to Technology.

A REORGANIZAÇÃO DE TEMPOS, ESPAÇOS E RELAÇÕES NA ESCOLA COM O USO DE METODOLOGIAS ATIVAS DE APRENDIZAGEM E FERRAMENTAS COLABORATIVAS

RESUMO: A inserção das tecnologias de informação e comunicação (TICs) na sociedade em rede atual é um processo contínuo e irreversível. Desse modo, é necessário que se pense na construção de um novo modelo educativo e de ciência considerando dimensões complementares de conteúdo, forma e na relação entre docentes e discentes. Avaliar o impacto do Design Thinking, da Aprendizagem baseada em problemas e por projetos e a utilização das TICs na rotina das escolas dos alunos do curso de pós-graduação em Ética, Valores e Cidadania na Escola (EVC). Foram utilizadas de maneira experimental três tecnologias (BrainMerge™, TERF e Fishbowl™)

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Recebido em: 28/01/2014 – **Aceito em:** 19/02/2014.

para o desenvolvimentos dos projetos colaborativos. Ao final do curso foi aplicado um questionário para avaliar seu impacto nos participantes. Dos 239 participantes (Segundo EVC) 96,8% afirmaram que o curso contribuiu para a sua rotina. Já o primeiro EVC, entre os 142 participantes, 94,4 resposta semelhante. Esses resultados indicam que o curso teve um impacto transformador sobre participantes: enquanto eles "prototipam", podem ver melhores abordagens para resolver os problemas de sua escola, mudando suas aulas, transformando-as em atividades mais interativas. A educação básica e a superior não estão isentas das transformações sociopolítico econômicas que o mundo tem sofrido, e precisam se reinventar para terem o papel de destaque que as sociedades as concedeu ao longo dos últimos 300 anos. Paradoxalmente, essa reinvenção depende tanto da sua capacidade de continuidade quanto da sua capacidade de transformação, para se adaptar às novas demandas da sociedade, da cultura e da ciência.

PALAVRAS-CHAVE: Cidadania. Universidade Virtual. Desafios da Educação. Aprendizagem Baseada em Problemas. Acesso à Tecnologia.

LA REORGANIZACIÓN DE LOS TIEMPOS, DE LOS ESPACIOS Y DE LAS RELACIONES EN LA ESCUELA CON EL USO DE METODOLOGÍAS ACTIVAS DE APRENDIZAJE Y DE HERRAMIENTAS COLABORATIVAS

RESUMEN: La inserción de las Tecnologías de Información y Comunicación (TICs) en la sociedad actual es un proceso continuo e irreversible. De este modo, es necesario pensar en la construcción de un nuevo modelo educativo, y de ciencia, considerando dimensiones complementarias de contenido y de forma en las relaciones entre docentes y discentes. Evaluar el impacto de Design Thinking, Aprendizaje basado en problemas y proyectos, y el uso de las TICs en la rutina de la escuela de los estudiantes del postgrado en Ética, Valores y Ciudadanía en escuela (EVC). Se utilizó experimentalmente tres tecnologías (BrainMerge™, TERF y Fishbowl™) para el desarrollo de proyectos de colaboración. Al final del curso se aplicó un cuestionario para evaluar su impacto en los participantes. De los 239 participantes (Según EVC) 96.8% dijeron que el curso contribuyó a su rutina. En el primero EVC, entre los 142 participantes, dio 94,4 respuesta similar. Estos resultados indican que el curso ha tenido un impacto transformador sobre los participantes: mientras que "prototipam", se pueden ver mejores enfoques para resolver los problemas de su escuela, transformar sus clases con actividades más interactivas. La educación básica y superior no está exento de las transformaciones que el mundo socio-político-económico ha sufrido y la necesidad de "reinventar" a tener el protagonismo que la sociedad les concedió en los últimos 300 años. Paradójicamente, este nuevo enfoque, depende tanto de la capacidad de continuidad para conservar sus características de excelencia o de producción de conocimiento, como de la capacidad de transformación para adaptarse a nuevas exigencias de las sociedades, de las culturas y de la ciencia.

PALABRAS-CLAVE: Ciudadanía. Universidad Virtual. Desafíos de la Educación. Aprendizaje Basado en Problemas. Acceso a la tecnología.

1 INTRODUCTION

The Brazilian educational system has undergone significant changes in recent years. The introduction of information and communication technologies (ICTs) is seen as one of the main drivers of these transformations, one consequence of which is the availability of Remote Education (RE) programs.

The introduction of ICTs in society is a continuing and irreversible process that has encouraged a new education model to emerge. This new model challenges the traditional system, which emphasized a technical approach to teaching. Today, society calls for learning that “is characterized by the appropriation of knowledge taking place in a concrete reality”

(BEHAR, 2009, p. 15), which is present in the current networked society (CASTELLS, 1999).

UNESCO's proposal predicted new approaches to teaching through the use of ICTs tools, enabling broader access, better quality, and better results in education (UNESCO, 2009).

Within this change of perspective, the introduction and use of ICTs tools that encourage new forms of social interaction in connection with new configurations of knowledge production allow new approaches to organize space, time, and relationships in academic institutions (ARAÚJO, 2011).

The latest edition of *Measuring the Information Society*, published by the *International Telecommunication Union* on October 7, 2013, included indices related to countries' population and their level of human capacity in making use of ICTs. Brazil was ranked 77th on the list of 157 countries, far below the top-ranked countries such as South Korea, Finland, and the United States. Making use of ICTs is particularly important because, more than the ICTs infrastructure, education, competence, and skill are necessary to make effective use of ICTs and to build a competitive and inclusive information society, as recently demonstrated by the countries at the top of the list. In strategic terms, the implementation and familiarization of the infrastructure with the corresponding Brazilian reality would substantially contribute to the goal of promoting broader access to education for a larger number of people while also advancing the quality of the teaching and learning processes.

However, ICTs and RE are not the only two factors responsible for these transformations. Increased access and the popularization of these technologies promote these transformations as well. Thus, the currently used pedagogical models must be reviewed and updated (ARAÚJO, 2011). In this sense, new spaces for pedagogical action are configured with characteristics such as "the development of competences and skills, respect for an individual's rhythm, the formation of learning communities and social life networks..." (BEHAR, 2009, p. 16).

Therefore, it becomes essential that the roles of the people involved in these educational processes also undergo a change; the teaching-learning relationship must be inverted so that the process stops being centered on teaching and focuses on learning and the process of education. Active learning methodologies have become indispensable in this transformation.

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Problem-based Learning (PBL) is a constructivist learning that has been widely employed in higher education. The core principle of PBL is the active role of students in the construction of knowledge. In this conception, small groups work collectively and investigate and solve complex, practical problems that are related to their routines (ARAÚJO; SASTRE, 2009).

Systematically, the process for Problem-based work can be divided into eight steps: problem identification; presentation of the problem as open; hypothesis generation; reformulating the problem; formulation of the process organization; co-creation of knowledge; field study; and sharing results.

Thus, students proceed through these learning steps, managing their own learning processes and organizing their own activities to solve the problem. The learning is centered on the student.

ICTs can be considered as a key facilitator of PBL approaches because they both favor students' access to sources of information and communication. However, when one considers PBL in the context of virtual learning, some important issues must be kept in mind, such as the need to support collaborative work processes within small workgroups; to support students in self-monitoring and self-regulating their work and the process of individual and group learning; to support students in performing tasks by providing them with tools that assist them in understanding the sequence of tasks; and to facilitate the teacher's pedagogical monitoring (COLL; MAURI; ORUBIA, 2010; FRUCHTER, 2006).

Therefore, a PBL approach used in institutions that play a formative role must include teachers who are experienced using the new technological tools and who retain a concern with ethical and professional formation to create new, more efficient, and more effective ways to encourage citizens and professionals who are committed to a more competitive and inclusive information society.

2 THE GRADUATE PROGRAM IN ETHICS, VALUES, AND CITIZENSHIP IN SCHOOL

Starting from the previously stated premises and seeking to build new educational models in practice that are coherent with the demands for the reinvention of education, we initiated a graduate program in 2011 at the USP in partnership with the UNIVESP called Ethics, Values and Citizenship in School (EVC). The program was free of charge and took

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place in a blended learning format. It was initially offered to 1,000 teachers from 12 cities in the state of São Paulo. The program is now in its third installment, and in December 2014 it will have graduated 2,300 teachers from all regions of the state of São Paulo. The program has sought to bring innovation to the field of education through the three editions of the program.

The first and second editions of the program incorporated the *Design Thinking* methodology into the PBL theory. This methodology introduced the principle of building prototypes based on the needs of the participating subjects in search for solutions to the problems faced in their daily lives.

One of the central aspects of this project was to actively promote the concept of *"learning by doing"* to the students, who were teachers, through the new educational paradigms by actively experiencing projects on the themes of ethics and citizenship; by employing different pedagogical tools and languages in the production of knowledge; and by working in collaborative and cooperative groups in search for solutions to problems in their own schools.

The program underwent a series of transformations for the third edition by incorporating the use of technologies that support cooperative work in a virtual setting. This initiative was the result of a partnership between USP and Stanford University, which is one of the best-ranked universities in the world, to consider various methods of evaluation.

The following presents the structure of this teacher-training program with an emphasis on the learning model incorporated in the program's third installment to explicitly show how the functioning of the program necessarily implied changes in the dimensions of content, form, the relationships between the subjects of education, and in the development of technology mediated cooperative work.

3 THE DIMENSION OF CONTENT

With issues on ethics and citizenship as the theme, the first assumption of the program was its interdisciplinary conception, which contrasted with the traditional disciplinary structures of the university and the assumed homogeneity of students. Thus, the content of the program was organized to cross the traditional borders and disciplinary methods. Although the program was organized into modules due to the university's academic structure, the modules exhibited universal and interdisciplinary traits (ARAÚJO, 2010) and included the

following topics: universal themes and project strategy; education and construction of values; education for the community and for citizenship; health and citizenship in school; human rights education; daily democratic coexistence in school; ethics and the teaching profession; and special/inclusive education.

In addition to the propositional conception that sought to direct the students' (basic education teachers) behavior and reflections toward pro-social themes, the titles of the modules demonstrate that their content was designed to expand upon the limitations of traditional modules to tackle issues of ethics and citizenship by articulating knowledge from separate fields such as health, pedagogy, sociology, philosophy, and law.

4 THE DIMENSION OF FORM

As noted previously, we need to rethink the time, space, and relationships in teaching institutions by incorporating educational proposals based on "*open distance learning*", collaborative and cooperative spaces for the production of knowledge, and the use of ICTs in teaching and learning relationships. From a *blended learning* perspective, the EVC program combined weekly meetings with the creation of a Virtual Learning Environment (VLE) that allowed other approaches to knowledge.

The main concern in this teacher-training program was accessibility and the convergence of different languages and tools in the conception of the VLE and the program itself, allowing people with different proficiencies to participate while also demonstrating coherence with the assumptions of ethics and citizenship.

Taking as a principle that some bodies of knowledge organized by society are coherent with education's social mission of conserving the cultural and scientific patrimony and should be transmitted to new generations and not re-invented for each new program, we established that the base conceptual contents of the curriculum should be made available by means of video classes recorded in studios and classrooms at USP. To this end, some of the university's best specialists on the offered themes and disciplines were invited to teach the classes. Each of the video class modules lasted between 15 and 20 minutes, which was enough time to schematically present the current state of each subject. A total of 112 video classes were recorded, and they are available for anyone at USP's e-class website[6].

[6] http://www.eaulas.usp.br

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Each module consisted of 14 video class modules, with two available each week to the VLE students. It should be noted that each video class was also recorded in LIBRAS (Brazilian Sign Language) and subtitled to ensure accessibility to people with particular disabilities.

With the support of the video classes, the instructors assigned texts that were available from free-access electronic libraries. The main repositories for articles and texts on the themes of ethics and citizenship were the "Portal de Periódicos Científicos da Capes [CAPES' Portal for Scientific Periodicals]"[7], to which all USP students have access. The Portal includes over 30,000 of the main national and international publications in all fields of knowledge. The program also used the "Scientific Electronic Library Online" – SciELO[8], which grants access to over 1,000 periodicals published in Portuguese and Spanish.

With this initiative, we avoided producing texts exclusively for the program, acknowledging that there is high-quality academic material available online. We also avoided a common issue in long-distance programs regarding the production of texts that synthesize important knowledge in a simplified language, which is based on the assumption that those who take such programs do not have a strong academic background, have little available time, and need summarized texts to study. Finally, in contrast to traditional educational models in which professors generally suggest a certain amount of reading each week so as not to overload the students, we allowed the instructors to assign several texts every week, which allowed students who had more interest in specific subjects to study those subjects in greater depth. Thus, over time, a broad virtual library was created that was online and freely available, which contributes to the changes in time and space that characterize educational processes.

Reading material was made available for downloading or local reading at the program's VLE, but the most important texts were audio recorded and made available in mp3 format to allow users who preferred that approach to use such a device. Another possibility was to use screen-reading software that was made available to the students and granted access to blind people and offered a different method to study the texts used in the program.

[7] http://www.periodicos.capes.gov.br/
[8] http://www.scielo.org

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Each week, the instructors suggested other freely available videos and films on the Internet from well-known sites such as *YouTube*[9] and *Vimeo*[10] that could be used to enrich the students' learning experience.

Another important aspect of the teacher-training program was the use of television, which, with its production peculiarities, is capable of synthesizing important themes in short-duration chapters, including problems of everyday life and real situations that could be examined both by specialists and the participants. Thus, we relied on the participation of UNIVESP TV[11], a public television channel in the digital band of São Paulo's broadcaster TV Cultura. The channel's entire programming is focused on education; its shows are produced to support professional education programs and are transmitted both through open frequencies and through a special *youtube* channel.[12]

Thus, with a VLE with multimedia functionalities (built based on the *Moodle* platform) at our disposal, we were able to provide support for the convergence of different types of educational processes. We made several types of learning experiences possible through the use of television, cinema, video classes recorded in studios and classrooms, written texts, audio-book resources, LIBRAS, subtitles, zooming, and readers and screen contrast software, all mediated by a digital platform that is freely available on the Internet.

It is important to emphasize that the diversity of available learning experiences assumed that there is no unique way for a human being to learn, and when the different methods are complementarily employed, they increase the possibility of universal access to quality knowledge without giving up the singularities of specific subjects and cultural groups. Thus, we embraced the world of complexity and citizenship.

[9] http://www.youtube.com
[10] http://vimeo.com
[11] UNIVESP TV produced and broadcasted more than 10 special programs for the program on themes such as education and value (http://youtu.be/hilOC-1ZlEM); the social representation of human rights (http://youtu.be/PrZsHduiv6E); educational practices in human rights (http://youtu.be/dRtykdQy6Ts); the child that does not learn (http://youtu.be/V_0noT10qVc); interdisciplinary and universal themes (http://youtu.be/cNpTwye78Vk); dyslexia (http://youtu.be/tyyd09_xfTI); violence in schools (http://youtu.be/Z6lS_WQ0nWg); and others.
[12] http://www.youtube.com/univesptv

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5 THE DIMENSION OF RELATIONSHIPS BETWEEN THE SUBJECTS IN EDUCATION

The adoption of a blended learning model that disrupted the traditional class space but still partially retained it was motivated by an acknowledgement of the importance of interpersonal relationships as an essential part of teaching and learning. Teachers, in this case, instead of being the keepers of knowledge, take on the role of mentors, directors, and mediators between students and the different sources of knowledge, making the students protagonists in the educational process.

The adopted model consisted of mandatory weekly meetings, in person or virtual, for a duration of four hours, which were mediated by a professor who was trained to guide, cheer, and incentivize the small groups of students in their search for information and knowledge that expanded on the materials available in the VLE. The students were also encouraged to investigate solutions to the problems the students themselves described regarding their work context and that were linked to the themes of the program.

The path we took was Project Oriented Problem-based Learning (POPBL). Students were organized into groups of six and given a common central theme of reference. Each group developed a problem to study and investigated it empirically over 16 weeks based on important issues in their everyday lives.

Complementing the LBPP conceptual basis, *Design Thinking* (DT) was also included in the program's pedagogical model beginning with its second edition. DT was configured as a fourth dimension in the organization of the curriculum. Based on the usage of DT, it was suggested that the actors who actually lived in the school environments should develop innovative and real solutions to the problems they faced.

DT is a methodology centered on the human being that integrates multidisciplinary and interactive collaboration with the creation of innovative products, systems, and services that focus on the end user (PLATTNER; MEINEL; LEIFER, 2012). DT is centered on the human being because the process of conceiving of innovative services, for example, starts by examining the needs, dreams, and behaviors of the people to be affected by the designed solutions, listening to them, and understanding them (BROWN, 2010).

One of the foundations of the model is the process of iteratively constructing several prototypes for solutions to the observed problems. These prototypes are continually tested by the potential users throughout their development until a model that can be actually implemented is found.

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Thus, the problems that were investigated were not defined by the program's instructors but rather by the students, radically changing the axis in the learning processes. Beginning with general themes, each group would develop – after some weeks of studying, approximating, and mapping how the theme was reflected in their schools' routines – a research problem that would then be collaboratively and cooperatively investigated in the following months.

The weekly meetings were the fundamental basis of the program and served to allow the students to work on the solution to their problems with the instructor's guidance. The content transmitted in the video classes, by UNIVESP TV, and through the different media was designed to subsidize the understanding of the phenomena being studied and to provide conceptual foundations for the work.

The process that articulated the use of digital and virtual media with weekly meetings was put into practice by the program's VLE. In addition to tools for interaction and communication among the instructors and students involved in the educational process, the VLE also incorporated a *Google* tool that allowed documents to be cooperatively and collaboratively developed. Thus, the members of each group could participate in the process of working on the research problem from different times and places outside of the classroom. The tool is based on cloud computing and allows the inclusion of multimedia resources (images, videos, and graphs) to create a better presentation of the research problem.

Evaluation is another important aspect of the changes in the new learning environments such as the one we describe. To evaluate the content of the program, we adopted the concept of prioritizing the knowledge products and processes rather than controlling the time spent in the VLE or in meetings or by using training exercises and individualized learning verifications (e.g., exams). We understand that assessment must be coherent with the changes in time, space, and relationships that the new educational processes demand.

In evaluating the content of the program transmitted by means of video classes and supported by TV programs and academic texts, we adopted the use of individual portfolios in which each student used different methods to present what they gained from each module on which they worked. The students were free to organize their own time during each module, and at the end of the program, the students were required to submit a digital file that could contain songs, poems, texts, reviews, images, videos, etc., of their own creation that synthesized their personal reflections about the content of the program. In addition to

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allowing the students to display their knowledge in a rich and creative manner, as the diversity with which they produced this material was huge, the portfolio also served as a record of attendance, i.e., each module of the program was represented by the students in their portfolios and evaluated as pertinent and adequate by the instructor, thus validating the students' attendance.

6 THE DIMENSION OF TECHNOLOGIES APPLIED TO COLLABORATIVE WORK

Based on the experience developed over several years with the LBPP in the USP, as well as that of the researchers in Stanford University's PBL LAB (http://pbl.stanford.edu) in global teamwork projects that used technology to support collaborative work, four groups on two campuses of the USP (two in the University City/Butantã and two in Ribeirão Preto) used three collaboration technologies to develop their projects in an experimental fashion between March and June 2013. In the second semester of 2013, the project was expanded to 50 groups (300 teachers) participating in the third edition of the Graduate Program in Ethics, Values and Citizenship in School.

One of the challenges we faced was to bring the experience closer to the field of humanities and specifically to the training of teachers, while at the same time seeking to introduce the systematic use of various tools and technologies to routine educational practices and to study their impact in the processes of teaching and learning.

The tools were used at strategic moments in the program when we sought to provide support for each step in the construction of the projects developed by student groups. Therefore, the use of these tools must be understood in the context of a program that adopted LBPP as a reference. The program was designed to provide unique, high-quality conditions for collaborative and cooperative work, the ultimate goal of which was the construction of tools for the improvement of citizenship in schools.

BrainMerge™ developed by the PBL Lab at Stanford is the first tool to be described. It was developed to incentivize and gather creative ideas from all team members in each workgroup, thus providing a communication channel for all of the participants to "have a voice" during a virtual *brainstorming* session. The tool is based on one of the main aspects of *brainstorming*, i.e., that all ideas are good ideas. A unique feature of BrainMerge is to allow

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all team members to be heard concurrently in real time allowing all members of a team to share, construct, and expand their ideas with one another.

Thus, the use of BrainMerge™ played an important role in the first weeks of the project during the collective work, providing conditions for group members to construct and expand upon their thoughts and ideas with the other participants. Starting with fragmented but collectively created ideas, the groups could begin developing a plan of action. Although the tool may (and should) be employed throughout the entire period during which a project is developed (whenever the need to collaboratively discuss new ideas and perspectives arises), BrainMerge™ was most useful during the initial stage of creating prototype solutions for the problems being studied.

The second tool, a virtual world platform called TERF, was used when each group's plan of action was developed, including surveying, listening to, and capturing the perspectives of the different actors involved in the problem being studied. TERF is a platform that sprung from the experiences in *Second Life* and provides for the creation of virtual and immersive 3D collaborative spaces for sharing content and generating an environment for the co-creation of information and the reuse of data and knowledge gathered by the students in a workgroup. The tool works for the team members as a "plunge" into a virtual 3D environment in which the participants share and work collaboratively in the organization of their problem-solving projects, where the students can interact by means of different methods and tools such as voice, videos, text editors, the internet, whiteboards, and slideshows. Using this tool, the groups were able to analyze their project progress based on the data collected up to that point, including texts, videos, images, and other material.

Thus, TERF works as a virtual place where the progress of group work can be monitored and virtual meetings can be held for the discussion and analysis of ongoing projects.

The third resource used in this pilot project was Fishbowl™ (FRUCHTER, 2006). This learning interaction experience plays an important role in facilitating knowledge transfers between experts and specialists and groups of students through cognitive learning and apprenticeship, as well as understanding a given phenomenon or problem situation. In the program, each group had the opportunity to share their proposed subject with two specialists to consider aspects such as the main goals the students wished to achieve, the possible paths they found, and the challenges they faced in their search for as a solution for the problem being studied through the construction of prototypes.

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A Fishbowl™ session is mediated by a collaboration tool called RECALL™ (FRUCTER; YEN, 2000) which is a multi-modal interaction and drawing application written in Java® that captures and indexes in real time voice, video and each individual action on the drawing surface. The drawing application synchronizes captured audio/video and encodes it. As soon as a session is concluded, the drawing and video information is automatically indexed and published on a web server that allows isolated or synchronized playback of the drawing and audio/video session from any place and at any time. Furthermore, a user can navigate through a session, selecting individual drawing elements or audio/video indices and skip straight to the part of interest (FRUCHTER; YEN, 2000).

Finally, the last tool, which can be seen as a complement to the others, is GoToMeeting®[13], a web conferencing service used to hold virtual meetings, allowing the participants to share content and slides other than the visualization of images of the people participating in real time. Thus, under guidance of their instructors, students were able to schedule meetings through the program to discuss a project's progress, take part in meetings to conduct virtual *brainstorming* sessions with BrainMerge™, or even participate remotely in a Fishbowl™ session.

7 PRELIMINARY RESULTS

At the end of the first EVC and second EVC, we applied a survey to evaluate the impact of Design Thinking and PBL methodology as well as the use ICTs. One of the survey questions focused on whether the students found the EVC contributed to their school routine. We had 239 participants in the evaluation of the second EVC. 96,8% participants answered YES to the question and 3.2% said NO. The first EVC evaluation indicated a similar response distribution, i.e., out of 142 participants, 94.4% replied YES and 5.6%, NO.

In addition to asking this question, the participants were prompted to provide a justification of their reply. Most of the participants indicated that EVC enabled them to understand better the problems they face in the daily work in schools. They also assert starting to use Design Thinking and PBL on their own in their classes, as shown in quotes from two of the students' reports: the use of projects in schools is the most efficient way of learning, practice and theory together, leaving traditional classes, seeking for new horizons

[13] http://www.gotomeeting.com/

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for education. The implemented didactic inside the classroom touched even more, which made them devote more studies in order to understand and look at the process of teaching and learning from a new perspective: the perspective of the student.

Another common comment was related to the need to deal with school problems collaboratively and cooperatively, in a way that everyone involved can interact to reach a good result. As shown in the statement made in a report from a student: "The program enabled us to verify that the issues facing the school routine can be discussed with the students and the entire school community and that solutions can be built together and not alone by the faculty or school management".

Student project team members in the EVC2 provided feedback regarding the value of using collaboration tools like BrainMerge indicating that it:

- Leads to more audacious ideas.
- Helps to connect and organize group's ideas.
- Increases reflection.
- Challenges and stimulates creation of new ideas.
- Keeps a record of group's ideas and revisit them.
- Connects team members that are geographically disperse.
- Should be use more often to enhance learning.
- With the use of brainstorming, they realized the need to verify the possibility of using technological tools that are already present in the daily life.

The last quote from the students' feedback is an important indicator of their growing broader awareness of the potential value of ICTs and the respective new learning interaction possibilities in their school environments.

8 FINAL REMARKS

In summary, we describe and demonstrate how active learning methodologies, articulated with new and diverse ICTs environments in concert with personal and professional ethics, can be used as powerful tools to transform reality.

To clearly portray the new perspectives gained with the use of ICTs environments allied with active learning methodologies to transform the teaching-learning process, the structure of a "*latu sensu"* graduate program with duration of 480 hours for the continuing

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education of teachers was presented. The program represents a new approach to training teachers in light of the document published in 2009 by UNESCO, and the program reinforces the need for human development in relation to the use of new technologies, as noted by the *International Telecommunication Union* in its latest edition of *Measuring the Information Society*.

The core of this program is the use of active learning methodologies allied with the new possibilities brought to the teaching-learning process by the use of cutting-edge technology. The partnership established between the USP and Stanford University allowed us to incorporate tools used in other fields of knowledge in the sphere of education.

Also, preliminary results indicate that EVC has a transformative impact on students. The teachers, principals, and pedagogical coordinator that participated in EVC are changing the way they think about education. While they prototype, they can see better approaches to solve school problems, they are changing their classes turning them into more practice and interactive activities.

In conclusion, it can be understood that basic and higher education is not untouched by the socio-political-economic transformations that the world has undergone in recent decades, and it needs to re-invent itself to continue the prominent role that societies have granted it over the past 300 years. Paradoxically, this re-invention depends as much on its capacity for continuation – to retain its characteristic of excellence as a producer of knowledge – as on its capacity for transformation, to adapt to the new demands of society, culture, and science.

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Como citar este documento:

ARAUJO, Ulisses Ferreira et al. The reorganization of time, space and relations in school with the use of active learning methodologies and collaborative tools. **ETD - Educação Temática Digital**, Campinas, SP, v. 16, n. 1, p. 84-, apr. 2014. ISSN 1676-2592. Disponível em: <http://www.fae.unicamp.br/revista/index.php/etd/article/view/5736>. Acesso em: 30 Apr. 2014.