



# Developing 21<sup>st</sup> Century Graduate Attributes: Designing Learning Environment through Cooperative Experiential Learning (CEL) Approach

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## ABSTRACT

### CONTEXT

The issue of unemployment among graduates is a global issue and is mostly associated with the inadequacy of employability skills and generic skills in graduates during their time in university. Employers have often complained that graduates lack the necessary soft skills which is vital for the organisation. A highly competent candidate with strong foundational literacies alone will not guarantee its organisation will achieve its goal, especially in the 21<sup>st</sup> century workforce. Generic attributes and strong character qualities are the vital attributes for organisations that ensure a productive, collaborative, and healthy work environment in an increasingly competitive world.

### PURPOSE OR GOAL

To ensure that students can attain the required 21<sup>st</sup> century graduate attributes, a change of approach in their learning experience is essential. It is conjectured that the implementation of experiential learning with cooperative learning principles will facilitate the development of 21<sup>st</sup> century graduate attributes among undergraduate students. The paper aims to describe the first attempt of designing and implementing a learning environment that infuses cooperative learning principles into the experiential learning framework to help develop these attributes.

### APPROACH OR METHODOLOGY/METHODS

A general university course is designed by incorporating the principles of Cooperative Learning in Kolb's Experiential Learning Cycle to explore the development of 21<sup>st</sup> century graduate attributes among undergraduate students. Students went through five (5) cycles of the cooperative experiential learning (CEL) approach in class-based learning and field-based experience. In the CEL approach, abstract conceptualization mainly happens during mini lectures and briefings for team tasks and team projects. Active experimentations are conducted via team activities and a team project to promote cooperation and create meaningful learning experiences for students. Students are also provided with time and space to think individually during each CEL cycle (concrete experience stage) before discussing with respective team members to reach team consensus (reflective observation stage). To study the impact of the CEL approach, thematic analysis was conducted on the students' reflections - what they have learnt and experienced throughout the course implementation, focusing on the 21<sup>st</sup> century graduate attributes

### ACTUAL OR ANTICIPATED OUTCOMES

From the students' reflections, three main attributes were identified: teamworking & leadership, communication and thinking skills. In several deep reflections, the characteristics of cooperative groups emerged which includes accountability towards team members, shared leadership, developed interpersonal skills and positive interdependence among team members.

## **CONCLUSIONS/RECOMMENDATIONS/SUMMARY**

These initial findings indicate that the implementation of cooperative experiential learning in an introductory course allows students to be engaged in team activities and helps promote positive development of required graduate attributes among engineering students.

## **KEYWORDS**

Experiential learning, cooperative learning, 21<sup>st</sup> century graduate attribute

## **Introduction**

Today, the pace of change is accelerating, especially in technology, manufacturing, and marketing, which have resulted in an increasingly competitive borderless world. Competition for the right talent is aggressive and the demand for well-educated graduates exists everywhere. Inevitably, employers do not have the luxury of resources, especially time to train and improve graduate competency that can meet industry demand. What is needed are dynamic and highly versatile graduates that are capable of fitting in quickly to embrace a broader vision of professional role to respond to global challenges. Several skills highly valued by employers are communication skills (Levy & Cannon, 2016 and World Economic Forum, 2020), thinking skills (Floyd & Gordon, 1998 and World Economic Forum, 2020), scholarship, leadership and teamworking skills, adaptability, global citizen and enterprising skills (Mason & Arshed, 2013 and World Economic Forum, 2020). While hard skills are relatively easier to master, it is these soft skills that are more difficult to learn (Raj, 2008). Graduate attributes including generic attributes and personal traits, play a significant role for graduates to gain employment. In addition, graduates need not only to adapt to workforce change, but be willing to acquire new skills and to embrace a positive attitude towards life-long learning.

For this reason, higher education institutions have a crucial responsibility to undertake transformation, aimed at producing knowledgeable and high-quality graduates to fulfill the market needs. Therefore, holistic approaches at the institutional level are needed to ensure that graduates' competencies are assessed based on the current industrial market needs. Curriculum has been revised and designed to inculcate the important attributes among graduates. In Universiti A, the Graduate Success Attributes (GSA) course is designed with the aim to introduce students to the desired 21<sup>st</sup> century graduate attributes, and the need for competent graduates, especially in facing the challenges of the 21<sup>st</sup> century. The GSA course is designed to have a supportive student-centered learning environment that allows students to develop important skills to learn, as well as understand and develop abilities required to be highly competent graduate. To attain the course outcomes, student-centered learning approaches are implemented by introducing simple active learning activities in interactive class, cooperative learning through team-based activities leading up to experiential learning via team-based project.

Students need to be engaged in learning through variety of ways, and cooperative learning has been identified as a necessary skill for success in the 21<sup>st</sup> century. Cooperative Learning (CL) is an instructional strategy that involves students working together to accomplish common and shared goals. It is this sense of interdependence that motivate team members to help and support each other which enable them to maximize their learning experience. According to Johnson and Johnson (1999), CL comprises five elements, which are positive interdependence, face-to-face promotive interaction, individual and group accountability, social skills and group processing. Research shows that CL has been proven to enhance academic performance (Gull & Shehzad, 2015), guide in shaping student creativity (Elizabeth & Meera, 2014) and critical thinking (Sadeghi, 2012) and promoting soft skills (Mohd Azmir et. al., 2011). According to Johnson and Johnson (1990), placing students in small groups and telling them to work together does not guarantee that they will work cooperatively and produce positive social outcomes. Groups need to be structured to ensure that team

members will work interdependently if they are to reap the academic and social benefits widely attributed to this approach to learning. With cooperation and social interaction playing such a critical role in the success of individuals, students learn to listen to what others have to say, give and receive help, reconcile differences, and resolve problems democratically.

To attain deep understanding of graduate attributes among the undergraduate students, the learning environment for the GSA course is also designed based on Experiential Learning Theory (ELT). According to Kolb (1984), learning is the process whereby knowledge is created through the transformation of experience. Experiential learning focuses on learners reflecting on their experience of doing something, to construct knowledge. Kolb's experiential learning model suggest four stages in a cycle: active experimentation, concrete experience, reflective observation and abstract conceptualization (Kolb, 1984).

According to Lewis and William (1994), experience-based learning in the classroom can take many forms, including role playing, games, simulations, case studies (Gadola, M., & Chindamo, D., 2019), presentations and various types of group work (Musa et. Al., 2012). Effective and safe learning environment is vital for students to be able to perform analysis, exploration, and working on their own self-discovery process (Chapman, McPhee, & Proudman, 1995). In addition, classroom activities should build students' ability to see relationships in complex systems and find ways to work within them. Students should be able to reflect on learning, and gain insight about themselves and their interactions with the learning environment.

There is evidence that proved experiential learning, when properly designed, is highly engaging for students and leads to improvement in academic performances (Rodríguez & Morant, 2019). Research also claims that it leads to developed skills such as problem-solving (Miller & Maellaro, 2016), critical thinking (Suanto et. al., 2019) and improved communications skills. It enables learners to manage better highly complex situations that cross disciplinary boundaries, and subject domains where the boundaries of knowledge are difficult to manage.

Cooperative learning fits the experiential learning model perfectly to implement effective learning environment that can help students to learn the essential skills that will enable them to adapt to the workplace environment. Therefore, based on the principles of cooperative learning and the theoretical framework of experiential learning model, the GSA course is designed and the impact on students' attainment of 21<sup>st</sup> century graduate attributes is the focus of investigation.

## **Application Design**

### **Course Description & Implementation**

The Graduate Success Attribute (GSA) course is a university general course that is compulsory for all undergraduate students. The course is a two-hour weekly course which is designed to be offered in the second semester of the first-year undergraduate studies. The course aims to serve the need of students to understand and apply the holistic seven (7) graduate skills and attribute inspired by the university. The course guides students in developing the 21<sup>st</sup> century skills which consist of communication, thinking, scholarship, teamwork & leadership, adaptability, global citizenship and enterprising skills. The course also prepares them to face the real challenging world.

In class, forty-nine (49) students are divided into teams of five (5). The heterogenous teams are formed by considering various factors that include race, gender, cultural background, and academic achievement. Having a heterogenous team promotes diversity in thinking and provides opportunities for students to adapt with others of mutual concerns (Valls & Kyriakides, 2013). The teams are formed since the early session of the course to promote initial bonding among team members. Each team are required to identify a suitable team name and agreeing on mutual team rules to commit.

In support of transforming to student centred learning approach, the GSA course is designed by integrating CL principles into the experiential learning framework (Kolb, 1984) as shown in Figure 1. Students went through five (5) CLE cycles in two main settings: the classroom-based learning and the field-based experience.

### Classroom-based Learning

In the classroom-based setting, students went through the abstract conceptualization (AC) stage through mini lectures which introduced students to each graduate attributes, its basic principles, good practices, and related examples. Following the mini lectures, students underwent the active experimentation (AE) stage through different in-class activities related to the graduate attribute introduced for the session. All in-class activities were conducted in teams to help build trust and develop cooperative team characteristics among the members. However, in the concrete experience stage, students identified the required tasks for team-based activities individually first (concrete experience - CE). This provided students the space and time to think on their own before discussing with their respective team members and reaching a consensus (reflective observations). In the classroom-based setting too, students were introduced to SD challenges and global issues and provided with the requirements for poster presentation of the selected sustainable development (SD) that they decided to highlight. Students also presented to the overall classes on the selected SD challenges and were encouraged to use as much recycled items as possible.

CLASSROOM BASED LEARNING			FIELD BASED EXPERIENCE		CLASS BASED LEARNING		FIELD BASE EXPERIENCE	
TEAM FORMATION	GRADUATE ATTRIBUTES* MINI LECTURES	SD CHALLENGES	PROJECT PROPOSAL	PROJECT PLANNING	GRADUATE ATTRIBUTES* MINI LECTURES	PROJECT PLANNING	PROJECT EXECUTION	
Setting of team name, rules & agreed meeting times (PI,FF,IA, IPS)	<p><b>AC</b> Lecture on principles/good practices &amp; examples of attribute (IA, FF)</p> <p><b>AE</b> Team activities/games related to the attribute (PI, FF, IA, IPS)</p> <p>* Scholarship * Global citizen * Communication * Teamwork &amp; leadership</p>	<p><b>CE</b> Individual identification of SD challenges &amp; global issues (PI, IA)</p> <p><b>RO</b> Team discussion &amp; consensus on selection of SD challenge (PI, FF, IA, IPS)</p> <p><b>AC</b> Lecture on SD goals &amp; project ideas to address SD challenges. Briefing on poster presentation requirement (IA, FF)</p> <p><b>AE</b> Overall class poster presentation on selected SD challenges (PI,FF,IA,IPS,GA)</p>	<p><b>CE</b> Individual brainstorming for SD related project ideas (PI, IA)</p> <p><b>RO</b> Team discussion &amp; consensus on SD related project ideas (PI, FF, IA, IPS)</p> <p><b>AC</b> Briefing on SD related project proposal content, format &amp; assessments (IA, FF)</p> <p><b>AE</b> Overall class team presentation on project proposal (PI,FF,IA,IPS,GA)</p>	<p><b>CE</b> Individual task implementation (PI, IA)</p> <p><b>RO</b> Team discussions on project updates via team meetings (PI, FF, IA, IPS)</p>	<p><b>AC</b> Lecture on principles/good practices &amp; examples of attribute (IA, FF)</p> <p><b>AE</b> Team activities/games related to the attribute (PI, FF, IA, IPS)</p> <p>* Thinking skills * Adaptability * Enterprising skill</p>	<p><b>CE</b> Minutes of meeting preparation (by rotation) (PI, IA, GA)</p> <p><b>RO</b> Finalizing project planning via team meetings (PI, FF, IA, IPS)</p> <p><b>AC</b> Briefing on project execution &amp; requirements project report (IA, FF)</p>	<p><b>AE</b> Project execution with teammates (PI, FF, IA, IPS)</p> <p><b>CE</b> Resource's collection &amp; preparation for project report</p> <p><b>RO</b> Project report preparation via team meetings (PI,FF,IA,IPS,GA)</p>	
<p>Cooperative Learning Principles (Johnson &amp; Johnson, 1999)</p> <ul style="list-style-type: none"> <li>• Positive interdependence (PI)</li> <li>• Individual accountability (IA)</li> <li>• Face-to-face interaction (FF)</li> <li>• Interpersonal skills (IPS)</li> <li>• Group assessment (GA)</li> </ul>					<p>Kolb's Experiential Learning Cycle (Kolb, 1984)</p> <ul style="list-style-type: none"> <li>• Abstract conceptualization (AC)</li> <li>• Active experimentation (AE)</li> <li>• Concrete experience (CE)</li> <li>• Reflective observation (RO)</li> </ul>			

Figure 1: Cooperative experiential learning (CEL) framework

### Field-based Learning

The field-based experience involves a complete cycle of a team project that addresses one of the sustainable development goals (SDG) by the United Nations (UN) (United Nations, 2015). The project cycle involves the proposal, planning and execution stages. In the concrete experience stage of the experiential learning, students worked on their own to brainstorm about SD related project ideas before sharing them with the team members. This promotes positive interdependence (PI) and individual accountability (IA) in each team members. During the reflective observation (RO) stage, team members brought forth their

ideas, discussed and agreed on the final project idea. Through the team discussion, students develop their interpersonal skills (IPS) and promote face to face interaction (FF). Student teams then presented their SD related project proposal to the overall class cycle. After getting feedback on their project proposal, students now work on their individual tasks, depending on their role in their respective teams. Team meetings were expected to happen regularly as each team members were expected to take turns in submitting the team minutes of meeting. Prior to the project execution, a briefing on the project execution & project report was conducted. During project execution, students were required to record evidence of the event and to conduct a survey from participants to analyse on the current condition related to the SD challenges they were working on. Finally, students worked together in preparing the final report before submitting it as

Students were assessed based on the team deliverables which include sustainable development (SD) challenges poster presentation, project proposal presentation as well as minutes of meeting and final project report. Continuous group assessment (GA) was also conducted at the end of major team activities in each cycle of the AE stage. To ensure that students are able achieve the intended learning outcomes, feedbacks were given at the end of every in-class activity and after every team project presentation (poster presentation & project proposal). These serves as scaffoldings for students to improve in their next task together. Addition to that, students were also provided with guidelines for poster presentation, project proposal and the final report as well as a template for minutes of meeting as an example to record their meeting activities in an organised way. To support students working in team, the instructor was included in all team channels which used an instant-messaging platform for social interaction among team members.

## **Analysis method**

To study the impact of the CLE approach, an analysis was conducted based on the information gathered from students' reflective journals. The reflections were collected twice in the semester. Earlier in the semester, students were asked to write a brief reflection on their learning experience during their individual case study assignment. Students were asked to reflect on what they learnt, the challenges that they encountered and the steps that they did to overcome the challenges when preparing the case study assignment. At the end of the semester, students were requested to submit a reflective journal related to the project they were involved in. Students were asked to identify the graduate attributes that they have developed and explain on how they developed the attributes throughout the field-based experience. Students were also required to assess their peers and reflect on the team performance four (4) times throughout the semester.

Once the reflective journals are collected, a qualitative data analysis technique recommended by Miles and Huberman (1994) was employed. The thematic analysis stages include data reduction, data display, conclusion drawing and verification. Keywords and phrases that are related to the reflection questions were highlighted and categorized into different graduate attributes.

## **Results & Discussion**

There were eleven (11) teams that were involved in the implementation of the CEL approach. Through in-class team activities, students got the opportunity to get to know their team members gradually to prepare working together in a project in the field-based setting. In the CEL approach, students were introduced to the SDG outlined by the UN. Students worked in teams to highlight global issues that are related to the SDGs and their role as a global citizen through poster presentation. This is to provide background information for students during their research in preparing the poster. Among the issues presented include issues related to the effects of Industrie 4.0, solid waste management, pollution (air, water contamination, carbon emission), obesity and climate change. From the issues presented, students progressed into proposing a project to address these global issues. Some teams pursued

projects which were related to their poster presentation while the others decided to propose projects which were different from their poster presentation but were still within the scope of global issues that are related to UN's SDG. During the project planning, the dynamics of the team can be observed as the instructor was included in every team channel via an instant messaging platform. The instructor was able to provide guide, advice and also resources for financial support for the proposed project. Since the project started in the middle of the semester, all projects were conducted within the university. Participants involved mostly students in campus except for one project that involved children's participations. Examples of projects are Youth Mental Health Seminar, Waste Management Campaign, Recycling Awareness Game, STEM Fun Day, Run for Water and Good Morning - Free Breakfast event.

## Graduate Attributes

The paper explores the development on competencies and character qualities of 21<sup>st</sup> century graduate that student perceived to achieve in the GSA course. Table 1 shows the graduate attributes mentioned in the students' reflections based on ranking. The number in the table represent the number of students who mentioned the attributes in their reflections and also presented in the form of percentage.

**Table 1: 21<sup>st</sup> century graduate attributes mostly mentioned by students in reflective journal**

Graduate Attributes	Frequency	Percentage
Teamwork & leadership	42	86 %
Communication	39	80 %
Thinking Skills	33	67 %
Adaptability	23	46 %

From the reflections, the top four attributes that students perceived to develop through the learning activities are teamworking & leadership, communication and thinking skills. The other four graduate attributes (adaptability, scholarship, enterprising skills & global citizen) were also mentioned in the reflections, but the frequency was less than 25%. – scholarship (24%), enterprising (20%) and global citizen (16%).

Table 2 displays samples of the students quotes mentioning the three main attributes that were perceived to develop throughout the course. Analysis of the reflective journals show that student acknowledged the importance of each members' contribution and commitment in making the assigned task a success. For example, the tower building activity in one of the in-class team activities provides a cooperative environment in which teams are required to build a tower using the limited materials provided and at the same able to withstand the weight of the load. It also requires each student to think creatively and analytically to fulfill the required goal of the activity before coming to a team consensus on what is agreed upon. As for the team project, students demonstrate that they were able to work with others from different backgrounds. Some teams highlighted their experience in managing conflicts during project planning. By incorporating CL principles throughout the course, students stay in the same team for the whole semester, and this promotes greater teamwork skills gradually with time. The CLE approach also encouraged students to work individually,

These findings agree with previous research that claims experiential learning improved communication skills and lead to develop thinking skills, namely problem-solving skills (Miller & Maellaro, 2016) and critical thinking (Suanto, et al, 2019). Compared to students taught traditionally, students taught in small group learn at a deeper level, retain information longer, acquire greater teamwork skills, and gain a better understanding of the environment in which they will be working as professionals (Barbara et al., 2004). A study by Espinosa et. al (2020) proved that experiential learning had increase student-to-student and student-to-instructor

interaction, proving that going through experiential learning cooperatively within a small team promotes reflection, conceptualization, and experimentation in engineering courses.

**Table 2: Samples of quotation for attributes found reflective journal**

<b>Graduate Attributes</b>	<b>Excerpts of Students' Quotation from Reflective Journal</b>
Teamwork & leadership	<p><i>In our group, there is no leader as each one of us at some point, discovered our own capacity for leadership. We are all very good listeners for what is needed in the moment and expressed ideas such that they occur as opportunity for others. When five of us conducting our project, the questions of how to organize our event, how to relate our topic to global issue, and how to make our presentation as successful as the other groups are always our top concerns. Other than that, teamwork and leadership skills also give a lot of impact in myself. In a team each of us is expected to contribute. Each member must fulfill our own obligations for the team to succeed. From the team project, I learn that having the right people in the correct roles is an important factor in measuring the success of a team, where we are united to complete our main goals. Every member of our team is a leader in some way. We attend group meetings where we discuss any challenges, issues and problems. Part of being a good leader is knowing how important it is to receive the best ideas from each member of our team. We are all good communicators seeing as how everyone takes notes on team progress that need to be completed. At every meeting, we often exchange ideas or brainstorm new ones with each other and come up with the best team solutions to those perceived problems. For example, we had problem with our event location and one of our member suggest a place where we can get much people to participate our event. We also had problem with our free gifts where the parcel did not arrive yet but fortunately we manage to get them at very last moment before our event started. Now, I know teamwork can often achieve higher levels of performance than individuals because of combine energies of the members.</i></p>
Communication	<p><i>Communication is one of the obvious skills that I manage to develop during team project. I learn how to communicate with guys as all my team members are guy except me. Before this I'm quite awkward and shy to talk with a guy but to be professional I have to overcome that weakness and also for work purpose. During team project, I found that teamwork projects help me to work on my communication skills. Communication skills required in group projects include speaking in turn, speaking up when I have ideas, actively listening to other team members' contributions, and crucially making compromises for the good of the team. Communication is not only about speaking to and hearing from people, it's also about understanding the complete message. When I start to speak to my team members, they give full respect on my opinions and sometimes they agree with my suggestions. That what makes me become more confident to speak up my ideas. Also, during the event I learn how to talk with strangers where we have to approach people and entertained them to participate in our event. I feel so excited and happy because I had overcome my shyness towards people, and I realized somehow talk to people especially strangers can boost up our self-confident. So, a successful project manager can only maximize the effectiveness of communication within the team by being prepared to lead</i></p>
Thinking Skills	<p><i>There are many types of thinking skills such as analytic thinking skills, creative thinking skills, and critical thinking skills. During the preparation of the event, there is many aspects need to be considered so that the event can be carried out more efficiently. For instance, the effectiveness of the event, the venue that has a certain number of respondents, the distribution of tasks according to the ability of each team member, the method to collect the data regarding the mental health condition of the respondents, the method of analysis of the data and the presentation of the final report. Throughout the event, my critical thinking skills have improved a lot compared to the previous me. Common steps of critical thinking skills that I had taken in the event are identified a problem or issue,</i></p>

	<i>create inferences on why the problem exists and how it can be solved, collect information or data on the issue through research, organize and sort data and findings, develop and execute solutions, analyze what solutions worked or didn't work and identify ways to improve the solution. Thinking skills are important for me as it can help me to become a more organized person and also more analytical people. Thinking skills are also important as they can help me to reflect on the mistakes that had been made and make me a better person.</i>
Adaptability	<i>The biggest challenge I face is task distribution. As there is one member in my group is unable to present physically in the event and also the meeting due to some health reason. It is hard to give him a task. Therefore, I come out with the idea to give him the task that he is able to do it online such as designing posters, google forms, proposal and others. Even though he is unable to participate in this event physically, but he had shown his effort in doing the job that is assigned to him.</i>

## Cooperative Group Characteristics

In several reflections, the emergence of cooperative group characteristics was found. These characteristics were the results of embedding cooperative learning principles in the experiential learning approach. Among the characteristics that emerged in the students' reflections are:

- Accountability towards team members in achieving team goal

*Although there are two members of the group who are slow and inexperienced in doing their given task, it is not a good reason for me to relinquish my responsibility as a member of the group to working in the group because if I do not carry out the group assignment given by the lecturer, it would have a detrimental effect on our team marks*

- Shared leadership

*Leadership skill also very important skill as not everyone can be a leader in any situation. So, anyone have to stand up can take the responsibility to be a leader when the situation need you. This is why leadership skill and team working skill are put together to be a skill that we need to develop and improved. Leadership and team working skill can help me to be a good and team working member and also a leader when the situation need me in my life.*

- Developed interpersonal skills

*I saw that my confidence in communication skills especially my talking skill has been boost up. Before this, I don't know how to talk to the public. But after being taught by lecturers and encouragement from friends, I felt that my communication skills were improving and I was more open to talking to people I didn't know. It's an advantage that I get and I think I will value it. Communication skills are very important because they are a key step in starting a business with others. If we have a high of communication skills, we will be able to attract their attention and easily ensure that they are very confident in us.*

- Working & supporting each other academically & personally

*Throughout the preparation, we had discussed and distributed all the tasks to make sure the event can be run on the date. This attribute is important as it helps me to lead and work with other people from different backgrounds to achieve a common goal. I will be able to comprehend and assume the interchangeable role of leaders and follower as well as take action to get others engaged. One with a good teamworking skills able to recognise and respect others' opinions and ideas as well.*

- Team goal includes maximizing each member's learning

*Now, I know teamwork can often achieve higher levels of performance than individuals because of combine energies of the members*

*This is because the ability of a person is limited but the ability of a team is infinity*

- Members relieved that they have been assigned to work together

*Everyone sacrificed their time to prepared and organized this event and I am blessed that I have them as my new friends and teammates.*

These characteristics were inline with previous research that reported the implementation of CL not only promote learning but also help develop team members to attain characteristics of a cooperative group member. These characteristics are valuable for graduates to possess when they enter the challenging 21<sup>st</sup> century workforce. Extensive research has shown that properly implemented cooperative learning leads to greater learning and improved communication development and teamwork skills which include leadership, project management and conflict resolution skills (Felder & Brent, 2007). Students learn to organize themselves within the team, to divide tasks equally among team members and relying on each other before deciding on a final successful product (Patesan et. al., 2016)

## Conclusion

The inculcation of 21<sup>st</sup> century graduate attributes among engineering students can be attained through proper design of learning environment. The proposed cooperative experiential learning framework provided support in promoting the development of required competencies and character qualities in engineering graduates. It serves as a particularly valuable career preparation experience for the students. Integrating CL into the Kolb's experiential learning framework encouraged students to understand the theoretical principles and good practices of these 21<sup>st</sup> century graduate skills, experiment them in small scale via in class activities and helped them to project their learning into applications in the field-base setting via a team project.

The implementation of the framework requires detailed planning from instructors as well as continuous tracking on teams and student's performance. Despite the required efforts, the framework and its implementation can be custom-designed and applied in other courses that suits the course requirements. As the course is an introductory course to students, it is essential to have a continuous learning environment that help further develop these important and desirable graduate attributes to prepare them for the challenging future

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