Sustainable Development of Collaborative Problem Solving Competency for Technical Students through Experiential Learning

(A Case Study in Planning Skills Subject at Ho Chi Minh city University of Technology and Education)

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Abstract - ***Collaborative problem solving (CPS) competency is one of the key competencies in the 21st century [1]. However, this competency and other core ones achieved by students in higher education do not match with the requirements of labor market [2]. Therefore, CPS and other competencies of students should be sustainably developed to support them to meet needs of workplaces in the near future. This research focuses on how CSP competency of technical students could be sustainably developed by applying experiential learning (EL) during the teaching-learning process. Documentary research was applied to construct the literature review of CPS competency and EL. Experimental research (no control group) judged by qualitative (observation and interview) and quantitative (questionnaire) methods were used to assess the development of CPS competency of students at Ho Chi Minh City University of Technology and Education (HCMUTE). Initial results revealed that there were significant differences between Mean of students' CPS competency before and after conducting the experiment. Some minor suggestions of organizing experiential learning activities were also given to enhance the sustainable development of students' CPS competency.***

Keywords: ***collaborative problem solving; collaborative problem-solving competency; experiential leaning, sustainable development.***

I. INTRODUCTION

The CPS competency is a combination of problem solving and collaborative (teamwork) competency. The CPS is firstly stated by Stevens and Campion (1994)) [3], [4] when the authors studied on requirements of knowledge, skills and attitude in working group of Human Resource Management field. Since CPS is the one of key competencies in the 21st century [1] so Organization for Economic Co-operation and Development selected it to be the official competency to assess 15-year-old in 2015 [5]. Furthermore, CPS is considered to be the general competency which is very necessary not only for workers in their job but also for students in their learning as well as for everyone in life. Therefore, the CPS competency plays a very crucial role for the sustainable development of technical students as well as engineers in workplaces in the Industrial Revolution 4.0.

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There are many ways to develop the general competencies of students, but experiential learning is one of the effective methods to evoke them. EL has been applied to develop professional and general competencies [6-8], such as leadership [9], [10], teamwork [11], [12], interpersonal [13], [14]. However, researches on applying EL to develop the CPS competency of technical students seem not to draw researchers' attentions. In this paper, our scope is on applying EL to develop the CPS competency permanently for engineering students.

II. LITERATURE REVIEW

A. Outline of Collaborative Problem-Solving Competency

The CPS competency was defined "*as a joint activity where dyads or small groups execute a number of steps in order to transform a current state into a desired goal state*." [1] or "*the capacity of an individual to effectively engage in a process whereby two or more agents attempt to solve a problem by sharing the understanding and effort required to come to a solution and pooling their knowledge, skills and efforts to reach that solution*" [5].

The CPS competency comprises four main steps (OECD) [5]:

- Understanding the problem situation.
- Selecting, organizing and integrating into prior knowledge.
- Planning which consists of clarifying the goal of the problem, setting any sub-goals, developing a plan to reach the goal state.
- Monitoring steps in the plan to reach the goal state and reflecting on possible solutions and critical assumptions.

Based on PISA sequential process on problem solving, other researches on collaboration, and some relevant fields, Patrick Griffin and Esther Care (2015) built five steps of conducting CPS: Identifying the problem; Representing the problem; Planning; Executing; Monitoring. However, the authors mentioned that these steps are not a uniform process but a complex, coordinated activity between two or more individuals [1].

With respect to the stated CPS definitions and the process of CPS, we thought that the CPS process should follow separated steps and combine with consensus among members of groups. In addition, when students join in a new group, they should learn how to get to know each other and establish clear roles for each member. Derived from the above analyses, a process of developing the CPS competency is proposed by us with six steps in the following:

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- *Step 1: Preparation*

  Students introduce themselves to other members, establish ways of contacting (in person or online) and identify roles of every members in the group such as a leader, a secretary, a time keeper and so on.

- *Step 2*: Identify and define the problem

  Students identify and define the problem in harmony by discussing and analyzing it carefully.

- *Step 3:* Propose and select the feasible solution

  Students identify previous knowledge and skills and integrate them into solving the problem. Given solutions will be analyzed, judged by members. The best feasible solution will be selected in harmony among members of the group.

- *Step 4:* Make the plan

  Students co-operate to make a plan for tackling the problem. Main/Sub objectives, specific activities, time, recourses and so on are discussed carefully and responsibly by every member. The plan will be made basing on the harmony of members.

- *Step 5:* Implement the plan

  Students implement and monitor the plan to solve the problem. Teachers are always accompanied with every group during the learning process.

- *Step 6*: Assess results

  Results of solving problems will be assessed by teachers and students. Every group will adjust their activities if needed.

Not only focusing on the definitions and the processes of developing CPS competence, frameworks of the CPS competency have drawn researchers' attentions. Patrick Griffin and Esther Care (2015) developed the CPS framework consisting of two very broad skill classes: social skills and cognitive skills. There are three components in social skills (participation, perspective taking and social regulation), and two domains (task regulation and knowledge building) in cognitive skills [1]. Meanwhile, OECD stated three major components of this competency: establishing and maintaining shared understanding; taking appropriate action to solve the problem; establishing and maintaining group organization. Every component has four sub-components: exploring and understanding, representing and formulating, planning and executing and monitoring and reflecting [5].

María Elena Oliveri et al proposed four main components (Teamwork, Communication, Leadership and Problem solving) and 17 sub-components of CSP competency [15]:

- Teamwork contains five sub-components such as Team cohesion, Team empowerment, Team learning, Self-management, Adaptability/Flexibility, Open-mindedness.
- Communication includes two sub-component such as Active listening and Exchanging information.
- Leadership consists of five sub-components such as Organizing activities and resources, Monitoring Performance, Reorganizing when facing with obstacles, Resolving conflicts.
- Problem solving comprises of five sub-components such as Identifying problems, Brainstorming, Planning, Interpreting and Analyzing, Evaluation, and Implementing.

Drawing on the above mentioned CPS competency frameworks and the proposed CPS process, this paper proposes the CPS competency framework as follows:

TABLE 1. THE PROPOSED CPS COMPETENCY FRAMEWORK

Main comp-onents	Sub-components	Indicators	Indicators' Explanation
1. Collaborative	1.1 Organize the group and set up ways of contact	1.1.1. Organize the group and set up ways of contact	• Identify roles in a group (leader, time keeper, secretary, presenter and so on). • Set up ways of contact.
	1.2 Participate in the group	1.2.1 Interact and share knowledge and skills	• Initiate and promote interaction or activity • Share and reply information
		1.2.2 Cooperate with other members	• Relate well with others and work in harmony, not conflict
	1.3 Manage the group	1.3.1 Resolve conflict in the group	• Achieve the harmony among members
		1.3.2 Understand each individual and members	• Recognize own and others' strengths and weaknesses
		1.3.3 Be Responsible and initiative	• Assume responsibility for ensuring parts of task are completed by the group
2. Problem solving	2.1. Identify and define the problem	Identify and define the problem	• Analyze problem • Define goals and objectives
	2.2. Propose solutions	Propose solutions	• Analyze relevant information for proposed solutions • Propose a feasible solution
	2.3 Plan and Implement	Plan and Implement	• List of main and sub tasks • Assign tasks for members • Define time and others related factors • Follow rules of engagement
	2.4 Monitor adjust and evaluation	2.4.1 Monitor and adjust	• Monitor results and evaluate successes in solving the problem • Provide feedback and adapt the team organization and roles
		2.4.2 Evaluate	• Evaluate collaborative and problem-solving results

In short, the proposed CPS competency framework is constituted from two main components, ten sub-components and nineteen indicators. This framework will be applied in judging the changing of CPS of technical students when organizing experiential learning activities at HCMUTE.

B. Overview of Experiential Learning

Experiential learning or learning based on experience has existed in philosophy for a long time [16], [17]. However, Dewey were, arguably, the foremost exponent of the use of experience for learning, and the word occurs in a number of titles of his books [17]. After his works, many researchers have studied in this field with different definitions. These definitions can be classified into two main approaches: The first approach has emphasized learning from experience or beginning with experience [18 -21], to provide direction for making judgments as a guidance to choose learning actions [18] or transforming experience to create knowledge [20], skill, attitude, emotions, values, beliefs, senses [19]. The second tendency has focused on the direct and active involvement of learners in learning process to form and develop personal experiences [14], [21-23].

With the role of teachers, we concentrate on the later rather than the former approach by designing experiential learning activities and environment for students to take part in to get experience.

Michelle Schwatz mentioned nine characteristics of experiential learning. They are:

- *Mixture of content and process*: the experiential activities and the underlying content or theory must be balanced.
- *Absence of excessive judgment*: The teacher must create a safe environment for students to work through their own process of self-discovery.
- *Engagement in purposeful endeavors*: The learner is the self-teacher, therefore there must be "meaning for the student in the learning." The learning activities must be personally relevant to the student.
- *Encouraging the big picture perspective*: EL activities must have connection between the learning and the world.
- *The role of reflection*: Students should be able to reflect on their own learning, bringing "the theory to life" and gaining insight into themselves and their interactions with the world.
- *Creating emotional investment*: Students must be fully immersed in the experience, not merely doing what they feel is required of them. The "process needs to engage the learner to a point where what is being learned and experience strikes a critical, central chord within the learner."
- *The re-examination of values*: By working within a space that has been made safe for self-exploration, students can begin to analyze and even alter their own values.
- *The presence of meaningful relationships*: One part of getting students to see their learning in the context of the whole world is to start by showing the relationships between "learner to self, learner to teacher, and learner to learning environment."
- *Learning outside one's perceived comfort zones*: "Learning is enhanced when students are given the opportunity to operate outside of their own perceived comfort zones." This doesn't refer just to physical environment, but also to the social environment. This could include, for instance, "being accountable for one's actions and owning the consequences." [24], [25]

EL methodologies have been attracted by many researchers. Lewis & William (1995) [26] divided EL into two main types: field - based experiences and classroom – based learning. Field - based experiences is the oldest form of EL, includes internships, practicums, cooperative and service learning. Classroom – based learning is new trend of EL, consist of many methods such as role play, games, case studies, simulations, presentations, and various type of group work.

Ágota Dobos (2014) [27] classifies experiential learning methods based on the four stages of Kolb's experiential learning cycle. In the first stage Concrete experience, EL methodologies: simulation, case study, field trips, real experience, demonstration, role play, game, project-based learning, job rotation, small group should be used. Discussion, small group, designated observers, self-tests, reading, coaching, counseling, mentoring, feedback assessment, workplace observation, networking, ... should be applied in the Observe and reflect stage. Sharing content, guide discussion, lecture, presentation…are suitable for Abstract conceptualization stage. The final stage Active experimentation, laboratory experiences, on-the-job experience, internships, practice session, job rotation, working in real situation are more appropriate. Furthermore, in Mel Silberman's book [14], he mentioned on experiential methodologies such as computer-based simulations, action learning, games, adventure learning, role play, storytelling, observation and so on. Sreve Suger and Kim Kostoroski Suger (2002) studied experiential learning methods through 25 specific games [28].

Our approach is mainly based on the classification of Lewis & William and select some suitable EL methodologies that may be appropriate to develop technical students' CPS competency. Thus, we still keep two main types of EL methods. The first, field - based experiences or outside classroom activities includes practice in company, practice in real or simulation environment, cooperative in various group work, project-based learning, field trips, games, adventure learning, creative contest and so on. The second, classroom – based learning consists of observation: watching film/simulation/demonstration, role play, games, simulations, presentations, various type of group work, laboratory/workshop practice, self-tests, feedback assessment, sharing content, action learning, etc.

To organize EL activities successfully, Wringer provided guides to integrate experiential learning activities into a course [29]. When conducting EL activities, lecturers should combine classroom activities with external experiences. Furthermore, activities should be not only challenging but also manageable. Lectures provide students with clear expectations and an appropriate time to "identify, clarify, and keep focused on their problem". Students are also allowed to change their direction midstream if needed.

According to UNESCO, *"education for Sustainable Development empowers people to change the way they think and work towards a sustainable future"* [30]. From all the

above perspectives, to develop CPS competency sustainably through organizing EL activities, we suggest that instead of designing, organizing, managing, and assessing EL activities which students take part in, students should be empowered these role to experience. Students have to work in group to learn how to define situations, propose solutions, make feasible plans, implement and assess their results. Lectures become a guider, a scaffolder during the teaching - learning process. However, in order to act these roles effectively, lecturers should develop EL assignments or projects in which content and process are integrated into a subject. EL activities also should be implemented by various experiential teaching methods such as observation, games, role play, problem solving, exploration learning and so on inside and outside classroom. Moreover, technical students need to be guided how to work with CPS process by lecturers.

III. SUSTAINABLY DEVELOPING STUDENTS' COLLABORATIVE PROBLEM-SOLVING COMPETENCY BY APLLYING EXPERIENTIAL LEARNING IN TEACHING PLANNING SKILLS SUBJECT

A. Developing Experiential Leaning Assignments for Planning Skill subject

Planning Skills is a subject with 2 credits in the 150-credit training curriculum at HCMUTE. The aim of this subject is to support students in developing some general skills in workplaces such as CPS, planning, organizing, time management and interpersonal competency. This subject is usually scheduled in the first, second or third semester of every school year.

After analyzing learning outcomes, subject contents and combining with the EL and CPS literature reviews, 2 main experiential assignments were designed to help students to sustainably develop their CPS competency. Assignment 1 requires students to spend most of the time outside classroom while with the other, they mainly work inside classroom.

Assignment 1: Every small group (from 6 to 10 students) complete/fulfil all the following activities/tasks. The timeline is in 4 weeks:

- Design and implement a plan to visit and discover at least three historical/cultural/culinary sites in the city by bus.
- Design a plan to interview more than five foreigners about any optional topic and make video within 5 minutes.
- Make a plan to organize outdoor games in order to know about group members' hometown, hobbies, personalities, etc…
- Plan for all group members to present and self – assess the results in front of class within 15 - 18 minutes in total.

Assignment 2: Every small group design and implement plans to conduct the "Summary of the Planning Skills subject program" in 60 minutes.

Note: The program includes some sub-parts such as: program introduction, course summary by role play/or making video, professional products introduction, music show, game show, and other parts can be added. After program, students have to assess the results by themselves. Every member in class must be assigned tasks by class leader or group leaders.

Both assignments have some main general characteristics:

- They are organized by groups.
- Many methods such as: adventure learning, games, role plays, practice in real environment, cooperative in various group work, students' presentations and other active activities are used in assignments. More especially, these methods are not designed and organized by the lecturers but by students.
- In each assignment, there are some challenges requiring students to get over. To succeed, group must well organize, and members have to contact frequently, work in high consistency, define problems in accuracy, suggest good solutions, design effective plan as well as monitor and adjust plans appropriately.
- After finishing the assignment, students have to reflect/self-assess what had done well and not well, give reasons and propose solutions.
- Lecturers' roles are as guiders and/or scaffolders to help students to orient, solve problems, overcome obstacles and consult if needed. In addition, the lecturers need to guide students to work with the CPS process such as how to organize their group, share information, manage group, solve conflicts, define problems, propose solutions, design plans, do self-assessment, and so on.

B. Pedagogical Experiments and Results

Experiment Hypothesis: With $\alpha = 0.05$, there are significant differences between Mean of technical students' CPS competency before and after experiment of three classes.

Pedagogical experiments were conducted to test the hypothesis and an effectiveness as well as a feasibility of applying experiential in teaching Planning Skill subject to develop CPS competency in three classes at HCMUTE in the 2^{nd} semester of the school year 2017-2018, with a total number of students selected randomly in 1^{st}, 2^{nd} and 3^{rd} classes were 25, 23 and 28 students respectively.

Before and after applying two assignments, students had to answer the same refined 66 items of CPS self-assessment questionnaire that were developed by Factor and Reliability analysis in another branch of our research. The two surveys were 7 weeks apart.

Qualitative results

By observation, we found that before and the first 2 weeks of conducting experiments, most of students did not work in team so well. For instance, they moved slowly when forming a new group. They did not share much information, some students even did not take part in their groups. Some groups designed a plan but in an ineffective way or few groups even did not make plan. However, few weeks later, they changed in upward trend as they had better group organization, every group had contacts. They shared

information instantly, collaborated better, designed plans also better and so on.

Through interview after doing assignments, students shared that they have improved many aspects related to CPS competency such as organizing groups, collaborating with friends, solving emerged problems, designing and implementing plans, self-evaluation and others have improved. Additionally, they also shared that assignments were interesting and helped them to combine learning and relaxing, to work in small as well as big groups (assignment 2).

Quantitative results

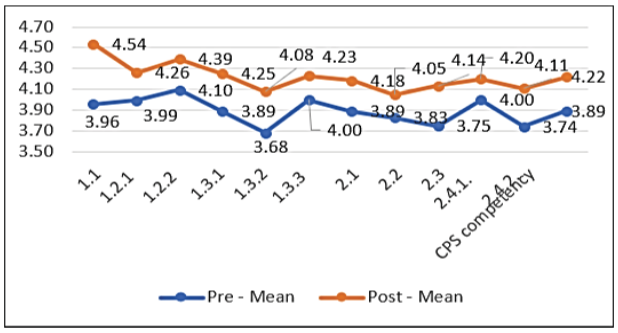

Figure 1. *Mean of CPS competency before and after experiment of class 1*

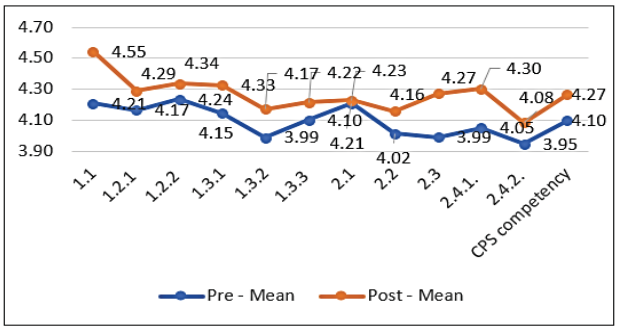

Figure 2. *Mean of CPS competency before and after experiment of class 2*

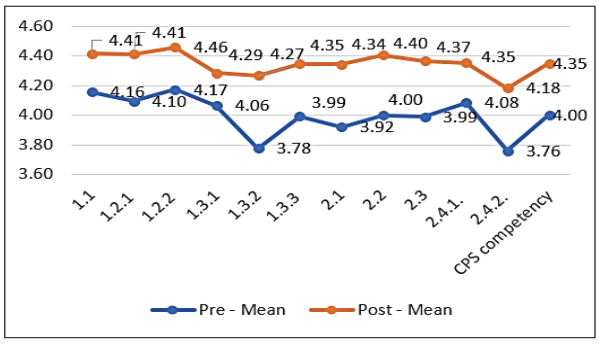

Figure 3. *Mean of CPS competency before and after experiment of class 3*

Note: 1.1 Group organization and contact; 1.2.1 Interaction and sharing knowledge; 1.2.2 Cooperation; 1.3.1 Resolving conflict; 1.3.2 Understanding individual and team members; 1.3.3 Responsibility initiative; 2.1 Identifying and defining the problem; 2.2 Suggesting solutions; 2.3 Making plan; 2.4.1. Monitor, evaluation and adjustment; 2.4.2. Evaluation the results.

Figures 1, 2, 3 indicate Mean results before or pre- and after or post- experiment of students' CPS competency and CPS components in three classes. Overall, graphs show that all Means after experiment were higher than Means before experiment. In detail, three CPS components: 1.1 Group organization and contact, 1.3.2 Understanding individual and team members, 2.3 Making plan were more developed (distance about 0.25 to 0.58) than the rest. The other components grew more than 0.15 in average, except components 2.1 Identifying and defining the problem component of class 2 which was only 0.02 difference. Therefore, it can be inferred that students have evolved their CPS competency after conducting experiential activities. However, it is important to test whether this difference is significant. The T – test was applied to evaluate the significant differences between Mean of technical students' CPS competency before and after experiment of three classes. The T- test results are illustrated in table 2 and 3 below.

TABLE 2. PAIRED SAMPLES STATISTICS OF 3 CLASSES

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Before_Class1	3.8912	25	.29391	.05878
	After_Class1	4.2196	25	.31849	.06370
Pair 2	Before_Class2	4.0965	23	.41650	.08685
	After_Class2	4.2665	23	.27686	.05773
Pair 3	Before Class3	4.0018	28	.25495	.04818
	After_Class3	4.3486	28	.26321	.04974

TABLE 3. PAIRED SAMPLES TEST OF 3 CLASES

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Before_Class1 - After_Class1	-.32840	.36576	.07315	-.47938	-.17742	-4.489	24	.000
Pair 2	Before_Class2 - After_Class2	-.17000	.38281	.07982	-.33554	-.00446	-2.130	22	.045
Pair 3	Before Class3 – After_Class3	-.34679	.29222	.05522	-.46010	-.23347	-6.280	27	.000

All Sig. value in the table 3 < 0.05, so the hypothesis is accepted. Therefore, there are significant differences between Mean of technical students' CPS competency before and after experiment of three classes. Additional, number in the in table 2 indicates that CPS competency's Means of three class before experiment are lower than after experiment. Thus, it can be confirmed that the technical students' CPS competency has grown significantly after experiment. These results also demonstrate that integration factors such as content, processes, multi EL methods and empowerment in doing EL assignments help students to develop their CPS competency in a sustainable way.

IV. CONCLUSION

Drawn from all the information above, it can be concluded that empowerment for students in doing experiential assignments, in which learning content, process, experiential methodologies are integrated, helps students sustainably develop their CPS competency. On the basis of the results, we recommend some solutions to develop students' CPS competency as well as other competencies in a sustainable way as follows:

- Studying definitions, framework and process of those competencies.
- Developing EL assignments which have a combination among learning content, process of conducting this competency, multi – experiential learning methodologies.
- Empowering students with many roles from developing ideas, designing, planning, implementing, and evaluating.
- Playing some roles such as the designer of EL assignments, the guider, the scaffolder during the experiential learning - teaching process.

REFERENCES

[1] Patrick Griffin, Esther Care, *Assessment and Teaching of 21st Century Skills _ Method s and Approach: Chapter2: A Framework for Teachable Collaborative Problem Solving Skills*. Springer, P. Griffin, E. Care (eds.), ISBN: 978-94-017-9394-0, 2015.

[2] ILO Newsletter, *Education-business mismatch worsens already low workforce quality and productivity*, 2014.

[3] María Elena Oliveri, René Lawless, Hillary Molloy, *A Literature Review on Collaborative Problem Solving for College and Workforce Readiness*, GRE Board Research Report No. 17-03 and ETS Research Report Series No. RR-17-06, ISSN 2330-8516, 2017.

[4] Stevens, M. J., & Campion, M. A. , "The knowledge, skills and ability requirements for teamwork: Implications for human resources management," *Journal of Management*, 20(2), 502–528, 1994.

[5] OECD , *Pisa 2015 Collaborative Problem Solving Framework*, OECD Publishing, 2017.

[6] Hollis, Francine H.; Eren, Fulya, Implementation of Real-World Experiential Learning in a Food Science Course Using a Food Industry-Integrated Approach, *Journal of Food Science Education*, v15 n4 p109-119 Oct 2016.

[7] Wei Wu, Brad Hyatt , "Experiential and project-based learning in BIM for sustainable living with tiny solar houses", *International Conference on Sustainable Design, Engineering and Construction, Procedia Engineering*, 2016, p. 579 – 586.

[8] Jack, Kristen, "The Role of Experiential Learning in Nurturing Management Competencies in Hospitality and Tourism Management Students: Perceptions from Students, Faculty, and Industry Professionals", *Institute of Education Sciences*, ERIC Number: ED533389, 2011 p.203.

[9] David Kolb, Stuart Lublin, Juliann Spoth, Richard Baker, "Strategic Management Development: Using Experiential Learning Theory to Assess and Develop Managerial Competencies", *Journal of Management Development*, Vol. 5, pp.13 – 24, 1982.

[10] Gregg Morris Warnick, Brigham Young University, "An Experiential Learning Approach to Develop Leadership Competencies in Engineering and Technology Students"*, 121st ASEE Annual Conference & Exposition*, India, 2014.

[11] Hoa Le Thi Minh, "Develop collaborative competency for secondary students through outside activities", Ph.D. dissertation, Vietnam Educational Institution, Ha Noi, Vietnam, 2015.

[12] Mel Silberman (edited), *The Hand book of Experiential learning,* Pfeiffer, San Francisco, 2007, chapter 15.

[13] Philip Burnard, *Teaching Interpersonal Skill: A handbook of experiential learning for health professionals*, Springer-Science+ Bussiness Media, B.V, 1989.

[14] Mel Silberman (edited), *The Hand book of Experiential learning,* Pfeiffer, San Francisco, 2007.

[15] María Elena Oliveri, René Lawless, Hillary Molloy, *A Literature Review on Collaborative Problem Solving for College and Workforce Readiness*, GRE Board Research Report No. 17-03 and ETS Research Report Series No. RR-17-06, ISSN 2330-8516, 2017.

[16] Jitka Kujalová, "*Use of Experiential Learning in Teaching English as a Foreign Language",* M.A. thesis, Department of English and American Studies, Faculty of Arts, Masaryk University in Brno, 2005.

[17] Colin Beard and John P Wilson, *Experiential Learning: A Best Practice Handbook for Educators and Trainers,* London and Philadelphia, United Kingdom and USA, 2006.

[18] Hutton, M., "Learning from action: a conceptual framework", in S. Warner Weil and M. McGill (eds), *Making Sense of Experiential Learning*, Milton Keynes: SRHE/Open University Press, P. 50-59, 1989.

[19] Jarvis, P, *International Dictionary of Adult and Continuing Education*, Kogan Page, London, 1999.

[20] David Kolb, *Experiential learning as the Science of Learning and Development*, Englewood Cliffs, NJ: Prentice Hall, 1984.

[21] Colin Beard, John P. Wilson, *Experiential Learning: A hand book for education, training and coaching* (third edition), Kogan Page, London/USA and India, 2013.

[22] Colin Beard, John P. Wilson, *Experiential Learning: A hand book for education, training and coaching* (third edition), Kogan Page, London/USA and India, 2013, p.25.

[23] Malinen, A, "*Towards the Essence OF Adult Experiential Learning" in* , Jyväskylä University Printing House, Jyväskylä, Finland, 2000.

[24] Chapman, S., McPhee, P., & Proudman, B., What is Experiential Education? In Warren, K. (Ed.), *The Theory of Experiential Education* (pp. 235- 48). Dubuque: Kendall/Hunt Publishing Company, 1995.

[25] Michelle Schwatz, *Best Practices in Experiential learning,* The learning and teaching office*, p.1,2*.

[26] Lewis, L.H. & Williams, C.J., In Jackson, L. & Caffarella, R.S. (Eds.). *Experiential Learning: A New Approach* (pp. 5-16). San Francisco: Jossey-Bass, 1994.

[27] Ágota Dobos, PhD, "Experiential learning for professional development in the civil service"*, Procedia – Social and Behavioral Sciences*, 116 (2014), p. 5085 – 5090, 2014.

[28] Sreve Suger and Kim Kostoroski Suger*, Primary games: Experiential Learning Activities for Teaching Children K-8,* Jossey-Bass, USA, 2002.

[29] Wurdinger, S.D., *Using Experiential Learning in the Classroom*. Lanham: Scarecrow Education, 2005.

[30] https://en.unesco.org/themes/education-sustainable-development