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WHO'S AFRAID OF UBIQUITY? OPPORTUNITIES AND CHALLENGES OF PROJECT-BASED LEARNING IN SCHOOL CONTEXTS

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***Abstract**: Ubiquitous learning and project approach are genuinely connected. Project work has strong potential to provide both powerful contextual learning experiences and serendipitous exploration and discovery of the connected nature of information in the real world. Such promising features could equally be seen as challenges. More specifically, teachers struggle with technology resources' accessibility and skills, lack of predictability in students learning endeavors, pressure of content-driven and standard-based instruction, mono-disciplinary curriculum and de-contextualized learning tradition, time as a limited resource, high stake testing and poor collaboration among teachers.*

***Keywords:** ubiquitous learning, project approach*

I. INTRODUCTION

Ubiquity is a synonym for omnipresence, the property of being present everywhere. The traditional divide between formal and informal contexts of learning is increasingly blurring. Technological, economic, social, cultural, and institutional changes supports learning as continuous possibility across spatial and temporal frames. The complexity of nowadays world, the extraordinary fast rate of knowledge growth and the amount of technological knowledge doubling every two years require radical reshape of the educational approach. At one hand, students need a deeper understanding of the core concepts in the disciplines that they receive now. At the other hand, to be successful now and in the future, students need new skills. The 20th century instruction focuses on manipulating predigested information to build fluency in routine problem solving, actual century requires processing various experiences in complex settings to build skills for sophisticated problems findings. Therefore students need to be able to design, evaluate, and manage their own work, individually and cooperatively. They need to be able to frame, investigate, and solve problems using a wide range of information resources and digital tools. Project-based learning incorporates all these features. Although it has a long and rich history, project approach' promising characteristics effectively fit within the actual context of digital media. Exploring the anywhere/ anytime possibilities for learning represents more than an opportunity, it should become a key principle.

II. UBIQUITOUS LEARNING AND PROJECT APPROACH

The Ubiquitous Learning Institute at the University of Illinois at Urbana Champaign defines ubiquitous learning as an emerging field, a new educational paradigm made possible in part by the

affordances of digital media. “The increased use of handheld and portable devices, along with pervasive wireless networking, means that structured learning opportunities are becoming an "any time, anywhere" enterprise. (…) Learners of all ages expect, and often need, structured learning opportunities in a "just in time" mode; this puts new meaning and vitality into the traditional idea of "lifelong learning"[1]. Counterpart to the concept 'ubiquitous computing', the ubiquitous learning places the dynamics of learning ahead of the technologies that may support learning. Ubiquitous computing does not guarantee ubiquitous learning in schools [2].

2.1. The 21st century skills

There are several frameworks in regard to 21st century skills [3]. For example, OECD provided in 2005 its conception of 21st century skills grouped as three types of competency categories, as shows in figure 1:

1: *using tools interactively*. Use language, symbols and texts interactively; use knowledge and information interactively; use technology interactively.
2: *interacting in heterogeneous groups*. Relate well to others; cooperate and work in teams; manage and resolve conflicts.
3. *acting autonomously*. Act within the big picture; form and conduct life plans and personal projects; defend and assert rights, interests, limits, and needs.

Figure 1: Organisation for Economic Co-operation and Development Competencies

Another frame of reference is provided by the Assessment and Teaching of 21st-Century Skills [4], organization which started with a group of more than 250 researchers across 60 institutions worldwide who categorized 21st-century skills internationally into four broad categories:

Ways of thinking. Creativity, critical thinking, problem-solving, decision-making and learning
Ways of working. Communication and collaboration
Tools for working. Information and communications technology (ICT) and information literacy
Skills for living in the world. Citizenship, life and career, and personal and social responsibility

Figure 2: Assessment & Teaching of 21st-Century Skills

From a more practical point of view, the 21st competencies are different to those specific to 20th century not only because focus on skills for work and citizenship, but because “a person and a tool, application, medium, or environment work in concert to accomplish an objective that is otherwise unobtainable (such as the remote collaboration of team scattered across the globe via groupware)”. Henry Jenkins [5] and his colleagues elaborated a list of digital literacies as shown in figure 3:

	The ability ….
Play	to experiment with one’s surroundings as a form of problem solving
Performance	to adopt alternative identities for the purpose of improvisation and discovery
Simulation	to interpret and construct dynamic models of real-world processes
Appropriation	to meaningfully sample and remix media content
Multitasking	to scan one’s environment and shift focus on needed to salient details
Distributed cognition	to interact meaningfully with tools that expand mental capacities
Collective intelligence	to pool knowledge and compare notes with others toward a common goal
Judgment	to evaluate the reliability and credibility of different information sources
Transmedia navigation	to follow the flow of stories and information across multiple modalities
Networking	to search for, synthesize, and disseminate information
Negotiation	to travel across diverse communities, discerning and respecting multiple perspectives, and grasping and following alternative norms

Figure 3: Jenkins’ digital literacies based on new media

These trends are landmarks of nowadays education's complexity. The digital media, wireless access, and "smart" technology are radically changing the way educators should think about teaching and how – and what – students learn. "Learning doesn't just happen in the schools. It happens in the workplace, it happens in coffeehouses. Especially with the Internet, it's an anytime, anywhere opportunity" [6]. Teachers need to take into account that young people are frequently and intensively using new technologies. Many teachers ignore or even reject web-based social networking sites like Facebook or Twitter and other collaborative ways to produce and share information over the Internet. Ubiquitous learning takes place in everyday life and could be more encouraged in formal education settings (like schools). Schools need to rethink motivational and teaching strategies.

2.2. Opportunities of the project approach

Many teachers consider that problem based learning and project based learning are ideal ways to develop the 21st century skills. Teachers need to shift their standard-based curriculum from direct instruction of passive students to active engagement of problem solvers and question askers. Commonly embracing aspects of the socio-constructivist learning theories of Piaget, Bruner and Vygotsky, the project approach is a comprehensive instructional effort which consists in individually, small or larger groups in-depth extended investigation of a topic or problem, worthy of the student's interests, energy and time. In order to be able to carry on the exploration process, students need to feel free to raise and formulate questions, but at the same time to be able to understand and process materials; therefore they activate skills and knowledge and are supported to go further on the next zone of proximal development. Carefully planned, implemented and assessed, the project approach should have a meaningful use for all ages, talents and challenges. Project approach provides effective opportunities for teachers to create innovative socially-situated exploratory learning experiences supported by ubiquitous technologies. Although not entirely overlapping, there are different concepts connected to project approach or based learning: project teaching, teaching through projects, project method in teaching, project-problem instruction, problem-based learning, inquiry teaching and others. Although there are different definitions, the project related activities embrace the following features.

Projects are students-centered. Project requires teachers to engage in what Pianta calls intentionality, purposefully taking students' individual interests, skills, and abilities into consideration when planning activities and responding to the . The project starts from children's curiosity, interests and challenges. Projects have a focus on inquiry and tailor to individual students' learning needs. Project involves the use academic skills in the service of intellectual pursuits [7].

Projects are question driven. Projects are typically framed with open-ended questions that drive to investigate, do research, or construct their own solutions. Students's curiosity is guided through a clarification process. *What do you like to find out about …?* could be one question that teachers can use to help zooming in to a topic. Lilian Katz [8] recommends teachers to use questions *(How do you…*?)/ predictions (*What do you think the answers might be?) and* findings charts, filled in during the project work. Questions might guide students's research about something real, challenging and constructive for them. Sometimes the initial topic could be slightly changed during the process.

Project based learning is both a curriculum organizer and an instructional method. Project work is combined with other learning experiences. Young children will be involved in project work, but at the same time teacher will provide opportunities for spontaneous play, dancing, story telling, singing and others. In elementary schools, teachers will balance project approach with systematic instruction. Projects are central to curriculum and requires a variety of instructional strategies.

Project approach is integrated with real world issues and practices. Usually there is an entry event that generates interest and curiosity. Projects provide context, text and pretext for using skills, therefore projects help in fulfilling dynamic aims [9]. As highlighted by Katz and Chard, the projects involve motivation and engagement, not only the acquisition of the skills alone, but includes the acquisition of the dispositions to use them. Therefore the learning experiences welcome interdisciplinary dimension. Students are engaged in extended process of asking questions, making predictions, using resources, developing answers.

Compared to isolated and decontextualized learning tasks (usually for one-period class time) projects have a long-term approach (more than a couple of class days and up to a couple of weeks). Long-term project allows combining of experience and thinking, interest and discipline, and the flexibility of aims.

Project approach involves complex activities based on collaborative or cooperative group learning, organized within different stages. Investigation (observing, measuring), reading, drawing, writing, decision making, analysis and presentations require sharing responsibilities and valuing various individual and group resources.

Projects have productive outcomes. Inquiry learning environment promotes a spyral of ask, investigate, create, discuss and reflect. In addition, project requires to make an artifact, to design an object, to find practical solutions to a real problem. Therefore riting with a purpose that is clear to students enhances motivation and engagement. For young children, project aproach is one of the most effective ways to move children towards literacy.

Project work illustrates the socio-constructivist understanding of learning and thinking, which are always situated in a cultural setting and always depends upon the utilization of cultural resources [10].

Projects generate genuine opportunities for cooperation, individual initiative, sharing responsibilities, and many other developing intellectual as well as social capacities and dispositions. They have an impact on "life skills" like self-management, group process, and problem-solving skills.

Projects provide many opportunities for transposing inclusive education' principles into practice, for providing diverse learners with culturally responsive activities. Students work in different groups, which are heterogenuos multi-aged, different ability level or cultural background [11] and they experience interactions with both children and adults.

Identity represents a key concept related to project work. Individual learner has the opportunity to try out various identities while engaged in a project. Each student, as a project team's member is working together with others. He or she is surrounded by other identities, those of the other participants, children and adults. The interaction of identities of varying expertise in part comprises legitimate peripheral participation, as is found in communities of practice [12].

Students of different cultures and language backgrounds can become deeply engaged in the kinds of intellectual explorations such items in their own environments can provide. The teaching (modeling, scaffolding, questioning, etc.) is provided according to learner need and within the context of the project. Projects offer students choice and voice, personalizing the learning experience. As long as the project's design stimulates to consider and evaluate multiple solutions they sometimes need to defend their choices. Engaging activities encouraged by the project work help students in developing resilience (persisting through difficulties), resourcefulness solving problems, reciprocity, and acting collaboratively and constructively with others.

Students use a variety of resources and technological tools to communicate, collaborate, conduct research, analyze, create, and share their own work for different audiences. Anticipated and planned learning activities interconnect with ubiquitous learning contexts [13].

2.3. Ubiquity and project work

Various learning needs and project's key features reflect the complexity of the project work. For a more operational purpose, we consider Grant's description as reflecting key stages followed by in project working [14]:

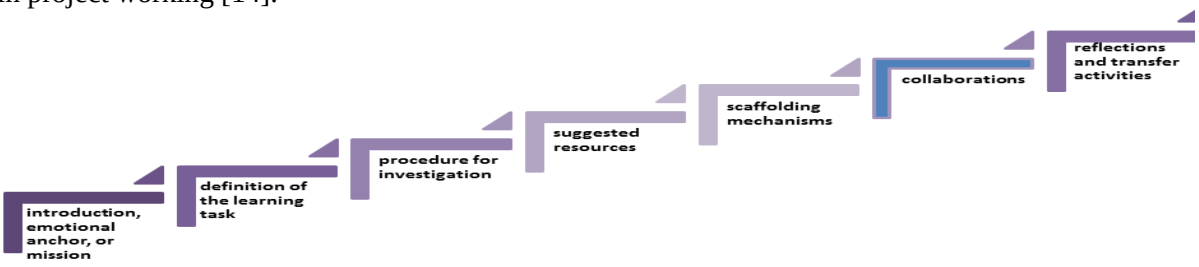

Figure 4: Grant's key stages in project-based learning

Project work could take benefit of blended learning strategies. Learning can be enhanced by giving control of their interactions with media and prompting students' reflection. Interactive technologies were positively related to student engagement, self-reported learning outcomes, and deep approaches to learning [15].

Projects should connect students to real world, to real life. Real life or real world embody broader concepts, which help bringing into focus the idea of building on the bridges between formal educational settings (schools, universities) and learning opportunities genuinely provided by outside-school environments. Dewey encouraged educators to teach children how to engage with the world on a practical level and trust them to construct their own knowledge through (successful) engagement in activities of a lifetime. Instead of learning about nutrition in the abstract, students act as consultants to develop a healthier school cafeteria menu. Rather than learning about the past from one textbook, students become historians as they make a oral history project, organize a small museum or prepare a documentary about an event that changed their local community.

Theorists like Slattery (2006) or Kozol (1975) criticized the curriculum fragmentation and the organization of the school activity. Project approach extensively takes advantage of the articulated complexity of real life and provides opportunities for situated learning. Real life is the starting point and at the same time serves as an assessment environment for project's outcomes. Compared to learning process encouraged by traditional instruction, in in project work "students are 'pulled' through the curriculum by a meaningful question to explore, an engaging real-world problem to solve, ot a design challenge to meet" [16]. Projects inspired by real life bring meaning for students, connect to their experience and gives a sense of accomplishment.

2.4. Challenges of the project approach

Who's afraid of ubiquity? A short answer could be: teachers and parents. In our country, teachers struggle with technology resources' accessibility and skills, lack of predictability in students learning endeavors, pressure of content-driven and standard-based instruction, mono-disciplinary curriculum and de-contextualized learning tradition, time as a limited resource, high stake testing and poor collaboration among teachers.

Ubiquitous learning takes place in a complex and dynamic contexts, where there are many actors involved. The student himself/ herself is connected to teachers, peers, family, friends and wider world. He or she is also connected to technological network and ubiquitous computing. The pedagogic framework should fit with this dynamic complexity, where learning could potentially occur anytime, anywhere. Isn't it threatening to traditional pedagogical framework grounded on rigorous planning and predictable connection between learning objectives, curriculum inputs, and pedagogy? The digital media is overwhelming for many adults. How to use digital media's affordances for learning while feeling unsecure or unsure about the benefits?

The abundance of resources and relationships made easily accessible via the Internet is challenging. Instead of seeing themselves as main information providers, teachers need to teach students the ability to assess the credibility of information. Ambiguity related to ubiquity is even worsened by various conceptions related to the project approach. How do teachers perceive project based learning? They see project approach as curriculum organizer, instructional method or an occasionally activity during a school year.

Another challenge is generated by the difficulty to balance curriculum requirements and students' interests, spontaneity and rigorous planning. Many times the 21st century skills are not covered by the high stake testing. The taken for granted difficulty to focus on assessing both the process and outcomes of the projects become even more complicated when students access data when and where they want and build on networks amongst themselves. How to manage the time frame and build habits of self-direction?

III. CONCLUSIONS

Rethinking our roles as teachers is challenging. Effectively playing our roles as teachers is even more challenging. The Singapore vision is "Teach less and learn more". How to teach less and learn more? Project approach coupled with performance assessment facilitate learning and teaching strategies which meet nowadays learner's interests and skills, emphasizes flexibility and critical thinking, provides students with appropriate tools for engaging and motivating tasks and connects students to social issues through collaborative team work and civic engagement. To many of our students, the Internet and mobile devices are an integral part of their world, therefore the ubiquitous learning is intrinsic to the process. Teachers could take benefit of devices like smart phones, I-pads, i-pods or global positioning systems, which could be used as portable tools for productivity, learning, and communication, providing a wide range of activities. Many times the teacher perceives himself/ herself as outsider to students' world. In order to get involved, he or she should get connected: to their students' learning needs and real lives. At the same time, teachers need to build on learning communities, based on effectiveness, diversity and equity.

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