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# The design of An Online Collaborative Orientation's Learning Activities to nurture Soft skills, Life skills and Self-directed learning

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**Abstract:** In this study, an approach of online-collaborative learning activities was designed to facilitate students in soft skills, self-directed learning, and life skills. All of activities orientation camp were created using 3 essential skills including (a) soft skills such as creativity, visual thinking, and critical thinking (b) self-directed learning that include the literacy competency and the online skills and (c) life skills that are respect, adaptabilities and knowing the role and responsibility. Finally, Socialotopia an integrated gamification project was designed to support the school's community whilst still completing all of the learning outcomes during this camp.

**Keywords:** Engineering skills, Soft skills, Self-directed learning, Online learning.

## 1. Introduction

Most countries' educational systems are relatively rigid and unable to keep up with rapid developments in the modern economic sector. In the midst of intense global competition, technological innovation is one way to keep a country competitive. Technological advancements are propelling the country's economy forward. Therefore, engineering and technology education must be recognized in order to improve national competitiveness and economic progress (Harnandez et al. 2014). Hands-on activities can be structured to integrate knowledge, and engineering design techniques and handouts can be used to build fundamental competencies when developing courses and curriculum (Fan & Yu, 2017; Nam, Lee, & Paik, 2016). Integrated STEM education can help students form associations between theory and reality. Furthermore, course content that helps students create connections with their potential profession content stimulates them to learn (Kwon, 2016) and facilitates the integration of STEM subjects.

The SARS-CoV-2 virus causes the COVID-19 disease, which has infected and died patients all around the world. Uncertainty regarding the virus's wide range of disease, the serious risk of infection, and the lack of a specific procedure until now (Lotfi, Hamblin & Rezaei, 2020) have led to a situation in which all the governments were unprepared for and unable to predict the repercussions of immediately terminating any professional practices. As a result, throughout the virus's spread in 2020, and until an appropriate treatment or vaccine is discovered, the main strategies to avoid or minimize the virus's impact are to keep to cleanliness standards and to use social distancing techniques (Ali & Alharbi, 2020). These measures have had a significant impact on any interpersonal activity, including education at all levels, as many students and teachers avoided face-to-face meetings at this time. Despite this, and because of the critical function of education in society, education has not stopped and has had to adapt to these changes, mostly through the use of e-learning whenever possible. In this perspective, e-learning can be defined as a method of learning that involves both teachers and students using electronic media, mostly the internet.

During this situation, teachers all across the world are captivated by collaborative online learning. The event abruptly altered the way people were taught and learned. In a world where education has quickly transitioned to virtual teaching and learning, social distancing has become the new normal. Our teaching expertise and understanding about disseminating instruction approaches have grown as a result of the paradigm shift in the learning mechanism. (Li et al., 2021). The objective

of this study is to design the learning activities of collaborative online learning orientation camp that serves to nurture engineering skills, essential skills and self-directed learning.

## 2. Relevant Research

### *2.1 Collaborative Online Learning Activities*

Dillenbourg and Schneider (1995) indicated that collaborative learning defines situations which two or more subjects construct continuously and interactively a joint solution to some problem. With cooperative tasks, members could agree on the component of the assignment and distribute those across group members who would work individually until each has finished her/his component. For collaborative online learning, students' learning was initiated positive contributions by the interactions among students (Diana, 1993; Soo & Bonk, 1998). Curtis and Lawson, (2001) said that online interactions contrast in vital ways from face-to-face discussion. Online interactions need non-verbal signals that are a component of face-to-face communication, and this may decrease the degree of communication that appear. Nowadays, computer-based learning (CBL) has progressively been used to support STEM classrooms for promoting student-centered and collaborative learning, getting to information, and expanding interdisciplinary STEM skills and strategies (Freeman et al., 2014; Holmlund, Lesseig, & Slavit, 2018). Recently, Zoom video conferences technology moves forward the productivity of online collaborative learning since of it can give the face- to- face designs accessible with some of the distance teaching and learning (DTL) options. Due to the Covid-19 social distancing restrictions, Weill Cornell Medicine-Qatar chosen to replace students' clinical instruction with novel online electives course. Using the Zoom system, students conducted high levels of satisfaction about the elective's overall quality, their pathology learning and online interactions, with negligible challenges related to the remote nature of the course (Guiter et al., 2021). In addition, Zoom breakout room method is applied to teach pair programming in a virtual classroom during the COVID-19 pandemic. By facilitating pair programming in a virtual learning environment, the research achieved valuable experience in improving collaborative learning, active learning, and problem-based learning activities in a cloud setting (Li et al., 2021). The transformation from formal education to implementing the Zoom platform has been a learning curve and to some extent, frustrating to utilize for many educators and students. The effect of the long-term utilization of Zoom has yet to be discovered (Stefanile, 2020).

### *2.2 Soft skills*

The World Economic Forum (2020) reports that the most essential skills for 2025 that individual must develop are: analytical thinking and innovation, active learning and learning strategies, complex problem-solving, critical thinking and analysis, creativity, originality and initiative, leadership and social influence, resilience and stress management, emotional intelligence, reasoning, problem-solving, systems analysis and evaluation, persuasion and negotiation. Succi & Canovi (2019) proposed that soft skills represent a dynamic combination of cognitive and meta-cognitive skills, interpersonal, intelligence and practical skills. Soft skills help people to adapt and behave in a positive way so that they can eff ectively deal with the challenges of their occupation and daily life. Vogler et al. (2017) studied collaborative project-based learning that explained how the interdisciplinary nature of this project supported important aspects of student learning that may not happen through a more traditional classroom project. The study discovered that the soft skill of teamwork/collaboration most frequently and consistently were mentioned by students throughout the semester (24%) as the soft skill most correlated for the interdisciplinary task and most vital for its flourishing completion. Gibb (2014) revealed that soft skills development might be a mechanism for promoting compliance, and employers and vocational education and training institutions may be, explicitly or implicitly, adapting 'soft skills' to that end. These skills have become a topic that people are increasingly interested in lifelong learning. Their development aims to promote and strengthen personal development, learning participation and employment success. However, soft skills assessment is widely used, but there is little research or evidence to show the implementation of such assessments.

### *2.3 Life skills*

Life skills are defined as adaptive and positive behavioral skills that enable people to cope with the needs and challenges of daily life (WHO, 1993). Gould & Carson (2008a) defined life skills as ‘‘Those internal personal assets, characteristics and skills such as goal setting, emotional control, self-esteem, and hard work ethic that can be facilitated or developed in sport and are transferred for use in non-sport settings”. The interest in graduation rates in higher education has led universities to provide courses that help students develop successful skills. Scientist Life Skills, a new course for freshman at Florida A&M University, focuses on helping students enter STEM majors via development of growth mindset, grit, and critical thinking. The study indicated that course design significantly moved students toward a growth-mindset, increased their critical thinking, and their second-semester grade point averages (GPAs) (Hacisalihoglu et al., 2020). Therefore, further research is needed to better understand when and under what conditions life skills can be developed, and why life skills can be developed and not developed in various environments. Research so far has shown that cultivating life skills is not a simple process. On the contrary, it is complex and affected by many factors (Gould & Carson , 2008b).

### *2.4 Self-directed learning*

Self-directed learning are known for many perspectives such as (1) empowering individual learners who can take enchantingly more responsibility for various decisions related with the learning effort; (2) self-direction is best viewed as a characteristic that remain to a few degree in each individual and learning circumstance; (3) self-direction does not essentially mean all learning will isolate from others; (4) self-directed learners attend to transfer learning, in which both knowledge and learning skill, from one situation to another; (5) self-directed study can involve various activities and resources, (6) effective roles for teachers in self-directed learning are possible, such as dialogue with learners, securing resources, evaluating outcomes, and promoting critical thinking; (7) the ways to support self-directed learning from educational institution can occur through open-learning programs, personalized learning options, non-traditional course offerings, and other innovative programs (Hiemstra, 1994). The concept of self-directed learning has been applied in various countries. For example, Brockett and Hiemstra (1991) describe several self-directed efforts in China, Indonesia, Japan, Norway, Russia, Saudi Arabia, Sweden, and Tanzania. Knowles and Associates (1984) describe various self-directed learning efforts in various government, industry, health, religion, and military settings. Hill et al. (2020) indicated that students’ perceived attitudes towards the quality of knowledge obtained as a result of the self-directed learning activity. The analysis team identified four themes from student reflections on their perception of their self-directed learning skills: self-learning skills, collaboration, application, and meta-cognition (Franchi, Magudia & Rasheed, 2020). In Indonesia, during Corona Virus pandemic period, educators required to make a learning innovation that called learning self-directed learning based on digital literacy (Hanik, 2020).

## 3. Methodology

### *3.1 Orientation Overview*

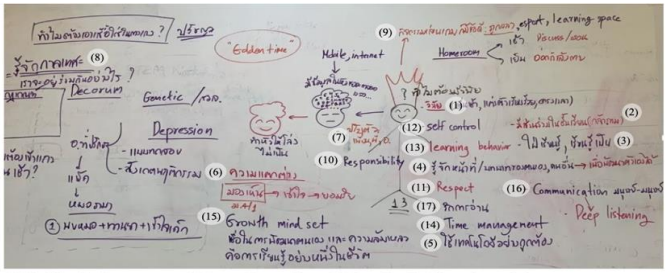
#### *3.1.1 Participants*

The participants of this study were 99 newcomer students of the 10$^{th}$ grade in 2020 academic year in Engineering Science Classroom (ESC) which are supported by King Mongkut’s University of Technology Thonburi. ESC consists of Darunsikkhalai Science School (SCiUS program) and KOSEN KMUTT program that aim to nurture pre-engineering students. The 99 students consisted of 53 males and 46 females and the age between 13-15 years old. All students participated in orientation camp activities from 18-29 May 2020. All students had to attend orientation camp to provide students with an understanding of learning style and the culture of Engineering Science Classroom (ESC) school. Moreover, they started to practice soft skills such as creativity, critical thinking, collaboration, operacy and self-directed learning. In addition, from the situation of the Coronavirus 2019 (Covid-19), students

could not do activities together as face to face. So, orientation camp and post-camp learning from these, the online platform was built up.

### *3.1.2 Learning Outcome of online orientation*

Figure 1 shown the brainstorming from the past orientation camp activities and ESC curriculum, teachers expected that students will be able to learn and acquire 5 competencies: literacy, creativity, numeracy, operacy and responsibility, and soft skills during 10th to 12th grade. These skills could help promote their innovation capabilities that are the highest target goal to cultivate the students of Engineering Science Classroom. From the list of 17 criterion, the teacher selected the main 4 characters for nurturing M.4 students during orientation camp and design the learning outcome as follows; (1) students were eager to learn and know how to learn, (2) students respected the differences such as adapting to friends, seniors and teachers, respect the others and knowing the role of themselves and others, (3) building M.4 student's community in ESC school, (4) students can learn by using self-directed learning.




(1) Discipline (2) Class engagement (3) Eager to learn and know (4) Know the role of themselves and others
(5) Use the technology properly (6) Respect the differences (7) Adapt to friend senior and teacher (8) Know appropriate time & place
(9) Play game at the right place and time (10) Responsibility (11) Respect (12) Self control (13) Learning behavior
(14) Time management (15) Growth mindset (16) Communication skills (17) Love reading

*Figure 1*. The results of the teachers from brainstorming on the desirable characteristics that students are fostered in three years.

### *3.2 The orientation approach*

From the learning outcome, we focused the essential skills that are categorized into three parts, the first was called soft skills such as creativity, visual thinking, critical thinking, collaboration etc. The second was self-directed learning skills that include the literacy competency and the online skills that were tools for supporting self-directed learning skills. The last was life skills that are respect, adaptabilities and knowing the role and responsibility.

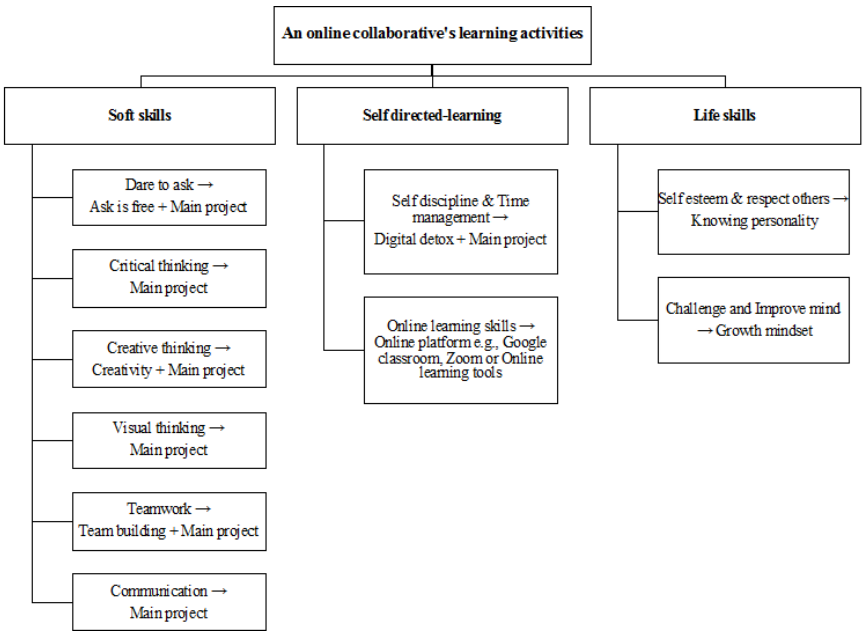



*Figure 2*. Overall online activity structure based on learning outcome (competency).

### *3.3 Online orientation camp activity design process based on learning outcomes*

#### *3.3.1 Soft skills activities*

The first activity was Ask is Free that created for practicing a basic critical thinking. It was divided into two parts. The first part was called lateral thinking. The learning outcome of this activity were to encouraging students to think critically, ask questions and had a positive attitude towards collaborative learning in the online classroom. In this activity, students practiced the thinking tool by brainstorming the subcontinent of keyword. The principle of this activity was “feel free to doubt and ask question at any curious point”. The students were divided into 3 rooms with 30 students in each room and each room was divided into 6 groups with 4-5 students. Zoom application was applied in all activities during this orientation camp. Starting activity with lateral thinking using brainstorming tool created relating words though the keywords for example, Covid-19 (Figure. 3a). Then, students learn how to use question words for making the free questions and ask into the heart of question (Figure. 3b) which could nurture the basic critical thinking and Flexible thinking skills. All assignments were taken the photos and sent into Google Classroom. Second part, the learning outcome was that students can understand and learn how to improve critical thinking skills through "Think about Thinking" or metacognition. For this activity, students debated and discussed in a small group about the topic “the importance of sleeping room” and this activity connected to the Sociolotopia project.

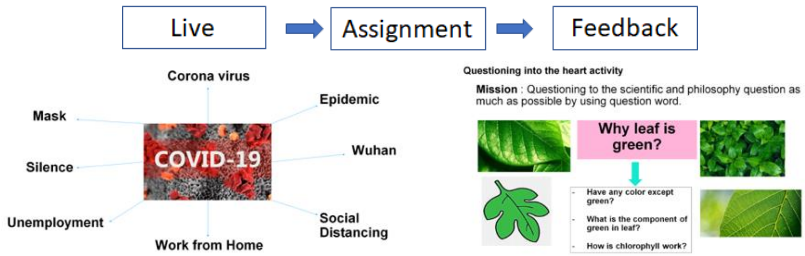



*Figure 3.* (a) Lateral Thinking: Fun-Fast-Flow and (b) Questioning into the heart activity.

The second activity was Visual Note Taking or VNT which the students were separated into 4 groups. The learning outcome was to know that what VNT is/why VNT is important for learning, practice VNT tools/ techniques that suit with students’ styles and applied the skill to their lecture notes. Teachers encourage students to do activities. For example, Squiggle Drawing Activity, students drawn variety of shapes and then drawn simple birds in any shapes. They will listen more intently and focus the key point of those things or capture the big ideas. Quick Drawing, student drew emotions or abstract ideas. They can use two primary channels, verbal and visual. Teachers inform students how to learn by self-learning method. For the assignment in google classroom, a pair of students introduced and presented each other their dairy life and take note in visual. Individual work, students practiced and improved VNT techniques by listening and drawing at the same time which made them feel more natural.

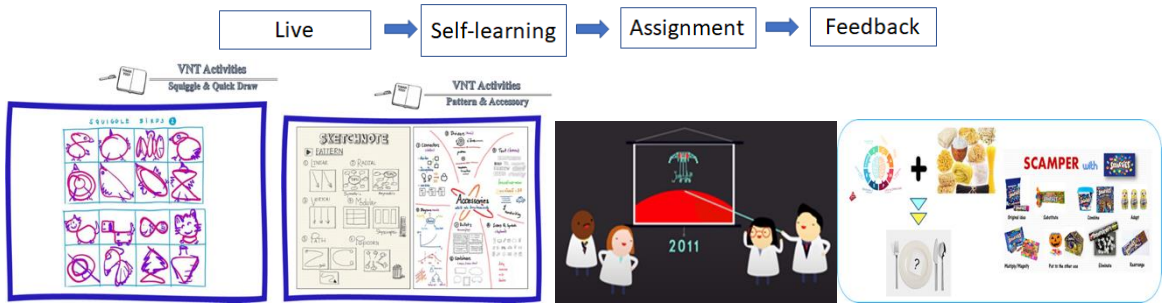



*Figure 4*. Quick drawing, VNT tool, and creative activity.

The last of thinking skill activity was creative thinking. The learning outcome was to practice systematic knowledge on creativity thinking, encouraged students to think outside the box and found the solution to various problems with adaptive mindset. The first activity aims to lead the understanding

of creativity to students and let them discuss the definition of creativity. Next, students and teacher discussed about "Creative Thinking Techniques" such as mind mapping, brainstorming and SCAMPER, and how to apply creativity with problem solving.

### *3.3.2 Self-directed learning*

In the beginning of orientation camp, we called pre-orientation camp. Students learnt how to use programs for online learning such as google classroom, Zoom, Kahoot, Padlet, mini world game etc. After that they practiced all applications in orientation activities. Recently, students have become more and more dependent on technology like smartphones, tablets, and computers. Though we cannot deny how important these electronic devices support learning, they can sometimes distract the learning process if students do not know how to limit themselves. It was a double-edged sword. Digital detox was designed in this camp that aims to offer different perspectives of technology as a tool, its benefits and drawbacks. Digital detox aimed to make students aware whether they are addicted to phones too much and known some of the tools/tips that they can use to focus on their tasks without getting distracted. The objectives of these activities were students see benefits and disadvantages of technology, they learnt to manage their time properly and develop self-discipline against distractions in the real world. Teacher suggested tools that could help them managed their time properly by using application called "Moment" to track phone usage Task 1: Screen Time Tracking (1 week), Task 2: Phone Pickups Tracking (1 day) and Task 3: Offline (1 day) student answered questions that helped them reflect on their digital detox experiences in google form.

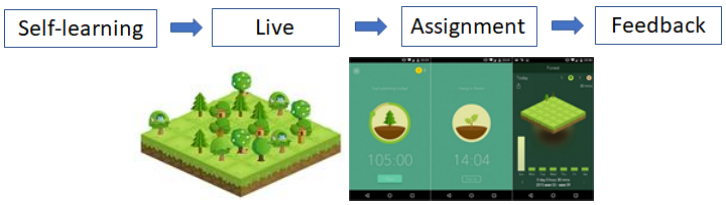



*Figure 5*. Moment application in digital detox class.

### *3.3.3 Life skills*

Students respected the differences that was one character to nurture for new students. This included students adapted to friend, senior and teacher, respected the others and known the role of themselves and others. Personality type and growth mindset was kicked off life skills before students work together. The learning outcome of this part was students understand the causes of personality type that related to brain cognitive functions of every individual and understand growth mindset concept and tried to use this concept in their diary life and then they know how to start thinking in the way of growth mindset. Team building activity was the last activity to encourage them to work well together. They learnt about goal, role and teamwork as well.


### *3.3.4 Main project: Bedroom challenge (Socialotopia)*

Sociolotopia (Bedroom challenge) is the last activity of orientation camp. The purpose was to wrap up all thinking skills that students have learnt in camp by using project. Practice engineering skills were embedded in Sociolotopia. Students learnt to define the problem, designed their master piece, created the prototype and tested it. Moreover, they practiced presentation in English and Thai and shared with audiences. The learning process is shown in Fig 5. This will nurture them to get the engineering skills.

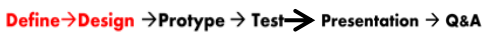



*Figure 6*. The engineering design process.

*3.3.5 Soft skills assessment*

The soft skills assessments were evaluated in only Socialotopia project because the project based learning was an integrating activity of all skills. There were 3 criteria to assess which were collaboration, critical thinking and creativity & innovation (Buck institute for education, 2013). The student's in group were observed by teacher and the rubrics were used 3 scales (below standard (1-2), approaching standard (3) and at standard (4-5)).

## 4. Results

*4.1 Student's work in thinking skills (Soft skills)*

*4.1.1 Student's work in Ask is Free class*

*Figure 7*. The example of student's work in Ask is Free class.

Ask is Free activity was kicked off in live session so students could participate with teachers and their friends and did the activity in team. The activity atmosphere was set that students and teacher feel free to share their ideas and opinions about any topics and questions. Figure 7 shown the lateral thinking of the keyword what will happen after Covid-19 situation. In their works, they can create the subcontinent of keyword that was the one thinking tools. This activity was used to nurture a basic critical thinking skill.

*4.1.2 Student's work in Visual Note Taking class*

*Figure 8*. The example of student's work in virtual note taking class

In Virtual Note Taking (VNT), students practiced and improved VNT techniques. Figure 8 shown students' work, students listened more intently and focus key point of those things or capture the big ideas two story telling (2 and 6 minutes). Their works can tell the stories through VNT techniques.

*4.1.3 Student's work in creative thinking*


*Figure 9*. The example of student's work in creativity class

For creative thinking, student learn what is the creativity and creativity tools. In live session, students separated into three groups and discuss about "Creative Thinking skill" and Creative Thinking

Techniques. Students generated idea by drawing pictures with rubber band as much as they can. This activity was started point those students dare to think of new things and / or solve problems in a variety of ways.

### *4.2 Student's work in self-directed learning*


*Figure 10.* The example of student's student's work from digital detox class

Self-directed learning skills were merged into all activities in this camp. It started with learning how to use digital programs for online learning and then, practiced all applications in orientation activities. Moreover, we added an inspiration session that invited a well-known speaker to share the idea of his self-directed learning. Digital detox was the one-self-directed learning that made students aware whether they were addicted to phone or not. This activity helped them to learn time management. In the assignment session, students had to use Moment for tracking their screen time and the number of times they picked up their devices. They had to follow their screen time, pickup and refrain from using social media and mobile activities of any kind as much as possible. The assignment was shown in Figure 10.

### *4.3 Life skills*

For the assignment of growth mindset, students drawn a summary behaviors or thoughts of people with growth mindset as much as students can find or at least 5 behaviors/ideas. Their work was shown in Figure 11. Their work was shown in Figure 11. It was found that VNT was applied in this activity. Moreover, teacher encouraged and challenged students to start developing a growth mindset in their

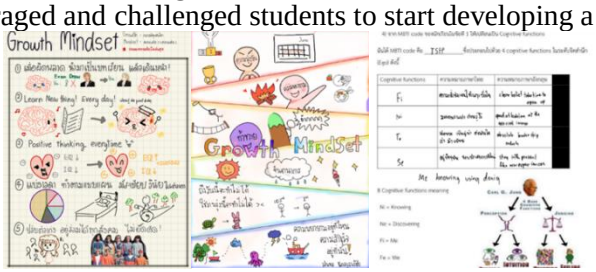



*Figure 11.* The example of student's work from growth mindset and personality class.

mind all the time and every day in the orientation camp. Personality class was a class for cultivating self-awareness. The students could understand the causes of personality type and how can it had related to brain cognitive functions of every individual. In personality class, students got experience to observe their personality type and brain cognitive functions.

*Figure 12.* The example of student's work from team building class.

Team building of school's community aim to practice working together as a team, in this part, students had to learn mini-world application in live session so each group could learn and teach each other. And then, they worked together in a team designing a family dining room. The requirement was the size of the area maximum as 20x20 and 15x15 blocks. Their family dining room was shown in Figure 12. They practiced team work before the main project would start and practiced to design under the problem and constraints.

### *4.4 Student's work in Sociolotopia project*

Sociolotopia (Bedroom challenge) were created into18 works which were uploaded in Youtube playlist the link is in the location here: https://youtube.com/playlist?list= PLu1pocyPSZvuR3R3-yMuc4gNWm2Li3y_v

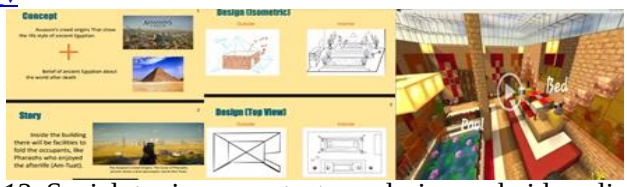



*Figure 13.* Socialotopia concept, story, design and video clip presentation.

Sociolotopia (Bedroom challenge) was the wrap up of all activities in orientation camp. Each group had a problem and they had to understand and define the problems. The problem was designing their ideal bedroom in Egypt or Roman period/style. After all idea was sketch then they had to create their team's bedroom in mini world game. Socialotopia works in Figure 13, there were the concept of their bedroom, the sketching and the prototype. Student got the experience in engineering design process and soft skills such as critical thinking, creativity and collaboration.

### *4.5 Socialotopia project soft skills assessment*

Table 1. *The assessment of soft skills during Socialotopia project which were observed by teacher.*

| Soft skills | Mean |
|---|---|
| Collaboration | 3.87± 0.56 |
| Critical thinking | 3.38± 0.52 |
| Creativity and Innovation | 3.53± 0.60 |

From the quantitative results in Table 1, it shown the mean score and standard deviation of soft skills in Socialotopia project from observing teachers. In term of soft skills, collaboration was the maximum skills observing in this project (3.87± 0.56). Next were creativity and innovation (3.53± 0.60) and critical thinking (3.38± 0.52), respectively. It meant that Socialotopia project was a starting point to build up the school's collaborative learning because they worked as a team and solve the problems together.

## 5. Discussion and Conclusion

In this orientation approach, it aimed to help students to link the concept of science, social and art context in real-life phenomena via online-collaborative learning activities. The activities were designed following learning outcome and competency based. In this work, we focused on nurturing soft skills, self-directed learning and life skills. All activities were designed in a sequence of learning. Example, for thinking skills part, students must dare to think and ask before they think something new or outside the box. So, Ask is free is a prerequisite activity to encourage students to curious and dare to ask the questions. After that, Visual note taking, Creativity activity and Sociolotopia project were learnt. In the students' work, we found that students applied skills or techniques from previous lessons to the next activities. The challenge of this study was that this was the first time for students who learnt together without seeing each other in school before. The suitable learning management systems (google classroom, microsoft team) could help to organize a proper classroom for online learning environment. While the section of live discussion will be held via the technology of videotelephony and online chat services such as zoom, google meet, and Microsoft team. One of the important goal of the online camp was to build the self-directed learning so time management was enhance through the digital detox activity. In addition, life skills were used to transform attitudes of their learning and living in our school. According to the overall design, step to online teaching and learning were self-learning and/or live session, assignment/submission and feedback/ discussion, respectively. For self-learning, teachers created/ provided the effective learning materials and guideline that students can learn by themselves, and students learn by themselves. For live session, students and teacher participated, shared the idea and got to know each other more in this session. In assignment part, teacher provided the real context

assignment to student and students managed themselves for doing assignment. The last important session is feedback. Teachers gave the feedback for development students or asking the challenge question for foster the widen perspective of students and students improve their assignment and they can ask the question and share their ideas. These is the overall online collaborative orientation's leaning activity corresponding the real class in ESC school. Finally, Socialotopia, a gamification interdisciplinary project, was designed for building up the school's community, collaborative learning and wrap up all expected learning outcomes in this orientation camp. All activities in orientation camp were the starting point for developing essential skills along with academic competency for students. However, in the future work, the assessment of online collaborative orientation's learning will investigate and improve the learning process that should be close to the learning accomplishment in a face-to-face classroom.

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