

Liisa Kairisto-Mertanen  
& Tri A. Budiono (eds.)



**258**  
Reports

# INDOPED – Modernising Indonesian Higher Education with Tested European Pedagogical Practices

Report on Piloted Pedagogical Practices



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# INDOPED – Modernising Indonesian Higher Education with Tested European Pedagogical Practices

## Report on Piloted Pedagogical Practices

Edited by: Liisa Kairisto-Mertanen, Tri A. Budiono

Project Hatchery  
Innovation Camp  
Project Module  
Learning by Teaching  
Gamification  
Learning by Case Method  
Storytelling  
Learning to Learn  
Project Market Research  
Assessment Rubrics

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#### European Partners:

1. Turku University of Applied Sciences
2. Inholland University of Applied Sciences
3. Business Academy Aarhus
4. University of Gdańsk
5. University of Seville

#### Indonesian Partners:

1. BINUS University International
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3. Syarif Hidayatullah Jakarta
4. Widya Mandala Catholic University
5. Yogyakarta State University
6. SEAMOLEC

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# Preface

Education is a value-based societal investment, which leads to the overall welfare of society. One of the main challenges in education is to anticipate necessary skills and knowledge for the future. Without a clear understanding of the aims for education, we just cannot organise the implementation of studies and the evaluation of learning outcomes appropriately. Lots of research has taken place to map the state of practice and the required actions in renewing educational structures and practices. The Indonesian Ministry for Research, Technology and Higher Education (MoRTHE) carried out a study in 2016 on learning processes in public universities in Indonesia. The main objectives of the study were to analyse the effectiveness of learning processes and map learning aspects based on student engagement indicators in public universities. After the analysis of responses from almost 6000 lecturers and over 47,000 students, the main recommendations included improving the role of the lecturer as a facilitator, the interaction between students and lecturers, students' learning skills, and lecturers' skills to create challenging tasks.

Findings from that wide Indonesian study are fully in line with the aims and expected impacts of the European Commission-funded INDOPED ('Modernizing Indonesian Higher Education with Tested European Pedagogical Practices') project. As stated six years ago when the planning of the INDOPED project started, the overall aim of the INDOPED project is to raise the teaching capacity of Indonesian university lecturers. We see that the role of the lecturer should be more like a mentor and facilitator of learning, not a teacher in the traditional meaning. Additionally, active university-enterprise cooperation, which gives students more opportunities to enhance their competencies in real working life situations, is key for more efficient and cost-effective higher education.

The INDOPED project started to operate in October 2015. During the project, five Indonesian universities have tested active learning methods with mentoring provided by five European universities. Over 100 Indonesian lecturers and more than 3000 Indonesian higher education students have actively been participating in these pilots. We also succeeded in closely cooperating with several rectors and deans of participating Indonesian universities, guaranteeing the sustainability and justification of our pedagogical modernisation efforts. Additionally, our dissemination conferences, seminars, workshops, webinars and study visits have engaged thousands of experts from Indonesia and other South-East Asian countries.

I have been privileged to meet many of the above-mentioned broadminded key actors. I'm so pleased to discover the encouraging results of the project and it definitely gives power to all stakeholders to continue this modernisation work following the end of the project. Actually, I

would like to propose that the term 'INDOPED' or 'INDOPEDA' continues its life as a 21st century Indonesian learning approach in which 1) global competency needs form the basis for education; 2) national and local characteristics and strengths are taken into account in the spirit of smart specialisation; 3) learning matters, and teaching is just one way to enable learning; 4) education providers, learners and stakeholders (public organisations, companies, NGOs) form a real learning community together; 5) students' intrinsic passion for research and learning will be strengthened by motivational real-life assignments.

This booklet is a reflection of some of the moments and experiences during the INDOPED project. It is a snapshot of the reality in classroom settings in the INDOPED way. Only some of the numerous pedagogical pilots of the project are presented here, but in reality many more now live in the minds of participating universities' forerunners and hopefully in practices of forthcoming semesters. Evidence collected after the INDOPED pilots, support this vision: 75% of respondents from Indonesian partner universities (n=40) said that they would continue utilising the tested pedagogical methods after the project, and 22.5% hadn't decided yet. In this profession I sometimes experience the so-called 'Wow' effect, and here I did!

The INDOPED project has officially been a platform for learning about learning. But that's not all folks: even greater than these pedagogical lessons learnt has been friendship. I have experienced such deep positive feelings with our Indonesian peers in formal settings like project meetings and training sessions, but maybe even more in informal settings like eating soto ayam together or drinking delicious Indonesian coffee after long official sessions (by the way: did you know that Finnish people rank number 1 in the world in terms of coffee consumption per capita?) These unofficial discussions have widened my perspective as a global citizen and therefore are worth their weight in gold. Terima kasih.

Finally, as the Head of the INDOPED project, I would like to express my gratitude to all the Indonesian university partners, who have showed great persistence and creativeness in modernising their educational processes and structures to meet the requirements of this century. European partners have done a great job in mentoring the pilots, therefore a big hand to you as well. What is absolutely noteworthy is the professional and active support from SEAMOLEC – without their input our project would have been remarkably insignificant in terms of visibility and stakeholder cooperation. I am personally very pleased with the continuous deepening cooperation with MoRTHE. Our cooperation is a prerequisite for the next steps and having a greater impact. Financial support from the European Commission has enabled the implementation of the INDOPED project – thanks a lot Brussels.

The INDOPED project will end soon but its work continues.

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# Developing Critical and Creative Thinking: Piloting of the Project Hatchery Method at Yogyakarta State University

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## Abstract

This article deals with experience of piloting the Project Hatchery (PH) method in Yogyakarta State University. The method was implemented in the second semester as compulsory activity in entrepreneurship and translation courses in French Language Department of YSU. A central issue in the learning process is to what extent change can be made to encourage critical and creative thinking in favour of student's innovation capacity. Two courses were simply chosen among others because both direct the students to be autonomous and equip them with life skills. The PH piloting and implementation was held during the second semester of 2017 and the first semester 2018 at the Faculty of Languages and Arts at YSU.

## Keywords

Project Hatchery; Learning Method; Critical Thinking; Creative Thinking; Innovation; Piloting Project.

# 1. Introduction

## *Piloting the Project Hatchery at YSU*

This article reflects on the experience of piloting the Project Hatchery (PH), which is a method developed by Turku University of Applied Sciences (TUAS) and implemented at Yogyakarta State University (YSU) in the second semester of 2017 and the first semester of 2018. The first piloting in the first semester of 2017 was an extracurricular activity and benefited from great student demand in term of participants, while the second pilot is an implementation in two compulsory subjects, namely an entrepreneurship course and a translation course. Both experiences are very useful for students, student tutors as well as lecturers because they provide opportunities to learn developing capacities and life skills.

PH was previously conducted as an extracurricular programme at YSU during the first semester of 2017, and piloting is one of two other methods that have attracted a number of students due to its potential in terms of capacity building, which would be appropriate for a YSU mission as a university for teacher training. PH as method will be discussed in this brief article, particularly in terms of how and why it is implemented as learning method in the French language department.

Rapid and unpredictable changes in the disruption era of the 21st century must be estimated and considered in order to achieve good results in the learning process. The development of science, technology and the high demands of mastering professional and life skills are inevitable. YSU is one of several Indonesian universities that plan thoroughly in order to anticipate the demands of innovative learning, i.e. learning that enables students to create or innovate. Today's students are those who will lead our society in the future. Therefore, students must equip themselves with professional and life skills for the future in order to be able to innovate. Misconceptions about the learning process that are often claimed by many Indonesian students include the requirement to retain everything by listening, recording, memorising anything being told or taught to them, and this makes all students from top to bottom depend on their teachers and the environment. The learning process must therefore be reformulated or even transformed into one that stimulates creativity by activating the power of critical and creative thinking and the ability to develop networks in a multidisciplinary environment that could produce interaction and communication activity. A learning environment that supports innovation is one that comprises individuals with a variety of different backgrounds who work on the same problem (Penttilä, Kairisto-Mertanen et al., 2013: 11). This complexity is one way to open up creative thinking and become a means of collaboration among learners and teachers.

During the piloting project in 2017, YSU did not implement the method as effectively as other universities like Syiah Kuala and BINUS University did, where it was integrated into compulsory courses. PH was implemented at YSU as an extracurricular programme that involved 112 students. Although it was not applied as an integrated activity in the curriculum, students' enthusiasm for learning and benefiting from new experiences via the new learning method was very clear. However, it is predicted that this situation will not last for ever, it is not easy to manage due to the number of participants, which is not proportional compared to the number of available tutors and facilitators, and its optional status makes it somewhat less effective.

In the second pilot, PH was integrated as a method of learning on an entrepreneurship course and thus it was a compulsory study unit for students. Participants are directed to do some critical and creative thinking activities to solve the problems that exist around students' lives. These include problems associated with support for academic life, such as boarding houses, libraries, toilets, canteens, pavements, car parking and public transport. The entrepreneurship course, in this case, is not aiming for economic or business learning but is purposely taught as a compulsory subject that directs students to improve their ability to innovate and create something by creatively thinking and applying their knowledge in formal and non-formal sectors, such as trading in goods or services, and social services.

#### *About innovation skills*

The first problem that was taken into account was developing students' interacting and communication skills. Students must learn how to interact with confidence and communicate their thoughts and ideas in dynamic conditions. The challenge is how to make them perceive other's difficulties and consider them in order to find good solutions, which is merely a learning instrument and not a learning target. The objective is to enable students to create and innovate. Problems that the students are working on are not directly related to language, linguistics or skills in other fields; instead, they are related to the basic skills of collaborative learning, namely capacity building that point towards the individual ability to work and think properly by operating a scaffolding concept. However, at the beginning of the course, students were still expecting that learning with the HP method would improve their language skills and that these abilities could be achieved more quickly. The first two sessions on the HP method brought the student to a greater level of awareness of learning and they started to change their minds and altered their perceptions of collaborative work. In reality, the anticipated results cannot be expected from just two sessions because these two sessions simply deal with information and examples of HP methods. However, it had limited success in terms of motivating participants.

The second PH pilot was initially greeted with less enthusiasm by students because they thought that the course directed them to study economics and business procedures. However, it soon changed when the students were introduced to the PH method that put a greater emphasis on good character formation and savoir-faire to innovate through creative thinking. It connected the concepts of good self-esteem, trustworthiness, and autonomous and problem-based learning. Starting with raising immediate problems, each group then made observations of their surroundings, the public facilities around the campus or issues related to student needs for about a week. Students initially applied several data collection techniques such as observation, interviews and questionnaires they had previously learnt in other courses such as research methodology. Facilitation by lecturers was carried out during discussion to stimulate creative and critical thinking. Every step counts in the process and outcomes of group work, including the way of resolving common problems of weekly meeting times, roles and responsibilities of each member and tasks to accomplish.

Unlike the previous pilot, on entrepreneurship courses, student tutors have not been involved because senior students were not available. Discussions and group work were handed over to each group member and were assisted by a facilitator. For example, at the beginning of working with questionnaire data, students were invited to brainstorm ways of obtaining valid data relevant to the problems they were considering. Various new ideas can emerge, followed by the facilitator's feedback on the grid or the questions they have asked. Similarly, during the initial phase of understanding the problem, the students did not pay sufficient attention. Each group is usually dominated by the opinion of a 'superior member'. Besides, the expected critical thinking does not arise because it is hindered by students' low self-confidence or poor self-esteem. However, following discussions among some groups, various questions from other groups generated a lot of ideas and perceptions regarding the problems became more established. The preparation of each group's work plan, agreed rules and work procedures were among the things the students produced.

## **2. Lesson learnt**

Through problem-solving, students cope with some challenges they face. Students become accustomed to expressing ideas in discussions, not being passive or waiting for lecturers' explanations. They were conditioned to take the initiative and to find solutions to deadlocks. Besides, communication outside the classroom community is the objective. Students, step by step, began to form their environment and the learning material as a learning medium by engaging themselves in problem-solving. Initiatives that grow from small group discussions affect the formation of one's self-confidence, especially for those who have problems expressing themselves in public. Students who are initially passive become more and more active and

responsive. The process is lengthy enough to create this encouraging atmosphere. Many personal conflicts were resolved between individuals in the group and different point of view were resolved; as were differences in the desired method or technique and the lack of sources of knowledge about problems themselves.

Communication and the ability to initiate interaction are among the most commonly developed skills in PH activity on the entrepreneurship course. Some groups even conducted field studies at the bus terminal, on the road, in the library and in public car parks. Communication with the community to effectively comprehend the problems users face in dealing with public facilities and stakeholders is something that students might never have done before. Learning to communicate effectively by practising directly on- site is an important issue they learn in this activity. Some groups hold guided interviews by first preparing a list of questions and the possible answers they expect. Some students felt that they failed to interview the key people at the beginning of their field trip because they were not vigilant when making a list of questions. Then they discussed with the group and sought to make the interview instrument more substantiated. The lecturer facilitated brainstorming activities for all groups that used interview techniques to support the creation of the list of questions and gave some tips on how to disclose relevant information to produce the desired data. Methods for asking questions and interviewing are important lessons that may occur implicitly but are good to learn.

#### *Learning from other's points of view*

Other skills related to creative thinking are brainstorming about solutions students proposed to the problems. At the beginning of the PH activity, most of the solutions proposed for the challenges were very normative, ordinary, and too commonplace for everybody. However, during class discussions various questions and facts revealed by students and facilitators progressed from their 'precooked' solution. Students came back to the zero point and faced the reality that a theory they have learnt is not necessarily easy to practice. The shadow of the failure of their work forces them to strengthen their plans.

There are groups that change their point of view; there are groups that remain on the same track but keep sharpening their understanding and ways of solving problems they come up against. The group that seeks to review their plans by thinking more creatively and critically in general finds that the solution they proposed the first time was not enough to think profoundly and they actually did not understand the substance. For instance, the group that worked on a city bus services project initially proposed the idea of improving city bus numbers and quality services based on their own imagination without learning more about the system that already existed. After being questioned by another group and by the facilitators about their plan, they decided to conduct a field study by observing and interviewing the directors of bus companies

and officers in the local transport service office. In a similar way to other groups working on the campus car park project, after receiving criticism and being asked questions from other students, they pursued interviews and observations in the field. The information they got then changed the way they thought about renovating a safe, comfortable and user-friendly parking facility.

Another project was pavements around campus. Initially, the students' idea was to critique the inappropriate use of pavements, such as for taxi parking and street trading. This project raised a lot of debate in class, especially for those as pedestrians who felt that pavements had been the subject of misuse for a long time. Others, however, felt that the taxi drivers and street vendors were beneficial. The project to restore the function of pavements lacked support from those who were opposed to the idea due to humanitarian reasons that suggested the changes would disrupt the business of the small entrepreneurs who should actually be supported by students. Finally, this project stood out with its tenacious win-win solution that accommodated the interests of the taxi drivers and street vendors at the same time as improving the rights of pedestrians. This group underwent a lengthy process to identify the best solution, because they had to reiterate the concept of car parking arrangements in the campus area in discussions with many stakeholders and users.

#### *Piloting on a French translation course*

The French Language Department at the Yogyakarta State University is a study programme that offers French language education programmes for future French as a foreign language teachers, where they must complete 145 credits to graduate. Over the course of two decades, French language education study programmes have had to cope with new problems due to changes to the secondary education curriculum, which have gradually reduced the number of French language teaching hours, even though the number of French students continued to increase.

Over the last 15 years, the French language study programme has brought together several vocational courses related to tourism and translation. These two subjects were developed after an alumni tracer study, and it was discovered that almost 60% of French language graduates worked in the tourism and translation industry, while only 30% worked in the education sector as teachers, tutors or lecturers. This situation shows how the reality in the professional world reverses the direction of French language learning, which initially became the training for tour guides, hotel employees, travel agency employees, translators, interpreters, writers, journalists and book publishers.

That fact then spurred lecturers to bring professional French language learning into a position where it required serious handling: first, giving it sufficient time allocation for the development of student knowledge and skills; second, streamlining work practices in the field of tourism and translation (*Traduction*) in the form of the practical work of guiding tours and French text translating.

Translation of French text into Indonesian is an applied skill requiring two language skills, namely reading French text and writing the comprehension into Indonesian. This lesson provides an ample opportunity for students to interact with the problems discussed in the text and to express themselves with creative Indonesian expression. Therefore, the creativity of reading, writing or expressing ideas becomes compulsory. In addition, translation activities also require critical thinking skills to comprehend source language texts that do not always explicitly convey the messages.

PH is implemented in the *Traduction* course as a method for developing critical and creative thinking skills. Students take one session every week, which is based on projects that must be accomplished in one semester. Groups of three to four students were faced with a challenge that engages them systematically in a learning process. The PH implementation in the *Traduction* course involved two student tutors who worked with the students from start through to the working phase of the project. These tutors act as feedback providers for various efforts carried out by the group, such as making plans and doing work, up to making a presentation to report on the results at the end of the course. The tutors do not offer or provide any solutions, but they keep stimulating the students to explore the ability to think and act critically and creatively.

Some initial projects had to be revised by the students themselves after some profound discussions with other groups. This happened not because they took the wrong step, but because they thought that they were less precise in understanding a problem and were insufficiently exploiting the available potential, such as the project to make a *dictionnaire synecdoc* and a web-based paid translation project. Both projects are examples where students have to adapt their ways of thinking to their own plans. Another project that had also been modified was the web-based quiz for translation e-learning.

The implementation of PH in the *Traduction* course enables students to boost collaboration among individuals. From the beginning, it was emphasised that their project must involve stakeholders and other parties in its realisation. Although the results of the realisation of projects were not the sole goal to accomplish, each project had to have a clear vision of what it could be at the end. First of all, planning for completion still had to be taken into account. Secondly, the students needed to define who the target is, which party will be involved in the next stage, what costs need to be provided, and how long the project will be planned for. All of these are things

that must be learnt by each group and each individual. The target of one phase to the next is also considered by each group. Sixteen face-to-face meetings in the Traduction courses are organised to finalise the above matters. This means that the project will only be a complete presentation of the plan and the problems that need to be resolved.

The project initiated by Group 1 was a web-based dictionary project, namely *Le Dictionnaire de la Connotation*. During the process to understand the challenge, Group 1 kept consulting the facilitator to validate the data they had collected. Their work was then loaded onto YouTube for publication. Group 2 involved a facilitator and tutors who discussed stakeholder functions in the development of their projects. Group 4 validated the content that will be displayed in the games application to tutors and facilitators and discussed with technicians and game developers to create the *Partez-Traduire* games applications. Group 5 did not match their plan to any stakeholders and they were still dependent on the facilitator's support as the project was focused on the content of a dictionary, which required a good deal of help. Group 6 planned to get expert web application developers to develop the *Go-Traduire* website. The other two groups, namely groups 3 and 7 had shared problems regarding deciding on their stakeholders at their project's kick-off.

Of the seven groups, only two considered the functions of stakeholders and users in their projects, namely Group 4 and Group 6. They actually needed other parties and a computer scientist to start the project. The other five groups have not made good use of their networking skills in working on their project.

### **3. Conclusion**

#### *Learning from the learner's experience*

During the implementation of PH, the facilitator and tutor have attended and listened to the discussion about the ideas in development but they have not provided any direct solutions. If discussion reached a deadlock, the tutor would suggest brainstorming to provide some alternatives. Guidance is preferable to generate students' abilities to think more deeply regarding the steps that have been taken. The facilitator and tutor do not share any of their ideas, but always try to discuss and encourage students to find their own solutions to the problems they encounter. Tutors provide motivation so that students do not necessarily avoid problems by modifying the topic or the systematics that they have set from the beginning.

Mentoring in the PH activities meant usually conducting assistantship during the group discussion. The tutors listen to the explanations in each group then let them find their best solution before giving feedback. The rough solution should not be taken for granted by each

group. Students must be able to think again and again by critiquing the solution as well; they may disagree with the opinion of the tutor or even the facilitator when they participate in discussion activities with each group.

PH does not only facilitate students in learning but it also empower them to be able to innovate. It also shows facilitators and tutors how to be good listeners and mentors. This is a long process that is sometimes boring, and one that certainly requires certain skills to handle it. The ability to teach is not enough to solve the very complex problems in education and the learning process.

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# Project Hatchery: Infusing Creative Learning Methods into the Electronic Course Classroom

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## Abstract

This present study aimed to investigate the impact of creative learning methods applied in an electronics course classroom. We seek the impact on learning performance, creativity and learning motivation among students and lecturers. We applied a learning method, namely Project Hatchery (PH) developed by Turku University of Applied Sciences, in our electronics classroom involving a total number of 64 students, six lecturers and eight student tutors. Students were divided into eight working groups (hatcheries). An experimental approach was employed with specified tasks to solve problems related to cocoa bean quality analysis with our partner (Socolatte). Analysis of covariance (ANCOVA) was performed to see the impact of this applied learning method. Experimental hatcheries received six weeks of regular teaching and tutorials, while the remaining ten weeks were spent with an infused PH curriculum for creativity and problem-solving. The results of one-way ANCOVA indicates that the PH learning method significantly improved the learning of electronics course participants in terms of their ability to express ideas, teamwork, self-confidence and general marks at the end of the course. However,

there were a few students who's failed to adapt to this infused curriculum. Improvements and real commitments from all academic members are definitely required to make this pedagogic pathway a successful learning method implementation in higher education.

## **Keywords**

Project Hatchery; learning method; innovative; education.

## **1. Introduction**

Generally speaking, traditional and conventional teaching methods are still conducted elsewhere, including in Indonesia. One-way teaching systems from the teacher or lecturer to the student still dominate and are the prominent learning method applied in many universities in Indonesia. Transformation and innovation learning in higher education systems for sustainability requires the commitment of staff and academics (Lin, 2007). With their efforts, motivation and innovative ideas, change in content and methods can be performed (Chiu, 2015). It is obvious that creative and innovative learning methods can improve the critical thinking of learners or students. Moreover, it can increase their engagement in the learning process and boost their motivation (Avila, 2015; Cheung, 2018).

Creative learning methods and pedagogy refer to teaching that improves creative and innovative development through three correlated elements, namely creative teaching, teaching for creativity and teamwork, and creative learning (Ausubel, 2010; Lin, 2011). Creative and innovative learning methods aim to nurture participant or student thinking through effective and efficient teaching strategies in a supportive learning environment. Furthermore, those three core elements of creative learning pedagogy must be followed in order to provide opportunities for learners and students to initiate activities, both individually and in teams, or to make choices (Baddeley, 2007), and also to give them time and space to develop new creative ideas and thoughts (Cremin et al., 2006). Innovation pedagogy redefines how knowledge is absorbed, produced and used in order to strengthen students' innovation competencies and create new innovations (Lappalainen & Keinänen, 2017).

In order to employ and apply innovative and creative pedagogy, the lecturers or instructors should teach creatively to motivate students to engage in the learning process. In addition, there have been many efforts to develop such creative teaching methods, including tasked-based learning, problem-based learning, and cooperative teaching (Chang et al., 2017).

In the last few years, many learning methods have been employed and carried out according to the principles of innovation pedagogy. Project Hatchery is one of those methods which combines real-life assignments, peer counselling and working in broad disciplinary groups, including the international aspect in all work. It is a teaching and learning method that includes different types of hatcheries. The principles of carrying out the work in the hatcheries is approximately the same but the expertise level of students varies in the different hatchery types (Lappalainen & Keinänen, 2017). The Project Hatchery learning method was first developed at Turku University of Applied Sciences (TUAS) and has been applied here for first semester students.

In order to modernise and evaluate the feasibility of the Project Hatchery learning method, we applied this learning method in our electronics course (EL) classroom and investigated its impact on student performances. Therefore, the main aim of this present study is to apply the Project Hatchery learning method in order to prepare students in real-life assignments given by our respective stakeholder. This real-life problem was related to electronic applications in cocoa processing, since the stakeholder is a chocolate processing company. Creativity in the EL classroom was expected to enhance and promote performance simultaneously with intensive activities aimed at building student's creativity and problem-solving skills.

## **2. Method of implementation**

The Project Hatchery learning method was employed in the EL classroom, with the total number of students taking this course being 64 from fifth semester. These students were divided into eight groups, called hatcheries. Each tutored hatchery had a total number of five students from the seventh semester. A total 16 weeks were allocated to complete this learning method implementation and assess the student performance at the end of the semester. Experimental hatcheries received six weeks of regular teaching and tutorials, while the remaining ten weeks were spent studying the infused Project Hatchery (PH) curriculum for creativity and problem solving. Our stakeholder and partner was Soccolatte (a chocolate processing company) located in Pidie Jaya, in the Aceh province. The detailed location and address of the stakeholder involved in this PH implementation is described in Figure 1.



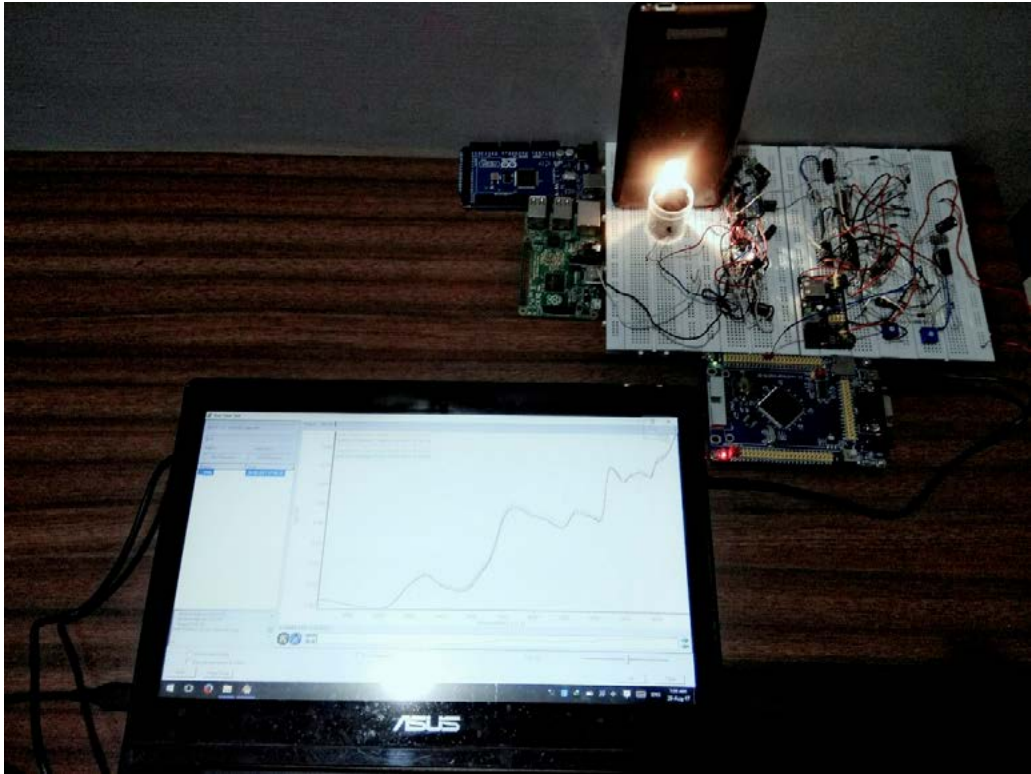
**Figure 1:**  
Detailed location of Socolatte in Aceh Province.

The problem to be solved by hatcheries as related to quality control and electronics support used for sorting and grading cocoa beans, powder, pasta and liquor based on their related quality parameters (i.e. moisture content, fat content and fermentation levels).

### 3. Implementation results

Overall, the Project Hatchery implementation was successfully infused and student motivation increased. They are eager and confident to follow and get involved in a national student competition related to electronic apps. Moreover, their creativity, teamwork and interpersonal skills also improved significantly compared to previous electronics courses taught in one year prior to the implementation of the Project Hatchery learning method.

The main problem put forward by the stakeholder could be solved by designing and developing an electrical circuit for an infrared sensor, which works based on the principles of electromagnetic radiation and biological matters. It is tested to see its ability in sensing and predicting quality parameters or chemical compositions of biological objects. This circuit was designed and developed as one part of the hatchery project in solving problems for our partner (Socolatte). The sensing device used to solve the assignment from the industry is shown in Figure 2.



**Figure 2:**

Sensing device used to predict inner quality inside biological object resulting from infusing PH learning method in electronics course classroom.

Since infusing this learning method into the EL classroom was a non-equivalent control group pretest/post-test experimental design, we conducted a cross-group analysis of covariance (ANCOVA) with the post-test after the final exam and used the marks as the dependent variable; the hatchery group as a fixed factor; and the pretest preliminary study scores as the covariate.

Before performing the one-way ANCOVA analysis, a Levene's test was employed to assess the variance homogeneity of the experimental- and control-hatchery scores, and obtained equal variances of  $p > .05$ , confirming the appropriateness of parametric testing. Mediation analysis, used to facilitate a better understanding of the relationship of this application of learning method, was justified between the independent and dependent variables, when they appear to not have a definite connection. This is performed to achieve a better understanding of the infusing creative teaching method with innovation, creativity and overall student performances.

The significant increase in the hatchery group performance addressed the fact that the infused creative learning method and innovation pedagogy, like the PH learning method, can help build basic electronic skills. In contrast to the control group of students from the previous year with the conventional teaching method in the same course classroom, the creative and innovative pedagogy PH learning method approach facilitated all participants (students, tutors and lecturers) in the use of their creative thinking and ideas, and offered them freely when it came to their choice of responses. Furthermore, the creative and innovative PH learning method, infused into the EL classroom, helped the students to learn more about other aspects of electronics subjects and to participate in meaningful activities that promoted a deep level of cognitive processing.

In this present study, as students related the assignment objective from the stakeholder to their own experiences, and justified their own performances, their motivation and self-confidence associated with their mental images were reinforced. As such, the infused creative learning and innovation pedagogy enabled them to extend their learning experience beyond the classroom, and thus to obtain and achieve new experiences through real-life assignments from the industry. Figure 3 shows some activities in the EL classroom following interventions with the PH learning method.



**Figure 3:**  
Observing class activities during tutorials and discussions.

As described by Christianson (2014), creative learning pedagogy may lead to an improvement in critical thinking and playfulness, which may positively influence memory and learning. Moreover, a positive affect itself may act as a retrieval for concepts located in creative and innovative learning pathways (Miller et al., 2017). Thus, direct attention to the situation in the classroom will provide positive signals to the cognitive system, and facilitate evaluations of responses to the current situation (Miller et al., 2017).

## **4. Conclusion**

The results obtained from the current study indicate that infusing creative and innovative learning methods via Project Hatchery work can improve student creativity, critical thinking and self-confidence. The Project Hatchery learning method highlights creative thinking skills in combination with real-life assignments. Thus, the students were encouraged and motivated to utilise their autonomy to respond to the designed curriculum in electronics class activities. Judging from the performances, almost all the experimental hatchery participants' final marks improved significantly. More importantly, they gained real and different experiences compared to previous the previous electronics class. Moreover, the findings also confirmed the positive impact of brainstorming and teamwork techniques in electronics course classrooms.

## **5. Acknowledgements**

We give our sincere thanks to Harri Lappalainen and Meiju Keinänen from Turku University of Applied Sciences, Finland for providing Project Hatchery (PH) materials and evaluating PH implementation in our classroom. We also extend sincere gratitude to Erasmus++ via the INDOPED project for funding this modernising and innovative pedagogy approach in Indonesia.

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# The Implementation of the Project Hatchery Method in the Agro-technopreneurship Programme at the Agricultural Faculty at Syiah Kuala University

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## Abstract

Teaching methods are one of the strategies applied by teachers to enable student learning. One of the learning methods is Project Hatchery (PH), introduced by Turku University of Applied Science (TUAS). The aim of this paper was to evaluate the PH method applied in the Agrotechnopreneurship programme (4 credits; 2 credits for theory and 2 credits for practical) at Animal Husbandry Department of Agricultural Faculty at Syiah Kuala University Banda Aceh. The PH methods have been applied in this subjects for two years (2016/2017 and 2017/2018) in the fifth and sixth semesters. In semester 5 (theory), a total of 138 students (2016/2017) and 113 students (2017/2018) were exposed to this approach. By applying these methods, it was concluded that students were more innovative, active and creative. In addition, the students saw an improvement in their communication skills, their ability to work in teams and their self-confidence.

## Keywords

Agrotecnopreneurship, Project Hatchery, method and teaching.

## 1. Introduction

In higher education, students should be equipped with hard and soft skills in order to be able to compete in the workplace. Through the use of an appropriate learning method, it is possible to educate students who are active, innovative and creative. Innovation pedagogy can be used as a tool to develop student's innovation skills from the beginning of their studies until the end of them. Several learning methods can be used to implement learning strategies such as lecturing, demonstration, discussion, simulation, field work and so on. MoRTE conducted a wide research project about the learning process involving 6000 lecturers and 47,000 students in Indonesian public universities. The conclusion of the research is that the teaching skills of lecturers should be improved, that students and lecturers should interact more, and that the learning tasks should be modified to be more challenging in order to improve the learning results of students. The recommendation is in accordance with the objective of the INDOPED project to improve the teaching capacity of the lectures at Indonesian universities with several methods of teaching such as the Project Hatchery, Gamification, Innovation Camp, Learning by Teaching, learning through storytelling, market research, Project Module, Learning to Learn, Learning by Case and assessment rubrics.

Syiah Kuala University (UNSYIAH) is one of the five Indonesian universities involved in this project to test active learning methods provided by five universities in Europe. It is hoped that this project will be able to improve the role of lecturers whereby they function as a facilitator in a student-centred learning model rather than traditional teaching method. In addition, students would be able to improve their competencies in working life. PH is one of the European methods introduced in this project. The concept of this method has been developed by TUAS since 2018 and it belongs to the Educational Research, Development and Innovation Methods (ERDIM) family. The goal of this teaching method is to improve learning methods, to enhance students' ability to work in groups with multidisciplinary backgrounds, and to improve the soft skills of students, including independent work skills, presentation and networking. With this method, student tutors' and teachers' tutorial, counselling and teaching skills can also be improved. Since 2016, Syiah Kuala University has implemented a new curriculum based on the Indonesian Qualification Framework - *Kerangka Kualifikasi Nasional Indonesia* (KKNI). With this revised curriculum, the Agricultural Faculty introduced 'Agrotechnopreneurship' which is one of the mandatory subjects for all its students. The aim of this study unit is to create innovative and competitive students who are also able to work independently and know how to network. It was important to implement PH in this study unit. The purpose of this article is to describe students' skills, competitiveness and innovation by applying the PH method in the agrotechnopreneurship programme.

## **2. Material and methods**

This pilot project was conducted over two academic years, from 2016 to 2018. The subject for piloting was agrotechnopreneurship (obligatory subject for all students at the Agricultural Faculty). The subject consisted of four credits (two credits for theory and two credits for practical work). The theory is conducted during the fifth semester, and the sixth semester is for practical work. In total, 138 students were taken in year 2016/2017 (both theory and practical) and 113 students in year 2017/2018 (both theory and practical). The practical work can only be taken by students who have passed the theory element.

In the theory class, students attended the lectures in the class for the theoretical content of the subject and the students were also divided in the group to study a business plan related to the animal business. Each group had to visit and interview different animal-related business such as fattening and breeding industries, animal product and food industries, and other animal-related industries. The students had to make business plan reports and at the end of the projects, they were required to present their projects in the classroom. The rubrics for this subject were not only from theoretical examination but also how they conducted their business report and presentation. Teamwork and how they networked with the animal industries were also evaluated.

In the practical work, students were divided into groups based on the PH method. The groups were mentored by lecturers. The lecturers only had the role of facilitators for students. During the practical work, the students were given time to discuss within their groups to create innovative products to support animal industries. After finding interesting products for themselves they had to present their findings to the class to discuss and get suggestions from other group members and teachers. During the discussion, their original idea of their planned products could change based on the input from their mentor and lecturers, or it could stay as it was originally presented. After the final products were fixed, all groups presented their ideas for a second time to disseminate their final product before starting the production for the final exhibition. At the end of the semester, they had to exhibit their product at a one-day expo and invite students, lecturers and stakeholders to attend the exhibition. The innovative products were evaluated by examiners from a multidisciplinary background. The criteria for evaluation are attached. The winners were awarded by a prize and a certificate.

### 3. Results and discussion

Hoegl and Gemueden (2001, p. 435) stated that innovation generation requires more skills such as communication, teamwork and coordination skills to be successful. Research conducted by Putra and Fibria (2016, p. 139) in BINUS' PH classes concluded that the main factor contributing to innovation generation was teamwork. Based on the Indonesian Qualification Framework – *Kerangka Kualifikasi Nasional Indonesia* (KKNI), the Agricultural Faculty introduced 'agrotechnopreneurship' as one of the obligatory subjects which has to be taken by all Agricultural Faculty students. The PH method was applied in this subject to produce the skills needed for innovation generation. Students were asked to create a business plan after they had visited small enterprises engaged in the animal industry. Each group had to interview the owners of the animal production business and ask how they thought they have managed to be successful entrepreneurs. The results are presented in Figure 1.

By performing these activities, the students obtained a lot of experiences and knowledge from the business owners. In addition, the students learnt to build networking with the industries. A study conducted by Boyle et al. (2007, p. 299), which investigated the effectiveness of field courses in geography, earth science and environmental science courses at UK institutions of higher education with 300 students, concluded that field work had a positive impact. In this study, the students obtain positive experience as a result of field experience. In our agrotechnopreneurship subject, we also asked students to visit animal industries to get experience of how the people developed their businesses. In addition, this kind of activity also built the teamworking skills of the students as they had to work in environments stressing the importance of teamwork. Research conducted by Cooper, Spencer-Dawe and McClean (2005, p. 492) at the University of Liverpool found that teamwork was able to teach students to learn from each other and significantly developed awareness about collaborative practice. TUAS is one of the higher institutions which is very active in developing education methods, and has argued that networking requires the ability to build networks and cooperate with different cultural environments and backgrounds and also the ability to interact and communicate on an international level.



**Figure 1:**

Students discussed and visited animal-related businesses for a business plan project, and made presentations in the subject of agrotechnopreneurship.

In this subject, we also invited successful entrepreneurs to inform students about their successful experiences and to give ideas to students regarding how to be good businesspeople (Figure 2). In the group, the students also created innovative product for the animal industries. Over the two years there were 20 innovative products produced by students from animal food processing to animal equipment. Students' innovative products were exhibited at a one-day exhibition and evaluated for best innovative products. The best products were awarded certificates and prizes. This method was very effective at encouraging students to develop their products to be the best on the market. All activities are presented in Figure 3.



**Figure 2:**

Invited speakers encourage students to become entrepreneurs in the subject of agrotechnopreneurship.



**Figure 3:**  
Exhibition of hatchery project in the agrotechnopreneurship classroom.

## 4. Conclusion

In conclusion, by applying PH methods in this subject, students learnt to be more active and creative. In addition, they were able to stimulate innovative ideas, improve their teamworking abilities, network better with animal business industries and plan more effectively.

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# Innovation Camp – What, Why and How?

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## Abstract

The perspective of this article on Innovation Camps is practical and empirically based, with a focus on what, why and how, with the purpose of providing basic recommendations for implementing Innovation Camps. The article covers the rationale and motivation for students, lecturers and educational institutions in implementing Innovation Camps. We will include the what and why context and the implementation of Innovation Camp at BINUS University and Yogyakarta State University. The choice of implementing Innovation Camp among all the INDOPED innovative pedagogical methods was, in itself, an innovative choice for the two Indonesian universities. It brought with it different experiences and implications, but also great wins and motivation. As the European ‘train the trainer’ institution, Business Academy Aarhus was impressed by the enthusiasm and engagement from the lecturers and students, as well as the motivation for and results of the implementation. The joint experiences and evaluations will lead to a recommendation on why and how to implement an Innovation Camp.

## Keywords

Innovation; pedagogical methods; entrepreneurship; camp guideline; teacher role; student-driven learning.

### 1. Innovation Camps – origins

Innovation Camp is one of the new and innovative learning methods piloted in the INDOPED project. Innovation Camp is an intensive idea generation, idea development and innovation process method, where students from different educational programmes work together in interdisciplinary and cross-curricular teams in order to solve a specific issue or challenge for a company, an industry or an NGO.

Professor emeritus Torben Bager from the University of Southern Denmark introduced the idea of Innovation Camp as a method of teaching entrepreneurship at an EFMD Conference in Barcelona in 2009. Torben Bager was and still is the leading dean at the IDEA Entrepreneurship Centre, University of Southern Denmark. Before that, the concept of Innovation Camp developed and materialised itself in a collaboration between the University of Southern Denmark, Business Academy South West and Business Academy Aarhus. In 2013, an official EU Camp Guide was published as a practical guide for educational institutions in the EU. Business Academy Aarhus has been the forerunner in planning and implementing Innovation Camps in Denmark since 2004, where the first Innovation Camps took place. Since then, Business Academy Aarhus is one of the most experienced institutions in planning and implementing numerous Innovation Camps with different themes, business partners and students. Business Academy Aarhus is one of the European partners in the INDOPED project, and is a university of applied science with seven different faculties.

The Innovation Camps represent the very essence of the pedagogical and educational platform for Business Academy Aarhus. The fundamental thing in the platform is ‘close to practice’, meaning that the industry context that students must work in after graduation is the starting point for all pedagogy. The core value is ‘insight provides perspectives, only action brings true transformation’. Learning at Business Academy Aarhus is student-centred (SCL) and teaching is a dynamic, interactive process with an emphasis on active student participation. This results in a combination of classroom teaching, project work in groups and individual work – often involving cross-curricular issues and always with a practice-oriented basis, including solving relevant issues and challenges for companies. Business Academy Aarhus has a close relationship and collaborates with a large number of small and medium-sized enterprises in the region in

which it is situated. The reason why Business Academy Aarhus do many Innovation Camps is that it is an accurate implementation of the teaching principles, following the overall pedagogical and educational platform. In addition, it is an efficient means to give students skills that enable them to succeed in a dynamic, ever-changing 21st century workplace, whatever they pursue a career as an employee or an entrepreneur.

### *What is Innovation Camp?*

In Innovation Camps, the participants cooperate in interdisciplinary teams, usually four to six students in each team, on a common issue, problem or challenge. The camp content will alternate between presentations, practical work, presentations and feedback. The participating students are under pressure with tight deadlines, and the process always ends with a presentation of the preliminary results.

The starting point is a specific challenge, formulated in cooperation between the company, NGO or governmental organisation and the educational institution. In the INDOPED pilot, this was the responsibility of BINUS University and Yogyakarta State University. The camp manager (the lecturer designated to that role) controls the process along with a number of process guides or facilitators, all trained to manage a short and intensive innovation process.

Time pressure and interdisciplinary, cross-curricular teams push the participating students out of their comfort zone, and preferably, the participants work outside their familiar surroundings. If it is possible to arrange the Innovation Camp to take place outside campus, as was the case in the pilot at Yogyakarta State University and partly at BINUS University, it ensures the best opportunities for innovative height in the collaboration and in the final solution to the challenge.

The organisation of the camp makes the participants pass through a creative, collaborative and innovative process, which focuses on the relationship between problem and solution. The innovation process, used at Business Academy Aarhus and in this pilot, is a three-zone innovation process tool. This tool is experience-based, developed in a combination of practical learning and action research context by Business Academy Aarhus. The innovation process tool by Business Academy Aarhus is the yellow, green and red zone, and it consists of three phases that the team goes through after the presentation of a problem, challenge or opportunity. The yellow zone establishes a basic understanding of the problem, the green zone is for idea development (the creative phase), while the red zone is for sorting and idea selection. The method relates closely to the Design Thinking Model (Stanford University, USA), as the yellow zone represents the 'empathise and define' phase, the green zone is the 'ideate' phase and the red zone correlates the 'prototype and test' phase.

### Yellow zone:

#### Problem/challenge understanding and defining the problem statement to work with

The main parameter in the yellow zone is that the team is working to obtain a common understanding or framework of the overall problem. The team discusses definitions, frames the understanding of the domain and problem, and pinpoints the problem, so that it works in the context of the team and everyone understands it. Data and information collection is often necessary in order to address and clarify any lack of understanding of the problem. In the yellow zone, the team must achieve a satisfactory level of knowledge for the problem area and the problem itself before the team can proceed to the green zone. However, the team should not be experts or crush their own creativity in data collection. The team defining the focus in the problem area that it will work with must complete the yellow zone. Several specific exercises are recommended (and available on request) for use in the yellow zone.

### Green zone: Idea generation

In the green zone, it is important that the team has agreed on rules for the cooperation in the team process, including ‘everything goes’, meaning that everyone is positive and that nobody rejects any ideas. The team must constantly move forward and not ‘just fall in love’ with its first idea. It is about getting as many ideas as possible, which is why creative exercises are good tools. It may also be a good idea to switch between working individually, working in twos, or working as a whole team. Specific exercises recommended for use in the green zone include brainstorming, word/picture association, and several others. (These are available on request).

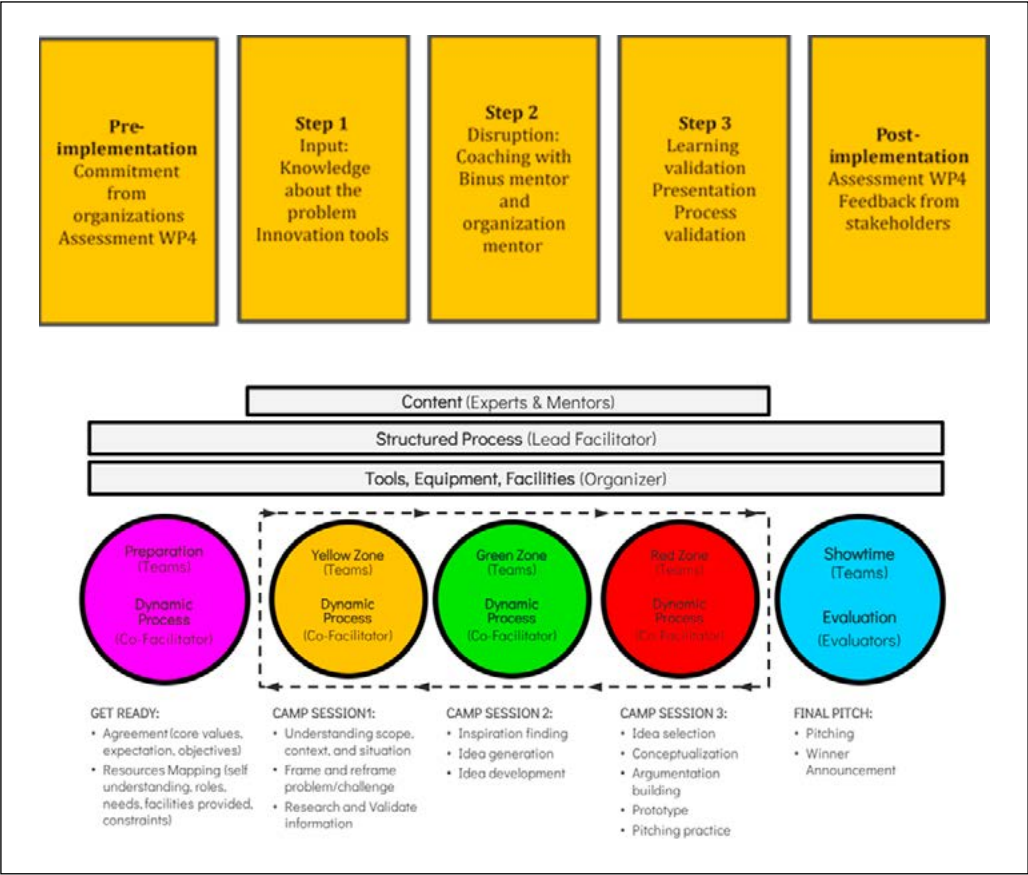
### Red zone: Sort, evaluate and combine ideas

The red zone is usually easy for most participants to work in because it resembles a ‘normal’ educational process, and it is often far easier to ‘crush’ ideas than to get them. In the red zone, however, it may be a challenge to ‘kill your darlings’. This means that it can be difficult to work in a structured way in the red zone, as many teams have already formed an opinion on what idea they want to work on, without really considering why. Therefore, a structured process through the red zone is crucial. Specific exercises are recommended (and available on request) for the red zone. The team can use the tools in a chronological order, replace one exercise with another, or skip an exercise entirely. If the team feels it is necessary to go back to the green zone, it can be healthy to go back and develop the idea even more.

A camp runs over 8 to 48 hours with at least 12 people. The programme for the Innovation Camps varies, depending on the challenge and the sponsoring company. However, the set-up of the camp is usually as follows:

- If possible, the camp always takes place close to the company/organisation that is producing the challenges. Being close to practice, will give the students a better understanding of the product/service, etc., that they will be working with, along with also being away from their normal setting, i.e. the classroom.
- Firstly, the students will be introduced to the challenge along with a presentation of the product/service/destination, etc. The company or organisation will normally do this.
- The teams will then have half a working day to come up with two ideas, which are pitched to all teams, teachers and experts, (usually local business people), who will all provide feedback. Afterwards, the groups will continue working with one of the two ideas that they find the most innovative and best solution for the challenge given by the company. They will have to work with the idea in order to turn it into a concept, which they have to analyse, research and evaluate in terms of market potential, economy, realisation and innovation height.
- After more rounds of pitches and feedback, the students go into competition mode!
- On the last day of the camp, all teams will pitch their best and final idea/concept in front of the company, a panel of external judges (local business people, etc. with an interest in the challenge), all students and teachers.
- The judges will appoint the winner and explain their choice in the announcement of the winner. The winning team receives prizes, usually sponsored by the company that has provided the challenge.

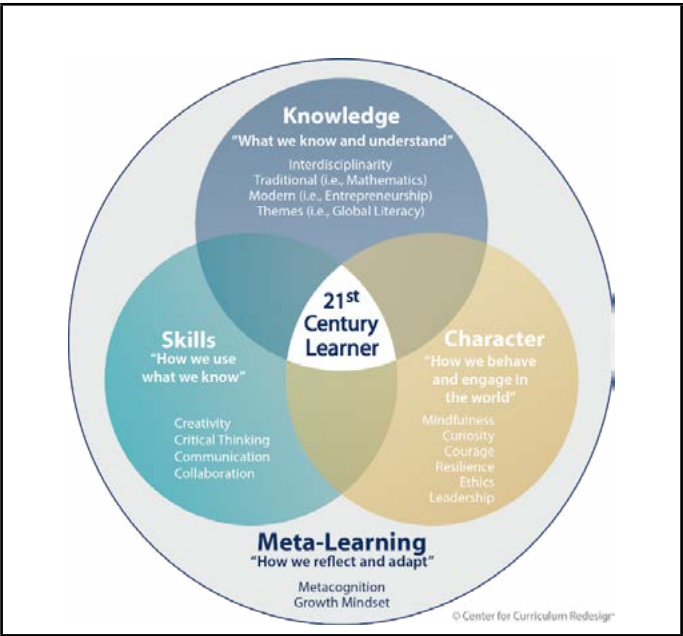
Figure 1 is a visual illustration of the concrete Innovation Camp at BINUS University in 2017, but it could apply for any Innovation Camp.



**Figure 1:**  
Innovation Camp BINUS University  
Source: Handrich Kongdro, BINUS University.

## 2. Why Innovation Camps?

Our thesis is that when students participate and actively work in Innovation Camps, they are preparing themselves for the 21st century labour market. In 2015, the Center for Curriculum Redesign published the book ‘Four-Dimensional Education: The Competencies Learners Need to Succeed’, which the OECD has included in the visions for education 2030. When participating in an Innovation Camp, we believe that the students actually work in all four dimensions, and through Innovation Camps we focus on at least some of the important six character elements.

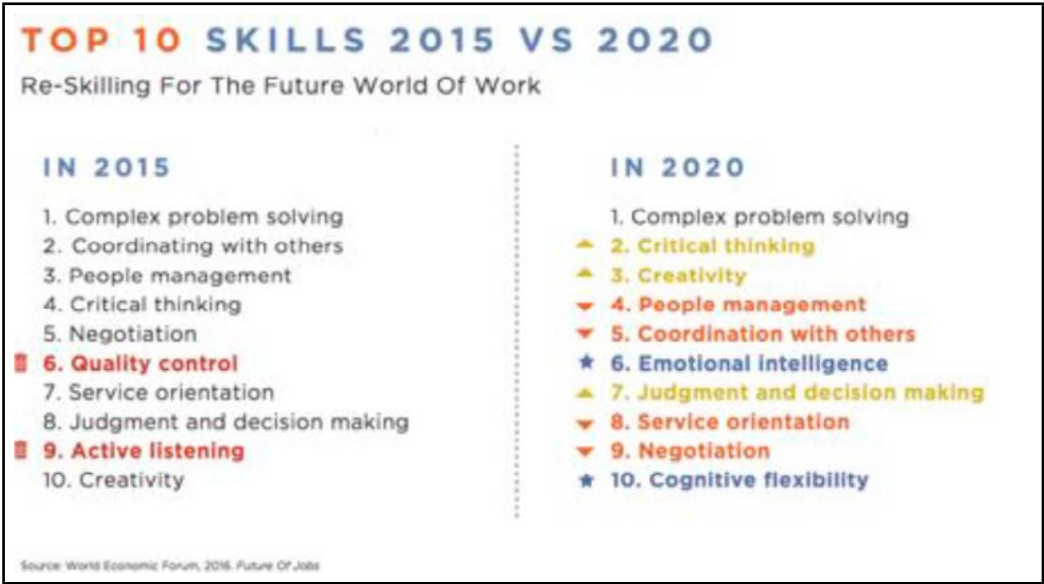


**Figure 2:**  
Four-Dimensional Education

Source: Center for Curriculum Redesign, Charles Fadel, 2015.

Thus, we are preparing students for the 21st century labour market. They build knowledge, skills and character, although the meta-learning probably does not take place immediately after an Innovation Camp. At Business Academy Aarhus we have learn, that reflections and meta-learning usually happen in the students' latter work and projects, and most often after the students graduate.

The students will also acquire some of the important skills that the World Economic Forum predicted for the future world of work in 2020.



**Figure 3:**  
Top ten skills  
Source: World Economic Forum, 2016.

Through close collaboration with the business world and companies in the region where Business Academy Aarhus is situated, we have gained specific knowledge from companies and organisations about their expectations of our students’ skills. They expect, demand and value skills in collaboration, teamwork, complex and innovative problem-solving, creativity, critical thinking, resilience, curiosity and leadership. This also applies for future education in Indonesia in preparing students for the demands of Indonesian businesses and organisations.

*Implementation at Yogyakarta State University, Yogyakarta and BINUS University, Jakarta.*

*Piloting of the learning method Innovation Camp at Yogyakarta State University (YSU). Responsible lecturers: Svenja Volkert and Tri Sugiarto.*

From 25–27 November 2016, the team at YSU conducted an Innovation Camp for first and third semester students from 11 different study programmes at the Faculty of Languages and Arts. Seventy students voluntarily signed up and took part in the programme, which took place in a natural campsite environment with wooden huts, just beside a river and not far from Merapi volcano, called Desa Wisata Kembang Arum. Besides the students, who formed twelve interdisciplinary teams, there were the following present during the programme: one process leader, one process coordinator, six lecturers in the role of facilitators, five observers who accompanied the facilitators, two experts and a jury consisting of five people.

The goal of the Innovation Camp was to enable the participants of the camp to present the most creative and feasible idea possible to solve a certain problem faced by business, government or society in general. In the case for the Innovation Camp at YSU, the challenge was:

‘How can you create non-monetary incentives for people to reduce, reuse and recycle solid waste in their houses and neighbourhoods in Depok, Sleman and Yogyakarta?’

The challenge was proposed by YSU stakeholders, a staff member of BORDA (= Bremen Overseas Research and Development Association) and then discussed with a staff member of the local authority, representing the Kecamatan Depok, Sleman.

The programme started with two workshops a few days before the actual Innovation Camp began. One workshop was a preparatory course for the lecturers, who enrolled themselves to take part as facilitators, and another workshop was a preparatory class for the students. Both workshops are relatively important for the smooth running of the implementation of Innovation Camp. In the workshop for students, the goal was to equip students with the tools for generating ideas. The workshop introduced them to the three zones principles that enable them to develop and structure their ideas better. The workshop for lecturers was also crucial, because the lecturers needed to have the same perspective and understanding that facilitating was different from lecturing. Thus, as the lecturers received information and training for facilitating the camp, it helped them in the facilitating process and in reaching the ultimate goal of the camp. Business Academy Aarhus, Denmark, who conducted this programme on a regular basis at their own university, led the workshops.

On Friday 25 November, after lunchtime, the students departed to the above-described campsite. There, they were divided into multidisciplinary teams and carried out some teambuilding activities. The next morning, the teams got down the challenge and had a period of four hours to come up with their two best ideas. The rules were the same for all: all the teams got the same assignment and the same deadline. Therefore, competition mode was on from the very beginning. After the first presentation, the teams got feedback mainly from the other teams

and returned to work until the evening, when they got detailed feedback from the facilitators in order to improve their findings. The following morning, the teams had their last chance to present their ideas in front of the facilitators to get some feedback. Just after lunch, the official presentation in front of the jury took place. The jury members were 1) a staff member of the local authority, representing the Kecamatan Depok, Sleman (a second stakeholder), 2) two representatives of BORDA, and 3) two representatives from YSU (Dean of Faculty of Languages and Arts and Head of the International Office). The jury finally determined three winners and awarded the token of appreciation to them.

| No. | Day/date                   | Time        | Activities                                                                                                                                                                    |
|-----|----------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.  | Wednesday 23 November 2016 | 10:00-15:00 | Workshop with facilitator (and observers)                                                                                                                                     |
| 2.  | Thursday 24 November 2016  | 09:30-11:00 | Workshop with students                                                                                                                                                        |
|     |                            | 13:00-14:30 | Discussion with facilitator's team, stakeholders and committee                                                                                                                |
| 3.  | Friday 25 November 2016    | 14:00-15:00 | Go to Desa Wisata Kembang Arum                                                                                                                                                |
|     |                            | 15:00-15:30 | Room distribution                                                                                                                                                             |
|     |                            | 15:45-17:30 | Team building activity 1                                                                                                                                                      |
|     |                            | 17:30-19:30 | Shower, snacks, preparation for the student's team building 2 and performances                                                                                                |
|     |                            | 19:40-22:00 | Students performances, barbeque and bonfire                                                                                                                                   |
|     |                            | 23:00       | Sleep                                                                                                                                                                         |
| 4.  | Saturday 26 November 2016  | 07:00-08:00 | Breakfast                                                                                                                                                                     |
|     |                            | 08:30       | <b>Meeting in the 'auditorium' house</b><br><i>Representative from the Office of District of Depok introduces the challenge</i>                                               |
|     |                            | 09:30       | <b>Get to work</b><br><i>Facilitators and observers visit the group (after an hour of working time)</i>                                                                       |
|     |                            | 14:00       | <b>First presentation</b><br><i>Each group presents its two best ideas (max. 4 min)</i><br><br><i>Oral feedback – one group gets the chance to give comments (max. 2 min)</i> |
|     |                            |             | <b>Get to Work</b><br><i>Facilitators and observers visit the group (after an hour of working time)</i>                                                                       |
|     |                            | 19:30       | <b>Second presentation</b><br><i>One group presents max. 4 min. Max. 4 min feedback from team of facilitators</i>                                                             |
|     |                            | 21:30       | <b>Work</b><br><i>Facilitators and observers visit the group (after an hour of working time)</i>                                                                              |
| 5.  | Sunday 27 November 2016    | 07:00-08:00 | Breakfast                                                                                                                                                                     |
|     |                            | 08:30       | <b>Third presentation</b><br><i>One group presents max. 4 min. Max. 4 min feedback from team of facilitators</i>                                                              |
|     |                            |             | <b>Work</b><br><i>Facilitators and observers visit the group (after an hour of working time)</i>                                                                              |
|     |                            | 13:00       | <b>Final presentation</b>                                                                                                                                                     |
|     |                            | 14:30       | <b>Announcement of the winner</b>                                                                                                                                             |

**Table 1:**  
Innovation Camp in Yogyakarta (Preparation and Execution).

Source: Tri Sugiarto, M.Hum, Yogyakarta State University.

*Piloting of the Innovation Camp learning method at BINUS University. Responsible lecturers: Handrich Kongdro and Ina Murwani.*

The camp organised by BINUS University was a social Innovation Camp. The content in the social Innovation Camp was one challenge, two days of outdoor work, and the three-zone (yellow, green, red) tools for the innovation process. The framing of the Innovation Camp was that ‘if inno camp is a kitchen, it will offer surprising food’. The ingredients in the Innovation Camp were a facilitator team, multidisciplinary students, experts, mentors, and an organiser, a sponsor, a challenge and owners. Ninety students participated at five different locations, and they came up with sixteen solutions to the challenge.

The programme started with two workshops a few days before the actual Innovation Camp began. One workshop was a preparatory course for the lecturers who enrolled themselves to take part as facilitators, and another workshop was a preparatory class for the students. Business Academy Aarhus, Denmark, held the workshops and participated in the Innovation Camp as facilitators as well.

As an academic partnership, Bina Nusantara University and Business Academy Aarhus have worked together, especially as an Innovation Camp facilitator team, to optimise students’ learning experiences. Both graduate and undergraduate programmes were involved in this pilot. In addition, to reach its objective, BINUS University worked with several organisations to introduce real social challenges.

|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Stakeholders  | Coordinator<br>Facilitators<br>Mentors<br>Panellist<br>Students                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Organisations | Campaign.com – social networking platform and community for change<br>Akademi Kompos (Waste Bank) – waste management, social enterprise<br>Jakarta Hidden Tour – Jakarta urban slums tourism activist<br>Sanggar Waria Remaja (Swara) – vocation alternative school for transgender<br>Yayasan Sahabat Anak – education foundation for street kids<br>Xcidic Singapore – innovative technology lab<br>DAAI TV – local television which focuses on positive broadcasting                                                                                                                                                        |
| Locations     | Urban Poverty Challenge (Jakarta Hidden Tour) <a href="https://goo.gl/maps/rxmnQRFwvvy">https://goo.gl/maps/rxmnQRFwvvy</a><br>Transgender Challenge (Swara)<br><a href="https://goo.gl/o282QI">https://goo.gl/o282QI</a><br>Waste Management Challenge <a href="https://goo.gl/maps/voMWo3eMBRw">https://goo.gl/maps/voMWo3eMBRw</a><br>Early Childhood Education Challenge (Sahabat Anak Pasar Rebo)<br><a href="https://goo.gl/maps/w8AEZ5ZpJ6o">https://goo.gl/maps/w8AEZ5ZpJ6o</a><br>Legal and Empowerment Challenge (Sahabat Anak Grogol) <a href="https://goo.gl/maps/TV9hMrcq58q">https://goo.gl/maps/TV9hMrcq58q</a> |
| Participants  | Graduate/Master's Degree Programme 95 students, 19 teams.<br>Participating facilitators:<br>Handrich Kongdro (BU), Ina Murwani (BU), Ahmad Seiichi Ramadhan (BU), Peri Akbar Manaf (BU), Valentina Tohang (BU), Dwita Ulibasa (BU), Jesper Nørskov (Business Academy Aarhus), Steen Kamronn (Business Academy Aarhus)<br>Panellists were chosen from both internal and external stakeholders:<br>Rini Setiowati (BU), Sukma Putra (BU), Artomo (Akademi Kompos), Ronny Poluan (Jakarta Hidden Tour), Vina (Sanggar Waria Remaja), Alles Saragih (Yayasan Sahabat Anak), Gabriel and Febri (Xcidic Singapore)                   |

**Table 2:**  
Innovation Camp in Jakarta (Preparation and Execution).

Source: Handrich Kongdro, BINUS University

(continues on the next page)

|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Activities | <p><b>First Day – Saturday 8 April 2017</b></p> <p>The event started by giving a brief to the students. Rini Setiowati kicked off the programme by welcoming them and sharing the new concept and overall objective of this initiative. Handrich Kongdro continued to motivate and introduce how this initiative will give students a valuable experience before taking it to the next level, especially if the students want to build their start-up or do social projects. Ina Murwani introduced the Innovation Camp method and told the students what to do from the beginning until the end of event. Rini Setiowati also gave additional information about the technical briefing of this event on the D-Day.</p> <p>Four organisations were invited and they presented their challenge in front of all the students, so the students could start thinking about their idea and solution. Before lunchtime, the students were prepared after a non-facilitated activity, to come up with their own solution. After lunchtime, they presented it and the results were as expected! They all had rather similar ideas without being facilitated and going to the field.</p> <p><b>Second Day – Friday 21 April 2017</b></p> <p>The next day was also important since it started with a facilitator workshop. Jesper and Steen from Business Academy Aarhus, Denmark, were the main trainers. We agreed on how we would facilitate the two-day in-campus camp. Jesper and Steen shared the best practices from Denmark and we had a discussion on how to apply it in the BINUS context. All of the materials needed during the event were reviewed.</p> <p><b>Third Day – Saturday 22 April 2017</b></p> <p>The first day of the camp was successful. It started with registration, breakfast, and t-shirt distribution. After that, the group was divided into five teams in five locations. Each of the facilitators gave a separate brief during the journey to the locations. It was a great time for both students and facilitators to interact with the community because of field insights. After finishing the activities in the field, all headed back to the campus to work on the next stage.</p> <p>On campus, every team received guidance and facilitation in order to go through the three-zone methods, which all facilitators had agreed upon the previous day. It was a dynamic process from afternoon until evening. Students even continued on their work after the on-campus session ended. They were preparing to showcase their innovation to all of our partner organisations.</p> <p><b>Fourth Day – Sunday 23 April 2017</b></p> <p>In the morning, all the students were still preparing each of their booths while the invited panellists were arriving. The committee gave a brief to the panellists and started the assessment after every booth was ready. At the end, the result of the panellist assessment was calculated and announced in the closing ceremony.</p> <p>The five best teams out of 16 were selected. Before the announcement, all the students gathered in the auditorium to get a final debriefing from Jesper Nørskov, Handrich Kongdro and Rini Setiowati. During lunch, all participants filled out the self-reflection paper. As a final activity, the committee gathered all the panellists, facilitators and students to announce the winner, gave their appreciation and took group photos.</p> |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

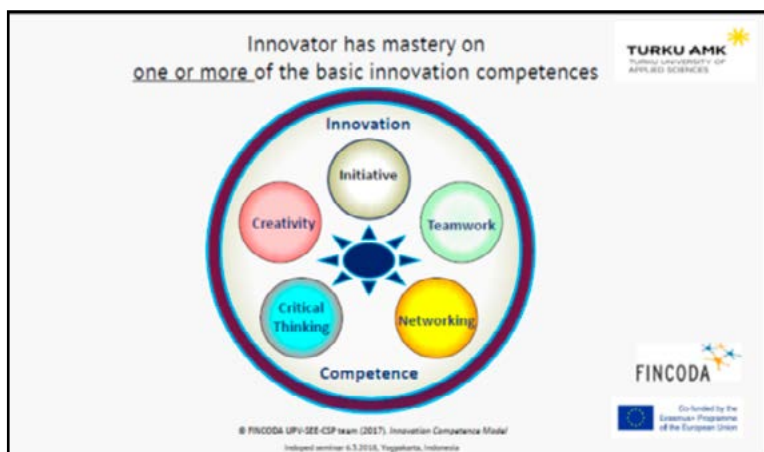
**Table 2:**  
Innovation Camp in Jakarta (Preparation and Execution).

Source: Handrich Kongdro, BINUS University

### 3. Evaluation

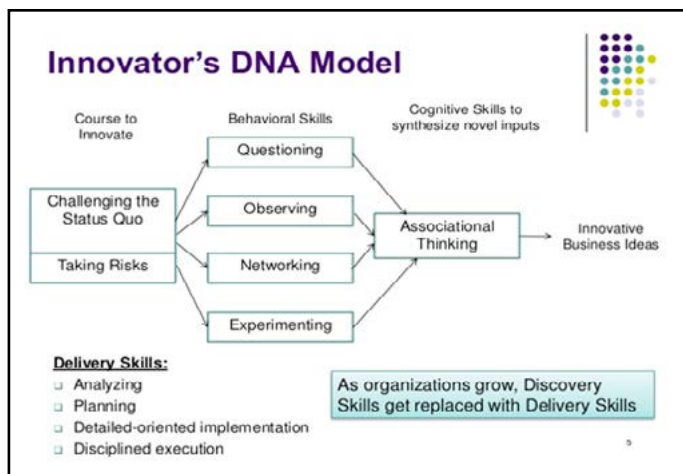
One of the aims of the INDOPED project and all the innovative pedagogical methods piloted in the project was to increase students' innovative skills as well as a transformation from teacher-centred to student-centred learning. This is of course present in the purpose of and learnings from implementing Innovation Camps.

The numerous evaluations from Business Academy Aarhus show that students perceived that the Innovation Camps helped them increase their skills and competencies according to the basic innovation competencies shown in the FINCODA Innovation competence model below. They learnt to master an innovation process, how handle a team process with difficulties, collaboration and conflicts, and how to organise their work and handle time pressure, presentations and feedback. In the qualitative evaluations, they also referred to obtaining and enhancing skills such as curiosity, leadership, resilience and courage.



**Figure 4:**  
Innovation competencies  
Source: [www.fincoda.eu](http://www.fincoda.eu)

At Business Academy Aarhus, the Innovators DNA model is an inspiration and a fundamental aspect of entrepreneurship teaching. On several occasions, following Innovation Camps students (and facilitators for that matter) realise that the behavioural and cognitive skills in the model are often exactly those demonstrated in Innovation Camps without knowing the model. Therefore, through the qualitative evaluation after a camp and the inclusion of the model in the subsequent teaching, the students found that they actually learnt these skills and were taking a big leap forward into mastering the skills of an innovator.



**Figure 5:**  
Innovators DNA

Source: <https://hbr.org/2009/12/the-innovators-dna>

However, what were the learnings and evaluation of the piloting of the Innovation Camp?

#### 4. Evaluations from participants on the BINUS University Social Innovation Camp

*'The methods (yellow-green-red zone) help us to get surprisingly real and unusual solutions, because we can use one zone to view the problem and another to seek solutions.'* ARINA.

*'Each respondent gave different responses to our questions. Some were open, while others only gave limited answers. This situation just opened up my perspective. We could not judge the people from how they looked. They also had skills, the same feelings like us and how they feel when they were isolated.'* PUTRI.

*'So many things we got. It was like a revelation from a world that we never got in touch with or even we did not want to involve. They were not as negative as we thought. Without this event, we most likely would never go there, or even to think about it. I could be more empathic.'* VEGA.

Overall, the evaluation of the Innovation Camp pilot at BINUS University was positive. The camp was a success due to positive feedback coming from the stakeholders: organisation partners, students, facilitators, panellists and the collaborators from Business Academy Aarhus, Denmark. It was particularly so considering that this was the first time the event was held by BINUS University.

During the pilot, stakeholders' time and schedules were the main challenge especially, in the facilitation skills workshop, where half of the facilitators could not join the workshop fully due to other schedules and priorities. Different locations and agendas or situations of each of the organisation partners also became a challenge, in terms of keeping every team in the same pace and providing structured facilitation. When everyone came back to the campus, classroom locations for each team on different floors also affected the effectiveness of the process, which led to some delay in delivering the following stage.

Despite this, the facilitation process went smoothly. Even more, the organisation partner the founded this learning method was really showing a solution they were looking for, which at the same time increased students' confidence levels. Besides, this learning method was also a revelation for some students because they were involved in 'real-life cases'.

Interviews that stated the perspective of each stakeholder (facilitators, mentors and students) also prove the value of the Innovation Camp and support the general perspective of it at BINUS University.

*'Innovation Camp is an effective learning method for the matriculation programme to "set the tone" of innovation culture, but it is not necessarily enough to implement the real solution for organisation partners. Therefore, an after-event follow-up would be important to make sure the idea continued to benefit the partner organisation. One of the ways to do this is to continue incorporating it into the courses in the next semester.'* Handrich Kongdro.

## **5. The Innovation Camp at Yogyakarta State University**

The Innovation Camp was a success, because everything worked out very well and everybody learnt a lot during these two days. Not only students but also the lecturers involved in the camp gave positive evaluations, and stated that they experienced new things with the method. Some evaluations given by the students were as follows:

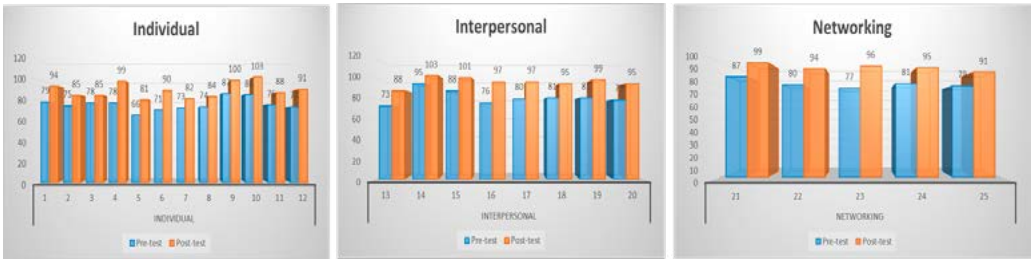
*'I had a new experience with Innovation Camp. I had to work for more than 24 hours with a very sharp deadline. This was crazy for my team and me. Yet in the end, we made it and we were so proud and happy with our result. Personally, the camp improved my communication skills and importantly it made me more disciplined, because I had to manage my time to work with deadline. I believe that people, especially students, need this kind of activity for themselves for a successful future.'* (Danika, a student from the English education department)

*‘Innovation Camp provided me with the strategy to develop ideas step by step and prepare and present things in a systematic way. This method pushed us to produce creative and innovative ideas to solve a problem faced by the society. This also trains us to work in team and helps with time management. My team and I had to show a good deal of discipline in order to finish everything based on the time allocated. For me this activity gave me lots of positive outcomes.’* (Edita, a student from the German education department)

*‘Innovation Camp improves my critical and innovative thinking. This also drives me to think quickly and effectively because time is limited. In addition, it trained me to get out of my comfort zone, because I have to work with new people who come from other disciplines. It is not a piece of cake because often I have different point of view to them, but I have to respect the differences in order to keep to the team’s goal.’* (Hilman, a student from music education department).

The aforementioned evaluations showed that the Innovation Camp at YSU did indeed provide students with the opportunity to explore and experience many things that did not present themselves in the classroom settings or activities. Being able to work in a multidisciplinary team would be one among the many positive results of the implementation of the method. Another one is the ability to work within a specific time boundary. This led the students to be disciplined and manage their time effectively. Failure to manage time was equal to ruining the team’s pride, as they were all in competitive mode and needed to update their progress every four to six hours work and discussion in front of the facilitators.

Furthermore, the method also increased the students’ innovation competence performances, illustrated by the following charts:



**Table 3:**  
Self-assessment of innovation competence performance  
Source: Tri Sugiarto, M.Hum, Yogyakarta State University.

From the pre and post evaluation of the implementation of Innovation Camp at YSU, as represented by the above charts, the method improved the innovation competencies of the students in at least three areas; individual, interpersonal and networking. For individuals, the method increases the students' ability to present creative ideas, evaluate and foresee problems and solutions from different perspectives, show enthusiasm and focus on the work or task objective. For the impact on the interpersonal, the camp improved the ability of the students to transmit ideas to others, to listen and engage in dialogue with teammates, to collaborate effectively, to take the initiative, and to be flexible regarding conflict. In addition to the networking, Innovation Camp led the students to consider the implications of their thoughts towards society, to work in multidisciplinary teams and a multicultural environment, and to use network contacts.

The lecturers, who worked as facilitators in the Innovation Camp, also expressed that the camp benefited them. The camp channelled them to a new pedagogical approach that inspired them to shift from the traditional teaching approach to the tested one. Most of the lecturers agreed that their teaching strategies were more to direct and instruct than to facilitate. They could not resist informing students what the acceptable opinions were and what recommendations looked like. They would not listen to irrelevant and unfeasible solutions offered by the students in their teaching routines. Thus, some said that to become a facilitator was not a piece of cake at all! The lecturers needed to possess critical and creative ways of thinking in the first place. They also had to be open-minded and possess an egalitarian personality.

Other lecturers expressed their appreciation of the implementation of Innovation Camp. They mentioned that the method has trained and led the students to be autonomous learners. They collected data, read, evaluated and discussed them to select the most relevant to their needs. These would prepare them with sufficient skills to conquer the competitive and challenging society after they finished undergraduate level.

Two alumni facilitators from the Innovation Camp implemented the method in their subjects last semester. They ran an eight-hour camp inside the faculty at weekends. They adopted the principles of the model, such as giving training for both students and facilitators before the implementation, involving stakeholders from inside and outside the university, along with many other preparations, similar to those previously conducted at YSU. The result of the implementation was also extraordinary, but it provided lessons learnt from this very short camp. The most important one was the fact that eight hours was a very short period to produce thought-provoking ideas or solutions. This was too short, as the students had just started to warm up after the second presentation and feedback from the team of facilitators, whereas the presentations were set just three times.

## 6. Recommendations for planning and implementation of Innovation Camps

The camp model draws on well-established principles taken from the innovation and entrepreneurship field. This and the two Innovation Camp pilots in Indonesia lead to a number of recommendations.

### Prerequisites:

- Diversity – because students are recruited from different disciplines to work on concrete tasks in cross-disciplinary groups. This provides several benefits, such as giving them insight into other disciplines, helping them understand their own discipline better, and, not least, resulting in more interesting ideas and innovative results than work in single-disciplinary groups. Second, students work across the important borderline between academia and business, applying their theoretical knowledge to concrete problems in businesses or NGOs, and meeting and working with people while being rooted in practice rather than theory.
- Horizontal thinking – traversing cross-curricula fields is a well-known driver in idea generation processes and entrepreneurship. Great ideas are often to be found at the intersection between sectors, domains, disciplines and cultures (Johansson, 2004). Horizontal thinking is particularly important in the early stages of a camp where the minds of participants are open to other knowledge fields and people – and their own fixed positions are challenged.
- Parallel thinking – camp participants work in teams where parallel thinking is important for achieving creative collaboration and coordinated action (De Bono, 1995). Minds being tuned into the challenges of the team is important, as participants should do their best to work in the same direction, particularly in the result-oriented stages of a camp setting.
- Problem orientation – Problem-Based Learning (PBL) is a well-known learning approach and is often seen as core to the entrepreneurship teaching field (Hanke et al., 2005). Departing from a problem rather than a topic changes the rules of the game in the learning process. Knowledge and topics are no longer ‘supplied’ to passive learners, but asked for by active learners who face challenges when trying to solve a problem.
- Action learning – action is made a key ingredient in the camp learning process. Generally speaking, ‘doing, thinking and talking’ are core ingredients in this type of learning process rather than ‘listening, reading and memorising’, (Löbler, 2006, Scharmer & Käufer, 2000). This doing side is consistent with Kolb’s experience-based learning circle, suggesting that praxis (or simulated praxis) is core to the learning process (Kolb, 1984).

- Future orientation – fostering ideas and solving innovation challenges means moving into unknown territory rather than absorbing past and present knowledge. It is about seeing and evaluating a possible future state or solution before it has become reality (Scharmer, 2007).
- Facilitation – the team process needs attention and facilitation. Hence, trained team facilitators monitor the processes and intervene when appropriate, advising the team on how to get across barriers, obstructing the process if ideas fly too low, and easing the psychological atmosphere and physical well-being of the group members in order to maximise collaboration and concentration. In contrast with traditional classroom teaching, the teacher role changes to the facilitator role and students are converted from passive consumers of existing knowledge to active producers of new knowledge. Lecturers must be trained to become facilitators. In becoming facilitators, lecturers must accept that (students') creativity works best without their expertise and judgement.

#### Framing:

- Neutral location, outside the university/classroom.
- Involvement of outsiders, collaborate with stakeholders who are willing to finance the event and to open as many resources and as much information as possible to solve the given problem.
- Well-defined roles for the camp organiser, team facilitators and participating students. The appointment of a camp leader is very important, as they are responsible for enabling a dynamic and time-pressured process.
- Students have to be split into cross-disciplinary teams before the Innovation Camp starts.

#### Process:

- Train the students using three-zone tools for the idea generation. This is crucial in order to inform the students how to structure and evaluate their ideas.
- Train the lecturers to be good facilitators! Facilitating the process helps the students with possible perspectives and thoughts that would open up their horizons, yet it does not dictate! This demands training because not every lecturer is born with such skills.
- The flow is guided by outcome/solution orientation, related to the overall camp goal.
- Students should know something about the camp programme before they arrive.

- The flow should be well prepared and structured in detail.
- Facilitators should energise or support/obstruct the process through interventions and exercises.
- There should be significant time pressure.
- Facilitate the Innovation Camp for a minimum of 48 hours.
- Plan the Innovation Camp at the beginning of the semester, so that scheduling and practicalities do not become obstacles.

#### Considerations:

- How much do the students need to know about the domain of the challenge prior to the Innovation Camp in order to be able to work with the challenge? It is a balance between sufficient knowledge to be able to understand the domain and the context of the challenge, but on the other hand still be able to ask questions and challenge the status quo. Therefore, carefully consider the need to and nice to know information for the students.
- How much time do the camp leader and facilitators allocate to the three zones? There has to be tight time pressure, but still enough time to work sufficiently in each zone. Therefore, consider and evaluate carefully before and during camp how much time each zone requires.
- How can an Innovation Camp complement and support the ordinary curriculum? Each faculty has several learning objectives to fulfil, but perhaps doing an Innovation Camp could be a shortcut and at the same time a way to raise the learning level accordingly. Consider and evaluate carefully when, how and why it could be appropriate to include an Innovation Camp as an extra or co-curricular event.

#### Practicalities:

- Please see the detailed programmes from Yogyakarta State University and BINUS University.
- A complete and detailed inspiration document and guidelines for Innovation Camp is available here: [www.idea-camp.eu/eu-camp-guide](http://www.idea-camp.eu/eu-camp-guide).

## 7. Conclusion

When the INDOPED project started late 2015, the self-assessment report concluded that there were significant needs for the Indonesian university partners to move from traditional teacher-centred learning (TCL) to student-centred learning (SCL). The prevailing perception of all INDOPED partner universities was that SCL is a better method to engage students actively in their learning. The internal concern at that point was how to change the mindset (attitude) of administrators, lecturers and students. The necessary change should be directed towards putting the students at the centre of the learning process, the lecturers as the facilitators of the process, and the administrators as the providers of sufficient learning support. Therefore, the recommendation was that there was a need for good training and intensive mentoring from European university partners. In addition, the report pointed towards the existing wide gap between academics and industry.

The two pilots of Innovation Camp have been proven, in many ways, to meet and correct the needs and assumed difficulties pinpointed in the self-assessment report. The evaluations of the two Innovation Camps show that students CAN be the centre of their own learning, and that they gain skills and competencies in the field of innovation and entrepreneurship, which are highly valued by industry and recommended by all learning authorities as important for succeeding in the 21st century labour market. They also show that lecturers CAN manage and value the transformation from teacher-centred learning, they can become facilitators and promote student-centred learning. One of the most important factors in the concept of the Innovation Camps is collaboration between academics and industry. This also applied to the pilots and the experience for both parties were indeed positive. The training and intensive mentoring from the European university partner was in place, but so was the careful, engaged and motivated planning, implementing and execution from the two Indonesian university partners. All of this points to the importance of a good and close collaboration between the European and Indonesian partners in order to obtain valuable learning and implementation of an innovation pedagogy, from which students, lecturers, educational students and Indonesian society benefit.

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# Project Module and Structured Internship: Challenges and Opportunities

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## **Abstract:**

The great needs to involve external stakeholders, such as industry, to have a significant role in the student learning process coincides with the concern of fostering graduate employability in higher education. Project Module, which requires students to learn by doing company projects, seems promising for address such needs. Project Module was piloted in the computer science department over two semesters in 2016/2017 as the learning method for structured internship. In the first semester, a single course (software engineering) was chosen to be delivered through Project Module, while in the second semester a single module consisting of four different courses including distributed systems, enterprise applications, wireless mobile software engineering, pervasive computing was implemented using Project Module. The evaluation of the students' learning indicates encouraging results on the intended learning outcomes such as independent working, time management, communication and problem-solving. Despite a lack of buy-in from the lecturers, the pilot shows that Project Module seems to successfully facilitate the development of various working life skills of the students.

## **Keywords:**

module; real world; hard skills; soft skills.

## 1. Introduction

Employability became a crucial issue around 2000 (Dearing, 1997; DEST, 2002) and is now becoming an even more pressing issue for higher education. This concerns the expectation that higher education will promote learning outcomes that employers value. Higher education institutions are now charged with fostering graduate employability, which will contribute directly to human capital development. Improving human capital and skills is essential for accelerating economic growth and technological progress. In Indonesia, the government has been advocating higher education to improve students' employability since 2012 when a new regulation, called KKNI (Indonesia National Qualification Framework) was enacted (KKNI, 2012). At BINUS University, employability became one of the strategic objectives within vision 2020, known as Global Employability & Entrepreneurship (GE&E) from 2009. It stipulates that graduates should work at global organisations or become entrepreneurs within six months of graduating: one out of three by 2014 and two out of three by 2018. GE&E has been implemented in both intra-curricular and extracurricular programmes, including a one-year structured internship that was institutionalised in 2014.

Fostering employability seems to be in line with the results from the INDOPED preliminary study in early 2016, which assessed the needs and readiness of students, lecturers and management in the teaching capacity of Indonesian university teachers (Hutagaol et al., 2016). It was revealed that lecturers and students demonstrate great needs to involve external stakeholders, such as industry, to play a significant role in their learning process. The study also shows that they have engaged with external stakeholders consistently through various methods, but mostly in the short term. Additionally, the management expects lecturers to be good facilitators as significant players in conducting student-centred learning methods that could nurture the students' innovation competencies. Project Module seems promising for meet these needs as well as improving students' employability, since it requires the students to engage in a company project in a preferably multidisciplinary group organised as one study module. From the student's perspective, the intended outcomes of the method are to improve students' innovation competencies, while from the lecturers' perspective it will increase teachers' counselling and teaching skills as well as widen contacts with industry. The pilot implementation is a stage within the overall framework of the INDOPED project that allows the Indonesian partner universities to adopt and adapt the selected European methods in their universities. The pilot implementation of Project Module at BINUS University will provide evidence that indicates whether the above needs can be facilitated and whether the intended outcomes that employers value can be realised in practice.

## 2. Design of the pilot

### *Project Module description*

As described in the INDOPED booklet (2016), the Project Module concept was developed at Turku University of Applied Sciences and it belongs to the Educational Research, Development and Innovation Methods (ERDIM) family, which makes up the key elements in the INNOPEDA (Innovation Pedagogy)<sup>1</sup> learning approach. The assignment to the students includes getting new ideas and solutions to develop products, services or processes for the hosting company.

From the student's perspective, the intended results of the method are increased innovation competencies, i.e. improvements in:

- independent working
- knowledge management skills
- project management skills
- metacognitive skills
- responsibility
- social skills
- shared expertise
- transmission of tacit knowledge
- networks and working life connections

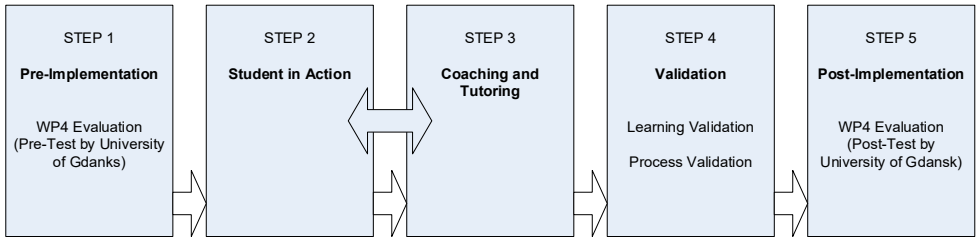
Teachers also benefit from the Project Module method in terms of enhancing counselling and teaching skills, as well as strengthening contacts with industry.

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<sup>1</sup> INNOPEDA is a trademark of a learning approach at Turku University of Applied Science. For a concise introduction to INNOPEDA, see [http://www3.hamk.fi/metnet/Documents/Presentation\\_Poznan.pdf](http://www3.hamk.fi/metnet/Documents/Presentation_Poznan.pdf)

*Protocol of the pilot implementation*

As part of the overall INDOPED work packages, the design of the pilot should be embedded in other work packages, notably Evaluation. Therefore, a protocol for the pilot implementation was set up to ensure its consistency with evaluation instruments provided by the University of Gdańsk (Figure 1).



**Figure 1:**  
Project Module pilot protocol

The critical steps of the protocol are described concisely in Table 1 below.

| Step 2 - Student in action                                                                                                                                                                                                                                                                                                                                                                                                                                                | Step 3 - Coaching and tutoring                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Students are briefed about the company</li><li>• Students are assigned a company project</li><li>• Students work full-time on the project assignment</li><li>• Students meet company tutor on a regular basis</li><li>• Students maintain log book</li><li>• Students deliver presentation (four times) to the faculty supervisor</li><li>• Students maintain reflection journal</li><li>• Students submit final report</li></ul> | <ul style="list-style-type: none"><li>• Faculty supervisor (coach) and company supervisor (tutor) plan for the student learning (learning Plan)</li><li>• Company supervisor gives knowledge input and daily work guidance at workplace</li><li>• Students meet company supervisor on a regular basis</li><li>• Students meet faculty supervisor (lecturer) on a regular basis</li><li>• Faculty supervisor relates company’s work assignment to academic context</li><li>• Faculty supervisor reviews and assesses the student in weekly progress report (online)</li><li>• Faculty supervisor reviews and assesses the student in monthly coaching meeting</li><li>• Faculty supervisor records students’ progress – coaching logbook</li></ul> |

**Table 1:**  
Description of the protocol’s critical steps.

*Assessment and evaluation instruments*

A set of assessment instruments were devised both for assessing the technical competencies (hard skills) and soft skills to validate the students' learning. The data collected from these instruments serve as evidence of how well the students may have achieved the intended learning outcomes set out in the learning plan. In addition, evaluation instruments were made available as data collection tools to validate the overall learning process. Later, the analysed and interpreted data can serve as evidence or an indication of how well the designed protocol of the pilot, and especially the learning method itself, might have worked in facilitating the successful students' learning. Pre-test and post-test questionnaires provided by the University of Gdańsk were taken by default to collect the evaluation data in the pre- and post-implementation steps, while observation, reflection (student and lecturer) and FGD were used to collect evaluation data in all the steps. The complete list of assessment and evaluation instruments are shown in Figure 2.

| Purpose                                     | Pre-Implementation                             | Student in Action                                                                 | Coaching and Tutoring                          | Post-Implementation                             |
|---------------------------------------------|------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------|-------------------------------------------------|
| <b>Assessment<br/>(Learning Validation)</b> |                                                | Hard skills assessment using four presentations, progress report and final report | Soft skills assessment using Coaching Log book |                                                 |
|                                             |                                                | Soft skills assessment using student reflection                                   |                                                |                                                 |
| <b>Evaluation<br/>(Process Validation)</b>  | Pre-test questionnaire by University of Gdańsk | Site observation                                                                  |                                                | Post-test questionnaire by University of Gdańsk |
|                                             |                                                |                                                                                   |                                                | Student reflection                              |
|                                             |                                                |                                                                                   |                                                | Lecturer reflection                             |
|                                             |                                                |                                                                                   |                                                | Student FGD                                     |
|                                             |                                                |                                                                                   |                                                | Company FGD                                     |

**Table 2:**  
Assessment and evaluation instruments

### 3. Pilot implementation

Project Module was piloted in the computer science programme over two semesters spanning odd semester 2016 (September 2016–January 2017) and even semester 2017 (February–June). In the first semester, due to curricular constraints, only the software engineering course could be included in Project Module. The second semester provided a more suitable setting for Project Module implementation, where four courses could be packaged into a single module. The list of courses piloted as Project Module is shown in Table 3. Table 6 in the appendix shows the intended learning outcomes for these courses.

| Semester | Courses                              | Credit | Hosting Company                                                                                                                                                                                                                                                                            |
|----------|--------------------------------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| First    | Software Engineering                 | 4      | Aitindo ( <a href="http://www.aitindo.com/">http://www.aitindo.com/</a> )                                                                                                                                                                                                                  |
| Second   | Wireless Mobile Software Engineering | 2      | 1. Aitindo ( <a href="http://www.aitindo.com/">http://www.aitindo.com/</a> )<br>2. PT Metrodata Electronics, Tbk ( <a href="https://www.metrodata.co.id/">https://www.metrodata.co.id/</a> )<br>3. Ice House ( <a href="https://www.icehousecorp.com/">https://www.icehousecorp.com/</a> ) |
|          | Distributed Systems                  | 4      |                                                                                                                                                                                                                                                                                            |
|          | Enterprise Applications              | 4      |                                                                                                                                                                                                                                                                                            |
|          | Pervasive Computing                  | 2      |                                                                                                                                                                                                                                                                                            |

**Table 3:**  
Courses included in Project Module

In order to get insights into the differences between various aspects that may emerge as the result of applying Project Module, the students were divided into two groups: an intervention group and a comparison group. The intervention group underwent ‘treatment’, while the comparison group received no treatment, as shown in Table 4. By treatment, we mean using Project Module as the learning method to plan, organise, assess and evaluate the students’ learning.

| Semester | Dimension                      | Intervention Group               | Comparison Group                                                 |
|----------|--------------------------------|----------------------------------|------------------------------------------------------------------|
| First    | Number of courses              | 1                                | 1                                                                |
|          | Number of students             | 3                                | 35                                                               |
|          | Number of lecturer supervisors | 1                                | 0                                                                |
|          | Number of company supervisors  | 1                                | 0                                                                |
|          | Learning setting               | Company Site                     | Classroom                                                        |
|          | Weekly study load              | 8 hours (one full day at work)   | 4 hours of in-class lecturing and 8 hours of independent study   |
|          | Teaching learning activity     | Project at work                  | Lecture, laboratory tutorial                                     |
|          | Assessment                     | Presentation, reflection, report | Written assignments, written exam, project                       |
| Second   | Number of courses              | 4                                | 4                                                                |
|          | Number of students             | 8                                | 30                                                               |
|          | Number of lecturer supervisors | 3                                | 0                                                                |
|          | Number of company supervisors  | 3                                | 0                                                                |
|          | Learning setting               | Company site                     | Classroom                                                        |
|          | Weekly study load              | 40 hours (full-time work)        | 12 hours of in-class lecturing and 12 hours of independent study |
|          | Teaching learning activity     | Project at work                  | Lecture, laboratory tutorial                                     |
|          | Assessment                     | Presentation, reflection, report | Written assignments, written exam, project                       |

**Table 4:**  
Intervention and comparison group

### *Pilot implementation in the first semester*

Among the 38 computer science students who undertook the software engineering course in the odd semester 2016 (September 2016–January 2017), three students were selected by the head of programme to participate in the Project Module pilot. Prior to joining the company (PT Aitindo), the company representative conducted an interview with these three students to ensure that they were highly motivated to work and passionate about the company business. The company assigned one dedicated supervisor who was responsible for getting the students accustomed to the company work environment, tools and technology, as well as to guide them in completing the assigned project.

Since the students had to attend other courses, they were only able to work for the company one day per week. They were involved in the project called ‘Convenience Store Receipt Validation’ web application. The requesting client was an FMCG business that normally sells its products through third party distributors, convenience stores and other retail channels. From their

marketing perspective, they would like to know who actually purchases their products. The students and their supervisor worked out the solution by creating a marketing campaign that rewards customers by uploading a photo/scan of their receipts upon buying the products.

Initially, while the students were still learning about the required tools and technology for the project, the company separated them from the company employees. As the students got more confidence, they were encouraged to mingle more frequently with the employees. The students were also obliged to meet their lecturer supervisor regularly to check their progress. Throughout the internship period, the lecturer required the students to present their progress at each milestone, that is, make a presentation on their project plan, design, build and final result. After five months, the students accomplished the project and delivered the final report.

#### *Pilot implementation in the second semester*

For the very same student cohort, the head of programme selected eight students (out of 38) to join the second pilot of Project Module. Whereas in the first pilot the company was chosen by the INDOPED team, in the second pilot the SAGE department (Student, Alumni, and Graduate Employability) assisted in finding the company for the student interns. Three IT companies – Metrodata, IceHouse and Aitindo – agreed to participate in the pilot and they hosted three, three and two students respectively. Similarly to the arrangements of the first pilot, each student group was assigned one company supervisor and one lecturer supervisor. The students worked full-time at the company site from Monday to Friday. They did not go to the university campus at all, except when they needed to meet their lecturer supervisor or for some other study-related reasons.

The assigned projects were more varied than in the first pilot. As a mobile IT solutions company, IceHouse assigned the students a mobile application development project, while at Aitindo and Metrodata the students were assigned to more traditional web-based and other IT application development. Almost all the participating students had to learn new technology before starting the project. The companies supported the student learning by providing various resources. IceHouse even offered to enrol the students in a paid online course to facilitate this new technology learning. During the internship period, the INDOPED evaluation team visited each company three times and observed how the students were doing on-site. The students also met their lecturer supervisor regularly to seek advice and to report on progress. A coaching log book was maintained by each group to document their progress and at the end of the internship programme they submitted the final report.

## 4. Data collection and analysis for evaluation

The INDOPED evaluation team visited the company site a number of times to observe how the students were doing throughout the internship period. At the end of the period, they also completed a reflection form. Interviews with selected students were conducted by the INDOPED team to ask for their feedback. The selected participating company was interviewed as well to find out their perception and assessment of the students. All participating lecturers completed the reflection form and a mini questionnaire. The collection of information from different participants, different sources and different stages in the project was done to anticipate the need for triangulation, which might be required when analysing the data. Except for the survey sent to the lecturers, all data was qualitative and the analysis was performed using simple coding.

## 5. Results

### *What was good*

The piloted structured internship using Project Module seems to have yielded a variety of benefits to the students, including opportunities for learning new technology, expanding networks and learning workplace skills. Working on a real customer-based project forces students to update their technological knowledge to meet the company's requirements. In this pilot, students got to learn Angular JavaScript, ReactJS, Reflux, Laravel, and Drupal and Go, which are not taught at university. They were also motivated to learn from various sources, such as web sources and asking the company supervisors and employees. One company even paid for an online course. In this way, they felt that they were able to 'learn from the expert in the specific area'.

From the company's perspective, hosting Project Module students is an opportunity to coach them. One company who claimed to have a learning culture used this opportunity to test it. At the workplace, the company supervisors (tutors) helped the students by providing online learning resources, face-to-face consultation sessions and workplace strategies. They gave homework and assignment to further test the students' knowledge about the technology. In implementing the solution, they guided the students through developing and creating the project. The intensive communication between the students and the company tutor happened both in the face-to-face conversation and on the messaging app (Basecamp). The company perceived that through the experience of working with the assigned projects, the students developed self-discipline, time management and problem-solving. Overall, the companies involved in this project thought that although students had sufficient basic knowledge, they still needed at least a month to train them.

Working inside the company gave students excellent opportunities to develop their networks. Not only were they exposed to companies, but they worked with others directly. With their company tutor, they developed a close working relationship, which can potentially be nurtured beyond the internship.

The Project Module internship also gave students the taste of real work situation, enabled them to develop workplace skills. First of all, they needed to apply the knowledge they learnt in class to a real situation. They learnt the concepts first hand by experiencing it in the process of developing and delivering actual products for the real customers. The students were given compensation and support in many aspects such as regular mentoring, good facilities and good working environment. Additionally, they learnt how to communicate in the workplace and work in teams.

The benefits of the structured internship mentioned explicitly by the students include gaining new experiences, connecting to the real world, getting a lot of things outside class, getting along with others, not being boring, learning from working people and developing their character. The students perceive the company tutors as experts who are professional, straightforward in terms of telling them what the students have to do, and have a good deal of advice and relevant knowledge to share.

From interpreting the lecturers' reflections, the identified general perception of the lecturers towards Project Module as a learning method include:

- It is a suitably structured learning method that matches/is appropriate for real work experiences.
- It is suitable because the course is usually project based.
- It is suitable because the students learn about/develop an actual app/product that can be used by users/customers.
- It has similar structure to real-life work experiences where the student is forced to practice to solve a problem in a specific project.

### *What was lacking*

Although the students, companies and lecturers had a good general feeling about the implementation of Project Module in the internships, each faced their own obstacles in the implementation. The students seemed to value the coaching given in the company, but some were disappointed with their lecturers' support. Some said that the lecturer was 'irrelevant', 'doesn't know what we do at work' or just 'very text book'. It seems that some students felt there was a big gap between what happened in the company and the expected support from their academic supervisor. This was more prominent when the lecturer failed to visit the students at the work site.

Through their feedback at the end of the Project Module implementation, there seems to be a problem for the lecturers. There is a lack of knowledge and buy-in to be able to implement the method effectively. A lecturer said that he was 'forced to implement it'. Project Module was a method that was given, rather than one of choice. Overall, when asked whether Project Module is superior compared to other methods in this course, the lecturers gave low scores. The results from the lecturers' survey is presented in Table 5 below.

| No | Questions                                                                                                          | AVERAGE<br>(out of 5) |
|----|--------------------------------------------------------------------------------------------------------------------|-----------------------|
| 1  | I have achieved the CLOs of this course well using Project Module                                                  | 4.0                   |
| 2  | I have achieved the additional learning outcomes I intended using Project Module                                   | 4.0                   |
| 3  | The coaching session went well                                                                                     | 4.0                   |
| 4  | Having students working in a real company project is valuable for their learning process in this particular course | 4.3                   |
| 5  | The company we work with is supportive of the students' learning                                                   | 4.3                   |
| 6  | I work well with the company and/or company mentor                                                                 | 3.3                   |
| 7  | The Project Module method is superior to regular teaching methods                                                  | 2.7                   |
| 8  | I have a network that can cater for future Project Module implementation                                           | 3.3                   |
| 9  | I am satisfied with the implementation of Project Module in my class                                               | 4.0                   |

**Table 5:**  
Results of lecturers' survey

There seems to be a contradiction in the result. Lecturers indicate that Project Module is suitable for delivering the intended outcomes, and that it is able to give valuable opportunities to students, but they do not think that it is a better method, that it is valuable personally for their networking purposes, or that they work well with the company. This may indicate that having to coordinate with external parties makes lecturers feel uncomfortable, even though it is valuable for students.

The coordination effort was also felt by the companies. Students' scheduling was messy, and not well communicated. The students often asked for leave to go to campus after giving only one day's notice or even sometimes on the same day. In such cases, the students claimed that the campus had only just told them about the time. This was a significant risk for the company's resource scheduling. This coordination problem should be seriously considered in the future by developing better communication lines between the three parties – students, campus and company.

## **6. Lessons learnt, further thoughts and feasible actions**

### *Lessons learnt*

Through the feedback and reflection activities, we learnt some important lessons from the pilot of Project Module:

- The importance of buy-in. Feedback from the lecturers shows that it is important to get a strong buy-in from lecturers prior to execution. A method might be good, but without the motivation to implement it well, the result will not be as good. In this case, although the students indicated their satisfaction and the company was also keen in the whole project, the lecturers failed to utilise the opportunity for their own development.
- Commitment and communication. The university needs to maintain students' commitment to the company. If a schedule has been agreed by the three parties, it means that the university will respect and prioritise the company's schedule, and vice versa. This will ensure the company's commitment and satisfaction with the students' attendance.
- Role clarification. The role of the company and lecturer supervisors should be specified clearly to manage the expectation of the students, company and lecturers.

### *Further thoughts*

Project Module practically demonstrates what Boud, Solomon and Symes (2001) conceived in bringing together universities and companies to create new learning opportunities in the workplace. This opportunity enables experiential learning to take place effectively by letting the students work on actual projects with real clients such as Insto and Enervon. In Project Module, learning was consolidated through learning from company tutors as experts, doing hands-on activities, and facing a real situation. Student reflection played a key role in the successful learning, as indicated by the company supervisor who gave homework and assignments to further test the students' knowledge about the technology. The regular meetings with the lecturer supervisor has bridged the gap between the theory taught within the classroom and the experiential learning from work practice, as the students said: 'The lecturer helped us to understand the assigned projects more'. High student satisfaction with the Project Module pilot might have suggested that Kolb's experiential learning cycle (1984) can really be put into practice.

It is universally agreed that students on certain courses should cover certain content and possess particular skills. The current practice of applying outcomes-based education (OBE) in the course design embodies a closed situation in learning, where student attainment of the intended cognitive outcomes transpires through assimilating the pre-existing learning material and is validated through assessment instruments aligned with the intended outcomes. Thus, the learning forms a closed-loop cycle, often known as constructive alignment (Biggs, 2003). The evidence of the pilot, however, shows that such intended outcomes pre-casted in a learning plan both led to a deficit as well as a surplus of learning, as indicated by the results of the survey in Table 5. On one hand, there is a deficit since not all of the outcomes listed in the learning plan could possibly have been realised just by doing the project during the internship period. On the other hand, there is a surplus because some unintended outcomes have occurred, such as the acquisition of new technology beyond specified outcomes, or the students' professional character development by emulating their company supervisor. While the deficit could possibly be remedied by the lecturers' coaching, the surplus seems difficult to properly assess due to the variations in the emerging skills developed at the workplace. At the end, awarding a fair marks to the students can be tricky.

The apparent lack of buy-in from the lecturers when conducting the Project Module pilot may be due to a number of factors. The fact that one lecturer said the use of Project Module was obligatory might convey the message that an insufficient induction to Project Module might have occurred. On a theoretical level, the subconscious belief teachers have in certain learning theories may also affect how the lecturers perceive and make use of new learning methods. Apparently, the setting of Project Module has ensured that the teachers' perceptions

of teaching, such as 'what students are' and 'what teachers do' (Biggs, 1999) could be changed. However, aligning the intended outcomes with proper assessments for learning by performing the company tasks can be challenging, even for seasoned and motivated lecturers. Moreover, with the tendency for new managerialism in higher education (Biggs, 2013), lecturers have greater workloads and are subject to more pressure at work. Lecturers can be overworked and isolated in the course of delivering the expected performance.<sup>2</sup> Therefore, the indication of low engagement of lecturers in facilitating university/company communication during Project Module cannot not be blamed on the lecturers alone. Generally speaking, despite their reasonable protestations, the practice of new managerialism is becoming more prevalent around the world. Hence, the development of Project Module should take the trends of the lecturer workload model into account.

### *Feasible Action*

Below are some actions that can improve the implementation of Project Module:

- Develop the ability of students and lecturers to conduct reflective practices
- Train students and lecturers in the techniques of reflective writing
- Conduct a professional development programme to equip lecturers with facilitation, coaching and mentoring skills

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<sup>2</sup> See: <https://www.theguardian.com/higher-education-network/blog/2014/may/08/work-pressure-fuels-academic-mental-illness-guardian-study-health>

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## Appendices

| Semester | Courses                              | Intended outcomes                                                                                                                                                                          |
|----------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| First    | Software engineering                 | Understand fundamental concepts of requirements engineering and use of software in UML (Unified Modeling Language) to express and analyse software requirements, design and implementation |
|          |                                      | Use software development tools such as integrated development environment (IDE), configuration management systems, software modelling tools and testing tools                              |
|          |                                      | Use well-known software engineering design patterns                                                                                                                                        |
|          |                                      | Understand the issues concerning software safety and ethical issues in software engineering                                                                                                |
| Second   | Wireless mobile software engineering | Demonstrate effective teamwork to accomplish a common goal                                                                                                                                 |
|          |                                      | Apply design and development principles in the construction of mobile software systems                                                                                                     |
|          |                                      | Analyse problems, and identify and define computing requirements appropriate to the problems                                                                                               |
|          | Distributed systems                  | Apply different distributed application development methods and techniques, including the use of cloud administration and application development tools and API                            |
|          |                                      | Identify the challenges and requirements in distributed application including cloud                                                                                                        |
|          |                                      | Integrate distributed systems principles in cloud-distributed systems application                                                                                                          |
|          | Enterprise applications              | Design, develop and evaluate computer-based systems, processes, components or programmes to meet desired needs                                                                             |
|          |                                      | Describe best practices and other advanced issues in business component development with enterprise technology                                                                             |
|          | Pervasive computing                  | Conceive and develop applications for a specific mobile computing platform that addresses social or educational needs or business opportunities                                            |
|          |                                      | Apply current techniques, skills and tools creatively to produce innovative mobile application                                                                                             |

**Table 6:**  
Intended learning outcomes of the piloted courses

# Students Teaching Students: Do They Really Learn by Teaching Others?

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## **Abstract:**

Accounting curricula are often criticised for being too technical and ignoring important workplace skills such as critical thinking, communication skills and teamwork. To complement the technical skills emphasised by the curriculum, the international accounting programme at Bina Nusantara University trialled the Learning by Teaching method on two accounting courses. Although students did not like the extra work and the pressure of speaking in public, they found the experience valuable. Students from both classes said that they learnt more deeply and prepared seriously for their teaching session. They identified extra skills learnt from using this method, including teamwork, communication skills and time management. However, this pilot also showed that junior and senior students have a different reaction to the method, which should be taken into account in future implementation of this method.

## **Keywords:**

peer mentoring, learning method, accounting, soft skills, technical skills

## **1. Introduction: Accounting education and the need to incorporate non-technical skills**

The significant influence of the accounting profession on accounting education has been well documented for many years (e.g., Gaffikin, 2009, Verhoef & Samkin, 2017). This is also the case in Indonesia, where the Indonesia Accounting Association (Ikatan Akuntan Indonesia – IAI) has a very significant influence on accounting curricula and vice versa. The accountant professional degree is granted through a certification course run by selected state universities approved by the IAI. Although there are no specific studies on the relationship between academia and IAI, it can be inferred that both parties influence each other in accounting education.

However, despite the closeness between profession and education, accounting curricula are often criticised for their rigidity. A literature review of accounting education topics in six prestigious accounting journals between 2013 and 2014 shows the need to go beyond technical skills in accounting education (Apostolou, Dorminey, Hassell & Rebele, 2015). Similar findings in individual studies were found in New Zealand (Gaffikin, 2009), South Africa (Verhoef & Samkin, 2017) and the US (Fischer & Friedman, 2015). Fischer and Friedman (2015) also argue that today's accounting education in the US fails to recognise 21st century skills by focusing on technical skills. Furthermore, Friedman (2014) focuses on the fact that employees without tertiary qualifications are on the increase at Google, due to the failure of tertiary education to teach what really matters for employment.

Moving to a student-centred approach is a necessity. In the era of information technology and with the rise of the millennial generation who are technology-savvy, traditional teaching is considered old-fashioned and does not match the learners' style, and teachers need to factor in the generational differences (Roberts, Newman & Schwartzstein, 2012). On top of keeping up with the generation gap, moving towards student-centred learning is also one way for higher education to prepare students for life after study. It is undeniable that society puts pressure on higher education to produce an able workforce, which should have a certain skill set. The World Economic Forum has listed the top 10 skills needed in 2020, which include: complex problem-solving, critical thinking, creativity, people management, coordinating with others, emotional intelligence, judgement and decision-making, service orientation, negotiation and cognitive flexibility (Gray, 2016). This pressure forces higher education to change their orientation from delivering discipline-based knowledge only to covering the skills needed to enter the workforce.

To respond to the global trend, the International Accounting and Finance Department at Bina Nusantara University joined the INDOPED project to trial the implementation of new learning methods in partnership with Turku University of Applied Sciences (TUAS) from Finland. The learning method chosen was Learning by Teaching (LbT), which is a kind of peer mentoring

scheme. The objective of the paper is to describe the accounting students' perception of their learning experience using the LbT method in two different courses. The first was the seminar in thesis course that focuses on abstract, theoretical and technical skill-learning materials, while the other was intermediate accounting, which emphasises technical learning materials.

## **2. Peer mentoring as active learning**

Incorporating non-technical skills can be done through the way the learning is delivered. Active teaching methods have been promoted as being able to build up skills such as negotiation, group work, communication, reflectivity and critical thinking. Active teaching methods are defined as learning activities in which students research, discuss and interact with each other (Cameron et al., 2015), and include methods such as group discussions, flipped classroom, experimenting and peer mentoring. These methods promote engagement and interaction between students, students and teachers, and students and content.

Peer mentoring is a method commonly found in higher education and in the workplace. Usually it is part of a transition process such as mentoring new students and new employees to increase retention. It is less common to use mentoring formally in classroom context. However, there is a strong belief within education that students can retain up to 90% of what they teach to others compared to only 5% when they learn it through lectures (Letrud, 2012). Although there is no empirical study on the accuracy of this popular belief, many people experience this at least once in their lives.

Peer learning is defined as 'a two-way, reciprocal learning activity' that is mutually beneficial and 'a way of moving beyond independent to interdependent or mutual learning' (Boud, 2001). The implementation can vary to include collaborative learning and cooperative learning, group mentoring, peer tutoring, supplemental interaction, peer-assisted learning, peer assessment, dialogical pedagogy, reciprocal teaching and classroom talk (Haynes et al. 2016).

Two studies in an accounting education context show that peer mentoring can be an effective method. Fox, Stevenson, Connelly, Duff and Dunlop (2015) investigated a mentoring programme for new students in an accounting programme in the UK. Each new student is paired with a third year student, and a set of commitments is set by the institution. This mentoring scheme does not specify which course was piloted, and it aims to increase student retention instead of achieving a specific set of course learning outcomes. The results show that first-year students who were involved in this scheme did better in their marks. However, the third year students did not enjoy the same results. There are no significant differences in marks between third year students who mentor and those who do not. A second study by Wheaton, O'Connell and Yapa (2016) on auditing students in a university in Vietnam reported the use

of the inter-teaching method in tutorials. Inter-teaching resembles a mix of flipped classroom and group discussion. Students were divided into small groups to work on problem-solving in tutorial sessions, but the tutorials were conducted prior to the lecture session. Comparing the fail rate of students from lecture-based tutorials and inter-teaching tutorials, it was found that inter-teaching classes have fewer students who fail. Although both studies use peer mentoring in both studies, the first one did not specifically measure accounting course attainment, and the second study does not formally assign the roles of mentor–mentee. The Learning by Teaching method addresses these issues by making it specific to achieve course learning outcomes and think about the benefits for both mentor and mentee.

The INDOPED team at Bina Nusantara University chose LbT to increase students' feelings of responsibility for their learning. Teaching is a daunting task, and it needs a combination of skills such as public speaking, overcoming fear, time management, planning and preparation. Teachers are put on the spot, and they should be ready to handle unexpected things. On top of that, they have to know the material they teach very well. In addition, putting students in a teaching role is also a way to put them in the lecturers' shoes. Many students criticise their lecturers as boring, strict, ignorant or unfair. With LbT, students can try to be a better teacher than their lecturers.

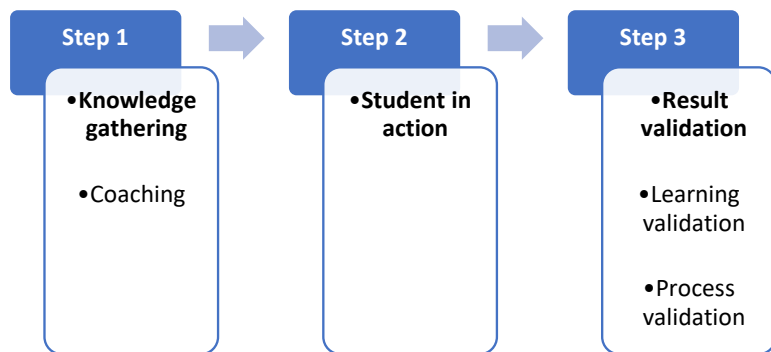
### **3. LbT in the accounting programme at BINUS University International**

Learning by Teaching (LbT) is a peer mentoring scheme that can be used to deliver discipline-based courses. Designed by TUAS, the basic tenet of LbT is that students teach other students who are at a lower educational level. The key elements of LbT as explained in the INDOPED learning method descriptions, as follows:

- **Group formation:** Students work in small teams of 3–5
- **Preparation:** Teams learn the chosen training subject including information, references and videos about the subject. Teams prepare training lessons (contents, materials, tasks in training and homework)
- **Coaching by the lecturer:** Before training, teams present their plans to teachers and other teams and edit their plans based on other feedback from others
- **Organisation:** Teams organise the dates of the training lessons with a contact person from the organisation at the lower educational level

- **Implementation:** During the training, the teacher and the teams have regular meetings where good practices are shared and problems or challenging situations are discussed and solved together
- **Evaluations and reflection** are based on self, peer and teacher assessments as well as feedback from training participants (pupils and teachers)
- **Appreciation:** After training, students get a certificate for acting as a trainer

Before executing the project, the INDOPED team at BINUS specify a set of protocols to provide a standard in LbT implementation (see Figure 1). To be able to measure the success of this programme, an action research plot was designed. The project was divided into three blocks: pre-implementation, implementation and post-implementation. The team created assessment instruments that are incorporated into each stage. The assessment purposes were to monitor students' attainment in the course material, and to provide support for lecturers should they need it. The pre-implementation contains students' preliminary questionnaires; in the implementation stage, a reflective questionnaire was given to the lecturers to assess the success or the need for further support; and the post-implementation was also about the research method. Reflective activities were designed for after the group teaching (see Figure 1)



**Figure 1:**

LbT protocol of the INDOPED project pilot at BINUS University

Two classes were chosen as pilots: seminar in thesis (SiT; semester 6) and intermediate accounting (semester 2). In each class, students chose their team and maintained the work in this team. Each group was given a topic based on the syllabus. The groups were responsible for their students' understanding of the topic. Two different types of students were targeted in the pilots. Students in the SiT class were assigned to teach their peer, while intermediate accounting students were assigned to teach senior high school pupils.

Prior to their teaching, the groups met the lecturers once or twice to discuss their materials and the delivery. The lecturers limited the slides that the groups used to present their materials and encouraged them to implement active teaching, such as role play, games, asking questions, discussions and so on. After the implementation of the teaching, the groups met the lecturers to discuss their teaching experience and fill in the reflection form. This article describes the students' opinions about their teaching experience based on the written reflection. A separate discussion on each subject (course) will be presented next.

### *SiT students' responses*

SiT is a sixth semester course, and there were 18 students on this course at the time of LbT implementation. The course's main outcome is that students are able to compose an individual thesis proposal. Therefore, the course materials range from finding a literature gap and literature review (more towards abstract knowledge) to the data analysis (more towards technical skills). The LbT method is focused on the data analysis. The students were grouped into five groups, and each was given one specific piece of data analysis software (MS Excel, Stata, SPSS, SMARTPLS and NVIVO) to learn and teach their fellow students in the class. The groups had to learn how to operate the software independently, using a data analysis task given by the lecturer as a learning tool. In the coaching time, the groups presented the teaching plan as well as the class activities to the lecturer. The lecturer gave feedback on their plan and materials.

The teaching took place in the computer lab. On the day of teaching, the groups demonstrated how to operate the software by analysing the dataset according to the task objectives. They also had to answer questions from their peer students. Then the groups asked their fellow students to practise the software on each PC using a task they had prepared. The group members provided assistances to the students when required. All the fellow students' works was saved and emailed to the lecturer.

After the teaching, the groups met with the lecturer to discuss their self-evaluations and comments from the lecturers. Then, the groups filled in the reflection form, which is a combination of closed questions in a questionnaire using a Likert scale of 1-5 and open-ended questions. The responses to the close questions are summarised in Table 1.

| Question                                                 | No. of responses | Median | Minimum | Maximum |
|----------------------------------------------------------|------------------|--------|---------|---------|
| Achievement of topic's intended learning outcomes (ILOs) | 18               | 4      | 4       | 5       |
| Achievement of non-course ILOs                           | 18               | 4      | 3       | 4       |
| Teaching satisfaction                                    | 18               | 3      | 2       | 4       |

**Table 1:**  
Responses to closed questions

Through the combination of close and open-ended responses, students seem to have mixed feelings about this method. Most of them believed that they had achieved their session learning outcomes as they either answered 4 (89%) or 5 (11%). Most of them (78%) also thought that they themselves have achieved more than just the intended research skills. Beyond mastering the software they were supposed to teach, they identified the following additional soft skills they learnt: public speaking, teamwork, self-confidence and patience. In addition, some said that they gained a deeper understanding of the software.

However, although they thought they had done well and learnt more, not all of them were satisfied with their own sessions. The median score was 3, which indicates that most students were neither satisfied nor dissatisfied. This is surprising, as all of them claimed that the intended learning outcomes had been achieved. One student comment was: 'I feel that our group could do better if we had more practice. Though it went well, we could always have dig more deeply on delivering the materials [S11]'. This indicates that students have higher expectations of how to teach. It's not only that the material is delivered as planned; the session has to be good, too.

In reflecting on what worked well in the session, students mostly said that classroom participation was good. This can be interpreted as responses from their audience and engagement with learning activities. There are more varied answers for what did not work well during the session. Many felt that although they understand the software they taught, there were still some questions that they couldn't answer. Mastery of topic is important for them to enable better interaction with students. Other answers were related to technical limitations, such as time constraints and the confusion brought about by managing both demonstrating the software and talking at the same time.

When reflecting on their own learning as to whether LbT is a suitable learning method for the topic they chose, most students agreed that it is suitable. They stated that LbT encourages deeper learning about the topic. A few specifically mentioned that LbT is an effective method for learning. Only two students conveyed disagreement, and commented that 'the method is not suitable because we need to have extra understanding before teaching [S8]'. This may imply that some students have an issue with the extra work it takes to learn before they are able to re-teach the material to others.

### *IA students' responses*

Intermediate Accounting (IA) is a second semester course. There were 34 students in the class. The course's main outcome is that students are able to conduct accounting (identifying, recording and presenting financial statements) in various business transactions. Compared to SiT, this course requires students to practise making judgements and technical skills more.

The implementation of LbT in this course is similar to that in SiT. Students were grouped into eight groups. Each group was assigned a specific topic to teach. For comparability, only six groups were assigned to teach the senior high school pupils, while two other groups (five students) were assigned to present to the lecturers. Prior to their teaching, each group had two coaching sessions with the lecturers to discuss learning materials and delivery mode plan.

The LbT session was conducted at the BINUS campus, in conjunction with BINUS' marketing activities. The pupils were invited to BINUS for a campus tour and were split into two classes. In each class, the pupils were taught three accounting topics for 2.5 hours. Each group was given 30 minutes to conduct their LbT. The group teaching was assessed by the lecturers for summative assessment and by the pupils for formative assessment.

After the group teaching, each student who taught senior high school pupil was required to complete the reflection forms/questionnaire – the same questionnaire given in SiT course. Table 2 summarises the students' response to questions.

| Question                                                 | No. of responses | Median | Minimum | Maximum |
|----------------------------------------------------------|------------------|--------|---------|---------|
| Achievement of topic's intended learning outcomes (ILOs) | 29               | 4      | 2       | 5       |
| Achievement of non-course ILOs                           | 18               | 4      | 1       | 4       |
| Teaching satisfaction                                    | 18               | 4      | 2       | 5       |

**Table 2:**

The responses to closed questions in intermediate accounting

More variation in students' feelings were shown in this class. Almost half of the class (48%) gave a score of 4 to the question of how they consider their achievement of the topic ILOs. Confidence was not as high as it was among the SiT students. Moreover, 31% of students gave a score of 5 to the question indicating that they strongly agree that they achieved the topic ILOs, and the percentage is higher than that from the SiT class. However, there were six students who gave scores of 3 and 2, showing they did not think they achieved the ILOs.

Most students who thought that they achieved the course ILOs also agreed that LbT is a suitable learning method for an IA course. 'It gives you the chance to reflect on how well you understand the topic as you have to teach others (about) the topic [S22]'. The most common answer was that the method helps students to understand more about the topic they taught. Six students stated that the method is unsuitable for an IA course. They reasoned that they prefer to have the topics taught by the lecturers, first, before they teach it to others. There was a particular student who thought that they achieved the topic ILOs (a score of 4 for question 1), but disagreed on the suitability of the method. The student commented '(the method) is unsuitable because we don't learn it before [S19]'. This is a rather contradictory answer from a student who thinks that LbT is not suitable for an IA course, yet they admitted that they experienced deep learning. This implies that some students still could not realise the advantage of deep learning on the achievement of ILOs.

Thirteen students (45%) gave a score of 4 for the question of whether they achieved more than the topic ILOs. Fewer students (17%) felt that they achieved more than the ILOs. However, when they were asked to mention the additional achievement, only 15 students answered the questions. The additional achievements most mentioned were communication, social and teaching/presentation skills. Other achievements stated are self-confidence and learning skills. Six students (21%) were not sure whether they learnt more than the topic ILOs, and the remaining (17%) answered 2 and 1 for the question, implying that they did not think they learnt more than the ILOs.

Unlike their seniors (the SiT students), the median score for teaching satisfaction was 4. About 70% of students gave a score of 4 or 5 for the question. When asked further about the reasons for the satisfaction, most students recalled the good engagement of the participants. This indicates that the students implemented interactive communication during their teaching sessions. There was a particular student who was satisfied for personal reasons: 'I am satisfied because (I enhanced my) self-confidence [S6]'. There were six students who were unsure about their satisfaction, 'I feel that some materials were delivered well, but some parts were not satisfying since they (the participants) were quite confused, but at the end they understood [S11]'. Furthermore, students who were dissatisfied with their teaching referred to nervousness and lack of preparation.

### *Discussions*

The pilot of LbT method in the international accounting and finance programme at BINUS University International shows interesting results. The overall implementation can be considered successful, as the teaching and learning process was completed without major disruption for both courses. However, students' ratings on their attainment of the technical skills, other skills, and satisfaction with their performance showed some variations based on the cohort.

Based on the attainment of technical skills, or the attainment of session-intended learning outcomes, students from both courses agreed that they met the outcomes. However, the more senior cohort (semester 6 students) seemed to be more confident than their junior (semester 2) counterparts. The semester 2 students taking IA gave more varied scores, between 2 and 5 in response to the question, compared to semester 6 SiT students, who scored between 4 and 5. This trend was also apparent in the question related to attainment of other skills outside the technical skills, in which the more junior cohort scored between 1 and 4, while the more senior students scored between 3 and 4.

Active teaching methods have been found to be confusing and might raise misunderstanding from the audience. Unlike passive teaching, which relies on the volume of material shared in a certain amount of time, the amount of learning is less visible in active teaching. Students need to actively engage with, reflect on and construct meaning from independent and group activities. For more junior students, this may be more difficult to take in, as their specific accounting knowledge and learning experience are much shorter than the semester 6 students, who are already preparing to write their bachelor's theses. Cameron et al. (2015) found similar results in their study, in which junior students identified themselves as passive learners before and after exposure to active learning methods.

The qualitative data also strengthened the quantitative data. Students were divided in their opinion as to whether LbT is suitable method for their courses. There were more junior students who expressed disagreement with LbT as a learning method, mostly stating that they need to be taught the material first by the lecturer before they can re-teach it. This may show that they did not feel confident in their own learning, despite the coaching given by the lecturers. Moreover, there might be a risk that although students recognised that they gained a deeper knowledge of the topic as a result of teaching others, they might not value it because the perceived benefit might not as big as the perceived cost of the extra effort in the learning process.

The more senior students were also more confident and articulate in defining the skills they learnt. They knew that they gained non-technical skills and can define them: public speaking, teamwork, self-confidence and patience. In contrast, the more junior students can recognise that they gained more than usual, but they did not readily recognise the specific skills. This may indicate that more junior students need more cues to understand the benefit of active learning in order to avoid resistance.

## 4. Conclusion

Overall, the implementation of LbT in International Accounting and Finance at BINUS University, can be considered a success. The aim of the pilot, which is to combine non-technical and technical skills through the learning method, has been achieved successfully. Regardless of the cohort, students agreed that they have learnt skills through the activities in LbT, either from teaching their peers or a completely different group of people.

For future implementation, we recommend that different cohorts may need slightly different treatment. More junior students need more direction as to why they need to do different things and what they will gain from it. More senior students have more knowledge and experience, so they are more prepared to experiment with different things in teaching. The lecturers who coached them also find it different, in that more junior students need more assurance and input with their teaching material, whereas they can give more attention to the session plan and the activities with the more senior students.

This study supports Cameron et al. (2015), who states the non-technical skills can be nurtured through the delivery of technical learning materials. Some students even identified the benefit of the LbT method as being to enhance their self-confidence. However, some students find the LbT method too time consuming – in the early semesters, they still have other courses to attend to. This comment can be considered feedback when considering what year the LbT method implementation is most suitable for.

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# Fostering Good Citizen and Worker Skills Through Learning by Teaching Projects

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## **Abstract:**

Higher education institutions around the world are expected to equip young people for the jobs market. Simultaneously, they are also expected to produce good citizens. Meeting industry demands and society's expectations is one of the crucial components in designing the higher education curriculum. This paper aims to describe the new pedagogy approach of civic education in one Indonesian private international university. The study focused on the implementation of character-building courses, especially the course specifically related to civic education. The data was collected using a qualitative approach to answer how the university implements civic education as part of the national curriculum and tailors it to meet the demands of industries, including how it equips graduates with worker skills. The research showed that developing worker skills can be done through civic education projects, especially through Learning by Teaching projects, where teams of students design and implement teaching sessions to solve community issues.

## **Keywords:**

Civic education; Learning by Teaching; worker skills; good citizen skills

## 1. Introduction

Castro and Levy expounded the four functions of higher education in various parts of the world. First, the academic leadership function, which involves what scholars usually identify with quality – a highly prepared faculty; sophisticated original research published in rigorously reviewed, internationally recognised outlets; graduate education; and selective undergraduate education. The second function is professional development, which mostly refers to the preparation of students for specific job markets requiring advanced, extensive formal education. Thirdly, the technological training and development function. This is mostly about preparation, often short term, for direct insertion into the job market. Last is the general higher education function, which is set up as professional education, but students wind up working in jobs other than those directly in the studied subject matter. It is probably the form through which most students in large higher education systems can develop analytical reading, writing and thinking skills that will be useful in a variety of possible jobs – and in broader roles as citizens (Castro and Levy, 2011).

Higher education institutions around the world are expected to equip young people for the jobs market. Meeting the industry needs is one of the crucial components in designing the higher education curriculum. The World Economic Forum shared the Top 10 Worker Skills Needed in 2020 (Gray, 2016):

1. Complex problem-solving
2. Critical thinking
3. Creativity
4. People management
5. Coordinating with others
6. Emotional intelligence
7. Judgment and decision-making
8. Service orientation
9. Negotiation
10. Cognitive flexibility

In this industrial revolution, there are changes in required skills needed by workers by 2020. Creativity will become one of the top three skills workers will need. With the avalanche of new products, new technologies and new ways of working, workers are going to have to become more creative in order to benefit from these changes. Robots may help us get to where we want to be faster, but they can't be as creative as humans (yet). Whereas negotiation and flexibility are high on the list of skills for 2015, in 2020 they will begin to drop from the top 10 as machines, using masses of data, begin to make our decisions for us. A survey done by the World Economic Forum's Global Agenda Council on the Future of Software and Society shows people expect artificial intelligence machines to be part of a company's board of directors by 2026. Similarly, active listening, considered a core skill today, will disappear completely from the top 10. Emotional intelligence, which doesn't feature in the top 10 today, will become one of the top skills needed by all (Gray, 2016).

Mitchell (2017) also stated that colleges and universities must create a dynamic, information-driven, creative and entrepreneurial culture where to be a part of global society requires the skills that make civic education vital again. Higher education institutions design their vision, missions and curricula to meet these expectations. At the same time, Indonesian universities follow the same method. Furthermore, Indonesian higher education institutions are highly regulated by the national curriculum. According to National Law, UU No 12 (2012), four mandatory courses must be included nationally in the higher education curriculum: Pancasila (the national ideology), civic education, religious education (according to one's belief), and Bahasa Indonesia (Indonesian language) (Indonesian Ministry of Education, 2012). The university must find ways to achieve both national curriculum goals and industry's demands.

## **2. Research method**

This paper aims to describe the new approach of civic education in one Indonesian private international university located in Jakarta, the capital city of Indonesia. The university has a mix of nationalities. In 2018, among the total active students (1100) the majority of students were Indonesian citizens and were Christian. This study focused on the implementation of character-building courses, especially the course specifically related to civic education.

The research question is: how does the university implement civic education as part of the national curriculum and tailor it to meet the demand from industries, which is to equip graduates with the worker skills? To answer this question, this research used a qualitative research method. Qualitative research is conducted through an intense and/or prolonged contact with a 'field' or life situation. These situations are typically 'banal' or normal ones, reflective of the everyday life of individuals, groups, societies and organisations (Miles and Huberman, 1994). The data was

collected through one 13-week semester of classroom observation. Across the university, there were eleven classes of character building: civic education taught by five faculty members during one semester in 2018. Each classroom consisted of 20–25 students. Weekly observation was conducted in two classes taught by two faculty members. Complete participant observation was conducted; Spradley (1980) explained that the highest level of involvement for ethnographers probably comes when they study a situation in which they are already ordinary participants. The researcher followed the training introducing the method Learning by Teaching and used it in the classroom, in order to experience first-hand how the new teaching method can be used to achieve two goals: teaching students to be good students as part of the national curriculum, and developing worker skills that are needed when they graduate from university. The researcher also followed the civic education meetings at the beginning of the semester and was involved in discussions with other fellow lecturers to hear students' progress in the classroom. In-depth interviews were conducted with two faculty members to gain information about designing lesson plans and teaching strategies of this new teaching method, and to identify things that worked well and did not work in the classrooms.

Qualitative research is the collection, analysis and interpretation of comprehensive narrative and visual (non-numerical) data in order to gain insights into a particular phenomenon of interest (Gay, Mills and Airasian, 2006). In addition to the classroom observations and interviews with two faculty members, student insights were gathered at the end of the semester by means of reflection papers based on a list of open-ended questions. In total, 78 students submitted reflection papers. The papers responded to three reflective questions aimed at capturing what students had learnt after completing their final project, i.e.: (1) What are the skills that you have learnt? (2) What important knowledge have you learnt? and (3) What kind of behaviour have you learnt?

### **3. Literature review**

#### **3.1 Civic education**

Civic education is one of the four mandatory courses that must be taught in Indonesian higher education. It is clearly stated in the National Law of Higher Education number 12 /2012 (The Law Number 12/2012) that civic education consists of learning *Pancasila* (the national ideology), Undang-Undang Dasar tahun 1945 (the 1945 Constitution), the Republic of Indonesia, and *Bhineka Tunggal Ika* or Unity in Diversity (the national motto); it all aims to shape students to be citizens with deep nationality and love of the homeland. (Indonesian Ministry of Education, 2012)

Nurdin explained the history of Indonesian civic education in his article entitled ‘The Policies on Civic Education in Developing National Character in Indonesia’. Civic education has been taught in schools and higher education since the mid-1970s. The obstacles encountered in the implementation of civic education as a medium for national character development are located in the commitment and quality of those who implement it and in the learning methods (Nurdin, 2015).

Budimansyah and Suryadi explained that civic education has three great missions: Firstly, as a preservation education of the noble values of *Pancasila*, the Indonesian national ideology; secondly, as social and moral development education, which aims to develop and guide students to be aware of their rights and responsibilities, obedient to the prevailing rules, and well-mannered; lastly, as a socio-civic development function, which aims to raise students’ understanding and awareness of their relationships within family, schools, society, and in the life of the nation-state.

Moreover, civic education is one of the fields of study that carry out the national mission of educating the lives of Indonesian people through the corridor of value-based education. Civic education, in addition to carrying the mission of sustaining the noble values of *Pancasila*, has the mission of developing students to understand their rights and responsibilities and be able to position themselves to be good citizens (Budimansyah and Suryadi, 2008).

## **4. Findings**

### **4.1 Learning by Teaching (LbT)**

Learning by Teaching is a teaching method developed by the University of Turku, Finland, and it was transferred to the five Indonesian universities involved in the Innovative Pedagogy Project in 2016. One of the universities that adopted this pedagogy method applied it in the general courses named Character Building: *Kewarganegaraan* (Civic Education). LbT has been implemented at this university for two years, with 12 faculty members and estimated 600 students involved in LbT projects.

In this Learning by Teaching method, students act as trainers (teachers) for pupils from lower educational levels (vocational schools/general upper secondary schools, comprehensive schools), for peers in the same classroom/group, or for students from different disciplines. Students work in small trainer teams in which the aim is to plan, organise and implement all the training independently. They plan and prepare the content of the training, all the materials and the tasks for pupils. The teacher’s role is to guide and give support and feedback to students (INDOPED Team, 2016).

In this method, students deepen their knowledge of the subject by training, learning to plan, organising and implementing training, learning how to guide, teach and motivate individuals, small and large groups, learning interactive and presentation skills, and learning to take responsibility. The method also brings variation to the traditional lessons and increases students' motivation (INDOPED Team, 2016).

#### 4.1.1 *Teaching strategies:*

The LbT method was applied in the general course named Character Building: *Kewarganegaraan* (civic education). This course is a series of character-building education lessons that aimed (1) to describe civic-related concepts such as citizens, social values, norms and national resilience; (2) to identify national identity and potential social conflict in Indonesia, potential threats to the archipelago, and challenges of national integration; and (3) to participate in a community and global citizen movement. The LbT method was incorporated into the final project assignment that was designed to achieve the third learning outcome. The course's duration was 13 weeks, with 100 minute-sessions per week.

The LbT project was a one-semester project. In it, students were expected to develop and execute a social movement project that aims to increase their social awareness by educating others. They conducted the project assignment in a team of three or four people. Students were asked to simply find a cause that they believed in and develop a plan for how to solve the community issue. Examples of LbT projects included promoting a healthy lifestyle in early childhood education, natural disaster education in high schools, teaching creative thinking in kindergartens, motivation sessions for orphanage children, and so on. The teams were free to choose the place where they wanted to teach: it could be in a formal setting like schools or an informal setting like street children shelters, orphanage houses, older people's homes or local NGO sites.

In the first week of the semester, the lecturers announced the expected learning outcomes, assignments and assessments. The course was designed in two modes of delivery. From week 1 to 7, the students learnt about the civic-related concepts, from week 8 to 13, it was less lecture-based but more focused on students' doing a team project. Students learnt not only theoretical concepts but also how to apply civic education skills by conducting a team project.

| Week | Students Activities                                                          |
|------|------------------------------------------------------------------------------|
| 1    | Listening to the explanation of LbT project instructions, and forming a team |
| 2    | Identifying the social issue that needs to be solved                         |
| 3-4  | Writing a proposal and permit letters                                        |
| 4-5  | Identifying potential partners, visiting NGOs, schools                       |
| 6-7  | Developing teaching materials                                                |
| 8-10 | Teaching in formal or non-formal institutions                                |
| 11   | Monitoring and evaluation                                                    |
| 12   | Writing a project report                                                     |
| 13   | Project report presentation                                                  |

**Table 1:**  
Learning by Teaching - Students' weekly activities

#### 4.1.2 *The roles of the lecturers:*

The lecturers had two roles on this course. The first role was being a conventional lecturer. The delivered materials were part of the national curriculum, they lectured using PowerPoint, conducted small and large group discussion, reading and analysing news, and so on. In this role, the lecturer prepared the students for the written mid-term exam. The second role was being a facilitator for the LbT project. Being a facilitator, the lecturers had a different approach towards the students. They handed over control fully to the students, starting from forming the team, then designing and executing the projects. The students had more freedom, received full responsibility to run their project successfully, and they were also required to solve issue within their team. As facilitators, the lecturers gave motivation to students to do their best and mostly listened to the team regarding the students' project progress. Students proactively asked for guidance. Moreover, if there was any term that they did not understand, they asked the facilitator about it. The questions concerned issues like sustainability, lesson plan, monitoring and evaluation. The facilitator challenged them to find out about the terms and then asked the students to explain it, and the facilitator provided corrections only if needed. The progress of each group also differed from one to the next, but the facilitator made sure that they all completed their projects by the end of the semester.

The LbT method has been implemented for the last two years. The challenges faced by the lecturers were to make sure the students were able to execute their teaching sessions, although they had four or five courses in that particular semester. The lecturers also provided extra hours after the class if the students wanted to consult them, or if they were facing an issue regarding getting approval to teach. The lecturers had to be able to switch their approach to students when they conducted LbT, and they changed their roles to become facilitators. During the

transition in roles, the lecturers did not announce it to the students, and as a result there were students who continued to ask the lecturers to make decision for their team. Meanwhile, as facilitators, they had to be able to encourage students to make the best decisions for their team. The university realised that shifting the role from lecturers to facilitators was not easy, therefore the lecturers monitored the training initially. The lecturers also held coordination meetings before the semester started, and they evaluated the previous semester and shared the LbT teaching method with the newly recruited lecturers.

Despite the challenges, the lecturers explained that LbT helped the students develop empathy with those involved in the teaching professions, to respect their lecturers, to become more mature, and to become more confident in speaking in public. The lecturers also learnt that there are many ways of learning and they learnt from the students' projects, and what concerned the students most. It also helped the lecturers to see from the perspectives of the students. The LbT projects were able to achieve learning outcome number 3, which was to participate in a community and global citizen movement. The most important thing was that the students were able to actively participate in being good citizens. They were not only criticising the government or condemning issues in society, but they were able to contribute and give an alternative solution. It fulfilled the expectation that higher education must be able to produce good citizens.

## **4.2 The link between civic education and worker skills**

The civic education focused on creating good citizens. A good citizen in democratic society is defined as a logical and well-informed decision-maker. They must have knowledge, skills and the right attitudes. The skills developed in civic education classes consist of two types of skills. First, critical thinking skills, for example: (1) to collect and analyse information, (2) to explain, clarify and prioritise, (3) to identify an alternative solution for every problem, (4) to identify and analyse consequences, and (4) to reflect and evaluate. Second, participation skills such as (1) to communicate well, to negotiate, compromise and reach for agreement, (2) to end a conflict peacefully and fairly, and (3) to watch and actively participate in politics and government.

Based on the classroom observation and students' reflections after completing the LbT projects, eight of the ten 2020 worker skills had been gained by students through the LbT projects.

| Worker skills                 | Learnt by Students through LbT |
|-------------------------------|--------------------------------|
| Complex problem-solving       | V                              |
| Critical thinking             | V                              |
| Creativity                    | V                              |
| People management             | V                              |
| Coordinating with others      | V                              |
| Emotional intelligence        |                                |
| Judgement and decision-making | V                              |
| Service orientation           | V                              |
| Negotiation                   | V                              |
| Cognitive flexibility         |                                |

**Table 2:**

The 2020 Worker Skills gained by Students through the LbT Projects

**Complex problem-solving** is the skill that the majority of students were not aware of. They went through a series of analysis to solve a community issue. The team started by brainstorming community issues, learning the root of the issues, and designing teaching materials to solve them based on the needs of the community. Although their projects may not immediately solve the issue, the students learnt the process of how to do complex problem-solving step by step.

**Critical thinking** was promoted by the lecturers when they switched their roles as facilitators. Lecturers are not the main sources of information, as unlike in conventional classroom management the lecturer must challenge the students to seek information, especially the teaching materials for their projects. Students gathered and carefully selected information that was suitable for their project.

**Creativity** means finding imaginative new ways of working with people who are referred or who ask for help (Jackson, Oliver, Shaw and Wisdom, 2006). Various creativities were demonstrated by students during the project report presentation. The students explained their teaching approach and additional activities that they conducted in the community. They creatively designed and adapted their materials in order to make the project bring benefit to the people.

**People management** is something that the students learnt when they worked in a team. They divided the roles in the team such as the leader, the material developer, the main contact of the project, the document keeper, etc. They learnt to delegate the jobs based on the pool of talents in the team. It is a practice of people management.

**Coordinating with others** happened during the stage of contacting the partners and when the team worked together. The projects had to be conducted off-campus. During week 5, the team of students visited non-governmental organisations to learn about what they do to solve community issues, and the students also seek partnership. Some students successfully work with the NGOs, but other students find alternative organisations or institutions to work with, such as schools, orphanages, older people's homes, reading clubs, street children's shelters, and other local community groups.

**Judgement and decision-making** happened through the project activities. The collective judgement and decision-making had to be made within the team, such as selecting the project topic, location for project implementation, the type of activities, things to do and not to do, the consequences of their actions, and so on.

**Service orientation** was something that the majority of the students become aware of. In order to maintain the reputation of the university, when teaching other people they needed to make sure that the people were pleased with their project. The LbT project is a social awareness project, so the teams had to consider activities that were useful to people. They talked to the leaders of the organisation before they conducted teaching sessions, and the students had to identify their expectations and demands while delivering the materials. The team also learnt and recorded the satisfaction of their 'students' or audiences.

*'The LbT project was filled with excitement and pleasure, getting to know people in other communities, experiencing what they were experiencing, and sharing our lives with other people by making them happy, even for a short while.'* (Imel, International Business)

**Negotiation** happened when the students were in the team and were dealing with partners. The teams wrote a letter prior to visiting and conducting activity to several organisations and institutions, and many received rejections but they learnt to negotiate. Meeting in a person, talking directly to the leaders and gaining approval to teach are examples of the negotiation process through LbT projects.

*'The project is a very good idea since not only we educate ourselves by reviewing, but we also share knowledge with those people who might lack access to education.'*  
(Cindy, International Business)

## 5. Conclusion

Research showed that it is possible for higher education institutions to incorporate the teaching of civic education skills and worker skills with a civic education project. The private university in Indonesia implemented Learning by Teaching projects where the students conduct a teaching project in order to solve a community issue, and this method can be seen as an alternative pedagogy approach. Teaching strategies and the roles of lectures are important in the implementation of the new teaching method.

The research has its limitations, such as how to measure the 2020 worker skills gained by the students. The assessments by the lecturers did not reflect this measurement. Therefore, the suggestion for the future research is to take a quantitative approach, so the success of this new teaching method in civic education can become apparent.

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# Piloting the Learning by Teaching (LbT) Method for Physics Study Programme Students, Widya Mandala Catholic University Surabaya

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## **Abstract:**

The Learning by Teaching (LbT) method is one of four other innovative methods piloted at Widya Mandala Catholic University Surabaya (WMCUS) since 2016 under the INDOPED project. LbT was chosen to be implemented because it was appropriate to improve the quality of students from various aspects, both in terms of academic and soft skills. The LbT method was piloted in the physics education study programme at WMCUS to teach compulsory courses called high school physics iv and calculus II. On the former course, several phases were conducted, i.e. (i) an orientation phase and learning contract, (ii) tutorial phase, (iii) pre-teaching phase, (iv) team teaching phase, and (v) review phase. On the calculus II course, several phases were conducted too, i.e. a (i) peer study phase, (ii) pre-test phase + traditional teaching class, and (iii) tutorial class + post-test phase. The results from high school physics IV showed the average score for the first half semester implementation was 72.01 (Grade B+, 3.3 points index from a maximum of 4), while the average score for the second half semester of

implementation was 75.61 (Grade A-, 3.7 points index from a maximum of 4). For the calculus II result, the average total score for the full semester implementation was 70.14 (Grade B, 3.0 points index from a maximum of 4). In conclusion, it can be argued that the LbT method can enhance students' participation and activities in the course. The implementation of each stage in the LbT method requires the students' activities in planning, preparing for lesson plans, conducting tutorials and taking important roles in teaching.

## **Keywords:**

Learning by Teaching (LbT); Students' activities; INDOPED Project; WMCUS

## **1. Background**

The Learning by Teaching (LbT) method is one of four other innovative methods piloted at Widya Mandala Catholic University Surabaya (WMCUS) since 2016 under the INDOPED project. The LbT method was piloted on the physics education study programme at WMCUS to teach a compulsory course called high school physics IV (2 credits), in the odd semester, and calculus II (3 credits) in the even semester.

Why implement LbT? LbT was chosen to be implemented because it was appropriate to improve the quality of students from various aspects, both in terms of academic and soft skills, especially for prospective teacher students who needed a lot of teaching practice before entering the world of work as teachers (Sarigöl & Akdeniz 2014). In general, there is a tendency for students to participate less actively during the teaching and learning process. During the learning process in the classroom, students tend to sit quietly and listen to teachers' explanations, as they are still regarded as the only source of knowledge (Zulfikar 2009). As a result, students' comprehension is still far from satisfactory and the lack of student participation causes a low comprehension level of learning material (Wilson & Peterson 2006).

In this research and implementation, students act as trainers or teachers for peers in the same classroom. Students are required to find sources of learning independently under the teacher's guidance. This will practically guide students to improve their ability to learn independently and their creativity in finding the right learning resources. In terms of group study, students are required to work together and communicate both in groups and classes. In addition, by implementing LbT, students may have more opportunities to improve their ability to plan, organise and implement teaching and training, apply several learning methods that have been studied theoretically, and have a lot of opportunities for teaching practice. In this learning process, students' presentation, interactive and problem-solving skills may also improve ([www.indoped.eu](http://www.indoped.eu)).

From the background described above and the understanding of the LbT method, the implementation of LbT is expected to be able to solve the existing problems and improve students' ability, in terms of understanding learning materials, learning process and soft skills.

## **2. The implementation of LbT on the high school physics IV course**

During the planning and preparation stage, the WMCUS LbT team planned every detail of the piloting. There were some adjustments before the LbT method was piloted on the course. The adjustments considered some aspects such as the difficulty level of course materials, student learning characteristics and culture, time allocation, and various components of the assessment system.

There were two periods of LbT piloting on the high school physics IV course: the first half period and the second half period. For the first half period, several phases were conducted, i.e. (i) the *orientation phase and the learning contract*, (ii) the tutorial phase, (iii) the pre-teaching phase, (iv) the team teaching phase, and (v) the review phase. In the orientation phase and learning contract, the students were given an explanation of the LbT method and any phases the students had to perform in piloting the LbT method. The students were also encouraged to understand all the benefits they could obtain while piloting the LbT as a new learning method. With regard to the learning contract, there were several things the students and the teacher had to agree on, i.e. student grouping, learning materials distribution, the assessment system and the weighting of each assessment method. In grouping the students, the teacher considered the heterogeneity aspect with respect to the students' academic abilities. The students were divided into groups depending on the number of learning objectives, and sub-chapters covered in the course materials. Each group was in charge of preparing for one sub-chapter material to teach to other fellow students. During the first half period of LbT piloting, the students were given a grace period of two weeks for the first two groups for carrying out teaching preparation prior to their teaching schedule.

In the *tutorial phase*, each group was given a tutorial by one student tutor assigned to assist them in understanding the learning objectives and preparing the teaching materials, including making a lesson plan. The tutorial had to be done outside of the regular class meeting schedule and the timing was quite flexible, depending on the agreement between the student tutor and student groups. Tutorial frequencies depended on the needs of the group concerned. The tutorial stage had to be completed before the pre-teaching phase.

**TUTORIAL PHASE: TUTOR ASSESSMENT**

**RUBRIC OF TUTORIAL ASSESSMENT**  
 Learning by Teaching Method – INDOPED Project  
 Name of the course: High School Physics IV

Day / Date : .....

Tutorial Place : .....

Student / Student Number : .....

Give a thick (v) for every aspect.  
 Grading score information:  
 1 = Poor  
 2 = Adequate  
 3 = Good  
 4 = Very Good

| No                           | ASPECT                                                           | SCORE |   |   |   |
|------------------------------|------------------------------------------------------------------|-------|---|---|---|
|                              |                                                                  | 1     | 2 | 3 | 4 |
| <b>Tutorial Preparations</b> |                                                                  |       |   |   |   |
| 1                            | Learning material preparations                                   |       |   |   |   |
| 2                            | Learning Idea                                                    |       |   |   |   |
| <b>During Tutorial</b>       |                                                                  |       |   |   |   |
| 3                            | Student participation                                            |       |   |   |   |
| 4                            | Delivering new idea during discussion                            |       |   |   |   |
| <b>Tutorial Outcome</b>      |                                                                  |       |   |   |   |
| 5                            | Capability about learning material after tutorial                |       |   |   |   |
| 6                            | Lesson plan (include how to chose the learning method and media) |       |   |   |   |
| <b>TOTAL SCORE</b>           |                                                                  |       |   |   |   |
| <b>AVERAGE SCORE</b>         |                                                                  |       |   |   |   |

**Figure 1:**  
 Rubric of tutorial assessment (assessed by tutor)

In the *pre-teaching phase*, each group performed teaching activities based on the previously formed lesson plan in front of the teacher and the student tutors. The pre-teaching phase was used as a quality control by the teacher to ensure the quality of materials and teaching activities performed by each group. After the pre-teaching phase there was usually some feedback from the teachers, and each group was required to revise their plans before implementing the teaching activities in front of their fellow students.

**PRE-TEACHING PHASE: TUTOR ASSESSMENT**

**RUBRIC OF PRE-TEACHING ASSESSMENT**  
 Learning by Teaching Method – INDOPED Project  
 Name of the course: High School Physics IV

Day / Date : .....

Pre Teaching Place : .....

Team/Group : .....

Give a thick (V) for every aspect.  
 Grading score information:  
 1 = Poor  
 2 = Adequate  
 3 = Good  
 4 = Very Good

| No                   | ASPECT                                                                  | SCORE                        |   |                             |   |
|----------------------|-------------------------------------------------------------------------|------------------------------|---|-----------------------------|---|
|                      |                                                                         | 1                            | 2 | 3                           | 4 |
| 1                    | Team preparation to do Pre-Teaching performance                         |                              |   |                             |   |
| 2                    | Was team utilized Innovative Learning Method ?                          | Yes <input type="checkbox"/> |   | No <input type="checkbox"/> |   |
|                      | If Yes, how is the utilization of Innovative Learning Method?           |                              |   |                             |   |
| 3                    | The knowledge about learning material, including problems and exercises |                              |   |                             |   |
| 4                    | Was team utilized Learning Media ?                                      | Yes <input type="checkbox"/> |   | No <input type="checkbox"/> |   |
|                      | If Yes, how is the utilization of Learning Media?                       |                              |   |                             |   |
| 5                    | Time management                                                         |                              |   |                             |   |
| 6                    | Compatibility of teaching performance and lesson plan                   |                              |   |                             |   |
| <b>TOTAL SCORE</b>   |                                                                         |                              |   |                             |   |
| <b>AVERAGE SCORE</b> |                                                                         |                              |   |                             |   |

**Figure 2:**  
 Rubric of pre-teaching assessment (assessed by tutor)

**PRE-TEACHING PHASE: TEACHER ASSESSMENT**

**RUBRIC OF PRE-TEACHING ASSESSMENT**  
 Learning by Teaching Method – INDOPED Project  
 Name of the course: High School Physics IV

Day / Date : .....

Pre-Teaching Place : .....

Team/Group : .....

Give a thick (✓) for every aspect.  
 Grading score information:  
 1 = Poor  
 2 = Adequate  
 3 = Good  
 4 = Very Good

| No                   | ASPECT                                                                  | SCORE                        |   |                             |   |
|----------------------|-------------------------------------------------------------------------|------------------------------|---|-----------------------------|---|
|                      |                                                                         | 1                            | 2 | 3                           | 4 |
| 1                    | Team preparation to do Pre-Teaching performance                         |                              |   |                             |   |
| 2                    | Was team utilized Innovative Learning Method ?                          | Yes <input type="checkbox"/> |   | No <input type="checkbox"/> |   |
|                      | If Yes, how is the utilization of Innovative Learning Method?           |                              |   |                             |   |
| 3                    | The knowledge about learning material, including problems and exercises |                              |   |                             |   |
| 4                    | Was team utilized Learning Media ?                                      | Yes <input type="checkbox"/> |   | No <input type="checkbox"/> |   |
|                      | If Yes, how is the utilization of Learning Media?                       |                              |   |                             |   |
| 5                    | Time management                                                         |                              |   |                             |   |
| 6                    | Compatibility of teaching performance and lesson plan                   |                              |   |                             |   |
| <b>TOTAL SCORE</b>   |                                                                         |                              |   |                             |   |
| <b>AVERAGE SCORE</b> |                                                                         |                              |   |                             |   |

**Figure 3:**  
 Rubric of pre-teaching assessment (assessed by teacher)

In the *team teaching phase*, each group performed teaching activities to fellow students in the class based on the lesson plan prepared beforehand. In the first half period of piloting the LbT method, the teacher was in the classroom when each group was carrying out the team teaching, but as much as was possible the teacher did not interfere in the process of team teaching. However, at the request of all students, there was one situation that forced the teacher to interfere and take over the role of explaining the learning materials. This invited criticism from the LbT consultant team from Turku University of Applied Science (TUAS) in Finland. There should not have been any interference because it could reduce the significance of the LbT process.

**TEAM TEACHING PHASE: STUDENT ASSESSMENT**

**RUBRIC OF TEAM TEACHING ASSESSMENT**  
 Learning by Teaching Method – INDOPED Project  
 Name of the course: High School Physics IV

Day / Date : .....

Pre-Teaching Place : .....

Team/Group : .....

Give a thick (v) for every aspect.  
 Grading score information:  
 1 – Poor, 2 – Adequate, 3 – Good, 4 – Very Good

| No                   | ASPECT                                                                              | SCORE                        |   |                             |   |
|----------------------|-------------------------------------------------------------------------------------|------------------------------|---|-----------------------------|---|
|                      |                                                                                     | 1                            | 2 | 3                           | 4 |
| 1                    | Team preparation to do Teaching performance                                         |                              |   |                             |   |
| 2                    | Was team utilized Innovative Learning Method ?                                      | Yes <input type="checkbox"/> |   | No <input type="checkbox"/> |   |
|                      | If Yes, how is the utilization of innovative Learning Method?                       |                              |   |                             |   |
| 3                    | Team deliver learning material clearly                                              |                              |   |                             |   |
| 4                    | Problems and exercises given                                                        |                              |   |                             |   |
| 5                    | Was team utilized Learning Media ?                                                  | Yes <input type="checkbox"/> |   | No <input type="checkbox"/> |   |
|                      | If Yes, how is the utilization of Learning Media?                                   |                              |   |                             |   |
| 6                    | Time management                                                                     |                              |   |                             |   |
| 7                    | Was audience team have good comprehension of learning material after team teaching? | Yes <input type="checkbox"/> |   | No <input type="checkbox"/> |   |
|                      | If Yes, how is whole team performance?                                              |                              |   |                             |   |
| <b>TOTAL SCORE</b>   |                                                                                     |                              |   |                             |   |
| <b>AVERAGE SCORE</b> |                                                                                     |                              |   |                             |   |

**Figure 4:**  
 Rubric of team teaching assessment (assessed by student)

**TEAM TEACHING PHASE: TEACHER ASSESSMENT**

**RUBRIC OF TEAM TEACHING ASSESSMENT**  
 Learning by Teaching Method – INDOPEP Project  
 Name of the course: High School Physics IV

Day / Date : .....

Pre-Teaching Place : .....

Team/Group : .....

Give a thick (V) for every aspect.  
 Grading score information:  
 1 = Poor, 2 = Adequate, 3 = Good, 4 = Very Good

| No                   | ASPECT                                                        | SCORE                        |   |                             |   |
|----------------------|---------------------------------------------------------------|------------------------------|---|-----------------------------|---|
|                      |                                                               | 1                            | 2 | 3                           | 4 |
| 1                    | Team preparation to do Teaching performance                   |                              |   |                             |   |
| 2                    | Was team utilized Innovative Learning Method ?                | Yes <input type="checkbox"/> |   | No <input type="checkbox"/> |   |
|                      | If Yes, how is the utilization of Innovative Learning Method? |                              |   |                             |   |
| 3                    | Team was succeed activating audience during team teaching     |                              |   |                             |   |
| 4                    | Team deliver learning material clearly                        |                              |   |                             |   |
| 5                    | Problems and exercises given                                  |                              |   |                             |   |
| 6                    | Was team utilized Learning Media ?                            | Yes <input type="checkbox"/> |   | No <input type="checkbox"/> |   |
|                      | If Yes, how is the utilization of Learning Media?             |                              |   |                             |   |
| 7                    | Time management                                               |                              |   |                             |   |
| 8                    | Compatibility of teaching performance and lesson plan         |                              |   |                             |   |
| 9                    | Whole team performance                                        |                              |   |                             |   |
| <b>TOTAL SCORE</b>   |                                                               |                              |   |                             |   |
| <b>AVERAGE SCORE</b> |                                                               |                              |   |                             |   |

**Figure 5:**  
 Rubric of team teaching assessment (assessed by teacher)

In the *Review Phase*, the teacher reviewed all of the materials delivered in the team teaching phase to consolidate and emphasise certain materials considered to be quite difficult.

With regard to the assessment system and the weighting of each assessment component, we present the details that were agreed as the learning contract below: (i) attendance (5%), (ii) tutorial phase (15%), tutor evaluation with rubrics (assessed by student tutor for each student), (iii) pre-teaching phase (15%), pre-teaching evaluation with rubrics (assessed by teacher and student tutor for each team), (iv) team teaching phase (20%), teaching evaluation with rubrics (assessed by teacher and other team for each team), (v) self-evaluation with rubrics + peer evaluation with rubrics (combined, assessed by students themselves, 15%) (the self-evaluation rubric and peer evaluation rubric were given to all the students during the interview session conducted after the mid-semester written test), and (vi) mid-semester written test (30%, for each student).

An *interview session* was conducted for each team to get feedback on the results of the first period of LbT piloting. In general, the LbT teams obtained positive feedback from the students. However, they also received some suggestions for improving the LbT piloting as follows: (i) longer time intervals were needed for teaching preparation and to meet the phases set out in the LbT system, (ii) each group needs to use more varied teaching methods so that the classroom atmosphere is not monotonous, (iii) each group should make prepare well to optimise the delivery of learning materials, and (iv) the tutorial process needs improvement.



**Figure 6:**  
Student interview session

### 3. The implementation of LbT on the calculus II course

LbT piloting on the calculus II course had different phases from the high school physics IV course. On the calculus II course, several phases were conducted, i.e. (i) peer study phase, (ii) pre-test phase + traditional teaching class, and (iii) tutorial class + post-test phase. Before those phases, as happened in the high school physics IV course, the students were given an explanation of the LbT method and any phases the students had to do in piloting the LbT method in the lecture of calculus II course. In addition, the students were also encouraged to understand all the benefits they could obtain during piloting the LbT as a new learning method. These phases were repeated every week.

Technically, in the peer study phase before the start of the course, the students were required to learn about course materials that would be given in advance. The students were formed into groups to enable peer learning. In grouping the students, the teacher considered the heterogeneity aspect with respect to the students' academic abilities. Group formation aimed to

enable the students to learn from each other, give responsibility to help each other, and ensure that each student as a member of the group mastered the course material.

After the peer study phase, there was a pre-test conducted at the beginning of the traditional classroom meeting. The score in this pre-test phase would be compared with the score in the post-test phase later. After that, students would give a traditional lecture where the teacher explained the material in front of the class.

After the traditional teaching class, students performed a peer study again to prepare for the post-test. Before doing the post-test, a tutorial class was given by a tutor selected by the teacher to help pilot the LbT method. The post-test was performed approximately 30 minutes before the tutorial class ended. The pre-test and the post-test score would be used as the individual score for each student. In addition, from the pre-test and post-test scores, a gain score was obtained, which represented the difference between those two scores. The gain score from each student affects the group's development score. From the influence of this value, the students were expected to learn from each other in their groups.

With regard to the assessment system and the weight of each assessment component, below are the details that had been agreed as the learning contract: (i) attendance (5%), (ii) individual score (20%), the average score from individual's pre-test and post-test scores, (iii) group development score (15%), average gain score from each student in each group, (iv) assignment (15%), (v) self-evaluation with rubrics + peer evaluation with rubrics (combined, assessed by students themselves, 10%) (self-evaluation rubric and peer evaluation rubrics were given to all the students during the interview session conducted after the mid-semester written test), and (vi) the mid and final semester written test (35%, for each student).

Group development scores were calculated based on research conducted by Slavin (1995), which is modified as follows:

| Post-Test Score                                          | Individual Development Score |
|----------------------------------------------------------|------------------------------|
| More than 20 points worse than pre-test score            | 5                            |
| More than 10 to 20 points worse than pre-test score      | 10                           |
| More than 0 to 10 points worse than the pre-test score   | 15                           |
| Same as the pre-test score                               | 20                           |
| More than 0 to 10 points better than the pre-test score  | 25                           |
| More than 10 to 20 points better than the pre-test score | 30                           |
| More than 20 points better than the pre-test score       | 35                           |
| Perfect score (does not depend on the pre-test score)    | 40                           |

**Table 1:**  
Reference to individual development scoring

Source: Slavin (1995) modified

SELF ASSESSMENT

RUBRIC OF SELF ASSESSMENT  
Learning by Teaching Method – INDOPED Project  
Name of the course: High School Physics IV / Calculus II

Name / Student ID : \_\_\_\_\_

Interval Assessment ☐ 1<sup>st</sup> Half Semester ☐ 2<sup>nd</sup> Half Semester

Team / Group : \_\_\_\_\_

**Objectives of the course and achieving these**  
Evaluate by numbers, how well you achieved the aspects during course. Justify your answer.  
Grading score information:  
1 = Poor, 2 = Adequate, 3 = Good, 4 = Very Good

| No | ASPECT                                                                          | SCORE |   |   |   |
|----|---------------------------------------------------------------------------------|-------|---|---|---|
|    |                                                                                 | 1     | 2 | 3 | 4 |
| 1  | I learn to find and use learning material independently<br>Justify your review: |       |   |   |   |
| 2  | I learned to work in group<br>Justify your review:                              |       |   |   |   |
| 3  | I increased my presentation skill<br>Justify your review:                       |       |   |   |   |

|   |                                                  |  |  |  |  |
|---|--------------------------------------------------|--|--|--|--|
| 4 | I increased my interaction/communication skill   |  |  |  |  |
|   | Justify your review:                             |  |  |  |  |
| 5 | I developed my problem solving skill             |  |  |  |  |
|   | Justify your review:                             |  |  |  |  |
| 6 | General evaluation of my labor input to my group |  |  |  |  |
|   | Justify your review:                             |  |  |  |  |

Student, \_\_\_\_\_

**Figure 7:**  
Rubric of self-evaluation assessment

## 4. Results



**Figure 8:**  
Micro-teaching room

Based on the students' feedbacks/suggestions and the LbT consultant team's suggestions, some improvements were made for the second half period of LbT piloting as follows: (i) each team implemented an innovative learning method, (ii) the team had three weeks to prepare for the team teaching, including tutorial and pre-teaching, (iii) there was no material reviewed by the teacher in the last class meeting, (iv) the class meeting was held in the micro-teaching room, which allowed the application of the 'no teacher' rule. The micro-teaching room had a control room from which the teacher could monitor team performance and no teacher was present in the class, and (v) the assessment weighting was changed as follows: tutorial phase (10%), pre-teaching phase (20%), team teaching phase (25%), and mid-semester written test (25%).

For high school physics IV, the average score for the first half semester implementation was 72.01 (Grade B+, 3.3 points index from a maximum of 4), while the average score for the second half semester implementation was 75.61 (Grade A-, 3.7 points index from maximum 4). This score is obtained from the sum of various scores agreed in the learning contract. The score details can be seen in Tables 2 and 3.

For calculus II, the average total score for the full semester implementation was 70.14 (Grade B, 3.0 points index from maximum 4). This score is obtained from the sum of various scores agreed in the learning contract. The score details can be seen in Table 4.

| RECAP SCORE HIGH SCHOOL PHYSICS IV, Academic Year 2016-2017, 1st Half Semester |                        |      |          |       |                         |         |       |                          |      |      |      |      |      |      |      |                    |       |      |         |       |        |       |
|--------------------------------------------------------------------------------|------------------------|------|----------|-------|-------------------------|---------|-------|--------------------------|------|------|------|------|------|------|------|--------------------|-------|------|---------|-------|--------|-------|
| NIP                                                                            | Nama                   | Team | Presensi |       | Pre-Teaching Phase 15 % |         |       | Team-Teaching Phase 20 % |      |      |      |      |      |      |      | Self & Fellow 15 % |       |      | UTS 30% | STS   |        |       |
|                                                                                |                        |      | 5%       | 15 %  | Tutor                   | Teacher | Avg   | Teacher                  | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8                  | Avg   | Self |         |       | Fellow | Avg   |
| 1113012016                                                                     | Andreas Christianto P. | I    | 100.00   | 80.00 | 2.67                    | 2.50    | 71.67 | 2.14                     | 3.00 | 2.29 | 2.43 | 2.29 | 2.00 | 2.86 | 2.86 | 69.64              | 3.00  | 3.00 | 80.00   | 50.00 | 68.68  |       |
| 1113013003                                                                     | Antonius Widua P.      |      | 100.00   | 76.67 | 2.67                    | 2.50    | 71.67 | 2.14                     | 3.00 | 2.29 | 2.43 | 2.29 | 2.00 | 2.86 | 2.86 | 69.64              | 3.00  | 3.00 | 80.00   | 71.00 | 74.44  |       |
| 1113014025                                                                     | Triayu Mardiana        |      | 100.00   | 76.67 | 2.67                    | 2.50    | 71.67 | 2.14                     | 3.00 | 2.29 | 2.43 | 2.29 | 2.00 | 2.86 | 2.86 | 69.64              | 3.00  | 3.00 | 80.00   | 61.00 | 71.48  |       |
| 1113014027                                                                     | Christa Paraniha K.    |      | 100.00   | 76.67 | 2.67                    | 2.50    | 71.67 | 2.14                     | 3.00 | 2.29 | 2.43 | 2.29 | 2.00 | 2.86 | 2.86 | 69.64              | 3.00  | 3.00 | 80.00   | 51.00 | 68.48  |       |
| 1113013015                                                                     | Rakia Dwi R.           |      | 100.00   | 80.00 | 1.83                    | 1.83    | 56.67 | 2.57                     | 3.14 | 2.57 | 2.57 | 2.57 | 2.71 | 3.00 | 2.86 | 75.00              | 3.00  | 3.00 | 80.00   | 60.00 | 70.50  |       |
| 1113013017                                                                     | Triwinia Putri H.      | II   | 100.00   | 73.33 | 1.83                    | 1.83    | 56.67 | 2.57                     | 3.14 | 2.57 | 2.57 | 2.57 | 2.71 | 3.00 | 2.86 | 75.00              | 3.00  | 3.00 | 80.00   | 51.00 | 66.80  |       |
| 1113014014                                                                     | Ardy Widioso           |      | 100.00   | 66.67 | 1.83                    | 1.83    | 56.67 | 2.57                     | 3.14 | 2.57 | 2.57 | 2.57 | 2.71 | 3.00 | 2.86 | 75.00              | 3.00  | 3.00 | 80.00   | 54.00 | 66.70  |       |
| 1113014015                                                                     | Gracedelia J. Ngessa   |      | 100.00   | 63.33 | 1.83                    | 1.83    | 56.67 | 2.57                     | 3.14 | 2.57 | 2.57 | 2.57 | 2.71 | 3.00 | 2.86 | 75.00              | 3.00  | 3.00 | 80.00   | 55.00 | 66.50  |       |
| 1113013021                                                                     | Achmad Salehudin       |      | 100.00   | 70.00 | 3.33                    | 3.00    | 83.33 | 2.57                     | 2.43 | 2.43 | 2.71 | 2.29 | 2.57 | 2.86 | 2.71 | 71.43              | 3.00  | 3.00 | 80.00   | 83.00 | 79.19  |       |
| 1113013025                                                                     | Ambrosius Martinho V.  |      | 100.00   | 80.00 | 3.33                    | 3.00    | 83.33 | 2.57                     | 2.43 | 2.43 | 2.71 | 2.29 | 2.57 | 2.86 | 2.71 | 71.43              | 3.00  | 3.00 | 80.00   | 67.00 | 75.89  |       |
| 1113014007                                                                     | Debora Sinaga          | III  | 100.00   | 53.33 | 3.33                    | 3.00    | 83.33 | 2.57                     | 2.43 | 2.43 | 2.71 | 2.29 | 2.57 | 2.86 | 2.71 | 71.43              | 3.00  | 3.00 | 80.00   | 51.00 | 67.09  |       |
| 1113014026                                                                     | Shirendia Rizka M.     |      | 100.00   | 66.67 | 3.33                    | 3.00    | 83.33 | 2.57                     | 2.43 | 2.43 | 2.71 | 2.29 | 2.57 | 2.86 | 2.71 | 71.43              | 3.00  | 3.00 | 80.00   | 44.00 | 66.99  |       |
| 1113013014                                                                     | Venissa Putri Erza S.  |      | 100.00   | 76.67 | 2.83                    | 2.00    | 68.33 | 2.71                     | 2.29 | 2.71 | 3.00 | 2.29 | 2.71 | 2.86 | 2.71 | 73.21              | 3.00  | 3.00 | 80.00   | 82.00 | 77.99  |       |
| 1113014012                                                                     | Adeodatus Y. Kopong    |      | 100.00   | 66.67 | 2.83                    | 2.00    | 68.33 | 2.71                     | 2.29 | 2.71 | 3.00 | 2.29 | 2.71 | 2.86 | 2.71 | 73.21              | 3.00  | 3.00 | 80.00   | 39.00 | 63.59  |       |
| 1113014016                                                                     | Ahmad Nizar            |      | 100.00   | 66.67 | 2.83                    | 2.00    | 68.33 | 2.71                     | 2.29 | 2.71 | 3.00 | 2.29 | 2.71 | 2.86 | 2.71 | 73.21              | 3.00  | 3.00 | 80.00   | 38.00 | 63.29  |       |
| 1113012012                                                                     | Hermira E.E. Sareng    | V    | 100.00   | 86.00 | 3.50                    | 3.17    | 86.67 | 2.86                     | 2.86 | 2.71 | 2.71 | 2.00 |      | 2.71 | 2.86 | 3.00               | 74.29 | 3.00 | 3.00    | 80.00 | 45.00  | 71.26 |
| 1113014011                                                                     | G                      |      |          |       |                         |         |       |                          |      |      |      |      |      |      |      |                    |       |      |         |       |        |       |

**Table 2:**  
Recap score high school physics IV, first half semester, 2016-2017

|            |                        | RECAP SCORE HIGH SCHOOL PHYSICS IV, Academic Year 2016-2017, 2nd Half Semester |                 |                 |                        |         |       |                         |      |      |      |      |      |      |      |       |       |                   |        |       |       |       |       |
|------------|------------------------|--------------------------------------------------------------------------------|-----------------|-----------------|------------------------|---------|-------|-------------------------|------|------|------|------|------|------|------|-------|-------|-------------------|--------|-------|-------|-------|-------|
| NRP        | Nama                   | Team                                                                           | Presence<br>15% | Tutorial<br>10% | Pre-Teaching Phase 20% |         |       | Team-Teaching Phase 25% |      |      |      |      |      |      |      |       |       | Self & Fellow 15% |        |       | UTS   | STS   |       |
|            |                        |                                                                                |                 |                 | Tutor                  | Teacher | Avg   | Teacher                 | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8     | Avg   | Self              | Fellow | Avg   |       |       | 25%   |
| 1113013015 | Ratika Dewi R.         | I                                                                              | 100.00          | 76.67           | 2.50                   | 2.67    | 71.67 | 3.00                    |      | 2.71 | 2.71 | 2.71 | 3.14 | 2.29 | 3.00 | 2.57  | 75.33 | 3.50              | 3.50   | 90.00 | 50.00 | 71.81 |       |
| 1113014011 | Krista Yestinia H.     |                                                                                | 100.00          | 86.67           | 2.50                   | 2.67    | 71.67 | 3.00                    |      | 2.71 | 2.71 | 2.71 | 3.14 | 2.29 | 3.00 | 2.57  | 75.33 | 3.50              | 3.50   | 90.00 | 72.00 | 78.33 |       |
| 1113014024 | Gendo Paolom M.        |                                                                                | 100.00          | 56.67           | 2.50                   | 2.67    | 71.67 | 3.00                    |      | 2.71 | 2.71 | 2.71 | 3.14 | 2.29 | 3.00 | 2.57  | 75.33 | 3.50              | 3.50   | 90.00 | 44.00 | 68.33 |       |
| 1113012016 | Andreas Christanto P.  |                                                                                | 100.00          | 83.33           | 2.67                   | 2.83    | 75.00 | 3.22                    | 2.57 |      | 2.57 | 3.00 | 3.00 | 3.28 | 2.86 | 3.00  | 78.75 | 3.50              | 3.50   | 90.00 | 59.00 | 76.27 |       |
| 1113014086 | Maria De Lourdes M.I.  | II                                                                             | 100.00          | 83.33           | 2.67                   | 2.83    | 75.00 | 3.22                    | 2.57 |      | 2.57 | 3.00 | 3.00 | 3.28 | 2.86 | 3.00  | 78.75 | 3.50              | 3.50   | 90.00 | 89.00 | 83.77 |       |
| 1113014012 | Adedotun Y. Kofunso    |                                                                                | 100.00          | 56.67           | 2.67                   | 2.83    | 75.00 | 3.22                    | 2.57 |      | 2.57 | 3.00 | 3.00 | 3.28 | 2.86 | 3.00  | 78.75 | 3.50              | 3.50   | 90.00 | 36.00 | 67.86 |       |
| 1113014026 | Shirenda Rika M.       |                                                                                | 100.00          | 63.33           | 2.67                   | 2.83    | 75.00 | 3.22                    | 2.57 |      | 2.57 | 3.00 | 3.00 | 3.28 | 2.86 | 3.00  | 78.75 | 3.50              | 3.50   | 90.00 | 55.00 | 73.27 |       |
| 1113014022 | Hendriks Marisa S.     |                                                                                | 100.00          | 56.67           | 3.00                   | 2.83    | 78.33 | 3.22                    | 2.57 | 3.00 |      | 3.00 | 3.14 | 3.29 | 2.71 |       | 79.80 | 3.50              | 3.50   | 90.00 | 37.00 | 69.05 |       |
| 1113014025 | Triapa Mariani         | III                                                                            | 100.00          | 80.00           | 3.00                   | 2.83    | 78.33 | 3.22                    | 2.57 | 3.00 |      | 3.00 | 3.14 | 3.29 | 2.71 |       | 79.80 | 3.50              | 3.50   | 90.00 | 50.00 | 74.62 |       |
| 1113014028 | Klara Paulina N.       |                                                                                | 100.00          | 86.67           | 3.00                   | 2.83    | 78.33 | 3.22                    | 2.57 | 3.00 |      | 3.00 | 3.14 | 3.29 | 2.71 |       | 79.80 | 3.50              | 3.50   | 90.00 | 87.00 | 84.53 |       |
| 1113013013 | Rosalita Erisinda D.   |                                                                                | 100.00          | 66.67           | 2.00                   | 2.33    | 63.30 | 2.67                    | 2.43 | 2.86 | 3.00 |      | 3.00 | 3.00 | 3.00 |       | 77.83 | 3.50              | 3.50   | 90.00 | 79.00 | 76.68 |       |
| 1113013014 | Verisica Putri Erza S. |                                                                                | 100.00          | 70.00           | 2.00                   | 2.33    | 63.30 | 2.67                    | 2.43 | 2.86 | 3.00 |      | 3.00 | 3.00 | 3.00 |       | 77.83 | 3.50              | 3.50   | 90.00 | 73.00 | 75.67 |       |
| 1113014023 | Martinius Adit W.      | IV                                                                             | 100.00          | 73.33           | 2.00                   | 2.33    | 63.30 | 2.67                    | 2.43 | 2.86 | 3.00 |      | 3.00 | 3.00 | 3.00 |       | 77.83 | 3.50              | 3.50   | 90.00 | 54.00 | 71.25 |       |
| 1113012012 | Hermana E E Saereng    |                                                                                | 100.00          | 96.67           | 3.33                   | 3.50    | 78.30 | 2.67                    | 2.71 | 3.14 | 3.00 | 2.57 |      | 3.00 | 2.43 | 2.86  | 75.95 | 3.50              | 3.50   | 90.00 | 48.00 | 74.81 |       |
| 1113013010 | Maria Margareta        |                                                                                | 100.00          | 76.67           | 3.33                   | 3.50    | 78.30 | 2.67                    | 2.71 | 3.14 | 3.00 | 2.57 |      | 3.00 | 2.43 | 2.86  | 75.95 | 3.50              | 3.50   | 90.00 | 62.00 | 76.31 |       |
| 1113014007 | Debora Sinaga          |                                                                                | 100.00          | 76.67           | 3.33                   | 3.50    | 78.30 | 2.67                    | 2.71 | 3.14 | 3.00 | 2.57 |      | 3.00 | 2.43 | 2.86  | 75.95 | 3.50              | 3.50   | 90.00 | 48.00 | 72.81 |       |
| 1113013003 | Antonius Widya P.      | V                                                                              | 100.00          | 63.33           |                        | 2.33    | 66.60 | 2.78                    | 2.57 | 2.86 | 2.86 | 3.14 | 3.00 |      | 3.14 | 3.00  | 78.38 | 3.50              | 3.50   | 90.00 | 93.00 | 81.00 |       |
| 1113014008 | Fernando               |                                                                                | 100.00          | 83.33           |                        | 2.33    | 66.60 | 2.78                    | 2.57 | 2.86 | 2.86 | 3.14 | 3.00 |      | 3.14 | 3.00  | 78.38 | 3.50              | 3.50   | 90.00 | 72.00 | 77.75 |       |
| 1113014015 | Gracedelia F. Ngaso    |                                                                                | 100.00          | 86.67           |                        | 2.33    | 66.60 | 2.78                    | 2.57 | 2.86 | 2.86 | 3.14 | 3.00 |      | 3.14 | 3.00  | 78.38 | 3.50              | 3.50   | 90.00 | 46.00 | 71.58 |       |
| 1113014016 | Ahmad Nizar            |                                                                                | 100.00          | 90.00           |                        | 2.33    | 66.60 | 2.78                    | 2.57 | 2.86 | 2.86 | 3.14 | 3.00 |      | 3.14 | 3.00  | 78.38 | 3.50              | 3.50   | 90.00 | 53.00 | 73.66 |       |
| 1113013025 | Ambarossa Martinus V.  | VI                                                                             | 100.00          | 90.00           |                        | 2.83    | 76.60 | 3.22                    | 3.00 | 2.71 | 3.14 | 3.00 | 2.71 | 2.43 |      | 90.00 | 78.03 | 3.50              | 3.50   | 90.00 | 75.00 | 81.08 |       |
| 1113014014 | Ary Widhiawan          |                                                                                | 100.00          | 90.00           |                        | 2.83    | 76.60 | 3.22                    | 3.00 | 2.71 | 3.14 | 3.00 | 2.71 | 2.43 |      | 90.00 | 78.03 | 3.50              | 3.50   | 90.00 | 79.00 | 80.00 |       |
| 1113014027 | Chris Peranginik R.    |                                                                                | 100.00          | 76.67           |                        | 2.83    | 76.60 | 3.22                    | 3.00 | 2.71 | 3.14 | 3.00 | 2.71 | 2.43 |      | 90.00 | 78.03 | 3.50              | 3.50   | 90.00 | 55.00 | 76.31 |       |
| 1113013017 | Triviana Putri H.      |                                                                                | 100.00          | 90.00           |                        | 2.67    | 73.40 |                         | 2.89 | 3.00 | 3.00 | 3.00 | 2.89 | 2.57 | 2.86 | 2.71  |       | 77.23             | 3.50   | 3.50  | 90.00 | 58.00 | 75.99 |
| 1113013021 | Achmad Salehudin       | VII                                                                            | 100.00          | 86.67           |                        | 2.67    | 73.40 |                         | 2.89 | 3.00 | 3.00 | 3.00 | 2.86 | 2.57 | 2.86 | 2.86  |       | 77.59             | 3.50   | 3.50  | 90.00 | 63.00 | 78.49 |
| 1113014021 | Jumela Veronika S.     |                                                                                | 100.00          | 90.00           |                        | 2.67    | 73.40 |                         | 2.89 | 3.00 | 3.00 | 3.00 | 2.86 | 2.57 | 2.86 | 2.86  |       | 77.59             | 3.50   | 3.50  | 90.00 | 43.00 | 72.33 |
|            |                        |                                                                                |                 |                 |                        |         |       |                         |      |      |      |      |      |      |      |       |       | AVERAGE SCORE     |        | 75.61 |       |       |       |

**Table 3:**  
Recap score high school physics IV, second half semester, 2016-2017

| CALCULUS II SCORES 2016-2017 |                     |            |               |                                      |      |         |      |          |      |         |      |         |     |                               |        |     |       |         |     |       |          |     |       |         |     |       |     |        |     |         |            |             |                     |                 |              |       |       |         |     |       |          |     |       |         |     |       |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Team                         | Name                | NRP        | Presensi (5%) | Average Pre-Test and Post-Test (20%) |      |         |      |          |      |         |      |         |     | Group Development Score (15%) |        |     |       |         |     |       |          |     |       |         |     |       |     |        |     | Average | Conversion | Tasks (15%) | Self & Fellow (10%) | UTS Score (35%) | Final Scores | Grade |       |         |     |       |          |     |       |         |     |       |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                              |                     |            |               | Test I                               |      | Test II |      | Test III |      | Test IV |      | Average | IDS | Score                         | Test I | IDS | Score | Test II | IDS | Score | Test III | IDS | Score | Test IV | IDS | Score | GDS |        |     |         |            |             |                     |                 |              |       |       |         |     |       |          |     |       |         |     |       |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                              |                     |            |               | Pre                                  | Post | Pre     | Post | Pre      | Post | Pre     | Post |         |     |                               |        |     |       |         |     |       |          |     |       |         |     |       |     | Test I | IDS |         |            |             |                     |                 |              |       | Score | Test II | IDS | Score | Test III | IDS | Score | Test IV | IDS | Score | GDS |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| I                            | Emilianus Sagastara | 1113016018 | 100           | 70                                   | 100  | 65      | 55   | 100      | 100  | 90      | 85   | 83.125  | 20  | 40                            |        | GDS |       | 10      | 15  |       | 0        | 40  |       | 5       | 15  |       |     |        |     |         |            |             |                     |                 |              |       |       |         |     |       |          |     |       |         |     |       |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Table 4:**  
Recap score calculus II, 2016–2017

## 5. Conclusion

In conclusion, after the second half period of LbT piloting in the high school physics IV was over, it can be argued that the LbT method can enhance students' participation and activities on the course. The implementation of each stage in the LbT method requires student activities in planning, preparing lesson plans, conducting tutorials and taking important roles in teaching. The teaching experiences of the students on the physics study programme also improved through the implementation of each stage in the LbT method. As seen in the self-assessment, there was improvement with respect to the students' soft skills such as interactivity, teamwork and presentation skills. However, the students' ability to master the learning material failed to improve significantly. Improving the LbT implementation is required in order to solve the problems of learning material mastery. In addition, the teacher's course management skills improved. The use of rubrics in each assessment and stages in the implementation of LbT contributed highly to the improvement of teaching management. Piloting the LbT method on other courses is recommended by accommodating the characteristics of the course and the students.

In general, the results of piloting the LbT method in calculus II are quite satisfactory. In terms of students' scores, they improved significantly (a lot of students failed to pass the previous course). Regarding the learning process, the students became more active in the learning process and in finding their own learning resources, and they also improved mutual learning. In addition, there was improvement with respect to the students' soft skills such as interactivity, teamwork and communication skills.

## 6. Lesson learnt and feeling in general

Lessons learnt after the pilot:

- The teacher got new experiences through implementing new method.
- The teacher learnt how to implement the LbT method, including how to manage the class with the LbT method.
- The teacher learnt how to coordinate the tutor.
- The teacher learnt how to form rubrics for evaluating every step in the LbT method.
- Students got much more experience from learning through the implementation of a new method.
- Students learnt how to make a lesson plan.
- Students learnt how to plan a learning situation.
- Students learnt how to implement a teaching method.
- Students learnt how to evaluate their group and another group.
- Students felt that implementing the LbT method in the classroom required more time to prepare and more time to do every step.

Feeling in general after the pilot:

- Teachers' skills in class management, coordination and communication improved significantly.
- Students improved their soft skills a lot, especially their teaching skills during piloting:
  - teaching skills improved
  - communication skills improved
  - presentation skills improved
  - cooperation skills improved
  - self-study skills improved
  - self- and peer evaluation skills improved
- Student's comprehension of the subject improved.

## 7. Further thoughts and possible future action

LbT is proven to increase students' activities and at the same time improve their abilities in both academic and soft skills. The implementation of LbT can be carried out in various fields of teaching by considering learning materials (level of material difficulty, proper material, etc.), the conditions of students (number of students, character and learning culture of students, etc.) and institutional policies.

The WMCUS Team in the INDOPED project is committed to continuing the implementation of the method in the further learning process and hopes that many other lecturers will participate in adopting this very useful method. The implementation of LbT will continue to be evaluated to provide improvements on all sides so that the results of LbT implementation become even more optimal.

We wish to thank the INDOPED project for all their support and especially TUAS and WMCUS for the extraordinary opportunity to undertake this self-development of lecturers and students.

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# The Implementation of the Learning by Teaching Method at Syiah Kuala University

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## **Abstract:**

This paper is aimed at describing Learning by Teaching (LbT), implemented to teach a course on English language teaching methods to sixth semester students in the 2017/2018 academic year at the School of Education of Syiah Kuala University. The study involved two lecturers and 19 students as trainers taking the course. Observations, recordings and interviews were used to collect the data, which was then analysed qualitatively. The finding shows that LbT was implemented by preparing a business plan, conducting workshops by the student trainers focusing on the content of the course (methods of English language teaching), and providing feedback at the end of the workshops. Students gained 21st century skills: communication, collaboration and instructional skills, and some other skills that helped deepen their knowledge. In addition, the teacher learnt a new teaching approach. Therefore, it is suggested that this method be applied to other courses as well.

## **Keywords:**

implementation, English language teaching methods, Learning by Teaching

## 1. Introduction

Approaches to learning and teaching at universities have shifted over recent decades from traditional teacher-centred to student learning-centred approaches following the development of knowledge and technology. The former focused more on the transference of cognitive aspect to students, whereas the latter deals with the three domains of competence: affective, cognitive and psychomotoric aspects.

Twenty-first century education considers the current needs of the world of work that must be possessed by individuals. Those needs are collaborative, critical thinking, creativity and innovative skills, as well as the skills of negotiation and ICT. Working in groups and teams is a great deal more common in organisations that achieve innovations than in those that are less innovative (Kumpula, 2014). Kumpula further mentions that the basic idea of innovation is for graduates to learn and become adept at working methods that create new operations and renew them as early as possible during their student year. The traditional approach does not provide such things as these skills, since the teaching focuses more on the mastery of cognitive aspects. Now learning and teaching at universities require creativity and innovation to a much greater extent. Creativity is the ability to think and act in ways that are new and innovative, whereas innovation is the process of making change, and introducing new ideas, methods, etc. (Hornby, 1999). In other words, creativity is the ability to conceive something original or unusual, whereas innovation is the implementation of something new. So, innovation in pedagogy is highly needed. Innovation pedagogy is a learning approach which provides a new definition of how information is assimilated, produced and used to bring about innovations.

The current practice of learning and teaching has not yet focused more on teaching the skills needed this century. This particular course is conducted by means of lecturing, presenting, and discussing the materials assigned to students. Students are given chapters of books on ELT and are asked to read and summarise in good English, and then they are required to give an oral presentation in groups, followed by a discussion. This leads to good results in terms of the mastery of contents, but less so in terms of creativity and innovation. Students tend to be passive, poorly motivated, dependent on others, and have low competency in terms of communication, negotiation, planning, leadership and responsibility. A solution to this problem should be found. Fortunately, through the INDOPED projects in 2016 some innovative methods were introduced.

## 2. Learning by Teaching

One of the innovative methods (also called *INDOPED* methods) implemented at Syiah Kuala University is the Learning by Teaching (LbT) method. LbT is a method of learning and teaching where students learn as they teach each other. This can be done by forming groups consisting of about 3–5 students. Each group is allocated some concepts to research, discuss and decide on the strategies to use for teaching the concepts to the rest of the class (Martin, 2008; Skinner, 2006) as quoted by Mafa (2010). Martin (1980) mentions this LbT method in the German language as *Lernen durch Lehren* (LdL). He defines the LbT method as a method requiring students to teach other students. Another definition is that LbT is a method of teaching in which students prepare a lesson and teach it to other students (Wikimedia, 2018). So, with this method students are made to learn material in depth and offer it to those who need their mastered knowledge. This method applies the learning theories of cognitivism and constructivism.

Procedure:

- Students from universities acting as trainers (teachers) for pupils from lower educational levels (vocational schools/general upper secondary schools, comprehensive schools).
- Students working in trainer teams (3–5 students per team) that aim is to plan, organise and implement all the training independently.
- Students plan and prepare the contents of the training, all the materials and tasks for pupils. The teacher's role is to guide student and give support and feedback.

This method was piloted at the English Education Department at the Faculty of Teacher Training and Education of Syiah Kuala University, Banda Aceh for the course on English language teaching methods in the odd semester 2017. This course leads to four credits with two session (100 minutes per session) each week. It is intended to provide students with approaches and methods in language teaching.

The competencies expected to be possessed by students are collaborative skills, communication/presentation skills, instructional skills, understanding new trends in language teaching, applying teaching methods that are relevant to the goals and the characteristics of the learners, applying appropriate classroom management, deepening students' knowledge in the subject of training, learning to plan, organising and implementing training, and also learning how to guide and teach individuals and groups.

### 3. Methodology

#### *Aim of the study*

This study is intended to investigate and describe the implementation of the INDOPED (Innovative) method ‘Learning by Teaching (LbT)’, as a pilot project sponsored by the European Union at the Undergraduate Programme in English Education Department, Faculty of Teacher Training and Education, Syiah Kuala University, Banda Aceh, Indonesia.

#### *Methods*

In line with the aim of the study, a qualitative approach with a case study design was used to explore how the LbT method was used to teach the course on English language teaching methods. The study employed 19 students (four student trainer teams) in the sixth semester of 2017. A purposive sampling technique was used to get the sample. Observations and in-depth interviews were conducted to collect the data (Spradley, 1098). The instruments used were observation sheets, field notes, questionnaires and video recorders. The collected data was analysed qualitatively by using the formula data reduction, display, and verification proposed by Mile and Huberman (1996). Students’ responses were used to reflect on the implementation.

### 4. Implementation of the study

The following is a description of the implementation of the LbT method as shown in the tables below.

| No. | Teachers’ activities                                                                                    | Students’ activities                                                                                                                                                                                                                                                              |
|-----|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | The teacher instructed the students to form groups (heterogeneous) of four                              | Students formed groups of four/five and a student tutor for each group was appointed                                                                                                                                                                                              |
| 2   | The teacher exposed the students to the materials based on the lesson plan to be mastered               | Students read and summarised the materials from sources/books/chapters, gave a presentation and had discussions                                                                                                                                                                   |
| 3   | The teacher guided the students in workshop planning and presented them with business plan format       | The students prepared business plans before they conducted workshops/training                                                                                                                                                                                                     |
| 4   | The teacher listened to the students’ business plan presentation and gave feedback for further revision | The students presented business plans in the classroom to get some input/comments from other teams for further improvement                                                                                                                                                        |
| 5   | The teacher prepared a letter to be taken by the students to the institution                            | The students contacted institutions where they wanted to conduct workshops/training to negotiate with participants on the venue, timing and facilities needed for the workshops/training                                                                                          |
| 6   | The teacher monitored the students’ work                                                                | The student groups led by the student tutor discussed and prepared contents/materials for the workshops/training, ways of presenting, banners, LCD, documentation, questionnaires for workshops/training feedback, questions regarding interview seating arrangement, etc. needed |

**Table 1:**  
Activities before workshops/training

Table 1 shows that student trainers were presented with some materials needed for their workshop presentation. Students were put into groups of four or five that were heterogeneous in nature. The student groups discussed their business plans several times outside the classroom before they presented it in the classroom for feedback from their teacher and other teams for further improvement before they conducted their workshop/training. In addition, they had to design a banner, questionnaires and certificates.

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| Dates                | Saturday, 20 May 2017                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Teachers' activities | <p><b>Pre-activities:</b> The teacher gave opening remarks</p> <p><b>Activities during the training:</b> The teacher observed the students' activities and noted any activities carried out by them.</p> <p><b>Assessment:</b> Assessment was done by using a test and non-test consisting of peer assessment, self-assessment, teachers' assessment using rubrics, and feedback from the students.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Students' activities | <p><b>Pre-activities:</b></p> <p>During the pre-activities, the trainer student greeted the 20 participants who were fourth semester undergraduate students at the English Education Department at Tabiayah and Keguruan of UIN (State University of Islamic Studies) Ar-Raniry with the phrase 'Assalaumalaikum WW and good morning'. They were trained to be future teachers of English at junior and senior high schools in Aceh or in Indonesia as a whole and they responded using the same phrase.</p> <p>-The students sat listening attentively to the trainer in the classroom. Prayers were recited together led by a trainer student to appeal for easiness and retention of what they were to learn during the workshop from Allah Swt.</p> <p>-Then, one of the trainer students came up and introduced herself as a moderator and afterwards she introduced the other trainer students in her group by asking them to state their names. These pre-activities took approximately 15 minutes.</p> <p><b>Activities during the training:</b></p> <p>-One of the trainer students began presenting what Communicative Language Teaching (CLT) was, using PowerPoint.</p> <p>-She explained the definition of CLT and gave a brief history of the emergence of CLT, which has introduced new ideas in language teaching compared to the traditional approach.</p> <p>-The other trainer student discussed the principles, the objective and the curriculum or syllabus types under CLT.</p> <p>In addition, he further mentioned the techniques under the CLT method, which include role-play, games and picture script stories.</p> <p>-To further explain the method, a student played a video show on the use of the role-play technique for a few minutes and afterwards he asked the students to sit in groups of three to discuss the positive and negative points of the implementation of the role-play technique in teaching English.</p> <p>-The method of grouping was based on the number (one, two, three and four) stated by the trainer.</p> <p>The students then discussed the video for five minutes in groups.</p> <p>During the discussion, all students actively spoke or contributed their thoughts to their group.</p> <p>Three of the trainers walked around offering help and monitoring to make sure that everybody was working in groups.</p> <p>After they discussed the video, each group representative reported the results of their discussion on the advantages and disadvantages of the role-play technique.</p> <p>-Based on our presentation and discussion, we can conclude that.....</p> <p>-Finally the workshop concluded by distributing feedback questionnaires to the students.</p> <p>-They were given five minutes to complete the questionnaires, which consisted of ten questions.</p> <p>-Students completed the questionnaires. At the same time they were also given some snacks to enjoy while completing the questionnaires.</p> <p>-The questions mainly asked about .....( see the questionnaires)</p> <p>-The student trainers also took photographs of all the students and student trainers, including the lecturer, while waiting for the next session by other groups.</p> |

**Table 2:**  
Activities during the one-day workshop/training

The table above shows the pre-, during, and post-activities. The student trainers began the workshop/training by greeting and introducing themselves to the participants. Then they presented the workshop materials to the participants by using power point elaborating point by point on the methods of English language teaching. Question and answer session on the material was provided. Participants then were shown video on a method of language teaching. They were also asked to give comments on the video about what advantages and disadvantages of the shown method. One of the trainers then came up with a conclusion of the workshop and got feedback from the participants. During the workshop the student trainers were assessed by using rubric.

### 5. Expected competencies

The table below shows the important skills the students and the teacher acquired while implementing the LbT method.

| No. | Competencies                                   | Remarks                                                                                                                                       |
|-----|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Instructional skills                           | Improved through preparing and presenting the materials to the workshop participants                                                          |
| 2   | Collaborative/teamwork skills                  | Improved through group work activities during the workshop/training                                                                           |
| 3   | Communication/presentation skills              | Improved through discussion/presentation activities                                                                                           |
| 4   | Deepening the mastery of the materials learnt  | Improved by learning and through workshop/training preparation and searching for material on the Internet                                     |
| 5   | Planning, organising and conducting skills     | Learning to plan, organise, conduct workshop/training, preparing questionnaires and interview guides for workshop feedback, and business plan |
| 6   | Higher-order thinking/critical thinking skills | Challenging, but inspiring and motivating                                                                                                     |
| 7   | New approaches/methods learnt by the teacher   | Learnt through reading the materials on innovation pedagogy                                                                                   |

**Table 3:**  
Competencies gained

The table above shows that students gained the skills needed through group work activities, collaborating, and other activities assigned to them. Observation shows that students were enthusiastic about the activities during the leaning process. In addition, they gave positive responses at the end of the workshops or the course. They remained well motivated, as the activities were mostly challenging and inspiring.

## 6. Discussion

The implementation of the LbT method for the course on methods of English language teaching was divided into three stages: before, during and after the workshop. During the pre-workshop/training period, students were exposed to the contents of the syllabus provided by the teacher. At the initial stage, students were put into groups of four and five (four groups altogether) as the class consisted of 19 students (five male and 14 female). During this phase, my observation shows that at the early stage when they were first given the assignment for this LbT method, they showed the teacher a kind of unhappiness as they thought that they would be burdened with extra works/assignments. However, later on this feeling gradually changed into happiness, since the students began to feel the benefits from teamwork. During this phase, students in groups had to work in and outside class. When not in the classroom, each group conducted four or five meetings to discuss workshop/training preparation. A business plan was presented twice in the classroom to get comments or input for revision.

Analysis of the second phase shows that the implementation of workshop/training by students began with the introduction of the student trainers to the participants. The trainers divided the workshop into three activities: pre, during and post activities. During the pre-activities, the student trainers and the participants got to know each other in order to build good interaction among the trainers and the participants during the workshop. Apperception took place in order to motivate the participants and to bring the material to be presented to the attention of the participants. The second phase shows that teaching/training was performed by means of materials (methods of English language teaching) presented by the trainers using PowerPoint, and afterwards a Q&A session was given. A video on using the method was shown. Participants were asked to watch the video and give comments afterwards. The participants were then asked to sit in groups to discuss the advantages and disadvantages of the method shown in the video. Each group was instructed to present the results of the group discussion. Finally, the participants were given questionnaires to complete while enjoying a snack provided by the trainers. The questionnaire was designed to get feedback on the workshop. Each participant was awarded a certificate of participation. Expressions of thanks to the participants were presented and a photo session was organised.

The findings of the study shows that the LbT method is useful and valuable to increase students' learning experiences. Students were challenged with work they had never experienced before, such as deepening knowledge to be presented, preparing a business plan, off-class meetings, searching for materials from books, the Internet and other resources, conducting workshops, classroom management, designing questionnaires, and designing banners and certificates for participants and trainers.

During the course using the LbT method, the observation and interview results show that students felt enthusiastic about the implementation. They were actively presenting, going around monitoring and offering help to the workshop participants working in groups. One of them was busy video-recording standing in one corner of the room. The classroom atmosphere was quite conducive. Consequently, the workshop participants seemed to be enjoying the course.

Based on the observation and interview, through the process of the LbT method implementation, the students felt they learnt a lot from this inquiry-based learning approach. With this kind of learning students construct knowledge and get to understand the contents well. Students were interacting and helping each other and the teacher offered help to the students (see ZPD and Scaffolding by Vygotsky, 1996). Learning how to prepare lessons for training, to solve problems and to develop creativity and innovation were supported by the LbT method. Most of them stated that their instructional, teamwork/collaborative, communication, negotiation, planning and leadership skills improved. Those skills are highly needed this century (Thrilling & Fadel, 2009) and Aslan (2015). In addition, their motivation and self-confidence were also increased. On the other hand, in the implementation of this method, students criticised the method for being very time consuming, which was also felt by the teacher. It is also felt that students' previous learning experiences may hinder the implementation, but this problem gradually disappears. It takes time to adjust to a new learning experience. Getting other teachers' attention and involvement in this method is another challenge.

## **7. Conclusion and suggestions**

Based on the previous discussion, conclusions can be made. The LbT method is an innovative method of learning and teaching in which students are given responsibility to train those individuals who need the knowledge they obtained from the classroom. The implementation began by learning the materials from their teacher in the classroom and other resources. They formed groups of four or five in which they were able to work collaboratively. They planned, organised and conducted the workshop/training. They created a business plan and implemented it. The competencies expected from the lesson were considered to have been obtained, although there was no quantification of the results of the study. In implementing the LbT method, the teacher faced several problems, such as the fact that it was time consuming, created a greater burden on the teacher, and that there were difficulties in assessing the students' work. However, the use of this method is highly recommended not only for this course, but also for other courses by other lecturers as well.

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# Piloting the Gamification Method to Increase the Engagement of Students at the Faculty of Pharmacy, Widya Mandala Catholic University

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## **Abstract:**

Gamification has been an emerging trend in many sectors, including business, organisational management, in-service training, health, social policy and education since 2010. However, the application of Gamification in education in Indonesia is still new and is not recognised by many teachers in secondary schools and higher education. In this article, an empirical study of the piloting of Gamification in two groups of first-year pharmacy students is reported. The analysis was done using the quantitative data of student marks and completed questionnaires. The results showed that Gamification gives a positive result in increasing the motivation and engagement of students, and could be used as a promising tool to increase the output of higher education.

## **Keywords:**

Gamification; higher education; empirical study; engagement; motivation

## 1. Introduction

The major problems often faced in education include low motivation of students, different abilities and cognitive levels of incoming students, and low engagement levels of students (Lee & Hammer 2011). Students often get bored with unpleasant activities, including learning activities, especially when learning subjects that are not interesting for them, or when learning subjects that are difficult to master or that they already know. The traditional teaching process is also perceived as ineffective and boring by many students (Boumova 2008; Dislen 2013). These problems were identified in courses taught to pharmacy students at the Faculty of Pharmacy at Widya Mandala Catholic University Surabaya (WMCUS). As one of the private universities in Indonesia, our institution faces similar problems to many other private universities in Indonesia, namely the low and very varied quality of incoming students, since most students still have a high prevalence to study at state universities.

To increase the efficiency and effectiveness of education, we have tested many approaches and strategies to improve both the learning process and also the assessment method. In 2016, our institution, together with four other universities in Indonesia (BINUS International, Syiah Kuala University, Yogyakarta State University and Syarif Hidayatullah Jakarta) in collaboration with five universities from Europe (Turku University of Applied Sciences, Inholland University of Applied Sciences, Business Academy Aarhus, the University of Gdańsk and the University of Seville) successfully received funding from the Erasmus+ Programme of the European Union under the title INDOPED project, Modernizing Indonesian Higher Education with Tested European Pedagogical Practices. The overall aim of the INDOPED project is to raise the teaching capacity of Indonesian university teachers. The project sees that the teacher's role should be more like a mentor and facilitator of learning, not a teacher in the traditional meaning. During this project, the Indonesian partners tested and adjusted European active learning practices and embedded the most valuable parts into the structures of Indonesian partner universities (INDOPED 2018).

From the 14 innovative pedagogical methods offered by the European partners, Gamification was chosen to address the problems faced in the subject of basic chemistry. This course is a compulsory course for the first-year students of the Pharmacy Study Programme at WMCUS. The piloting was driven by the fact that students of the basic chemistry course were found to lack motivation since the subject is the same as the one they had before when they were in senior high school. Most students were not engaged in the course and it was very difficult to motivate or even 'force' them to practise the chemistry problems at home. The Gamification method was chosen to overcome these problems based on all the good qualities theoretically offered by this method. Here in this article the piloting process and results are reported.

## 2. Review of Gamification

Since 2010, Gamification has been referred to as a rising technology trend and has been applied to many sectors including business and marketing, organisational management, health care, human resources, in-service training, social policy, and environmental protection and well-being (Caponetto et al. 2014; Dicheva & Dichev 2015). Deterding et al. (2011) claim that the first documented use of the term ‘Gamification’ was in 2008 within the digital media sector. Thus, it can be stated that Gamification is a relatively new concept but an old practice (World Government Summit 2016). The core concepts of Gamification have been used for much longer than the term has existed, to support learning in a variety of contexts and subject areas. The simpler and familiar previous practice in early years teaching was the use of gold stars next to a student’s name as a reward for his/her achievement in class, yet this motivational technique has been little used beyond primary education (Glover 2013).

Gamification in education refers to the *introduction of game elements and gameful experiences in the design of learning processes* (Caponetto et al. 2014) or *‘the use of game mechanics in non-gaming contexts’* (Deterding et al. 2011). Educational Gamification is not to be confused with Game-based learning, simulation, or serious games. The latter terms focus on creating games (and game-like experiences) which impart an educational benefit, and includes software such as simulators. This is the direct opposite of educational Gamification, which seeks to add game-like concepts to a learning process (Glover 2013). Gamification is taking off in education (Domínguez et al. 2013) since many are convinced that it can support and motivate students, and can thus lead to enhanced learning processes and outcomes (Kapp 2012). Thus, we understand Gamification as a long-term process embracing the whole unit of learning, i.e. a semester or an academic/school year.

The core concepts of games underlie the concepts of Gamification. There are three basic parts in most games: goal-focused activity, reward mechanisms and progress tracking (Dickey 2005). These basic parts are essentially implemented through Gamification in education to achieve a positive effect.

### *Goal-focused activity*

The activities in games should be arranged in a goal-oriented way, with a clearly defined set of ‘win’ conditions and a number of obstacles to overcome in order to complete the activity (Smith-Robbins 2011). The players, learners in the Gamification in education context, are directed to undertake tasks in order to achieve a desired outcome, moving to the next level/mission in the case of a game, or to complete the understanding of a complex topic (Glover 2013). For performance-related goals, motivation is increased when there is public recognition of achievement (such as by the use of class rankings), though actual learning may be unaffected (Meece et al. 2006).

### *Reward mechanisms*

There are three main categories of reward mechanisms used in Gamification: leaderboards, prizes and achievements (Glover 2013). *Leaderboards* are lists of players ranked according to their success within the game. Prizes should encourage further engagement, such as setting a research task for the cohort, and should not discourage it, such as being exempt from a test. Prizes can also take the form of additional activities, which are unlocked after meeting the conditions of previous goals. Different players will be motivated by different prizes and so will perform activities accordingly, and learners will also vary in this way. Achievements are icons displayed publicly on online profiles that highlight activities completed by the person, and allow an individual to keep track of what they have done and to 'show off' to third parties (Glover 2013).

### *Progress tracking*

Tracking progress towards goals is important within games, as well as with learning processes, since it gives the players or learners information about the remaining tasks required to fulfil the victory conditions. This part of Gamification is analogous to the provision of feedback within education. Good feedback should outline what the learner has done and give guidance on how to improve or advance in the future, and progress tracking within games performs a similar duty by identifying the steps to take in order to make it to the next milestone (Glover 2013).

## **3. Piloting process**

The piloting of Gamification in the basic chemistry course for first-year students at the Pharmacy Faculty of WMCUS started in April 2016, while the implementation was done in 18 weeks, between August and December 2016. The planning process involved the designing of a course class as a game. The teacher changed the activities previously used in the course into activities used in the game. The marks the students gained from doing homework or quizzes were converted into points. The conversion of points into the final mark and all the unchanging rules were also set. All of these elements were bound together in an interesting and attractive story and a challenging mission. After all the rules and elements were set, they were put into a 'book of rules' that all the students were then informed of at the beginning of the course. However, the students were given autonomy in deciding whether they wanted to play or not.

The game of the basic chemistry Gamification course is entitled 'Ettin: The Two-Headed Troll'. The story is based on a fairy tale of a king looking for the heir of 'Spring Kingdom' (here: the basic chemistry course). The king has no offspring and is getting old. He announces a contest open to any member of the young generation (that will be the students) in the entire kingdom,

The Gamification in basic chemistry course applied several elements, namely points, tasks, levels, a leaderboard, lives, stories, cooperation and a book of rules. All the materials for the game/course were managed in the cloud, using the Google Drive application. There were eight choices of task/activities, three of them were held in the class and the rest were done outside of class. Quizzes (named 'digging for the sword' in the game) were also done online outside of class, using the Google Forms application. There were rewards (bonus points) given to the students if they did all the quizzes properly. From the eight tasks offered, only two were mandatory for students which were training arena (attending a lecture) and combat training (homework). This meant that the students had the freedom to choose which optional/voluntary task they wanted to accomplish. This scheme gave students autonomy to decide their own strategy to achieve their desired results.

|    | A                  | B              | C                           | D                    | E     | F                                   | G              | H                 | I                    | J                       | K           | L                                  | M                      | N     | O                | P                             | Q                 | R                          |
|----|--------------------|----------------|-----------------------------|----------------------|-------|-------------------------------------|----------------|-------------------|----------------------|-------------------------|-------------|------------------------------------|------------------------|-------|------------------|-------------------------------|-------------------|----------------------------|
| 1  | Week               | 1              | 2                           | 3                    | 4     | 5                                   | 6              | 7                 | 8                    | 9                       | 10          | 11                                 | 12                     | 13    | 14               | 15                            | 16                | 17                         |
| 2  | Dates              | 08.08          | 15.08                       | 22.08                | 29.08 | 05.09                               | 12.09          | 19.09             | 26.09                | 03.10                   | 10.10       | 17.10                              | 24.10                  | 31.10 | 07.11            | 14.11                         | 21.11             | 28.11                      |
| 3  | TASKS              | LEVEL & UNLOCK | Atoms, molecules, ions      | Mole & Stoichiometry | Gases | Atomic structure & Chemical bonding | Thermodynamics | Chemical kinetics | Chemical Equilibrium | FIRST BATTLE (Mid test) | Acid & base | Concentration & Solubility Product | Colligative properties | Redox | Electrochemistry | Colligative transition metals | Nuclear Chemistry | SECOND BATTLE (Final test) |
| 4  | Training areas     | 1              |                             |                      |       |                                     |                |                   |                      |                         |             |                                    |                        |       |                  |                               |                   |                            |
| 5  | Combat training    | 1              | 5                           | 5                    |       | 5                                   | 5              | 5                 | 5                    |                         | 5           | 5                                  | 5                      | 5     |                  |                               |                   |                            |
| 6  | Battle for keys    | 1              |                             |                      |       |                                     |                |                   |                      |                         |             |                                    |                        |       |                  |                               |                   |                            |
|    |                    |                | ↑ DURING THE LECTURE ↓      |                      |       |                                     |                |                   |                      |                         |             |                                    |                        |       |                  |                               |                   |                            |
| 7  |                    |                | OUTSIDE ACTIVITIES/ONLINE ↓ |                      |       |                                     |                |                   |                      |                         |             |                                    |                        |       |                  |                               |                   |                            |
| 8  | Opposing the sword | 2              | 15                          | 15                   | 15    | 15                                  | 15             | 15                | 15                   |                         | 15          | 15                                 | 15                     | 15    | 15               | 15                            | 15                | 15                         |
| 9  | Special position   | 3              |                             | 15                   |       | 15                                  |                | 15                |                      | 15                      | 15          |                                    | 15                     | 15    |                  | 15                            |                   | 15                         |
| 10 | Ancient rules      | 3              |                             |                      |       |                                     |                | 20                |                      |                         | 20          |                                    |                        |       |                  | 20                            |                   |                            |
| 11 | Mystery Case       | 4              |                             |                      |       |                                     |                |                   |                      |                         |             |                                    | 40                     |       |                  |                               |                   |                            |
| 12 | Unknown tasks      | 1              | 5                           | 5                    | 5     | 5                                   | 5              | 5                 | 5                    | 5                       | 5           | 5                                  | 5                      | 5     | 5                | 5                             | 5                 | 5                          |

**INFORMATION:**

- = Obligatory individual tasks
- = Voluntary individual tasks
- = Voluntary team tasks
- = Voluntary individual tasks
- number inside the box = maximum points
- = lock with one key
- = lock with two keys

**Figure 1:**  
The game table that explains the timetable of each task and the points earned.

The piloting of the Gamification method was done in one basic chemistry class, while three other classes were taught using the traditional teaching process. One of the three classes was taught with the same lecturer as the Gamification class, to see the effect that Gamification had on the learning process and whether it can increase the output of the course. Though there were different students in each of the classes, all of the incoming students randomly joined each class, with each consisting of around 50 students. Therefore, fair and comparable results can still be gleaned from each class for further analysis.

#### 4. Analysis of the piloting process

The output of two basic chemistry classes is shown at Table 1. The results showed a higher class mark (GPA = 2.78) compared to the other class, which did not use the Gamification method (GPA = 2.48). From the analysis of questionnaires given to the students in both classes, the number of students that experienced difficulties in the gamified and non-gamified course were 14% and 26.4%, respectively. In terms of learning satisfaction, the share of students stating they were satisfied in the gamified course was higher (56%) compared to the non-gamified course (34%). Furthermore, only one student out of 50 failed in the gamified course, while three students from 53 failed in the non-gamified course. Two other basic chemistry classes that were taught by different lecturers in the traditional way also showed a lower GPA, which was 1.83 from a total of 50 students and 1.76 from 45 students. All classes used the same problem questions in the mid-term and final assessment.

|                                              | Gamified course | Non-gamified course |
|----------------------------------------------|-----------------|---------------------|
| Highest score                                | 93 & 85         | 85 & 87             |
| Mean score                                   | 39.5 & 43.5     | 40.2 & 45.3         |
| Lowest score                                 | 10 & 17         | 21 & 18             |
| Failed students (E)                          | 1               | 3                   |
| Total students                               | 50              | 53                  |
| GPA of class                                 | 2.78            | 2.48                |
| Difficulties with studies (by questionnaire) | 14%             | 26.4%               |
| Satisfaction of studying (by questionnaire)  | 56%             | 34%                 |

**Table 1:**

Comparison of several learning process indicators for the basic chemistry course between gamified and non-gamified classes taught by the same lecturer

These quantitative results showed a positive impact towards the efficiency of education. These findings were strengthened by the observation done by the teacher throughout the learning process in the semester. Students were observed to be more active, more engaged in the course, more independent, and more encouraged to work collaboratively in class and outside of class. The teacher also found that the students were easier to ‘control’, since the explicit rules of the course had been agreed together at the beginning of the course. These responses show that the implementation of the Gamification method in the basic chemistry course was successful in increasing the motivation and engagement of students. The main difficulty faced by teacher was time management. The teacher had to make extra effort to give quick feedback. This problem was overcome by hiring a student assistant to help the teacher manage the work (homework and quizzes) of students.

## 5. Discussion

Gamification, implemented in the basic chemistry course at the Pharmacy Faculty of WMCUS, is an innovative method introduced by Joanna Mytnik and Wojciech Glac from the University of Gdańsk, Poland, through the INDOPED project. Mytnik and Glac had successfully promoted this method as an effective tool for increasing motivation towards learning at their institution. As a pedagogical method, Gamification implements game elements in a non-game environment to engage and motivate students to learn. It changes the way of thinking about learning, a new approach to learning that uses the addictive behaviour from playing in our brain. In this method, the teacher creates a game environment that enables students to take responsibility for their education, to manage their own learning process and choose the way of learning (strategic approach), and to gain satisfaction deriving from progress in learning. It significantly increases students’ engagement and motivation to acquire knowledge.

Before introducing the method, the lecturers at WMCUS had never heard about this term or method. The piloting process was initiated after a short explanation of the core concepts of Gamification and sharing experiences of the implementation at the University of Gdańsk. The toughest part in preparing for this method was the technique to convert rewards and achievement gained in the game into the final mark for the course. The preparation of the activities, the story and the elements of the game is the most fun process for the teacher. In the implementation process, the toughest and most challenging part was the management of students’ points and the leaderboard, and especially giving rapid and immediate feedback.

Several studies showed that the underlying dynamics that make games engaging are largely already recognised and used in modern pedagogical practices, including higher education (Stott & Neustaedter 2013; Varannai et al. 2017; Caponetto et al. 2014). Nevertheless, the spread of this method is still not thorough across all continents and nations. In Indonesia, the term and use of Gamification, especially in education, is still rare or does not even exist. Thus, in spite of the fact that criticism and scepticism has begun to grow regarding this method being implemented in the education and learning process (Dicheva et al. 2015; Dicheva & Dichev 2015; Hamari et al. 2014; Lee & Hammer 2011), based on the pilot results reported in this article, the need for more implementation of this method in the educational system in Indonesia is required. The chance to have a positive impact from Gamification on different levels of education, different subjects, and different problems faced in our educational system exceeds the fear and doubt of the opposite effect. Still, we must keep in mind that the learning method is not the only factor involved in an effective education.

In conclusion, the Gamification method was found to be an effective tool for increasing the motivation and engagement of students on the course. The learning process becomes more attractive, both to students and the teacher. This method could also help the development of the students' soft skills, especially in time management, risk-taking, teamwork, creativity and strategic management. The teacher was also more excited about managing the class, and was challenged to be more creative and to get to know individual students. The best thing of all was that the Gamification method can be applied to any degree of education and to all subjects and behaviour processes. The implementation of this method is strongly recommended, especially in 'boring' conventional courses, in order to change the learning attitudes of students and increase the motivation of the teacher.

## **6. Acknowledgements**

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# Case Method in the Teaching of Sensory Evaluation and Industrial Food Quality Control

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## **Abstract:**

This case method is a teaching strategy in which students must apply their knowledge to solve real-life situations. Implementation of the Learning by Case method in the sensory evaluation and industrial food quality control course is composed of three major stages: individual preparation, small group discussion, and class discussion. Sensory evaluation and industrial food quality control is a compulsory subject for fifth semester students at the Food Technology Department-Agricultural Technology Faculty of Widya Mandala Catholic University Surabaya. Student competencies that are expected to be enhanced are: the ability to design and implement the sensory evaluation and determine food quality based on the acceptance of products from sensory properties, and the ability to design and perform quality control systems in the food industry through statistical analysis. The cases are taken from food industry problems or scientific journals. By applying Learning by Case, students are more actively involved in the learning process than when the subject was taught in a conventional way.

## **Keywords:**

Learning by Case method; real-life situation; individual preparation; small group discussion; class discussion.

## 1. Background

The case method is a teaching strategy in which students must apply their knowledge to solve real-life situations. They have to analyse the case described and propose the best possible solution. This method is the most effective way to make students learn about how to use their basic knowledge to solve real-life problems, which are usually unique because of the myriad variables involved, and for which a single answer does not necessarily exist. However, each possible answer should be analysed considering the multiple factors present. This methodology has proven to be a useful tool in many of the areas of hard science, such as in medicine and food science where the uniqueness of each situation is also a relevant characteristic (Alfredo et al. 2013). To be effective, a case has to present students with a situation analogous to situations they find in real life in order for them to take decisions similar to those that they should take in their professional lives (Brown et al., 2011). The case should have a real background, irritate or trigger a willingness to discuss, and concomitantly fulfil a scheduled learning objective that we expect our students to learn (Gallucci, 2006).

Sensory evaluation and industrial food quality control is a compulsory subject in the fifth semester for Food Technology Department students at Widya Mandala Catholic University Surabaya (WMCUS). The student competencies that are expected to be enhanced are: the ability to design and implement sensory evaluation and determine food quality based on the acceptance of products from sensory properties, the ability to design and perform quality control systems in the food industry, and the ability to analyse and determine whether a process or the handling of food products falls in the category 'controlled' or 'not controlled' through statistical analysis. By applying the Learning by Case method, students are expected to be more actively involved in the learning process and working with real-life cases with sensory evaluation and quality control of industrial food products. It immerses students into realistic situations, stimulates their thinking and encourages discussion. Implementation of this methodology on the subject of sensory evaluation and industrial food quality control becomes very attractive when we take into account the fact that one of the fundamental aims in education is to achieve the integration of theory and practice through the adequate implementation of teaching and learning strategies that efficiently connect knowledge with the real world.

## 2. Preparation for implementation

Based on the content of the subject of sensory evaluation and industrial food quality control, the semester is divided into two parts: one for sensory evaluation case discussion, and one for industrial food quality control cases. Each semester consists of about fourteen weeks with one meeting per week, as well as a session for the mid-term test and another for the final exam.

Each half semester (about seven sessions) was divided into two parts:

- During the first two to three meetings, the teacher explains the rules and regulations (including simple rubrics for assessment) and gives a brief description of each topic along with some examples of cases. The students are divided into 14 or 15 groups with three or four students per group (about 50–60 students per class), and every group was expected to explain a different case.
- In the second part, following the second meeting, students had to present one case and explain how to solve the case based on basic theory and the real conditions according to a journal or mass media. Every weekly meeting is about 150 minutes long and can be used for exploring three cases presented by three groups. Each group or each session includes 20 minutes for presentation and 20 minutes for discussion. At the end of the session, the teacher has about ten minutes to provide a brief summary, conclusion or correction when needed.

The learning process using the case method in this subject is basically is composed of three major stages:

1. Individual preparation
2. Small group discussion
3. Large group or class discussion

In the first stage, after a brief explanation from the teacher and having been given the case, the students read and analyse the case in preparation for the class. They are urged to suggest solutions to solve the problem, so each student can understand the general theory behind the case.

In the second stage, small group discussions provide an opportunity for the students to discuss their insights into the case. In the small groups the students should summarise their knowledge and discuss their suggested solutions to the case problem. Each group should then come up with some suggestions to solve the case and then share their ideas through the presentation.

The final step in the three-stage case learning process is a large group or classroom discussion. This is the last chance to create a thorough understanding of the case and to come up with an optimal resolution of the issue or decision. The discussions in class can ease the students' understanding of the general theory behind the case. Besides this, the classroom discussion also gives the students the opportunity to practise oral communication in a large group, to share their individual and small group learning with others, and also to be evaluated by peers and teachers. The large group or classroom discussion is a summary of the different conclusions from the students led by the teacher. Therefore, it is very important that the teacher sums up the conclusions at the end of the session. Most likely there will have been many discussions and suggestions from the different groups, so it is very important that the loose ends are tied together.

Each of the three steps is important to create an effective learning process and each contributes in different ways to maximising the quantity and quality of learning (Mauffette and Leenders, 1999). The individual preparation has a significant impact on the quality of the group idea/opinion and will decide the quality of discussion in class. Ultimately, a good-quality class discussion will immerse students more into realistic situations and stimulate their analytical thinking, thus improving the explicit and tacit knowledge of students so their innovative competencies will also improve.

### **3. Case example**

- Competition between industrial food products is very tight. Therefore, a business should know how to predict consumers' acceptance of their product compare to their competitor's product. As food technologist candidates, students should be able to evaluate why a certain product can be highly accepted and others not. The case can be taken from one business whose product sales decreases from time to time or from their observation at a supermarket or mall.

#### Individual preparation

Before coming to the lecture, the students are expected to do some individual preparation. In the course material the students should read a theory and scientific research journal about how to forecast consumers' acceptance of a food commodity through sensory evaluation. They should also be aware of the basic knowledge of hedonic preference tests, including sample preparation, how to create a proper questionnaire to use for the test, and then how to collect data from the questionnaire and perform statistical analysis to form a conclusion.

### Small group discussion

Small group discussion is needed before the group does the presentation in class. Based on the individual preparation, during group discussion they analysed the main cause of the commodity sales decrease, then based on the main cause, they gave some related alternative solutions to the main problem. All the ideas should be written as a paper and also in PowerPoint as a media presentation.

### Large group discussion

From the results of their group discussion, each group should be ready to present their discussion results in a classroom discussion. Each group has about 20 minutes to present their ideas, and 20 minutes to discuss the subject. Other groups may have a different idea or opinion. The different groups should suggest different solutions and the pros and cons of each solution should be discussed.

At the end of the session, the teacher sums up the factors that influence consumer acceptance that may cause a decrease in food product sales, and summarise the conclusions of how to solve the problem.

Each student should participate actively in the discussion and be well prepared. It is not important for the group to achieve consensus, but they should suggest one solution to answer how to maintain consumer acceptance. A challenging task could be that some of the students have not done the individual preparation or that some of the students are not actively participating in the discussion. An effective way to solve such problems is to urge each student to prepare well by giving each student a mark for their activity during the presentation and discussion. Every student is given a score for both their questions and answers or ideas/opinions during the class discussion, not only as a presenter but also as a participant. The teacher gives an individual score based on the individual activity. The score depends on the quantity/frequency and quality of questions or answers/ideas/opinions. The quantity shows the level of their involvement and curiosity, while the quality shows the level of basic knowledge and analytical skill. All of these aspects show the level of individual preparation. During the discussion when students need to explore more information related to the cases, they may use devices to search from credible sources. It is a good way for students to learn how to seek out credible information.

The assessment for the group is based on the presentation, including their performance, content, sources and references, and their mastery of the subject.

## **4. Results of implementation**

By applying the Learning by Case method, students are expected to be more actively involved in the learning process and working with real-life cases with sensory evaluation and quality control of industrial food products. It immerses students into realistic situations, stimulates their thinking and encourages discussion.

By taking the case from current issues and problems within the real food industry, students are more exposed to the real context of the food industry and its atmosphere. All three stages of the Learning by Case method provide students with more opportunities for improving their skills in terms of group working, exploring more information, discussion, and expressing their ideas and opinions.

At the end of the Learning by Case implementation, the students give their opinion or testimony related to the effectiveness of the teaching method to help them understand the subject by responding to a questionnaire. In general, students think that the method makes it easier for them to understand the implementation of basic theory and scientific consideration and how to use it for problem-solving in real conditions in the food industry. The students agree that the implementation of the Learning by Case method in the subject of sensory evaluation and industrial food quality control makes them more interested in learning and researching the subject more deeply, although they need to make more effort to do it in the limited time they have. Most of students assessed the implementation of the case method positively.

## **5. Student responses – lessons learnt from the students' point of view**

During the implementation, students received a questionnaire twice: once at the beginning and again at the end of the implementation. Based on the survey through the questionnaire, the use of a case discussion requires more effort from the students compared to traditional methods of teaching. In the beginning, not all the students thought that working with cases was a good learning method, mostly because they were not used to it and some students may be uncomfortable with open-ended questions as well as working in groups. Another thing that may have impacted their attitudes could be the time limits and that students do not have enough time to prepare properly.

At the end of the semester, following repeated exposure to cases, the students improved their analysis skills and their ability to deal with ambiguous situations and incomplete information. They began to learn how to approach problems in a focused and confident way that leads to firm, well-reasoned conclusions. So far, the case of solving the decrease in food commodity

sales with sensory evaluation science gives the students a more conceptual understanding of food technology tasks and helps them improve their skills to analyse and deal with complex situations.

## **6. Limitations identified by teachers and lessons learnt from a teacher's perspective**

The power of the case method lies in the active participation of the students (Noblitt et al., 2010), so the teacher should be able to immerse students in realistic situations, motivate them to search current related cases and engage in discussion. The teacher should not suddenly take control of the discussion to cover 'one last but important part' in a case discussion and risk hurting the process for future discussions. This is particularly true in early discussions, because they set the tone for the process throughout the course. These sessions, especially the first two, are so important to the overall experience in the course, so placing particular emphasis on the development of a good discussion process in early classes is vital. It is a challenge for the teacher to construct the case and work through the whole process. It is probably difficult to reach the appropriate level that is not too low or too high for the students the first time a case is constructed.

Some of the challenges have been handled by developing more detailed descriptions of the class action plan. However, there is still a need for further improvement in order for the students to achieve a deep understanding of the principles of sensory evaluation on food businesses and to be able to use the knowledge in new cases. By applying the Learning by Case method to sensory evaluation and industrial food quality control, the students are expected to be more actively involved in the learning process than before.

## **7. Conclusion**

The use of a case discussion requires more effort from both the students and the teacher compared to traditional methods of teaching. With repeated exposure to cases the students improve their skills in analysing and dealing with ambiguous situations and incomplete information. Furthermore, they improve their oral communication skills.

Implementation of the Learning by Case method needs a strong design and good preparation at the very beginning, but once it's ready, it will make students more interested in exploring the subject in greater depth.

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# Storytelling in Higher Education – A Piloting Experience from Indonesia

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## **Abstract:**

This chapter addresses the educational values of storytelling within higher education. A lively narrative format is being used progressively in higher education, and it helps students reflect critically and comprehend factual content in a personalised fashion. Using storytelling leads the reflective process away from being a possibly passive task, with the student merely going through the mandatory indications to get the task done, to a process whereby they must make informed decisions to enable their story to make sense to a specific audience. This article reflects the experiences of implementing storytelling in higher education institutions in Yogyakarta (Indonesia).

## **Keywords:**

Storytelling; implementation, higher education; reflection; Indonesia; innovation pedagogy; INDOPED.

## 1. Introduction

The role of storytelling and its prominence in all aspects of life is nothing new. Even Plato stated that those who tell stories rule society (Fisher, 1985). According to Goodman (2008), the outline and need of storytelling is so deeply rooted into our DNA that stories will always be the most powerful tool that we have to inform, persuade and inspire others. Stories help us remember; they share experiences and help shape identity, establish communities, promote culture and values, provide instruction and reveal the past with the intention of shaping the future. And, when provided successfully, they inspire action.

Storytelling has been commonly used in children's education as an important and creative tool (Moon & Fowler, 2007; Goodman, 2008). However, its use in higher education has been less frequent. This paper reflects the experience of implementing storytelling in higher education institutions in Indonesia as part of the Erasmus + KA2 project 'Modernizing Indonesian Higher Education with Tested European Pedagogical Practices' and aims to show that storytelling can be used as an effective reflective tool in higher education (Moon & Fowler, 2007). Within this context, stories are increasingly accepted as a powerful learning tool, and Moon and Fowler (2007) propose a structure to organise and recognise the role of story and how it can be used for better effect. Pedagogic practices that can be considered as storytelling include critical incident analysis, scenarios or case studies constructed from real experiences and reflective learning journals, all of which present different opportunities for learning, reflection and critical thinking (Moon & Fowler, 2007). Such a narrative pedagogy takes place within a real-world setting. In each case, it places learners within unfolding stories that require them to ask scientific questions, design experiments, make predictions, and generate and test hypotheses. Storytelling is a community practice that allows students and their teachers to consider what is possible and what is problematic within their teaching. This approach provides learners with opportunities to hear and consider different points of view. Within these different narratives, knowledge is questioned and elements of uncertainty are explored. Nothing in the subject area is taken as certain: everything is open and problematic. This approach supports a context-sensitive approach to learning, a consideration of different points of view in a given situation and opportunities to empathise with others. As stories are shared, the students are prompted to examine their values and attitudes. They are also made aware of the importance of continually questioning and thinking things through, rather than reaching for a set answer (Schank & Abelson, 1995).

Storytelling offers a way of engaging learners over time, structuring learning and encouraging students to develop their understanding. The aim here is to provide engaging and effective narratives that motivate students in a variety of ways. Tasks set at the right level for learners

provide challenge. Quests stimulate learners' curiosity by requiring them to explore intriguing environments and interact with engaging characters. These environments put the students in control, not only of their route through the landscape, but also of their route towards a solution. The fantasy elements of the scenario contribute to vivid imaginative sequences. Together, these motivational aspects combine to provide a narrative backbone for guided student enquiry. The Learning through Storytelling method is not discipline-related, and it is usable in all study programmes. It is possible to utilise in higher education and can be applied in all study programmes.

## **2. Objectives**

This study was aimed at investigating the implementation of storytelling in 11 study programmes in multidisciplinary areas, examining the impact of storytelling based on students' perspectives towards their learning process, and determining the sustainability of the storytelling learning method in further research.

## **3. Participants and methodology**

There were three phases of implementation in total, conducted in the Faculty of Languages and Arts at Yogyakarta State University (YSU, Indonesia)

## **4. The first phase of implementation**

Twenty-one teachers were involved in this study from 19 September to 23 December 2016 in the Faculty of Languages and Arts (YSU), Indonesia. Thirteen teachers applied the storytelling methodology in languages classes and eight teachers conducted the study in arts classes. In total 545 students were registered in this pilot project and all the subjects were mandatory for the running semester based on the Indonesian National Curriculum of Qualification 2014. Storytelling as a learning method was part of the INDOPED project, initiated by the University of Seville (Spain) and funded by the Erasmus + Programme of the European Union (2016). The aim of the INDOPED project was to raise the teaching capacity of Indonesian university teachers in order to bring higher education to a European standard. During the INDOPED project, the European active learning practices were tested and adjusted, and the most valuable ones were embedded into the structures of Indonesian partner universities.

To initiate the storytelling piloting in higher education institutions, teachers were deliberately registered onto this project. During internal meetings, the participating teachers were informed about the INDOPED project and agreed to apply one of three methods that YSU planned to implement in the academic year 2016-2017.

During the preparation phase, several workshops were provided for the teachers and the teaching practice was monitored by the European partner from Seville University (Spain). Consequently, the teachers from YSU implemented the method of storytelling and their students became the storytellers. Finally, an evaluation phase was stipulated, and the findings from the present study and the sustainability of the storytelling method in the coming semester were discussed.

Storytelling was implemented in the following 21 subjects by the corresponding teachers in 11 different study programmes. Since there was no single pattern of storytelling implementation, the students performed their storytelling learning in various models based on their study programme.

- 1) Children's literature (Indonesian study programme),
- 2) Literature reading (Indonesian study programme),
- 3) Teaching methodology for children (English study programme),
- 4) Speaking in professional contexts (English study programme),
- 5) Paragraph writing (English language),
- 6) Basic reading (English language),
- 7) German history (German language),
- 8) Reading for beginners (German language),
- 9) Listening (French study programme),
- 10) Media and IT (French language learning),
- 11) Media and IT (Javanese language learning),
- 12) Fiction writing (Javanese language),
- 13) Javanese for beginners,
- 14) Project and perspective in fine arts,
- 15) Ornament in fine arts,
- 16) Batik I,
- 17) Leather craft I,

- 18) Teaching plan (music study programme),
- 19) Analysis and critics (music study programme),
- 20) Evaluation (dance study programme), and
- 21) Tari Nusantara II (dance study programme).

During the implementation, teachers provided 15 minutes of storytelling in each period of class and this was specified in their teaching plan. In order to monitor the running process of the pilot, two meetings were held and the whole phase was videotaped. Evaluation was undertaken during and after the implementation of storytelling. All the evaluation items were provided by INDOPED team members from European partner organisations.

Based on the students' self-evaluation, storytelling was considered by the students as a strong tool for:

- working systematically and independently,
- continuing to work after class time,
- leading a classroom discussion,
- highly motivating for acquiring knowledge,
- increasing the innovative process,
- cooperating with peers and evaluating their work,
- having fun while studying,
- using previously acquired knowledge for problem-solving,
- self-evaluating and taking responsibility for someone's education,
- enhancing analytical and reporting skills, and
- thinking strategically and teamworking.

Based on the students' reports, three aspects that were very poor during the piloting programme were reduced or eliminated for the second implementation phase. Those three aspects were 1) respecting different opinions, perspectives and values, 2) presentation skills, and 3) ability to generate creative ideas.

## 5. The second phase of implementation

The new phase was grounded in the aspiration of the faculty for constantly using storytelling, especially for instructors. Two proposals for continuing the implementation were accepted for the research fund from YSU. The instructors with grants were supported to conduct the implementation in the form of classroom action research (CAR). The two subjects which continued storytelling were basic reading and listening comprehension in the Javanese study programme. Both pieces of research were conducted between April and October 2017.

‘An Effort to Improve Students’ Skill in Reading and Cross Culture Understanding’ was the first funded research project for the subject of basic reading. The research aimed to describe the storytelling method for improving reading skills and CCU of the students in English Literature Department, the procedure and the implementation of the storytelling, and finally to identify the challenge of implementing storytelling in higher education. The research was conducted from September to October 2017 with 19 students who registered for basic reading (semester one). Four steps were undertaken during the implementation: planning, acting, observing and reflecting. There were three cycles during this CAR.

The results showed that storytelling was an effective method for improving the reading skills of all 19 participants and that their score increased by 4.89 points. Students first read short stories, and discussed the cultural value from different countries’ perspectives. Only a few students felt that storytelling was less serious and less focused on learning. Others remained quiet and passive during class.

The second research project that was funded was entitled ‘Digital Storytelling to Improve Students’ Skills in Listening and Soft Skills’. It was conducted for the *Mirengake* (Listening comprehension in Javanese languages) and aimed at improving the learning process and soft skills of the participants. Thirty-five students from the second semester were registered in the listening subject. The results showed that more than 75% of the students enjoyed the learning process, being more motivated and active during the learning activity by launching some ideas and teamworking in developing digital storytelling in both cycles of the CAR.

## **6. The third phase of implementation**

The third phase of storytelling has been implemented in five different subjects. There are Sprechen (Speaking in German), pragmatics, teaching French as foreign language, interior design, and learning strategy in dance education. All projects were conducted in CAR. The objective was to strengthen storytelling specifically in accordance with the subject material. The three particular objectives in this phase were problem-solving, exploring ideas and strengthening character education.

## **7. Conclusions and recommendations**

As a result of the different phases of implementing storytelling at YSU, it can be concluded that storytelling which is embedded into the subject can be applied at the beginning and/or at the end of the class period. A period of 10-15 minutes is considered adequate to keep students using storytelling and to keep their motivation high. The implementation of the storytelling method will be varied at YSU depending on the subject and the creativity of both teachers and students. It also requires a high level of motivation to achieve teamworking when students are asked to create a story. Thus, the optimum development of an individual's soft skills will be significantly increased.

So, has storytelling shown it has a grown-up role in higher education? Students certainly provided interesting stories during this implementation experience at YSU and were able to respond perceptively and provide advice for their fellow students. However, since it has proved difficult to elicit stories, increasing numbers of students should be invited to participate.

Storytelling can provide an understanding of what it is really like to be a student today in higher education and provides students with a reflective tool to share and learn from each other's experiences.

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# Learning to Learn Methods in Market Research Courses

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‘I hear and I forget. I see and I remember. I do and I understand.’ – Confucius

## **Abstract:**

Twenty-first century learning environments are the support systems that organise the condition in which humans learn best – systems that accommodate the unique learning needs of every learner and support the positive human relationships needed for effective learning. Experts say 21st century learning must take place in contexts that promote interaction and a sense of community that enable formal and informal learning. Learning to learn engages learners to build on prior learning and life experiences in order to use and apply knowledge and skills in a variety of contexts.

The Learning to Learn process in market research is as follows: managing the work and progress, literature review, data gathering and data analysis. Therefore, there is a new role for educators: to become foremost facilitators of learning, create the right climate for learning, act as a resource centre, ask supportive questions, function as peers for support and cooperation, listen carefully and observe attentively, motivate learners, give feedback, recognise the potential of learners, and be a learner.

## **Keywords:**

21st century learning, Learning to Learn process in market research, new role for educators

## 1. Introduction

Hoskin and Fredriksson (2008) define the concept of 'Learning to Learn' as: the ability to pursue and persist in learning, to organise one's own learning, including through effective management of time and information, both individually and in groups. This competence includes awareness of one's learning process and needs, identifying available opportunities, and the ability to overcome obstacles in order to learn successfully. This competence means gaining, processing and assimilating new knowledge and skills as well as seeking and making use of guidance. Learning to Learn engages learners to build on prior learning and life experiences in order to use and apply knowledge and skills in a variety of contexts: at home, at work, and in education and training.

Learning to Learn within the European Commission texts (<http://www.indoped.eu/copy-of-learning-by-the-case-method>) contains elements from both social-cultural and cognitive psychological traditions. The affective part refers to social skills which can be seen in the definition – the learning relationships, 'motivation', 'confidence' and learning strategies – 'organise their own learning, including through effective management of time and information'. The cognitive dimensions are referenced in the definition in relationship to the capacity to 'gain, process and assimilate knowledge' and the 'ability to handle obstacles'. The definition emphasises that the combined skills should be able to be used in multiple different contexts by the individual who has them. This is referring to the transversal nature of Learning to Learn.

The teaching and learning process in most of the subjects at UKWMS still use classical learning methods: the lecturers deliver the material and students listen and record. The process of delivering the content of the course stops when the lecture hours are complete. The development of technology opens up vast opportunities for both lecturers and students to continue to seek and deepen their understanding of everything learnt in each subject. The Learning to Learn method is taught in a way that in the teaching and learning process it does not stop in special classes but continues even when students and lecturers are out of class – be they at home or wherever they are. Therefore, the writer is very interested in Learning to Learn methods in the teaching and learning process in class, especially for market research courses.

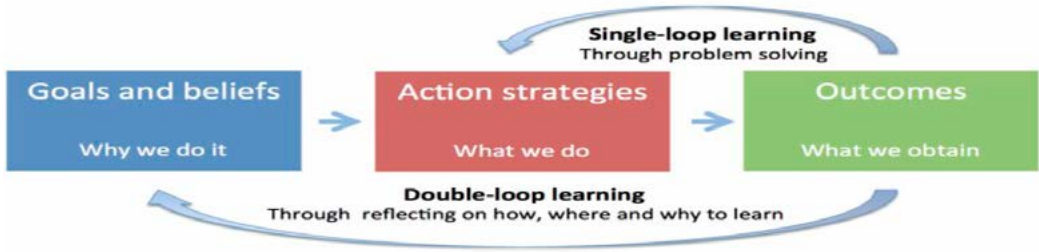
## 2. Learning to Learn in the 21st century

What is a 21st century learning environment? The term 'learning environment' suggests place and space – a school, a classroom, a library. And indeed, much 21st century learning takes place in physical locations like these. But in today's interconnected and technology-driven world, a learning environment can be virtual, online, remote; in other words, it doesn't have to be a place

at all. Perhaps a better way to think of 21st century learning environments is as the support systems that organise the condition in which humans learn best – systems that accommodate the unique learning needs of every learner and support the positive human relationships needed for effective learning. Learning environments are the structures, tools and communities that inspire students and educators to attain the knowledge and skills the 21st century demands of us all. Experts say 21st century learning must take place in contexts that promote interaction and a sense of community that enable formal and informal learning ([http://www.p21.org/storage/documents/le\\_white\\_paper-1.pdf](http://www.p21.org/storage/documents/le_white_paper-1.pdf)).

According to Scott (2015), as a result of the persistent use of digital and mobile technologies, most students today are natural investigators, researchers and synthesisers of information. These skills can be put to strong use in the classroom to unlock student engagement. Technologies in which students are already well versed are an effective way to support independent and enquiry-based learning, and to allow for instant and reflective forms of assessment. Personalisation, collaboration, communication, informal learning, productivity and content creation are central to the competencies and skills learners are expected to develop and the way in which these skills are taught. These elements are key to the overall vision of twenty-first century learning (McLoughlin and Lee, 2008; Redecker and Punie, 2013 cited in Scott, 2015). In addition, personal skills (initiative, resilience, responsibility, risk-taking and creativity), social skills (teamwork, networking, empathy and compassion) and learning skills (managing, organising, metacognitive skills and ‘failing forward’ or altering perceptions of and response to failure) are vital to peak performance in the twenty-first century workplace (Learnovation, 2009 cited in Scott, 2015).

**Double-loop learning involves considering the problem at hand, looking for the greater system, so as to achieve personal development.**



**Figure 1:**  
Double-loop learning  
(<http://www.indoped.eu/copy-of-learning-by-the-case-method>)

## **How does it work?**

### **Nine principles:**

- I:** Requires an ongoing reflexive process.
- II:** Does not have a 'one-size-fits-all' solution.
- III:** Students have different learning styles.
- IV:** Students have different needs and interests.
- V:** Choice is central to effective learning in this method.
- VI:** Different experiences and background knowledge.
- VII:** Students should have control over their learning.
- VIII:** It's about 'enabling' not 'telling'.
- IX:** Learning needs cooperation between students and staff.

## **3. Advantages of Learning to Learn**

The University of Bristol has developed ELLI, the Effective Lifelong Learning Inventory (Crick et al., 2004). ELLI is an instrument used to improve the effectiveness of learning measuring the 'learning power' of individual students.

In short, the seven factors included in the inventory can be described as follows:

1. Growth orientation (changing and learning) establishes the extent to which learners regard the process of learning is itself learnable.
2. Critical curiosity demonstrates the learner's desire to find out new things.
3. Meaning-making affirms the extent to which learners are on the lookout for links between what they are learning and what they already know.
4. Dependence and fragility identifies how easily learners are disheartened when they get stuck or make mistakes.
5. Creativity establishes the learners' ability to look at things in different ways.

6. Relationship/interdependence (learning relationships) establishes the learners' ability to manage the balance between sociable and individual approaches to learning.
7. Strategic awareness identifies learners' awareness of their own learning processes.

#### **4. The Learning to Learn process in market research**

Aguado (2009) explains the implementation process as follows:

1. Managing the work and progress of research is the instructor's primary concern. For students to learn by doing, the instructor prepared broad topics prior to the beginning of the semester. The instructor provided students with citations and background reading for each topic.
2. Literature review as a step offers the instructor an opportunity to expose students to important online archives that are typically not used in other courses, but that are essential to conducting original research. Using the Internet posed new problems and new possibilities. At this point, it was helpful to discuss the benefits and dangers of Internet research. Students learnt how to conduct literature reviews by using peer reviewed articles. Instructors should check that articles being used were published in the last ten years.
3. Data gathering educates students about the very large archives of available raw data and how they are entered into a statistical software package; and to create a survey instrument that in this case could be used to gauge the attitudes of local elected officials. Empirical work was the foremost priority, but an opportunity for students to become better acquainted with the community was offered. They learnt about the data-gathering process and saw that it can be somewhat messy, because researchers are constantly wrestling with less-than-ideal situations. They also learnt about the challenges of operationalisation, and of finding ways to measure the abstract concepts that interested them. The obstacles they encountered taught them that this was a difficult step in the process – one where researchers are often forced to make compromises due to lack of accessibility, time constraints and limited resources.
4. Data analysis was conducted in order to enter and analyse. Analysing the data gave students the ability to apply many of the skills that they learnt and also required students to prove their proficiency in performing some fundamental tasks within structural equation modelling (SEM). They demonstrated that they knew how to read the SEM output.
5. At the end of the meeting, students handed in independent assignments that all seemed to be related, i.e. the literature review was related to the data analysis. The goal was that each assignment would serve as a component of the final research paper.

## 5. Teaching agenda

| WEEK | SUBJECT                                              | WEEK | SUBJECT                   |
|------|------------------------------------------------------|------|---------------------------|
| 1    | The role, definition and marketing research process  | 8    | Measurement and scale     |
| 2    | Research proposal                                    | 9    | Develop a questionnaire   |
| 3    | Market research problem formulation                  | 10   | Data analysis tools       |
| 4    | Determination of design research                     | 11   | Collecting data           |
| 5    | Composite research: exploratory, descriptive, causal | 12   | Analysis                  |
| 6    | Planning data collection methods                     | 13   | Report                    |
| 7    | MID-SEMESTER ASSESSMENT                              | 14   | FINAL SEMESTER ASSESSMENT |

**Table 1:**  
Teaching agenda

### **A new role for educators** (Kloosterman & Taylor, 2012)

1. Educators becoming facilitators  
Educators become first and foremost facilitators of learning – this sounds simple but it is not; because it means letting go of control. Facilitators of learning therefore need to specifically develop their competencies to support the learning process of participants.
2. Creating a good learning environment  
The facilitator has an important role to help create the right climate for learning in a group. Being open and clear about ideas for what makes a good learning climate can help the group to start thinking about their role and responsibility in the creation of this climate. To act according to ideas and principles is of course crucial.
3. To offer resources  
The facilitator acts as a resource centre, being aware of the limitations that the educational activity has and the necessity of follow-up and further deepening. A facilitator who has a broad knowledge of websites, people, books, places, documents and the like can be a great help to learners.
4. To ask supportive questions  
The role of the facilitator is not so much about offering answers to the learners but much more about asking those questions that help to get more clarity about one's own needs and passions, goals and steps to take on the learning journey. The self-directed learner has a lot to reflect on and choices to make.

5. To bring learners together  
Learners need peers for support and cooperation. Learning with peers is something new for many people. The facilitator has an important role to bring people together and to stimulate them to learn together.
6. To put learning on the agenda  
Learners should be motivated to reflect on their learning so far, their strengths and challenges, alternative ways of learning and how they see their future learning. Learning has to be on the agenda. In every educational activity with the Learning to Learn approach, time and space has to be created for learners to reflect, discuss and think about the 'how' of their learning
7. To listen and observe  
Many learners, especially at the beginning of the process, are used to listening and expect the facilitator to talk. The critical element, however, for the facilitator is to listen carefully and attentively observe what the learners say and do. In order to discover and recognise the specific needs, blockages and passions of the learners it is vital to listen and observe. This can be of great help in the role of asking supportive questions.
8. To motivate learners  
This is a role which is difficult to describe concretely. Motivational problems can have many different backgrounds and reasons. Many people have a negative image about themselves when it comes to learning. With this image it is not easy to see the trainers as a supporting and guiding team, giving impulses and questions and great support.
9. To give feedback  
As an observer of the learning process the facilitator is often in a good position to give feedback to learners in order to help them to broaden their self-perception and look at different options and possibilities. It might be good to mention here that feedback can only be given on those aspects that you can really observe. Learners sometimes have the impression that facilitators have special powers that enable them to provide feedback on all aspects of life – this is clearly not the case!
10. To see the potential of learners  
Many people are excellent at describing the things they are not good at. In connection with giving feedback it is important that the facilitator is able to see, or to help explore, the different potentials that all learners surely have. Giving the opportunity to try out new tasks, roles and challenges can reveal the potential that people may not be aware of.
11. To be a learner  
Educators are not only offering learning but are also learners themselves. It's about knowing and showing as a learner.

## **6. Results obtained from Learning to Learn methods**

Student

1. Making students become an integral part of the learning process in the classroom
2. Increased learning motivation
3. Independence and responsibility in learning
4. Better student retention rates in universities

Lecturer

1. Quality improvement
2. The status of the teaching profession can be enhanced by the application of this approach
3. Fostering a lifelong learning culture

## **7. Conclusion**

Learning to Learn is an approach that focuses on what happens when we learn and how we can learn more effectively. Being involved in Learning to Learn means being part of a community of enquiry that aims for a better understanding of the learning process. The Learning to Learn approach provides all learners with the opportunities and tools for reflective and strategic thinking that generate talk and collaboration. This helps individuals develop the skills and disposition for successful lifelong learning that can develop their motivation and enable them to take effective action to fulfil their learning goals.

The use of Learning to Learn methods in the market research course was very rewarding for the students. This process used a hands-on approach to learning empirical research methods. Students learnt about the constraints that bind the research process. Understanding empiricism and the systematic analysis of data was an important lesson for the students because they saw how this step creates the basis of good social science research. Students found that the research process allows for some creativity by the researcher, and that there is a clear line between being creative and being dishonest. This approach was rewarding for both the instructor and the students because it enhanced their desire and their abilities to learn the material.

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# Towards a Student-Centred Approach

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## **Keywords:**

Student-centred learning; rubrics, project learning

## **1. Towards a student-centred approach**

Traditionally, education is about teachers and students. In college, students follow a programme of study and teachers determine your education and guide you for the most part. Teachers make the decisions about what students will study and how they will be assessed. The traditional approach to teaching is lacking in many ways. It does not acknowledge that learners are all different people with different needs, who learn in different ways.

Teachers play important roles in the learning process. They provide information or evaluate and monitor students so they arrive at the right answers, yet students are viewed as learners who are passive receivers of information. Teachers are the most dominant sources of information.

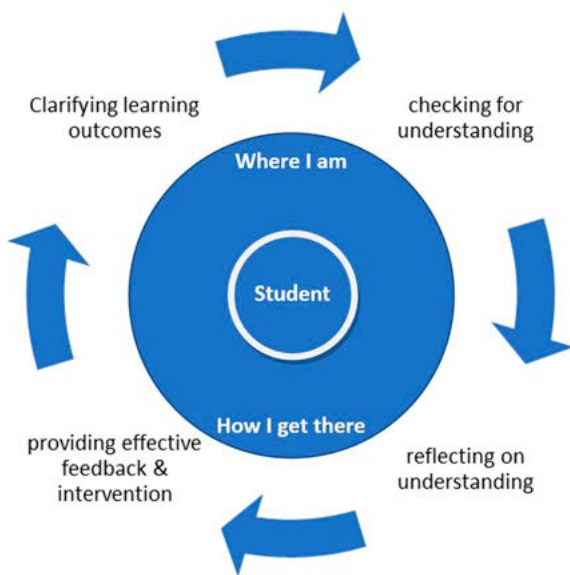
To learn effectively, it is desirable to use a model that engages students actively in the learning process. Another challenge is to link education to real life. Incorporating current affairs in the classroom creates a more engaging lesson – helping students become aware of global issues and allowing them to make connections between what is taught at college and what is happening in the real world. This connection will help the students to internalise what they study.

In this process, guidance is needed as the students need help in understanding the why, what and how of the study process. Even more today, students require help in understanding the learning process. Slowly, we as educators are moving (back) from teacher-driven to student-driven learning.

## 2. The shift to student-driven learning

Student-driven learning enables the student to move from being a passive receiver of information to an active participant in their own discovery process. What students learn, how they learn it and how their learning process is assessed are all driven by each individual student's needs and abilities. The student must take ownership of their own learning. Taking ownership of the learning process implies developing intrinsic motivation for growth. Intrinsic motivation is the opposite of motivation based on earning marks in the class – it stems from praise received from the teacher.

Student-centred strategies emphasise each student's interests, abilities and learning style. Students develop better skills in independent problem-solving, critical thinking and reflective thinking. The approach increases their confidence regarding how to develop students' knowledge and skills.



**Figure 1:**  
Student-centred learning

This student-centred approach focuses on what students are expected to be able to do at the end of the course. The teacher's role is more that of a facilitator than an instructor.

Learning outcomes are used to express what is expected of students at the end of the learning period. Learning outcomes are clear statements of what the student is expected to achieve and how the student is expected to demonstrate this achievement as a result of the learning process.

### **3. Clarifying expectations in a rubric**

A way to help teachers guide students in their learning process is the use of rubrics. A rubric is used to examine how well students have achieved learning outcomes. A rubric includes specific, observable and measurable descriptors that define expectations at each level of performance for each learning outcome. A rubric helps teachers apply consistent standards when assessing qualitative tasks, and promotes consistency in shared marking.

Rubrics are a good tool for students: they let students know what is expected of them. They help students see that learning is about gaining specific skills (both in academic subjects and in problem-solving and life skills), and they give students the opportunity to do self-assessment to reflect on the learning process. Rubrics encourage students to contemplate their own thought process and possibly their own criteria for what is 'good': to analyse their own work and learning process to see how it matches up with the standard set and how it is explained in the rubric. By using rubrics, teachers have students experience their own higher-level thinking processes.

### **4. Our experience in INDOPED**

Several partners in the INDOPED project adopted the rubrics methodology. In the workshops, participants were struggling with questions like what does the learning outcome mean? How do I formulate a clear learning outcome? Do the rubrics give the students enough information and guidance? How do I describe a performance level that is clear to students? Again, these were issues arising from the viewpoint of the teacher. In the workshop, we expressed the importance of students. They should realise what element of learning they have mastered and which areas remain unmastered. They need to learn what steps they have to take to reach a higher level.

During and after the workshops, these topics were discussed in a lively manner. When disseminating and applying rubrics in the classroom, the feedback from teachers and students was about increasing awareness of the students of their own learning process. The students noted that they had better understood the why of what they were learning. Another positive side effect the lively discussion was the realisation that teachers 'were on the same page'.

5. Project learning

Project learning is in itself not a new concept. Project work has often been used for inter-disciplinarian or multi-disciplinary learning. Combining knowledge, skills and competencies from different angles is key. Actually, it is the same approach that they will be expected to take in their future jobs.

The project work we formulate is based on real-life situations and assignments, which have an uncertain outcome. The role of the teacher is to guide students through the process.

Another requirement is that each of the participating teachers is aware of the overlap or cohesion with the other topics that are required for completing the project assignment. Working together is crucial in this.

In addition, the awareness of the role of the teacher as coach is paramount. The teacher must give their students the opportunity to learn by themselves; they are the coach and not the lecturer.

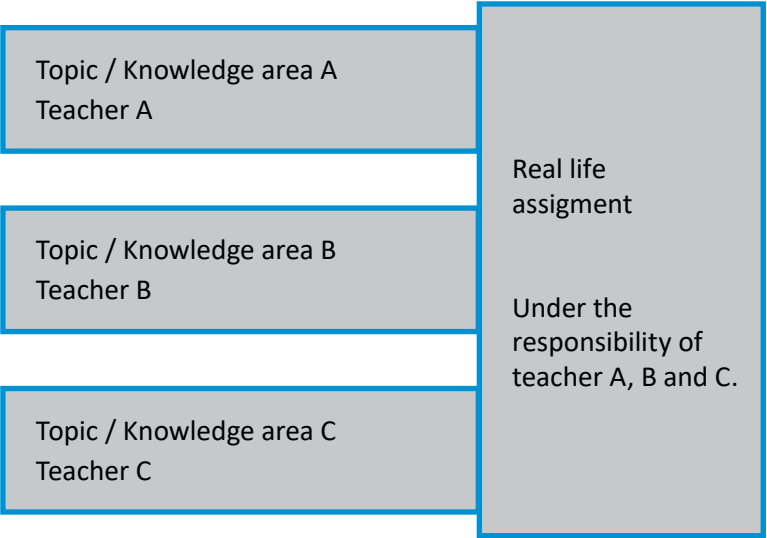


Figure 2:  
Project learning

## 6. Conclusion

Project work is a common denominator at all universities. Usually the project is linked to one teacher or to one topic. A sort of 'solo event'. In the workshops, we noticed that it was hard for the participants to look over the fence to see what a fellow colleague was doing. This is a result of the strict rules in education in Indonesia. Liberty to change timetables or content is limited. These regulations do not stimulate teachers and management to change even a small element in the classroom setting. It does not help the students to understand multi-disciplinary life outside of the classroom. In spite of previous objections, the teams implementing this method of project work were very enthusiastic. Feedback from students was that they better understood the complexity and better understood why they needed to learn.

# Do Assessment Rubrics Matter? An Overview of the Implementation of Rubrics for Assessment.

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## **Abstract:**

As assessment plays a very important role in the outcomes-based education system at tertiary level, this article aims to describe an effective way for rubrics development and an evaluation of the implementation of rubrics at Bina Nusantara University International (BI). Under the framework of the INDOPED project, BI promoted the use of rubrics for assessing student work and implemented it in the assessment activities of most courses. Using the appreciative inquiry approach, interviews with BI lecturers and students were conducted to gain their perspectives about rubrics use and draw some lessons learnt to improve and promote the use of rubrics further.

## **Keywords:**

rubrics; assessment; innovation; pedagogy; implementation evaluation

## **1. Introduction**

Assessment has become one of the crucial aspects of outcomes-based education at tertiary level, especially in a student-centred learning (SCL) system in which the focus has shifted from the teacher to the student. In an SCL environment, the students own their learning, while the teacher mostly acts as the facilitator of the learning. As Industry 4.0 advances, students in business schools are expected to be able to demonstrate not only a comprehensive understanding

of business knowledge, concepts and contexts, but also 21st century skills such as creativity and innovation, critical thinking and problem-solving, communication and collaboration. Hence, these expected skills are often articulated in the student's learning outcome at either programme or course level. Specific teaching and learning methods to support the attainment of these skills need to be promoted along with an appropriate assessment approach to ensure a valid and reliable evaluation of the student performance on those non-cognitive skills.

Rubrics as an assessment tool is commonly used for performance assessment of typical innovation competencies like creativity, problem-solving, collaboration and communication (Nitko and Brookhart, 2007). Although it seems simple, a rubric can be difficult to make. The Bina Nusantara (BINUS) University in Indonesia, especially in BINUS International (BI) programmes, introduced rubrics for assessment in 2014, but not many teachers or lecturers<sup>3</sup> have incorporate them in their assessment practices. BI offers both single and double degree programmes in partnership with overseas universities in international accounting and finance, business management and marketing, and international business majors as well as in computer science, business information systems, communication, fashion design/management, and graphic design and new media with English as the formal language of instruction. The INDOPED project came in early 2016 and has reinforced the use of rubrics for assessment at BI since then. As a member of INDOPED consortium, the Inholland University of Applied Sciences collaborated with the academic development team at BI to strengthen faculty capacity in rubrics development with the ultimate outcome of rubric implementation policy in 2016. In BI, rubrics are mainly used for assessing student presentations, essays and projects. This article aims to describe an effective approach to rubrics development and an evaluation of the implementation of rubrics in BI under the framework of the INDOPED project.

## 2. Assessment

Assessment is generally defined as an activity to collect, evaluate and use information to help teachers make educational decisions about students, curricula, programmes and schools to improve student learning (Nitko and Brookhart, 2007). However, its ultimate goal – student learning – has sometimes been overlooked, since the assessment process and result are often used simply to check on what students have learnt (McMillan, 2007; Taras, 2005). As a poor early experience of assessment can cause a detrimental effect on student learning (Krauss, 2001), teachers must carefully design an assessment process that can bring a positive impact to student

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<sup>3</sup> The terms 'teacher' and 'lecturer' are used interchangeably throughout this article to refer to the same meaning. 'Lecturer' is a common term for teachers at tertiary education institution in Indonesia.

learning. A sound assessment system can strongly influence students' learning, including what they study, when they study, how much work they do, and the approach they take to their learning (Bloxxham and Boyd, 2007). Therefore, assessment has become one of the significant aspects of a globally-used *constructive alignment* approach in curriculum design that emphasises the centrality of the students' intended and/or expected learning outcomes. A learning outcome denotes the expected knowledge, skill or attitude that students should be able to perform at the end of a learning period. To what extent can assessment really evaluate the attainment of the defined learning outcomes? And, how can it be used to improve student learning? Answers to these questions prompt the use of a rubric, which is a matrix-shaped scoring guide that provides the criteria to describe a set of expected levels of performance. When defined effectively, rubrics will not only ease the scoring process of student work and provide detailed feedback to improve student learning, but also uphold the standards of reliability and validity of the assessment.

## 2.1 Constructive alignment

Pioneered by Biggs (1993), *constructive alignment* (CA) is a curriculum or course design approach that aims for the attainment of a student's intended learning outcomes through well-connected teaching, learning and assessment (TLA) activities. Moving from teacher-centred design, CA adopts the concept of constructivism in psychology, where knowledge is believed to be effectively constructed through the activities of the learner or the student. This CA approach focuses on what the students are expected to be able to do by aligning their activities with the prescribed learning outcomes and justifying their learning success based on the indicators of specific learning outcome attainment. In order to implement this approach for an effective course design, the following steps can be taken (Biggs, 2014):

1. Define the intended learning outcomes (ILOs) for the course  
ILO denotes what the students are expected to be able to do at the end of the course. Each ILO should be defined by selecting one (or at most two) verbs according to the Modified Bloom's Taxonomy (Anderson and Krathwol, 2001) that taps into an appropriate cognitive level. The definition of ILO can be derived from the vision and mission statements of the university and the programme, and then from the programme objectives, as shown in Figure 1. The last process, enclosed in the dotted box in Figure 1, constitutes the CA approach in which the ILO(s) at course level should be related to the teaching and learning activities and the assessment task. These ILOs would inform the breadth and depth of content or topics to be learnt, and also how the assessment task needs to be developed.

2. Design appropriate teaching and learning activities

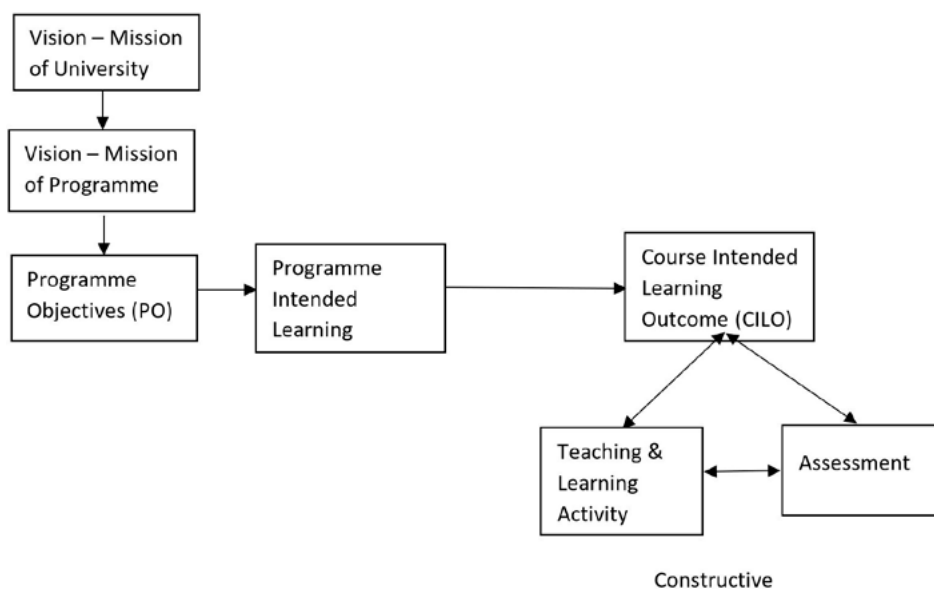
To activate student learning, an inductive learning environment should be provided by crafting an activity that requires students to engage with each verb in the defined ILO. A student should also be given enough time and space to learn the topics with good instructions and support from the teacher.

3. Develop effective assessment tasks

An effective assessment task gives clear direction to the students to perform the activity referred to by the verb(s) defined in the ILO. Here, the use of assessment rubrics plays a very important role in judging how well students perform and meet the ILO. The alignment between the ILO and the students' activity in fulfilling their assessment requirements should be made clear in the rubrics.

4. Transform academic judgement into scores

Rubrics are developed to allow teachers to make a valid and reliable judgement on student work/performance. These rubrics constitute solid evidence for accountability purposes as it may indicate what has worked and what has not in student learning process.



**Figure 1:**

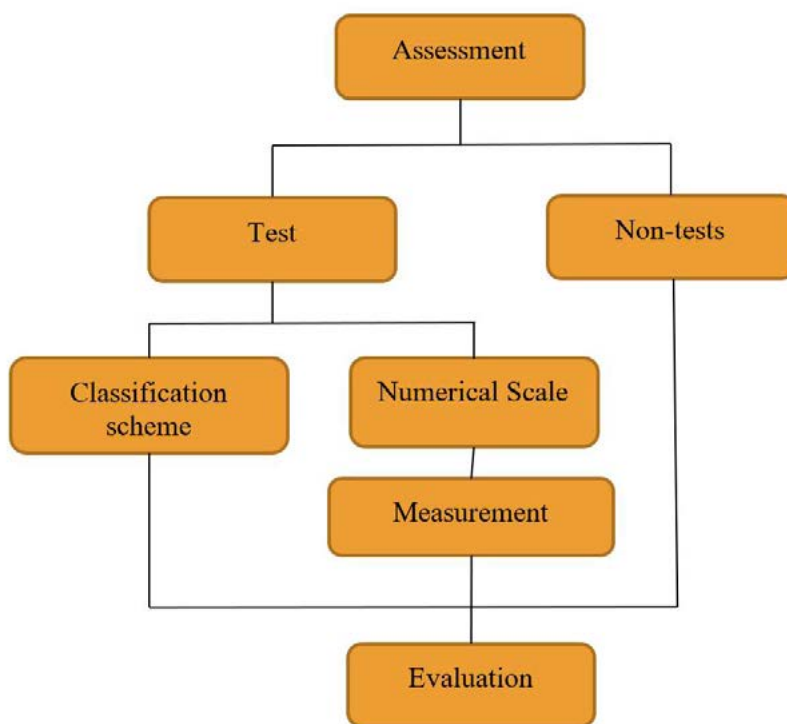
Schematic map for defining intended learning outcomes and constructive alignment.

## 2.2 Definition of assessment

To better explain the definition of assessment, Figure 2 provides the schematic definitions of assessment-related terms as illustrated by Nitko and Brookhart (2007). As previously defined, assessment is the whole process of information gathering to provide insights into how a student is progressing with their learning, which can be in the form of formal (i.e. tests) or informal (non-tests) observations. A test is defined as a formal instrument or systematic procedure to observe what and how a student is capable of, and typically in paper-and-pencil format, or computer-based, or using media like laboratory related equipment. Meanwhile, a non-test refers to a non-systematic procedure that obtains information about the student from other means such as classroom observation by the teacher or student background records. Tests can use either classification schemes that use psychological theories and assign qualitative labels to students, or numerical scales that use a process called measurement to assign scores to students. Finally, evaluation is actually the process of making a value judgement about the quality of a student's work or performance based on all information gained from either tests or non-tests. In addition, Nitko and Brookhart (2007) state that an 'evaluation may or may not be based on measurements or test results' (p. 8). It can be based on checklists or rating scales. However, although objective information is available, an evaluator may still use his/her own academic judgement and experience in making decisions about the student. Therefore, subjectivity and inconsistency can influence all evaluations, and this is where assessment rubrics come in. Rubrics are made in order to reduce these biases so that evidence of student performance on the attainment of a particular learning outcome can be provided and justified.

## 2.3 Categories of assessment

Based on the purposes, there are three main categories of assessment: (1) assessment of learning, (2) assessment for learning, and (3) assessment as learning. First, assessment of learning normally takes place after the learning process has been completed, e.g. at the end of a unit topic. With its summative nature, this type of assessment aims to identify and discriminate between students and different levels of achievement (for certification purposes). The assessment result is also used to provide evidence for relevant stakeholders (e.g. head teachers, school, government body) for making an appropriate judgement of standards (quality assurance purpose). The second type, assessment for learning, often referred to as formative assessment, helps teachers to monitor and guide student learning while the learning is in progress. The main objective is to promote learning by motivating students and to inform teachers for better teaching strategies (for feedback purposes). Finally, the assessment as learning, or diagnostic assessment, attempts to sharpen students' lifelong learning capacity in order to meet the expected learning outcomes.



**Figure 2:**

Schematic definition of assessment-related terminologies, as modified from Nitko and Brookhart (2007).

According to the reference used, there are two types of assessment: (1) norm-referenced and (2) criterion-referenced. The first type is designed to assess stable characteristics of individual students in order to compare them with each other. In other words, the norm-referenced type is used to discriminate between students, or to classify students in groups of various cognitive abilities. The second type is designed to evaluate the extent to which each student can achieve the defined set of standards, or learning outcomes. Hence, this criterion-referenced type of assessment utilises rubrics to provide evidence on whether and how a student can meet the intended learning outcomes. Thus, the outcomes-based education systems approach places a great deal of emphasis on the development and use of rubrics to assess student progress and/or performance in learning.

## 2.4 Principles of assessment

As adapted from Bloxham and Boyd (2007), Nitko and Brookhart (2007) and BINUS International (2010), the principles of assessment are defined as follows:

- **Reliability**

This principle defines the degree to which students' results remain consistent over replications of an assessment procedure. A reliable assessment gives a consistent result when (1) the same task was administered in similar/identical circumstances on different occasions; (2) two or more different but equivalent tasks were completed on the same or different occasions; and (3) two or more teachers marked the same task. To enhance reliability, the following activities can be done:

- use an adequate number of assessment items,
- construct assessment items that clearly differentiate between students based on what is being assessed,
- communicate the performance criteria for the assessment to students,
- ensure the objectivity of the assessment procedure and scoring,
- use shorter assessments more often than fewer long assessments,
- get another teacher or more from parallel classes to perform the marking of the same performance.

- **Validity**

Validity often refers to the accuracy of any inference made about the assessment. In other words, it defines the degree of interpretation and uses of the students' assessment results. To validate the assessment, we must combine evidence from a variety of sources that demonstrate these interpretations and uses are appropriate. Table 1 lists types of evidence to support validity. Intrinsically, validity ensures that the designed tasks are really assessing the stated/intended learning outcome(s). When assessment is considered valid, it is almost always reliable, but not vice versa.

- **Effectiveness**

In order to be effective, assessment tasks should be designed to encourage good-quality, 'deep' approaches to learning in students

- **Comparability and consistency**

There should be consistent and comparable approaches to the summative assessment requirements of awards of the same level across programmes and institutions.

| Type of evidence    | Description                                                                                  |
|---------------------|----------------------------------------------------------------------------------------------|
| Content-related     | The extent to which the assessment is representative of the domain of interest               |
| Instruction-related | The extent to which the assessment item is matched with given instructions                   |
| Criterion-related   | The relationship between an assessment and another measure of the same trait                 |
| Construct-related   | The extent to which the assessment is a meaningful measure of an unobservable characteristic |

**Table 1:**

Types of validity evidence, as adapted from Nitko and Brookhart (2007).

The following sample activity can be suggested to enhance validity:

- ask other teachers to judge the clarity of the assessment,
  - ask other teachers to check whether the assessment items match the objective of the assessment,
  - ask easy questions first,
  - ensure the appropriateness of vocabulary, sentence structure and item difficulty in an assessment,
  - provide adequate time to complete the assessment,
  - use a variety of methods to assess the same thing, and
  - use the assessment only for the intended purposes.
- **Equity**  
Each individual student should have an equal opportunity to effectively demonstrate their learning. In the new American standards of testing (AERA, APA and NCME, 2014), this principle is referred to as fairness, mandating that assessment procedures should be fair to students from all ethnic and socio-economic backgrounds as well as to students with any learning disabilities. Also, an assessment task should not contain any material that is offensive or favour ethnic and gender stereotypes.
  - **Practicability**  
Assessment tasks must be practicable for both teachers and students in terms of the time needed for completion and marking.

- **Transparency**  
Information, guidance, rules and regulations on assessment should be clear, accurate, consistent and accessible to all staff, students, practice teachers and external examiners.
- **Attribution**  
The assessment tasks should generate clear evidence that the work (of whatever nature) has been produced by the student.

### 3. Definition of intended learning outcome

A learning outcome indicates what the students are expected to be able to do after an instructional segment, i.e. upon completion of a learning unit, session, course or even programme (Kennedy, 2007; Nitko and Brookhart, 2007). As identified by Bloom, there are three domains of learning: *cognitive*, *affective* and *psychomotor*. Within each domain there is an ascending order of complexity, which is referred to as a *taxonomy*. The cognitive domain deals primarily with intellectual knowledge and thinking skills; the affective domain relates to what students should feel or value; and the psychomotor domain addresses students' motor skills and physical perceptions. Depending on which domain of learning a student should demonstrate their capacity at, one learning outcome should tap into only one of these three domains and into one level of the taxonomies. In his early work from 1956, Bloom introduced six major classifications of cognitive taxonomy, starting from *knowledge*, *comprehension*, *application*, *analysis* and *synthesis* to *evaluation* in an increasing level of performance complexity.

Within each classification, there is a list of action (active) verbs that can be used for writing a learning outcome to describe a specific learning activity. After almost five decades, Bloom's taxonomy has been revised to include six almost similar cognitive process levels and four levels of knowledge dimension within each cognitive level. Table 2 below illustrates the two dimensions of the revised Bloom's taxonomy (Nitko and Brookhart, 2007). The new classifications are a direct, one-to-one mapping of the original classifications, except for the last two levels that are swapped. The last classification in the revised version, i.e. *create*, represents *synthesis* in the original version. The revised two-dimensional version has an advantage as it provides a broader range of learning outcomes than the original one-dimensional version.

The *knowledge* dimension is comprised of four types of knowledge that the students can be expected to attain, ranging from concrete to abstract (see Table 3). Meanwhile, the *cognitive process* dimension represents a continuum of increasing complexity in the cognitive process (see Table 4).

| Knowledge Dimension     | Cognitive Process Dimension |                   |              |                |                 |               |
|-------------------------|-----------------------------|-------------------|--------------|----------------|-----------------|---------------|
|                         | (1)<br>Remember             | (2)<br>Understand | (3)<br>Apply | (4)<br>Analyse | (5)<br>Evaluate | (6)<br>Create |
| Factual knowledge       |                             |                   |              |                |                 |               |
| Conceptual knowledge    |                             |                   |              |                |                 |               |
| Procedural knowledge    |                             |                   |              |                |                 |               |
| Metacognitive knowledge |                             |                   |              |                |                 |               |

**Table 2:**  
Revised Bloom’s taxonomy table, as modified from Anderson and Krathwol (2001).

| Concrete knowledge  Abstract knowledge |                                              |                                                                          |                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Factual                                                                                                                 | Conceptual                                   | Procedural                                                               | Metacognitive*                                                                              |
| knowledge of terminology                                                                                                | knowledge of classifications and categories  | knowledge of subject-specific skills and algorithms                      | strategic knowledge                                                                         |
| knowledge of specific details                                                                                           | knowledge of principles and generalisations  | knowledge of subject-specific techniques and methods                     | knowledge about cognitive tasks, including appropriate contextual and conditional knowledge |
|                                                                                                                         | knowledge of theories, models and structures | knowledge of criteria for determining when to use appropriate procedures | self-knowledge                                                                              |

**Table 3:**  
The knowledge dimension in the revised Bloom’s taxonomy, as adapted from Anderson and Krathwol (2001).  
*Notes.* \* Metacognitive knowledge is defined as knowledge of one’s own cognition and about oneself in relation to various subject matters (Anderson and Krathwol, 2001)

| Lower order thinking skills |                       |                | Higher-order thinking skills |                |                 |
|-----------------------------|-----------------------|----------------|------------------------------|----------------|-----------------|
| Remember                    | Understand            | Apply          | Analyse                      | Evaluate       | Create          |
| recognising                 | interpreting          | executing      | differentiating              | checking       | generating      |
| • identifying               | • clarifying          | • carrying out | • discriminating             | • coordinating | • hypothesising |
|                             | • paraphrasing        |                | • distinguishing             | • detecting    |                 |
| recalling                   | • representing        | implementing   | • focusing                   | • monitoring   | planning        |
| • retrieving                | • translating         | • using        | • selecting                  | • testing      | • designing     |
|                             | exemplifying          |                | organising                   | critiquing     | producing       |
|                             | • illustrating        |                | • finding                    | • judging      | • constructing  |
|                             | • instantiating       |                | coherence                    |                |                 |
|                             | classifying           |                | • integrating                |                |                 |
|                             | • categorising        |                | • outlining                  |                |                 |
|                             | • subsuming           |                | • parsing                    |                |                 |
|                             | summarising           |                | • structuring                |                |                 |
|                             | • abstracting         |                | attributing                  |                |                 |
|                             | • generalising        |                | • deconstructing             |                |                 |
|                             | inferring             |                |                              |                |                 |
|                             | • concluding          |                |                              |                |                 |
|                             | • extrapolating       |                |                              |                |                 |
|                             | • interpolating       |                |                              |                |                 |
|                             | • predicting          |                |                              |                |                 |
|                             | comparing             |                |                              |                |                 |
|                             | • contrasting         |                |                              |                |                 |
|                             | • mapping             |                |                              |                |                 |
|                             | • matching            |                |                              |                |                 |
|                             | explaining            |                |                              |                |                 |
|                             | • constructing models |                |                              |                |                 |

**Table 4:**

The Cognitive Process dimension in the revised Bloom's taxonomy, as adapted from Iowa State University (2012).

Kennedy, Hyland and Ryan (2006) suggest the following tips for writing about a learning outcome:

- Begin each learning outcome with an action verb, followed by the object of the verb followed by a phrase that gives the context.
- Use only one verb per learning outcome.
- Avoid vague terms like know, understand, learn, be familiar with, be exposed to, be acquainted with and be aware of.
- Avoid complicated sentences. If necessary, use more one than one sentence to ensure clarity.
- Ensure that the learning outcomes of a course relate to the overall outcomes of the programme.
- The learning outcomes must be observable and measurable.
- Ensure that the learning outcomes are capable of being assessed.
- When writing learning outcomes, please note the timescale within which the outcomes are to be achieved. Ask yourself if it is realistic to achieve the learning outcomes within the time and with the resources available.
- As you work on writing the learning outcomes, bear the mind how these outcomes will be assessed, i.e. how will you know if the student has achieved these learning outcomes? If the learning outcomes are very broad, they may be difficult to assess effectively. If the learning outcomes are very narrow, the list of learning outcomes may be too long and detailed.
- Before finalising the learning outcomes, ask your colleagues and possibly former students if the learning outcomes make sense to them.
- When writing learning outcomes, for students at levels beyond the first year, try to avoid overloading the list with learning outcomes which are drawn from the bottom of Bloom's taxonomy (e.g. *knowledge* and *comprehension* in the cognitive domain). Try to challenge the students to use what they have learnt by including some learning outcomes drawn from the higher categories (e.g. *application*, *analysis*, *synthesis* and *evaluation*).

## 4. Development of rubrics

As discussed in previous sections, rubrics are needed to provide evidence on how the students have performed in attaining the defined learning outcomes. This evidence is important to justify that the assessment is valid and reliable. In addition, rubrics can help teachers teach and help students learn. For teachers, good rubrics can help identify and refine learning activities, coordinate assessment and instruction, and facilitate communication with other graders. For students, having a rubric definitely guides them in preparing and performing successfully in the given assessment. The rubric can also encourage the students' critical thinking as they would need to comprehend and attempt to fulfil all of the expected criteria.

### 4.1 Definition of rubrics

A rubric is a scoring guide that lays out the specific expectations for an assessment that includes a coherent set of criteria for students' work (Stevens and Levi, 2005; Brookhart, 2013). As shown in Figure 3, a rubric typically consists of a set of criteria, a set of performance levels (scales), and descriptors for each of the specific criterion – level of performance. The criteria/dimension/indicator describe the aspects of an assessment task which the assessor takes into account when making their judgement, while the performance level denotes the standard or level of attainment of that aspect. The descriptor delineates the levels of expected performance quality that the students need to demonstrate. A score (marking point) is also normally assigned at each level of performance. Figure 4 illustrates an example of a simple rubric used for a history research paper.

Rubrics can be used in any type of assessment and/or performance. Table 5 provides examples of learning activities with respect to the types of performance when rubrics can be used. Depending on the types of performance, a rubric is developed using the principles of transparency and practicability. The rubric needs to be designed in such a way that explains sufficiently how the student needs to demonstrate the expected outcome(s) and how the teacher as an assessor should score the student performance.

|                              |                                                                                      |                          |                    |                         |
|------------------------------|--------------------------------------------------------------------------------------|--------------------------|--------------------|-------------------------|
| Level of Performance (scale) |                                                                                      |                          |                    |                         |
| Criterion                    | Insufficient<br>(0 points)                                                           | Sufficient<br>(4 points) | Good<br>(6 points) | Exemplary<br>(8 points) |
| Assessment<br>criteria 1     |                                                                                      |                          |                    |                         |
| Assessment<br>criteria 2     | Descriptor in each cell corresponding to<br>specific criterion and performance level |                          |                    |                         |
| Assessment<br>criteria 3     |                                                                                      |                          |                    |                         |

**Figure 3:**  
A template of a rubric, as modified from NIU (2011).

| Criterion                     | Task                                                     | Level of Performance                                 |                                                |  | Score |
|-------------------------------|----------------------------------------------------------|------------------------------------------------------|------------------------------------------------|--|-------|
| History Research Paper Rubric |                                                          |                                                      |                                                |  |       |
| Criteria                      | Excellent                                                | Good                                                 | Poor                                           |  |       |
|                               | 3                                                        | 2                                                    | 1                                              |  |       |
| Number of sources             | Ten to twelve                                            | Five to nine                                         | One to four                                    |  |       |
| Historical accuracy           | No apparent inaccuracies                                 | Few inaccuracies                                     | Lots of historical inaccuracies                |  |       |
| Organization                  | Can easily tell from which sources information was drawn | Can tell with difficulty from where information came | Cannot tell from which source information came |  |       |
| Bibliography                  | All relevant bibliographic information is included       | Bibliography contains most relevant information      | Bibliography contains very little information  |  |       |
| Descriptor                    |                                                          |                                                      |                                                |  |       |

**Figure 4:**  
An example of rubric, as adapted from NIU (2011).

| Type of Performance                                                                                                                                                                                                     | Examples                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Processes</b> <ul style="list-style-type: none"> <li>Physical skills</li> <li>Use of equipment</li> <li>Oral communication</li> <li>Work habits</li> </ul>                                                           | <ul style="list-style-type: none"> <li>Playing a musical instrument</li> <li>Preparing a slide for the microscope</li> <li>Making a speech to the class</li> <li>Reading aloud</li> <li>Conversing in a foreign language</li> <li>Working independently</li> </ul>                                       |
| <b>Products</b> <ul style="list-style-type: none"> <li>Constructed objects</li> <li>Written essays, themes, reports, term papers</li> <li>Other academic products that demonstrate understanding of concepts</li> </ul> | <ul style="list-style-type: none"> <li>Wooden bookshelf</li> <li>Watercolour painting</li> <li>Laboratory report</li> <li>Term paper on theatrical concept</li> <li>Written analysis of the effects of the open market in China</li> <li>Model or diagram of a structure</li> <li>Concept map</li> </ul> |

**Table 5:**  
Examples of types of performance and learning activities in which rubrics can be used.

## 4.2 Type of rubrics

Based on the number of judgements, there are three types of rubrics: (1) analytic and (2) holistic. The *analytic* rubric evaluates each assessment criterion (or dimension, trait, aspect) separately (see Figure 5), while the *holistic* rubric evaluates all criteria simultaneously (see Figure 6). Next, based on the performance descriptions, there are two types of rubrics: (1) general and (2) specific. In a general rubric, the description of the performance quality/standard is defined in general terms that can be applied to many different tasks. On the other hand, the *task-specific rubric* describes the performance quality/standard using terms that refer to the specific assessment task. Thus, it can only be used for a particular task.

## Changing Communities in Our City

Task Description: Each student will give a five-minute presentation on the changes in one Portland community over the past thirty years.

The student may focus the presentation in any way they wish, but there needs to be a thesis of some sort, not just a chronological exposition. The presentation should include appropriate photographs, maps, graphs and other visual aids for the audience.

|                                 | Excellent                                                                                                                                                                                                                              | Competent                                                                                                                                                                                                                                                | Needs work                                                                                                                                                                                     |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Knowledge/<br>understanding 20% | The presentation demonstrates a depth of historical understanding by using relevant and accurate detail to support the student's thesis.<br>Research is thorough and goes beyond what was presented in class or in the assigned texts. | The presentation uses knowledge that is generally accurate with only minor inaccuracies and that is generally relevant to the student's thesis.<br>Research is adequate but does not go much beyond what was presented in class or in the assigned text. | The presentation uses little relevant or accurate information, not even that which was presented in class or in the assigned texts.<br>Little or no research is apparent.                      |
| Thinking/<br>inquiry 30%        | The presentation is centred around a thesis, which shows a highly developed awareness of historiographic or social issues and a high level of conceptual ability.                                                                      | The presentation shows an analytical structure and a central thesis, but the analysis is not always fully developed or linked to the thesis.                                                                                                             | The presentation shows no analytical structure and no central thesis.                                                                                                                          |
| Communication<br>20%            | The presentation is imaginative and effective in conveying ideas to the audience.<br>The presenter responds effectively to audience reactions and questions.                                                                           | Presentation techniques used are effective in conveying main ideas, but they are a bit unimaginative.<br>Some questions from the audience remain unanswered.                                                                                             | The presentation fails to capture the interest of the audience and/or is confusing in terms of what is to be communicated.                                                                     |
| Use of visual aids<br>20%       | The presentation includes appropriate and easily understood visual aids, which the presenter refers to and explains at appropriate moments in the presentation.                                                                        | The presentation includes appropriate visual aids, but these are too few, are in a format that makes them difficult to use or understand, or the presenter does not refer to or explain them in the presentation.                                        | The presentation includes no visual aids or includes visual aids that are inappropriate or too small or messy to be understood.<br>The presenter makes no mention of them in the presentation. |
| Presentation skills<br>10%      | The presenter speaks clearly and loudly enough to be heard, using eye contact, a lively tone, gestures and body language to engage the audience.                                                                                       | The presenter speaks clearly and loudly enough to be heard but tends to drone or fails to use eye contact, gestures and body language consistently or effectively at times.                                                                              | The presenter cannot be heard or speaks so unclearly that they cannot be understood.<br>There is no attempt to engage the audience through eye contact, gestures or body language.             |

**Figure 5:**

An example of an analytic rubric, as adapted from Stevens and Levi (2005).

### Changing Communities in Our City

Task Description: Each student will give a five-minute presentation on the changes in one Portland community over the past thirty years.

The student may focus the presentation in any way they wish, but there needs to be a thesis of some sort, not just a chronological exposition. The presentation should include appropriate photographs, maps, graphs and other visual aids for the audience.

|                                 | Criteria                                                                                                                                                                                                                               | Comments | Points |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------|
| Knowledge/<br>understanding 20% | The presentation demonstrates a depth of historical understanding by using relevant and accurate detail to support the student's thesis.<br>Research is thorough and goes beyond what was presented in class or in the assigned texts. |          |        |
| Thinking/<br>inquiry 30%        | The presentation is centred around a thesis, which shows a highly developed awareness of historiographic or social issues and a high level of conceptual ability.                                                                      |          |        |
| Communication<br>20%            | The presentation is imaginative and effective in conveying ideas to the audience.<br>The presenter responds effectively to audience reactions and questions.                                                                           |          |        |
| Use of visual aids<br>20%       | The presentation includes appropriate and easily understood visual aids, which the presenter refers to and explains at appropriate moments in the presentation.                                                                        |          |        |
| Presentation skills<br>10%      | The presenter speaks clearly and loudly enough to be heard, using eye contact, a lively tone, gestures and body language to engage the audience.                                                                                       |          |        |

**Figure 6:**

An example of a holistic rubric, as adapted from Stevens and Levi (2005).

### 4.3 Making rubrics

A rubric maker should always refer to the defined learning outcomes and define criteria and standards accordingly. Different criteria may use different weightings for the final scoring/marking. Making an analytic rubric can start from listing the major criteria of good work, of expected quality, and then preparing a rubric for each of these criteria. Figure 7 shows a common template for an analytic rubric, another example of which has also been provided in Figure 5. For each scale or level of performance per criterion, we can determine the number of points to be awarded to students equally or with different weightings and the descriptor that describes how the score is derived and what is expected from the student's work. A level of performance may or may not use descriptors, but having a descriptor helps in achieving objectivity in scoring.

| Task Description:                 |               |               |               |               |       |
|-----------------------------------|---------------|---------------|---------------|---------------|-------|
| Assessment criteria/<br>Dimension | Scale level 1 | Scale level 2 | Scale level 3 | Scale level 4 | Total |
| Criterion 1                       |               |               |               |               |       |
| Criterion 2                       |               |               |               |               |       |
| Criterion 3                       |               |               |               |               |       |
| ...                               |               |               |               |               |       |

**Figure 7:**

An example of an analytic rubric, as adapted from Stevens and Levi (2005).

The quality of performance levels is commonly expressed as a rating scale with two or more levels. The number of levels indicates, in a descending order of quality, examples of the performance levels, and can be given as follows:

- Sophisticated, competent, partly competent, not yet competent
- Excellent, good, fair, poor
- Exemplary, competent, beginning
- Strong, satisfactory, weak
- Master, apprentice, beginner
- Proficient, intermediate, novice
- Complete, incomplete
- Yes, No

Care should be taken when determining the number of scale categories. More categories imply more difficulties for the assessor to differentiate the quality of student work. The top and bottom scale categories are usually easier to decide than the middle ones. Thus, it is common to use a three- or four-category scale for a rubric, as having few middle categories is often preferable. Often, the number of categories corresponds to the programme's or course's grading system.

Nitko and Brookhart (2007) suggests that a *holistic* rubric can be appropriate for an essay-format paper that asks students to synthesise and create when no single description of the expected result can be pre-specified. It is also good for final exams or final projects when no feedback to students will be given. Figure 8 provides a typical template of a holistic rubric, another example of which has been presented in Figure 6. Similarly, we still need to identify the criteria of good

work or expected quality. The difference is that only the highest expected quality of student work is described in the rubric. To describe the highest expected level of performance, we can decide beforehand the number of possible categories of performance levels of the student work and provide descriptions of each of these categories. We can also try to match exemplars or samples of student work with each of the defined quality levels. By providing exemplars of the highest quality of work in the holistic rubric, an assessor can easily mark the student work using the rubric.

Based on the performance descriptors, a general (generic) rubric contains generic descriptors that can be used to score a wide range of assessment tasks or student work. The rubric contains guidelines for scoring different tasks of a similar type of assessment. For example, generic rubrics for writing may apply for an essay-format paper, a problem-solving case analysis, a literature report, and so on. Figures 5 and 6 presented above are examples of a generic rubric since the assessment criteria or dimensions are common criteria for assessing problem-solving-type tasks. The task-specific rubric, on the other hand, is a scoring rubric that uses the generic scoring framework and applies it to a particular task as guided by the defined learning outcome. By tailoring the rubric to a specific learning outcome, the relationship between assessment and the intended learning outcome is more warranted. The reliability and validity of the assessment result would improve when using this task-specific rubric (Nitko and Brookhart, 2007). Table 6 presents the advantages and disadvantages of different types of rubrics (Nitko and Brookhart, 2007).

| Task description:  |                                                                        |          |       |
|--------------------|------------------------------------------------------------------------|----------|-------|
| Criteria/dimension | Standards/performance level                                            | Comments | Score |
| Criterion 1        | Description of highest expectation of Criterion/dimension #1           |          |       |
| Criterion 2        | Description of highest expectation of Criterion/dimension #2           |          |       |
| Criterion 3        | Description of highest expectation of Criterion/dimension #3           |          |       |
| ...                | Description of highest expectation of the next criterion/ dimension #4 |          |       |

**Figure 8:**  
An example of a holistic rubric, as adapted from Stevens and Levi (2005).

| Type of rubrics                                       | Definition                                                                                                             | Advantages                                                                                                                                                                                                                                                                                                                  | Disadvantages                                                                                                                                                                                       |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Holistic or analytic: one or several judgements?      |                                                                                                                        |                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                     |
| Analytic                                              | Each criterion (dimension, trait) is evaluated separately                                                              | <p>Gives diagnostic information to teacher</p> <p>Gives formative feedback to students</p> <p>Easier to link to instruction than holistic rubrics</p> <p>Good for formative assessment</p> <p>Adaptable for summative assessment; if you need an overall score for marking, you can combine the scores</p>                  | <p>Takes more time to score than holistic rubrics</p> <p>Takes more time to achieve inter-rater reliability than with holistic rubrics</p>                                                          |
| Holistic                                              | All criteria (dimensions, traits) are evaluated simultaneously                                                         | <p>Scoring is faster than with analytic rubrics</p> <p>Requires less time to achieve inter-rater reliability</p> <p>Good for summative assessment</p>                                                                                                                                                                       | <p>Single overall score does not communicate information about what to do to improve</p> <p>Not good for formative assessment</p>                                                                   |
| Description of performance: general or task-specific? |                                                                                                                        |                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                     |
| General                                               | Description of work gives characteristics that apply to a whole family of tasks (e.g. writing, problem solving)        | <p>Can share with students, explicitly linking assessment and instruction</p> <p>Reuse same rubrics with several tasks or assignments.</p> <p>Supports learning by helping students see 'good work' as bigger than one task.</p> <p>Supports student self-evaluation</p> <p>Students can help construct general rubrics</p> | <p>Lower reliability at first than with task-specific rubrics</p> <p>Requires practice to apply well</p>                                                                                            |
| Task-specific                                         | Description of work refers to the specific content of a particular task (e.g. gives an answer, specifies a conclusion) | <p>Teachers sometimes say using these makes scoring 'easier'</p> <p>Requires less time to achieve inter-rater reliability</p>                                                                                                                                                                                               | <p>Cannot share with students (would give away answers).</p> <p>Need to write new rubrics for each task</p> <p>For open-ended tasks, good answers not listed in rubrics may be evaluated poorly</p> |

**Table 6:**

The advantages and disadvantages of different types of rubrics, as adapted from Nitko and Brookhart (2007).

In summary, an effective rubric contains the following aspects (as modified from NIU (2011)):

- (1) Criteria; identifies aspects or dimension of the assessment task that need to be assessed.
- (2) Levels of performance; denotes the adjectives that define standards, scales, or the expected quality of student work.
- (3) Scores; makes up the points or values used to rate each criterion in correspondence with a performance level.
- (4) Descriptors; indicates explicit descriptions of the performance or the expected quality of the student's work.

## 5. Implementation of rubrics at BINUS International

### 5.1 Use of rubrics

Catering for eight international undergraduate programmes, BINUS International (BI) implemented the constructive alignment approach for curriculum development, and started using rubrics for scoring assessment tasks in 2014. The Department of Learning and Faculty Development (LFD), under the division of Academic Development at BI, organises and gives training on rubrics development to all teachers and provides a consultation service related to teaching, learning and assessment development as well as academic policies. Initially, rubrics were used only for few assessment tasks in particular courses, such as projects, essays or reports. But since 2016, rubrics have been mandatorily used in most courses for any assessment task that is worth more than 20% of the total course mark. The rubrics used are *task-specific* and of *analytic* type (with four scale categories of performance level), as the rubrics' criteria are developed based on the prescribed course intended learning outcome (CILO) and a generic scoring framework. Figure 9 depicts the formal template of rubrics used in BI with each standard representing the general description of the quality of the expected outcome, while Figure 10 presents an example of a rubric for scoring a group project's proposal presentation applied in an *Advanced Statistics for Business* course for semester 4 students taking the *International Business* programme. It is task-specific because the criteria should be developed from a prescribed CILO that is targeted by the assessment task and also a generic scoring rubric. In this example, the group project's proposal presentation aims at tapping into four CILOs as defined in Figure 10. The derived criteria follow a generic scoring framework of a statistical research report, but still correspond to the given CILOs. However, the definition of each descriptor in the rubric shown in Figure 10 may need further work, as some of the expected levels of performance standards might not have been clear enough for some lecturers. For example, more detailed explanations on what can be considered 'adequate' or 'justifiable' may be warranted.

| Course intended learning outcomes | Assessment criteria | Proficiency level |            |            |            |
|-----------------------------------|---------------------|-------------------|------------|------------|------------|
|                                   |                     | Poor              | Average    | Good       | Excellent  |
| 1. Learning outcome #1            |                     | Standard 1        | Standard 2 | Standard 3 | Standard 4 |
|                                   | 1.1 Criteria 1      |                   |            |            |            |
|                                   | 1.2 Criteria 2      |                   |            |            |            |
|                                   | 1.3 Criteria 3      |                   |            |            |            |
|                                   | 1.4 Criteria 4      |                   |            |            |            |
| 2. Learning outcome #2            |                     | Standard 1        | Standard 2 | Standard 3 | Standard 4 |
|                                   | 2.1. Criteria 1     |                   |            |            |            |
|                                   | 2.2 Criteria 2      |                   |            |            |            |
|                                   | 2.3 Criteria 3      |                   |            |            |            |

**Figure 9:**  
 An example of *analytic* and *task-specific* rubrics implemented at Bina Nusantara University International.

| Course intended learning outcomes                                                                                                                                                                                                                  | Assessment criteria                          | Proficiency level                                                |                                                              |                                                                                                                                                  |                                                                                                                                                   |      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------|
|                                                                                                                                                                                                                                                    |                                              | Poor<br>(D – 1)                                                  | Average<br>(C – 2)                                           | Good<br>(B – 3)                                                                                                                                  | Excellent<br>(A – 4)                                                                                                                              | Mark |
| 1. Apply basic techniques in hypothesis testing of more than two samples<br><br>2. Apply basic techniques in regression analysis and forecasting<br><br>3. Apply basic techniques in non-parametric methods<br><br>(Choose one, whichever applies) |                                              | Not demonstrated, limited description of the given aspects below | Clear description of the given aspects below, but incomplete | Adequate and justifiable explanation of the given aspects below                                                                                  | Detailed, in-depth and logical explanation of the given aspects below                                                                             |      |
|                                                                                                                                                                                                                                                    |                                              | No research question or hypothesis statement                     | Gives 1 research question                                    | Gives 2 research questions                                                                                                                       | Gives more than two research questions                                                                                                            |      |
|                                                                                                                                                                                                                                                    |                                              |                                                                  | Gives 1 set of hypothesis statements                         | Gives 2 sets of hypothesis statements                                                                                                            | Gives more than two sets of hypothesis statements                                                                                                 |      |
|                                                                                                                                                                                                                                                    |                                              |                                                                  |                                                              |                                                                                                                                                  |                                                                                                                                                   |      |
| Criteria:                                                                                                                                                                                                                                          | Background/ motivation                       |                                                                  |                                                              |                                                                                                                                                  |                                                                                                                                                   |      |
|                                                                                                                                                                                                                                                    | Research objectives/ questions               |                                                                  |                                                              |                                                                                                                                                  |                                                                                                                                                   |      |
|                                                                                                                                                                                                                                                    | Hypothesis development                       |                                                                  |                                                              |                                                                                                                                                  |                                                                                                                                                   |      |
| Utilise statistical software to run and analyse data                                                                                                                                                                                               |                                              | Not demonstrated, limited description of the given aspects       | Clear description of the given aspects below, but incomplete | Adequate and justifiable explanation of the given aspects below, but incomplete connection between the chosen method(s) and their reason for use | Detailed, in-depth and logical explanation of the given aspects below, and clear connection between the chosen method(s) and their reason for use |      |
| Criteria:                                                                                                                                                                                                                                          | Use of data analysis method                  |                                                                  |                                                              |                                                                                                                                                  |                                                                                                                                                   |      |
|                                                                                                                                                                                                                                                    | Reason for choosing the data analysis method |                                                                  |                                                              |                                                                                                                                                  |                                                                                                                                                   |      |
| Utilise the interpretation of statistical analysis results in decision-making                                                                                                                                                                      |                                              | Not demonstrated, limited description of the given aspects       | Clear description of the given aspects below, but incomplete | Adequate and justifiable explanation of the given aspects below, but incomplete connection between results and implications                      | Detailed, in-depth and logical explanation of the given aspects below, and clear connection between results and implications                      |      |
| Criteria:                                                                                                                                                                                                                                          | Potential results                            |                                                                  |                                                              |                                                                                                                                                  |                                                                                                                                                   |      |
|                                                                                                                                                                                                                                                    | Potential implication of results             |                                                                  |                                                              |                                                                                                                                                  |                                                                                                                                                   |      |
| Total marks                                                                                                                                                                                                                                        |                                              |                                                                  |                                                              |                                                                                                                                                  |                                                                                                                                                   |      |

**Figure 10:**

An example of a rubric for assessing a group project's proposal presentation in the Advanced Business Statistics course at BINUS International.

## 5.2 Evaluation of the use of rubrics

Using an appreciative inquiry method, four BI teachers/lecturers of business majors were selected and interviewed about their experiences of using rubrics for assessment in their course(s). The selected lecturers were the ones who participated in the INDOPED workshops on rubrics development and had actively been using rubrics in their course. The interview included questions that asked about the lecturers' best experience with rubrics, their perspectives in the rubrics development approach brought in by INDOPED, their motivation and hopes when using rubrics, and their feedback on the kind of support needed to help the lecturers better develop and use rubrics for assessment. As a result, the following points emerged from the interviews:

- **When to use rubrics**  
All interviewed lecturers stated that rubrics were used to assess students' essays, project presentations and/or reports, and mid/final semester examination questions that were in open- or extended-response format.
- **Rationale for using rubrics**  
Grading consistency and fairness became the two main reasons why the interviewed lecturers used rubrics, especially since there were many parallel classes on the same course. Without rubrics, a lecturer, as a rater/scorer of student work on a particular course that is run across parallel classes, might have different ways for assessing student work. Rubrics, at least, could provide the same guideline or assessment criteria to rate the student work. Hence, the objective nature of rubrics had apparently made the grading easier and less confusing in understanding student work, and also reduced the scorer's bias.
- **Hopes/expectations of rubrics**  
By using rubrics, the interviewed lecturers hoped to be objective in assessing student work so that they could give fairer scores. From the assessment criteria and performance level descriptors included in a rubric, the students would know the expected knowledge and skills when fulfilling any assessment task. With the same rubric to assess student work from all parallel classes, these lecturers hoped to have the same perspectives or understanding in scoring among the lecturers of these parallel classes.
- Most of them agreed that an effective rubric was one that was clear, simple and easy to read or be understood. One lecturer mentioned that a good rubric also needed to reflect all necessary measurement indicators of the active (current) learning outcome(s) and show a clear staging of the attainment level of the stated learning outcome(s).

- Differences in rubrics development approaches

Half of the interviewed lecturers noticed that there was a slight difference in the rubrics development approach as introduced in BI in 2014 in comparison with the method promoted by the INDOPED partner from the Inholland University of Applied Sciences. According to BI's way, a rubric should be aligned with the specific course's learning outcomes as targeted by the assessment task (see Figure 10). Thus, the assessment criteria in a rubric are to be derived from a particular learning outcome. Meanwhile, the INDOPED way did not particularly tap into the prescribed learning outcome(s). The lecturers, however, indicated that this INDOPED way of rubrics development was simpler and more direct, as it can clearly identify the descriptors of each performance level. The latter approach did specify how to create a distinct identifier for different stages or levels of performance. Therefore, combining the two approaches seems to be more effective when developing a rubric, because the level of a student's achievement on a particular learning outcome could be justified, while the descriptors can be defined more clearly.

- Support needed

All of the interviewed lecturers stated that making rubrics had to be a concerted effort with other lecturers due to the complexity in their making and implementation. In BI, training on rubrics development has been given every semester, especially to any new lecturers. However, just like typical outcomes of new pedagogical training, not all trained lecturers implement what they have learnt in their teaching (Harjanto et al., 2018). Continuous guidance in rubrics-making through workshops and/or the personnel consultation service provided by the LFD team were still needed, especially when there was a new learning or assessment activity, or even a cross-discipline assessment task that had never been given to students before. One interviewed lecturer stated that having a clear understanding of a specific learning outcome – from which a rubric was to be developed – was a very important factor.

Not only the lecturers, but also two BI undergraduate students were interviewed to give their perspectives on the use of rubrics for their assessment. Both of them mentioned that rubrics were useful as they did give an understanding of what was expected and that this helped students to meet that lecturer's expectations. One student said that she used rubrics to personally check her own paper to see which areas she would still need to improve. The other student felt that she became more confident by having a rubric as it could provide guidance on how to do the assignment and it could also narrow the gaps between instructions and the assignment. Both agreed that rubrics maintained mark consistency and motivated students to reach as high a mark as possible. However, one said that rubrics might restrict students to find alternative ways

to do the assessment. Another disadvantage of rubrics is when it is too complex and unclear; it could make the students feel overwhelmed. Both agreed, however, that the use of rubrics should be maintained in the teaching and learning process at BUI.

## 6. Lessons learnt

To conclude, the use of rubrics does help teachers/lecturers and students assess student learning progress and performance, especially in non-cognitive skills that are hard to assess. The use of rubrics can reduce the scorer's bias and also upholds the validity, reliability and fairness of assessment, especially when the assessment is closely aligned with the learning outcomes as well as the corresponding teaching and learning activities in the classroom. It is important to note that the effects of bad (assessment) practice are far more potent than they are for any aspect of teaching. How teachers/lecturers conduct classroom assessment greatly influences students' engagement and self-efficacy, which in turn enhances the students' learning and achievement in the subject matter (Butler and McMunn, 2006; Linn and Gronlund, 1995; McMillan, 2007; Nitko and Brookhart, 2007). Therefore, a careful definition of rubrics as an assessment tool is pretty crucial. The INDOPED project has helped to address the difficult problems in rubrics-making, i.e. defining a clear and distinct identifier of the different levels of performance.

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# Innovative Pedagogy Implementation in Economics & Business Teaching and Learning

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## **Abstract:**

This study aims to provide an overview of the implementation of innovative pedagogy conducted by the Faculty of Economics and Business (FEB) of the State Islamic University (UIN) Syarif Hidayatullah Jakarta, specifically related to the implementation of the project marketing research method, the learning case method and Gamification, as well as to explain the components that support the achievement of the method. This study uses grounded theory within a qualitative approach. The data was obtained by interviewing four lecturers and six students, based on the characteristics of their respective subject; namely lecturers with an innovative pedagogy approach and students who had been taught by such a method. Data analysis is performed thematically against verbatim notes from interviews using the ATLAS TI 8.0 application. Data triangulation and theory are applied to increase the credibility of the study results. Based on

thematic analysis, it is known that the components forming the implementation of innovative pedagogy at FEB at UIN Jakarta are Advantages, Student-Centred Learning, Compatibility, Curriculum Adjustment, Core Innovation, and Infrastructure to Support Network Learning.

## **Keywords:**

Innovative Pedagogy, Teaching, Learning

## **1. Introduction**

Global development means we have now entered the era of the industrial revolution 4.0. The presence of industry 4.0 has had a major impact on the industrial, economic and social conditions of the global community. Prasetyo and Sutopo (2016) mentioned that industry 4.0 according to Angela Merkel, Chancellor of Germany (2014), is a comprehensive transformation of all aspects of production in the industry through the incorporation of digital and Internet technology with conventional industries. The industrial revolution itself has properties or components: Social Machine, global facility/virtual production, smart products and smart services (German Federation of Industries, 2016). How is this then related to education? The 4.0 industrial revolution will at least change the way people work and socialise, and it will improve global competition. The world of education is required to respond quickly to these changes.

Universities and industries must be able to develop industrial transformation strategies by considering the human resources sector that has competencies that are in accordance with the needs in this era. Students must have corresponding knowledge and skills, alongside the appropriate social attitudes and behaviours (Sani, 2017). As John Dewey has previously argued, education is the basic method of reform and social progress, and includes three factors: knowledge, skills and character formation (Dewey, 1972, 1984).

The Faculty of Economics and Business (FEB) of UIN Jakarta, as a higher education institution that is responsible for delivering competent human resources, must make changes to its teaching approaches and methods. So far, the teaching practice uses more conventional approaches, where lecturers are still the main source of learning through methods that are generally one-way. Efforts to improve new methods are carried out individually by lecturers, but this is yet to be a joint movement. The conventional teaching model practised so far will certainly no longer be in harmony with the needs of human resources in the industrial era 4.0. Human Resources (HR) produced by the FEB should take an active role in and make a contribution to industry 4.0. The teaching process implemented at FEB must be able to respond to these needs in addition to reflecting and producing advantages that are characteristic of the faculty as part of the State Islamic University (UIN) Syarif Hidayatullah Jakarta.

During the 2015–2018 academic years, the Faculty of Economics and Business at the State Islamic University (UIN) commissioned a number of lecturers in the Accounting, Management and Economics departments to update their teaching methods through innovative pedagogical approaches, such as the learning case method, project market research and Gamification in collaboration with the University of Seville in Spain, Inholland University of Applied Sciences in the Netherlands, and the University of Gdańsk in Poland.

Lecturers position themselves as intelligent facilitators who contribute to the professionalism of students and to develop broad insight and mastery of skills in the field of science. Students interact effectively with scientific problems and industrial skills needs through cases, project assignments and the use of current technology. The faculty facilitates the needs of the classroom infrastructure required for the application of each of these methods. Lecturers and students, regardless of the static and conventional atmosphere, become more dynamic and contemporary. At the faculty policy level, the above three methods are present and selected as part of an alternative to answering the question of taking an ambiguous philosophical position on economics at the intersection of perspectives between pure science or applied science. On the other hand, in the name of innovative work and continuous improvement, the three methods of project market research (PMR), Learning case method (LCM) and gamification are feasible in order to continue to be applied and developed in the faculties of Economics and Business.

## **2. Literature Review on Innovative Pedagogy**

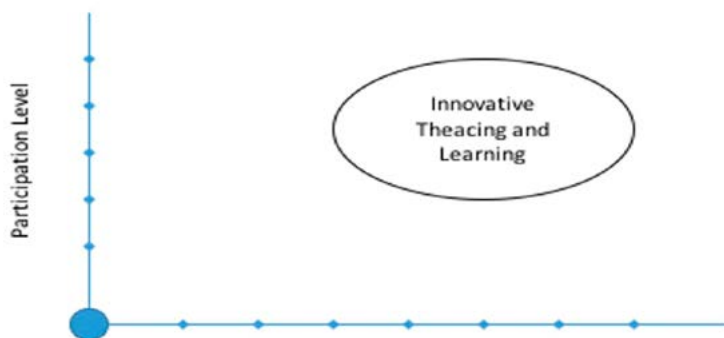
Currently, innovative pedagogy is increasingly gaining ground after having almost always been ignored, especially in faculties or business majors (Lorange, 2016). The need to contextualise education with change means higher education managers must carry out various innovations. Innovative pedagogy aims to produce a generation of professionals that understand the concept of producing, adopting and using knowledge to create innovative thinking and added value (Putkonen, Karisto-Mertanen & Penttilä, 2010). In this context, innovative pedagogy means an innovative pedagogy that is about being innovative educators or innovative teaching processes.

Innovative pedagogy consists of the terminologies of innovation and pedagogy. The terminology of innovation comes from the Latin *innovatus*: ‘to renew or change’. Innovation generally refers to the creation of better or more effective products, processes, technology or ideas, and it signifies substantial positive change compared to incremental changes. Innovation can also be understood as a competitive advantage based on knowledge (Kairisto-Mertanen et al., 2012), while pedagogy itself is a study of being a teacher or of an educational process. Pedagogy as a science explores the processes carried out by the community in transmitting knowledge, skills and values from one generation to another, from one hand to another, and activates the

growth of each individual student or in this case students. The main focus in pedagogy is how to educate people and how to improve student learning and meet the needs of a range of students. Innovative pedagogy in the context of higher education is characterised by deliberate actions to improve student learning on an ongoing basis (Chhabra & Raghunathan, 2016), also contextualising the concept of teaching with the needs and conditions of students; here, students fall into the adult category. Therefore, teaching in higher education must adopt the concept of adult teaching. The adult learning situation is more complex as it requires openness, trust, more experience, and provides opportunities to build relationships and interactions (Jogi, 2015).

Based on these conditions, innovative pedagogy will be easier if the educational paradigm has shifted from the teacher-centred learning (TCL) concept to student-centred learning (SCL). SCL is considered a constructive approach that has relevance, meaningfulness and connection with student knowledge and their previous experience (TEAL, 2010). This approach allows students not only to choose what will be learnt but also to make learning topics interesting (Rogers, 1983). In this case, students can influence the content, activities, materials and pace of learning. A simpler definition of SCL is that students are also responsible for the learning environment and activities (TEAL, 2010). This approach is of course very different from the conventional approach, namely didactic teaching or TCL, where the learning situation and its contents are mastered by the teacher/instructor (Cannon, 2000 in TEAL, 2010).

With the SCL approach, teachers must see each student as a unique person. In this case, each instructor must recognise that students have diverse learning styles, abilities and talents, and are at different stages of development. Teachers/lecturers also provide opportunities for students to study independently, learn from each other and train to use their skills effectively. The proper use of SCL will help increase learning motivation, absorb knowledge more strongly, have deeper understanding, and produce more positive behaviours towards the subject being studied (Collien & O'Brien, 2003 in Froyd, & Simpson, 2008).



**Figure 1:**  
Position of innovative learning models

To implement an effective SCL concept, learning management must have four focuses: knowledge-centred, learner-centred, assessment-centred and community-centred (National Research Council, 1999 in Froyd & Simpson, 2008). In practice, the SCL approach has actually been introduced under different names for a long time, including: active learning; collaborative learning; inquiry-based learning; cooperative learning; problem-based learning; peer-led team learning; team-based learning; peer instruction; inquiry-guided learning; just-in-time learning; small group learning; project-based learning; and question-directed instruction (Froyd & Simpson, 2008).

Related to the above needs, higher education must make changes to the syllabus and adjust the curriculum to the needs of industry and society, build infrastructure that supports networking, open up education resources (database sites), improve classroom teaching methods, increase experience in the field, strengthen e-learning and individual projects, including improvements to the aspects of language used in teaching, case methods, workshops, seminars, guest lecturers, etc. (Nawaz, 2014). Of all the above, the three main aspects of innovative pedagogy that must be considered are: infrastructure that supports networking, innovative teaching methods and curriculum adjustment.

- *Infrastructure to support networks*

Innovative pedagogy aims to prepare students to improve their skills and competencies to face future challenges. The completeness of infrastructure such as ICT (information and communications technology) as a component in innovative pedagogy will be very helpful. For example, technology will make students more stimulated and more involved in various learning activities (Khairnar, C.M, 2015). When accustomed to using ICT, students can learn more independently and easily access information, and besides that, they have the expertise and competence to master technology that can help them to manage, analyse information, communicate and express ideas using a variety of media (Ahmed, 2015).

- *Teaching methods in innovative pedagogy*

There are various methods and approaches that can be used in supporting innovative pedagogy. Various literature on innovative pedagogy suggests that a change of approach is required that will ultimately determine the teaching method. The approach in innovative pedagogy is no longer based on individual-based learning. This is because the individual-based learning approach is usually found in traditional universities that are oriented towards science rather than those that produce professionals or practitioners. Students usually only listen to lecturers, read books and memorise information in order to pass exams. This approach is not suitable for higher education applied science or universities that expect their students to have an impact on other companies, organisations or the environment.

The approach considered in accordance with the concept of innovative pedagogy is group-based learning. This approach is relatively more complex because it aims to solve problems using cognitive theory. Collaborative learning is built on constructivism and social theory, which assumes that learning can be realised if there is interaction (Vygotski, 1978 in Kettunen, Kairisto-Mertanen, Penttilä, 2013). Group-based learning is relevant for a multidisciplinary approach or one that requires diverse expertise. This approach allows students from diverse backgrounds to collaborate; each individual plays an active role, contributes to each other, accepts each other's opinions, and respects each other's abilities (Harsono, 2008). Collaborative learning approaches can be considered an interesting way to eliminate bias and increase tolerance among group members (Kelly, 2002). With this approach, students not only study in class or in the laboratory, but they can learn together from the environment (Puntambekar, 2006; Kettunen, Kairisto-Mertanen, Penttilä, 2013). With a collaborative learning approach, students gain experience and learning together to innovate.

Another approach that is considered in line with innovative pedagogy is cooperative learning. Here, a group focuses on the learning objectives and is divided into sections. Each group member performs their task independently, then the results are put together. The disadvantages of this approach are that there is no flow or integration of ideas from group members. Students are less able to learn from each other and the results cannot be too innovative.

The next approach that is considered to be in line with the goal of innovative pedagogy is networked learning. This approach can occur if students are connected to their environment. This approach is very relevant to education that produces professionals/practitioners, because individuals who have relevant knowledge can determine what is important. The networked learning approach is relevant to the existence of ICT because

it can expand the learning of this method. Detecting networked learning that utilises ICT can support teaching that aims to develop higher skills such as scientific inquiry and critical thinking (Roschelle et al., 2000). The teaching approach can be applied in various models of teaching methods. For example, collaborative learning approaches, cooperative learning and networking learning can be implemented in the form of teaching PMR (project market research), Gamification and learning by case methods.

Innovative pedagogy itself has several characteristics, including: *relative advantage* compared to the previous one; *compatibility*, or whether the innovation is consistent with values, experience and the needs of the adopter; *testability*, to what extent these innovations can be tested in educational institutions; *observability*, whether the innovation can show tangible results to students, and whether we can see variations when implementing the innovation; *complexity*, or whether teachers need training to implement the innovation, and whether to add to the work assignments of the teacher (Roger, 1983; Saud, 2012). Thus, an innovative pedagogy method or approach must at least have an advantage and compatibility.

In addition, in terms of innovative pedagogy there is the essence or core of innovative pedagogy. The essence of innovative pedagogy emphasises the existence of interactive dialogue between educational organisations, students and the lives of the world of work and society. Based on this, the conceptual core of innovative pedagogy is divided into three spaces, namely: (Kairisto-Mertanen et al. (2012))

- Final learning outcomes. Creating innovation and producing the ability to participate in different innovation processes/diversity. Students are expected to create innovation in life and the world of work.
- Learning about innovation competencies alongside study programme-specific knowledge, skills, attitude; i.e. being connected with working life.
- Meta-innovation, referring to how the method of learning and teaching is utilised in the learning process. The aim is to enrich the creation of innovation and innovation competencies.
- *Curriculum Adjustment*  
The curriculum that must be developed in innovative pedagogy must adjust to the needs of industry and society.

### 3. Research Method

The methodology used in this study is grounded, i.e. the general methodology for analysing a (social) phenomenon was carried out by systematically collecting data by utilising a series of methods to produce an inductive theory of substantive areas. Grounded research is used in order to explain phenomena or processes, or to construct a general theory of a phenomenon related to the implementation of innovative pedagogy of PMR, LCM and Gamification in a number of classes at the Faculty of Economics and Business at the State Islamic University (UIN) Syarif Hidayatullah that cannot be explained by existing theories. The grounded research is intended to make specifications of the implementation of innovative pedagogy on conditions that are the cause of a phenomenon of the implementation of PMR, LCM and Gamification classes, actions or interactions that are responses to these conditions, and the consequences arising from such actions or interactions. So, the theoretical formula that is the final result found in qualitative research with grounded theory is not applicable to all populations, but it is only used for such situations or conditions (Egan, 2002).

The grounded research approach begins with a literature review as a (1) *preliminary study* of the main sources of the implementation of innovative pedagogy. The results of the literature review will be strengthened by (2) *unstructured depth interviews* to seek opinions and information from stakeholders involved in PMR, LCM and current class Gamification, namely lecturers, students and faculty officials. Babbie (1992) explains that in grounded research, data collection is carried out through interviews where the questions are formed in an unstructured manner, i.e. through unstructured interviews. An unstructured interview is the interaction between the interviewer and the respondent, where the interviewer only has a plan regarding the questions, or plans for things or the context/topic to be asked. These are usually general questions and are not a set of specific questions that must be asked in certain words and in certain sequences. The interview data for this research utilises ATLAS Ti 8.0 software at each stage of data management and analysis, such as open coding, axial coding and selective code (Strauss and Corbin, 1990)

### 4. Findings and Discussion

#### *Specifications of Phenomenon, Interaction of Response and Implications of Innovative Pedagogy*

One of the steps to take in order to build more capacity at the Faculty of Economics and Business of State Islamic University (UIN) Syarif Hidayatullah Jakarta is to join the Indoped project (Modernising Indonesian Higher Education with Tested European Pedagogical Practices). The Indoped project seeks to increase the capacity of lecturers who are not interpreted in the traditional sense, but who function more like mentors and facilitators in learning. The active

collaboration of universities with external parties (companies, SMEs, cooperatives, etc.) can improve student competence when facing the world of work. The Indoped project will test and adjust the practice of active European learning and instil it in the structure of universities in Indonesia.

The implementation of innovative pedagogy involved 11 lecturers in 2017 and in 2018, it increased to as many as 21. The number of courses in each study programme that utilises the innovative teaching and learning method was as many as 12 in 2017 and in 2018 it increased to 28 courses. More detailed information is presented below:

| Method       | 2017 Number of lecturers | 2018 Number of lecturers |
|--------------|--------------------------|--------------------------|
| PMR          | 3                        | 6                        |
| Gamification | 4                        | 7                        |
| LCM          | 4                        | 8                        |
| Total        | 11                       | 21                       |

**Table 1:**

Lecturers that implement PMR, Gamification and LCM

Source: Faculty Academic Department

| Study programme | 2017 Number of subjects | 2018 Number of subjects |
|-----------------|-------------------------|-------------------------|
| Management      | 3                       | 6                       |
| IESP            | 4                       | 8                       |
| Accountancy     | 5                       | 14                      |
| Total           | 12                      | 28                      |

**Table 2:**

Courses that are subject to the implementation of PMR, Gamification and LCM

Source: Faculty Academic Department

There are three teaching and learning methods that are implemented at the FEB under the INDOPED project, namely:

### *Project Market Research*

Project market research (hereinafter referred to as PMR) is a teaching method in which students are requested to solve a problem by using various knowledge they have obtained from several courses they have studied. There are various reasons why the PMR method should be applied at university. This method encourages students to become active learners because they are required to think critically, analyse and evaluate a problem. Students must collect data, process it and present it. In this way, lecturers have trained students to develop a high-level thinking process, where they are required to apply the knowledge they get – not just the knowledge gained from one course, but from various subjects that have been studied to find a visible solution. Such conditions bring students closer to the real world they will face after completing their education. They will face problems that demand a comprehensive and full resolution. The PMR method can train students' abilities in this regard.

This PMR method also means that lecturers no longer play the role of the only source of knowledge. Their role changes to being facilitators who encourage their students to sharpen their skills in finding and analysing data, and then present solutions. Today there are so many sources of knowledge that can be accessed by students. Just making the lecturer the only source of knowledge does not foster the responsibility of learning in students; instead it solely fosters dependence on what the lecturer gives them. Attitudes like this will certainly not enable students to survive in the community after they finish their education (Description of European teaching and learning methods: Project Market Research, Inholland University of Applied Sciences).

PMR at Syarif Hidayatullah State Islamic University in Jakarta is applied to sixth semester students who take the marketing module in the management study programme at the Faculty of Economics and Business. PMR is applied in two courses, namely consumer behaviour and international marketing. Students are requested to provide marketing strategy recommendations for a number of foreign companies that will enter the Indonesian market. To provide these recommendations, students need to gather information and analyse data related to market potential in Indonesia, Indonesian consumers, and ways to enter the Indonesian market. PMR is studied for one semester. The assignment begins in the second session of the lecture. From the third session until the mid-term exam, the lecturer delivers lecture material. After the mid-term exam, the lecturer monitors the progress of the project by holding a class discussion every week. Thereafter, the final PMR report is presented at the end of the lecture session. In this presentation activity, business practitioners are also invited to provide input to students. The application of PMR is a reference to the learning method of Inholland University of Applied Sciences in the Netherlands.

### *Learning by Case Method*

The Learning by Case method (LCM) is a case-based learning programme developed to shift the traditional learning process into a basis for discussion. LCM aims to make students think critically and analytically and provide motivation to the lecturers to be creative in the learning process. Cases will help sharpen students' analytical skills, since they must produce quantitative and qualitative evidence to support recommendation (Hammond, 2015). LCM is carried out using a historical case, meaning that the cases analysed in the class have been faced by an organisation within the last two to five years, depending on the needs of the course. The case is then thoroughly discussed regarding the resolution of the problem and the views of students on the decision of the organisation to consider the problem. In order to extend the students' insights, it can be supplemented with current cases (Format Method Innovation Pedagogy: Learning by Case Method, University of Seville).

Learning based on case-based methods such as LCM is carried out through discussions between students, then guided by lecturers (facilitators). The discussion process will train students' way of thinking, shifting the habit of receiving lessons from lecturers into an independent learning process. This will then encourage students to solve their own learning problems that can sharpen their critical thinking skills. This independence will also familiarise students with analysing and looking for solutions to problems by linking lecture material together. In addition, one of the most important elements of the case study method is the collaborative discussion of the issues in the case. In that way, students can identify what they know and what they need to know, with the aim of understanding the case and determining the problem to be investigated. Not only is it about the ability to think critically; it is also being familiar with the problems faced by the case organisation. These habits will make it easier for students to work, they will not be surprised and they can immediately focus on solving these problems by developing a "mind map" or by connecting the various causes of an event or issue they may face when working.

LCM at Syarif Hidayatullah State Islamic University in Jakarta is applied to the accounting study programme for auditing courses, management accounting, intermediate financial accounting 2, analysis of financial statements, and introduction to accounting. The LCM project was carried out in the even semester of 2017. The optimal LCM implementation is carried out on auditing courses, financial report analysis, and management accounting. In the intermediate financial accounting 2 and introduction to accounting courses, it is still necessary to find the right method in the learning process because the nature of the course is basic knowledge. The application of LCM is a reference to the learning method used at the University of Seville in Spain.

## *Gamification*

Gamification is an approach to learning by bringing the spirit and mechanism of play into the interaction of education and lecture activities inside and outside the classroom. The main goal of Gamification is to encourage greater engagement in people and aid in creating richer experiences in everyday life events through game mechanisms and most importantly, with more enjoyment. In Gamification, there are four primary factors of game-based learning, which are challenge, fantasy, control and curiosity. These factors could bring about educational effectiveness more dynamically than in the traditional way (Kim & Lee, 2015). The playful atmosphere created in learning increases student motivation, interest and involvement in each learning activity and lecture activities become more interesting. All students have the same opportunities, and they can help each other or cooperate to achieve the maximum outcomes. Each achievement reached by each student at each opportunity will receive recognition. Students will be compelled to compete by mobilising all the abilities they have to get an award that can be achieved through activities agreed upon between lecturers and students. The atmosphere of competition created between students both individually and between groups formed at the beginning of the year give birth to the dynamics of the class, which stimulates each student to participate (description of European Teaching and Learning Method: University of Gdańsk).

The Gamification method has been implemented in the development economics study programme in the Faculty of Economics and Business, at UIN Syarif Hidayatullah, Jakarta over three consecutive semesters, in the economic sociology lecture in the second semester, the microeconomics lecture in the fourth semester, macro-economic theory II in the fourth semester, regional finance in the fifth semester, project design and evaluation in the fifth semester, and corruption economy in the sixth semester. The application of Gamification is a reference to the learning method of the University of Gdańsk, Poland.

## *Results and Analysis*

Based on the results of the interviews and the outcomes of expert consideration, the research team determined six codes that will be developed in the open, axial and selective code process, namely advantages, student-centred learning, compatibility, curriculum adjustment, core innovation and infrastructure to support network learning. Relative advantage is related to the effectiveness of LCM, PMR and gamification when compared to previous teaching methods; compatibility is related to whether the innovation of LCM, PMR and Gamification is consistent with the values, experience and adopter needs; student-centred learning is related to changes in perceptions of educators and students regarding activities and learning processes in class; curriculum adjustment is related to the need for curriculum adjustments in order to support innovative pedagogy from a monodisciplinary to multidisciplinary context; core innovation is

related to the existence of interactive dialogue between educators, students, the world of work and society in the learning process of LCM, PMR and Gamification; while infrastructure to support network learning is related to the class infrastructure development need that supports network building learning. Processing data (interview) using ATLAS Ti software resulted in the information presented in the following tables:

|                                            | Advantages |       | Student-centred learning |       | Computability |       | Curriculum adjustment |       | Core innovation |       | Infrastructure to support network learning |       |
|--------------------------------------------|------------|-------|--------------------------|-------|---------------|-------|-----------------------|-------|-----------------|-------|--------------------------------------------|-------|
| Code                                       | count      | coeff | count                    | coeff | count         | coeff | count                 | coeff | count           | coeff | count                                      | coeff |
| Advantages                                 | 0          | 0.0   | 8                        | 0.14  | 1             | 0.02  | 8                     | 0.13  | 44              | 0.44  | 2                                          | 0.03  |
| Student-centred learning                   | 8          | 0.14  | 0                        | 0.0   | 0             | 0.0   | 0                     | 0.0   | 14              | 0.15  | 0                                          | 0.0   |
| Computability                              | 1          | 0.02  | 0                        | 0.0   | 0             | 0.0   | 2                     | 0.07  | 12              | 0.13  | 0                                          | 0.0   |
| Curriculum adjustment                      | 8          | 0.13  | 0                        | 0.0   | 2             | 0.07  | 0                     | 0.0   | 18              | 0.19  | 1                                          | 0.02  |
| Core innovation                            | 44         | 0.44  | 14                       | 0.15  | 12            | 0.13  | 18                    | 0.19  | 0               | 0.0   | 22                                         | 0.23  |
| Infrastructure to support network learning | 2          | 0.03  | 0                        | 0.0   | 0             | 0.0   | 1                     | 0.02  | 22              | 0.23  | 0                                          | 0.0   |

**Table 3:**  
Code Co-occurrence  
Source: ATLAS TI 8.0

Table 3 – Code of Co-occurrence shows the frequency of shared events in an event (Quote) in two or more codings that are displayed in the form of a matrix similar to correlation. Overall, the highest co-insurance frequency is core innovation components associated with advantages, infrastructure to support network learning, and curriculum adjustment in the implementation of innovative pedagogy, each with coefficient values of 0.44, 0.23 and 0.19. Respondent opinions emphasised that the interactive dialogue process between educators, students, the world of work and society that took place in the class was closely related to the relative advantage felt by all respondents on the innovative pedagogy effectiveness when compared to existing teaching methods.

The implementation of PMR, Gamification and LCM brings about greater benefit when compared to traditional methods, namely that students are more active in the learning process and better understand the material delivered by the lecturer. Based on the results of the interview, the average experience of understanding increased to 80–85%. Understanding has a positive effect on the value achieved. In addition to students, lecturers also get more benefits, namely

the learning process becomes more structured and they better understand the needs of students when contemplating the world of work. The implementation of LCM, PMR and Gamification also provides emotional kindness to lecturers who have not applied the same. This is evidenced by the increase in the number of lecturers who implement PMR, Gamification and LCM, in both a mandatory and voluntary way. In addition, there is the number of subjects used in the implementation of PMR, Gamification and LCM.

For such reasons, faculties need to develop a classroom infrastructure that can support network building learning for parties (lecturers, students, the world of work and society) who are engaged in developing the core innovation of PMR, LCM and Gamification methods. Infrastructure is a determinant of smoothness in the innovation of these approaches. The interviewees referred to the required infrastructure, which included reference books, an adequate Internet network, sufficiently large classrooms, flexible classroom layout and so on. In the PMR, LCM and Gamification methods students are required to actively construct their knowledge. Shifting lecturer roles from learning sources to facilitators requires adequate Internet access and actual references, so that students can find the information they need independently without relying on their lecturers. The application of innovation pedagogy also requires relatively large classrooms with layouts that can be arranged flexibly according to the needs of the teaching activities. The support of the Internet network in innovation pedagogy as expressed by the interviewees supports the statements of Khamar (2015) and Ahmed (2015) regarding the importance of information technology in increasing student involvement in accessing and analysing information.

Table 3 also shows that student-centred learning is strongly associated with innovation and advantages cores with coefficient values of 0.15 and 0.14. Thus, the change from lecturer-centred to student-centred learning applied in the learning process of PMR, LCM and Gamification is an important component in building interactive dialogue for all parties (lecturers, students, the world of work and society). The student-centred learning process from the respondent's perspective is a valid advantage relative to the previous learning method. Here there is an awareness among the respondents (students, lecturers and faculty staff) that student-centred learning is seen as providing more advantage for all parties than lecturer-centred learning. In its implementation, the lecturer worked as a facilitator for students who proceeded to actively build dialogue with lecturers, the world of work and the community during the learning process. The learning process requires students to be more independent and active. This activity is enabled by reading textbooks, reading digital books and looking for materials from online sources (Redolfo, 2001). Based on interview report, it is clear that students at PMR have applied student-centred learning by searching for materials and information. Gamification searches through statistics online and analyses them. LCM searches for cases and materials online and cases are solved through discussion in class.

Improvement of the existing curriculum is a necessity that must be immediately carried out to provide an advantage to the implementation of innovative pedagogy. The curriculum currently applicable at the faculty has not heeded some of the learning process activities that were implemented during the learning process. In interviews, lecturers stated that the curriculum that has been applied so far tends to encourage students to analyse problems in a monodisciplinary frame, whereas in everyday life various problems require completion in multidisciplinary frames. The application of innovation pedagogy also requires the adjustment of the curriculum to suit the needs of the community (Nawaz, 2014). The level 6 KKNI (national qualification framework) curriculum that is very focused on the ability of students to analyse in multidisciplinary frames is to be translated into syllabus and lesson plans for the sake of the work of core innovation offered by LCM, PMR and Gamification. Students' analytical skills, in addition to the mastery of concepts and theories, need to be in direct contact based on available empirical data in the field (the world of work and students). The curriculum needs to develop general skill points and specifically in the curriculum that relates to advantages in the use of technology, technical management of big data and so on, in each class that implements innovative pedagogy. Direct contact with the real world based on one's own experience is part of the assignment during the learning process.

Based on the results of interviews, adjustments to the curriculum are also part of the main discussion because not all subjects can implement PMR, Gamification and LCM. It is not an obligation for the basic subjects to implement these approaches because basic subjects require students to know and understand the theory. PMR, Gamification and LCM tend to be effective if applied to specialization studies. In constructive subjects, the analysis of students is sharper because they already have sufficient theories to help understand the material. Adjustment of the curriculum by involving external parties is needed in supporting the readiness of students in the world of work.

Compatibility, like other components, is closely related to core innovation and advantages. The compatibility of LCM, PMR and Gamification is related to the consistency of the innovative pedagogy towards values, whereas adopter experience and needs are not at all related to student-centred and infrastructure development. Scientific integration is an important value or issue that must be compatible with innovative pedagogy in class learning or assignments outside the classroom.

As a systematic emphasis on the explanation flow above, the following is presented in the code document and Interceder agreement tables. Table 4 shows the frequency of the code that appears in this study, where the total frequency of 214 codes is from the data collected by the researcher in the form of interview transcripts. Core innovation is the code with the highest frequency of 94 (43.93%). Followed by code of advantages with frequency of 49 (22.90%), infrastructure to

support network learning with frequency of 25 (11.68%), curriculum adjustment with frequency of 19 (8.88%), student-centred learning with frequency of 15 (7.01%), and compatibility is the code that appears the least in interviews with a frequency of 12 (5.61%).

| Code                                       | Absolute | Column-<br>relative | Absolute | Column-<br>relative |
|--------------------------------------------|----------|---------------------|----------|---------------------|
| Advantages                                 | 49       | 22.90%              | 49       | 22.90%              |
| Student-centred learning                   | 15       | 7.01%               | 15       | 7.01%               |
| Computability                              | 12       | 5.61%               | 12       | 5.61%               |
| Curriculum adjustment                      | 19       | 8.88%               | 19       | 8.88%               |
| Core innovation                            | 94       | 43.93%              | 94       | 43.93%              |
| Infrastructure to support network learning | 25       | 11.68%              | 25       | 11.68%              |
| Totals                                     | 214      | 100.0%              | 214      | 100.0%              |

**Table 4:**  
Code Document  
Source: ATLAS TI 8.0

Interceder agreement explains how two or more coders classify the same data unit and compares the compatibility between the codes found in this study. Table 5 shows that the core innovation code has the highest compatibility, with a total of 10,411 words that indicate the code, then followed by advantages with a total of 6213 words, infrastructure to support with 3058 word matches, a curriculum adjustment with a total word match of 2626 words, followed by code of compatibility with 1285 word matches, and then code of compatibility with 1285 word matches.

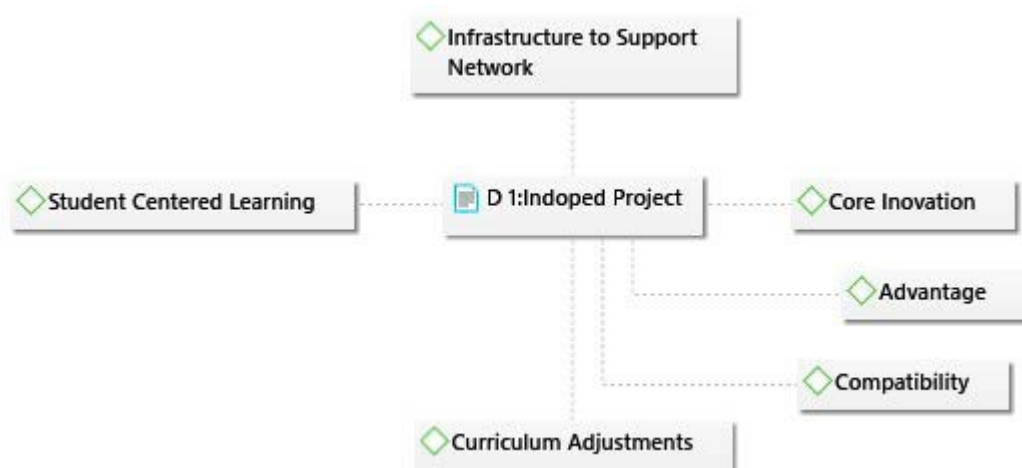
| Code                                       | Applied* | Units      | Total Units*   |
|--------------------------------------------|----------|------------|----------------|
| Advantages                                 | 0<br>49  | 0<br>6213  | 72810<br>72810 |
| Student-centred learning                   | 0<br>15  | 0<br>1320  | 72810<br>72810 |
| Computability                              | 0<br>12  | 0<br>1285  | 72810<br>72810 |
| Curriculum adjustment                      | 0<br>19  | 0<br>2626  | 72810<br>72810 |
| Core innovation                            | 0<br>94  | 0<br>10411 | 72810<br>72810 |
| Infrastructure to support network learning | 0<br>25  | 0<br>3058  | 72810<br>72810 |

**Table 5:**  
Interceder agreement  
Source: ATLAS TI 8.0

A word cloud design is a popular visualisation of words typically associated with text data. They are most commonly used to highlight popular or trending terms based on frequency of use and prominence. A word cloud shows the words most mentioned by respondents in this study, and is presented in the form of a systematically arranged image based on the frequency of words in an interview, where the interviewees mention the words in the picture with high frequency. A word cloud is a beautiful, informative image that communicates a good deal at a single glance. It can be seen that the words abilities (*bisa*), lecturers (*dosen*), students (*mahasiswa*), methods (*metode*), classes (*kelas*) and lectures (*kuliah*) are the key words stated by respondents when giving their opinions related to all components of research on the implementation of innovative pedagogy. The core innovation, advantage, student-centred learning, curriculum adjustment and infrastructure development components are arranged in discussions regarding the ability of all parties related to implementation. Methods, classes, semesters, students and lecturers are things that become a concern with the next respondent in the implementation of innovative pedagogy.

**Figure 2:**  
Word Cloud  
Source: ATLAS TI 8.0

Open networks form the selective coding stage carried out in this study. Open networks connect code to one another that has saturation in the quote found in the interview results. Selective coding also identifies a storyline and writes stories that integrate categories in axial coding models (Creswell, 1998). At this stage, conditional propositions (or hypotheses) are specifically presented. This network of codes is simply drawn to help the researcher further understand the conceptual framework-building or theory-building phase of this implementation of innovative pedagogy. Core innovation, advantages and compatibility are pooled together on one side, while infrastructure to support network learning, curriculum adjustment and student-centred learning stand individually on the other side. The overall purpose is to make visible what is already in the interviewees' or researcher's heads, consciously or unconsciously, and to allow the changing relationships between the codes to be represented in their evolving form.



**Figure 3:**  
Open Network  
Source: ATLAS TI 8.0

## 4. Conclusions

An innovative pedagogy study in the form of the Indoped project is grounded to seek a conclusion based on the phenomena formed in its implementation for the FEB at the State Islamic University (UIN) Syarif Hidayatullah Jakarta. Interviews obtained from students and lecturers fundamentally revealed the important components in the implementation of innovative pedagogy. In grounded research, these components are referred to as codes, which are captured by researchers as phonemes that are able to form and support the implementation of the method. Based on the results of the study, it can be seen that the implementation of innovative pedagogy is strongly supported by advantages, student-centred learning, compatibility, curriculum adjustment, core innovation and infrastructure to support network learning. This means that innovative pedagogy is very dependent on these components. This can be seen from the results of the interview transcripts obtained by the researcher, where there are 214 codes that appear in the interview transcript sentence.

This study shows that the most often-mentioned code is core innovation, which is an interactive dialogue that aims to produce innovation for students and the formation of connectivity between the world of education and the world of work. In the second place there is the code of advantages – based on interviews, the students consider that the implementation of innovative pedagogy has a positive impact, in that students feel more productive and more active when receiving material delivered through the innovative pedagogy method. In third place, there is the code of infrastructure to support network learning – this is considered very important for

innovative pedagogy, as there is a great need for adequate facilities that support the continuity of the learning and teaching system in the classroom. In fourth place, there is the code of curriculum adjustment. This is of course very important, as with the innovative pedagogy method there is a need for curriculum adjustments so that the implementation of the method can be performed in accordance with the curriculum at the university. In fifth place, there is code in the form of student-centred learning. This code indicates that there needs to be a change from the previous learning system, and there is a code of compatibility that is the value required by the adapter so that implementation of innovative pedagogy will run optimally.

Thus, this study recommends the implementation of innovative pedagogy in teaching and learning in the economics and business field. To provide educational services, faculties should give enough attention and focus to these components, which are: institutions must be able to implement core innovation effectively; each student must be able to feel the benefits arising from the implementation of innovative pedagogy; institutions must be able to create good services and facilities so that they can support the implementation of innovative pedagogy; institutions must be able to adjust the curriculum to support the innovative pedagogy method; institutions must be able to change orientation in teaching and learning systems with student-centred learning; and all stakeholders must be able to understand compatibility, i.e. the existence of values required of adapters in the implementation of innovative pedagogy.

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# Educational Research, Development and Innovation Methods According to Innovation Pedagogy: An Example of Application, Case Indonesia

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## **Abstract:**

The entire world recognises the importance of innovations. Companies rely on innovations when planning their future actions and when trying to understand how to create added value for their current and future customers. It is important for universities all over the world to find the means to change their education so that it better meets today's requirements for an innovative society. The aim of this paper is to introduce innovation pedagogy as the pedagogical approach for future universities and describe three concrete examples of the learning methods used in innovation pedagogy to train future innovators.

## **Keywords:**

Innovation pedagogy, learning methods, hatchery, Learning by Teaching, project work

# 1. Background assumptions

## *Introduction*

The entire world recognises the importance of innovations. Companies rely on innovations when planning their future actions and when trying to understand how to create added value for their current and future customers. The current wicked problems call for expertise from many different disciplines and professions. Innovations need knowledge and that knowledge very often emerges at the boundaries of different knowledge domains (Kairisto-Mertanen et al. 2007, 2009, 2010, 2011; Konst 2017).

Turku University of Applied Sciences is a multidisciplinary university situated in south-west Finland, in a region where one third of the entire workforce is employed by export-driven technology industries. To remain competitive in export markets, the companies in this field are required to focus constantly on renewing their processes and products, as well as on investing in research and development.

The changing environment and new requirements must be considered when planning education at the university level. During the past 40 years, there have been significant changes in Europe that affect the career market in different European countries. In general, the educational level of people has risen, digitalisation has influenced the everyday means of working, and the Internet plays a large role in workplaces. Alongside with globalisation, the boundaries of domestic and foreign markets have become obscure (Piilotettu osaaminen 2016.) It is very likely that there are going to be changes in the future and once our present students enter working life they will most likely find themselves in situations where the methods required to reach a goal are not carved in stone. Sometimes, even the goal itself will be left open (Oivallus 2011; Kairisto-Mertanen et al. 2012; Kairisto-Mertanen & Mertanen 2007; Konst 2017).

However, at universities, we still tend to educate students using traditional methods meant originally for a stable world, emphasising the learning of explicit knowledge. The constantly changing world calls for methods that are able to activate students in learning and include unofficial and exceptional situations.

## *Aim of the paper and method used*

The aim of this paper is to first introduce innovation pedagogy as the pedagogical approach for the future university and then describe three examples of the learning methods used in innovation pedagogy in more detail. For the INDOPED project, the paper focuses on three selected learning methods of innovation pedagogy, named Project Hatchery (PH), Learning by Teaching (LbT) and Project Module (PM). They all belong to the Research, Development and Innovation Methods (ERDIM) created and developed at Turku University of Applied Sciences.

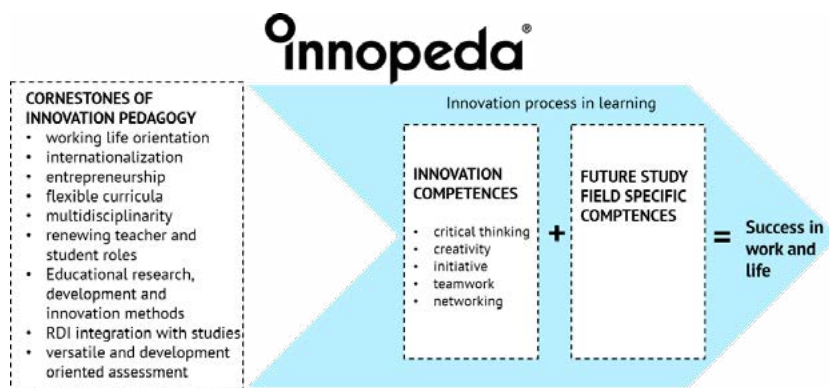
The idea in the INDOPED project was to apply learning methods used in Europe to boost and modernise Indonesian education. The described learning methods were presented for the Indonesian university partners participating in the project among other learning methods offered by different European partner universities. The Indonesian partners were free to choose what learning methods they wanted to start using when implementing the project.

The purpose of the paper is to give a general description of each of the mentioned ERDIM methods and explain how they have been developed, thus giving background information about them and increasing understanding about the articles written about their application in Indonesia. At the end of this article we very briefly reflect on our experiences and feelings about the results of the project. The actual examples of how the different Indonesian universities have been using these learning methods are described in this book's various articles written by them.

## 2. Innovation pedagogy as the educational approach of the university

### *Basics of innovation pedagogy*

The role of universities is essential for developing future professionals who have the capacity to think in new and innovative ways and who are able to create innovations that bring novel added value to their own organisations and to the customers of the organisation (Lehto et al. 2011; Putkonen et al. 2011). The role of the university in regional development requires that applied research be integrated into learning (Kettunen 2011). It is important to constantly develop learning and teaching to help the students in their personal growth and in their path towards expertise. It is a challenge to create learning situations where theoretical knowledge is constantly applied in practical contexts (Kairisto-Mertanen et al. 2009).



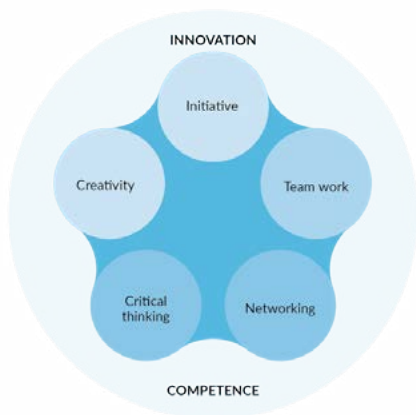
**Figure 1:**  
Innovation pedagogy, basic model © Liisa Kairisto-Mertanen 2018

Traditionally the role of education has been to provide knowledge-based readiness, and for it to be applied in practice only afterwards when the students enter working life. The aim of innovation pedagogy however is to start developing the student's innovation competencies starting at the very beginning of the first semester when they commence their studies. This is done by making sure that the students get a connection to real-life challenges and requirements while still studying (Kairisto-Mertanen et al. 2010; Konst & Kairisto-Mertanen 2017). Innovation pedagogy is a new strategic approach to learning and the innovation culture to be followed in the university.

As can be seen from Figure 1, the ultimate aim of innovation pedagogy is to make sure that the innovation process in learning is designed so that it includes elements that guarantee students will have opportunities to be successful in their future careers after graduation. Logically, it is important that students learn competencies belonging to the core of their study field but it is equally important to make sure that they learn to become active contributors in the different innovation processes they will face when working as entrepreneurs or employees. We call these learning outcomes related to the development of the innovation capacity innovation competencies. They include individual, interpersonal and networking competencies needed to produce innovative knowledge (Kairisto-Mertanen, Penttilä & Nuotio 2011).

### *Innovation competencies*

The work of defining innovation competencies has taken several years and required three EU-funded projects: INCODE, INNOKOMPPI and FINCODA. The result of the work has led to the finding that innovation competencies can be described by five dimensions: critical thinking, initiative, creativity, teamwork and networking, as Figure 2 illustrates (e.g. Keinänen & Kairisto-Mertanen, in press; Keinänen & Butter 2017, in press; Keinänen & Oksanen 2017; Keinänen, Ursin & Nissinen, 2018; Marin-Garcia et al. 2013; 2016; Pérez-Peñalver et al., 2018).



**Figure 2:**  
Innovation competencies (Konst & Kairisto-Mertanen, 2018)

The cornerstones, or meta-innovations, presented at the beginning of the arrow in Figure 1 are essential requirements for innovation pedagogy to succeed. They form the basis of the everyday application of innovation pedagogy as they are enabled in the learning environment (Konst & Kairisto-Mertanen, 2018).

As Figure 1 presents, the cornerstones include ERDIM educational research, development and innovation methods that activate learning, versatile assessment methods applied by the faculty, RDI embedded in learning and internationalisation leading to a global perspective. Further, the cornerstones include flexible curricula, multidisciplinary in learning and in the learning environment, as well as new approaches in teaching and learning (Kairisto-Mertanen & all 2010, Kairisto-Mertanen & all 2012, Penttilä & all. 2013).

### **3. Educational Research, Development and Innovation (ERDIM) methods**

When thinking about learning we often immediately think about the methods used in its delivery. Innovation pedagogy is not only about the methods as it is a total approach towards organising education in a new way. However, when looking at the issue from an individual teacher's point of view it becomes obvious that the methods are the easiest starting point when starting to change how the students are being educated (Keinänen & Kairisto-Mertanen, in press).

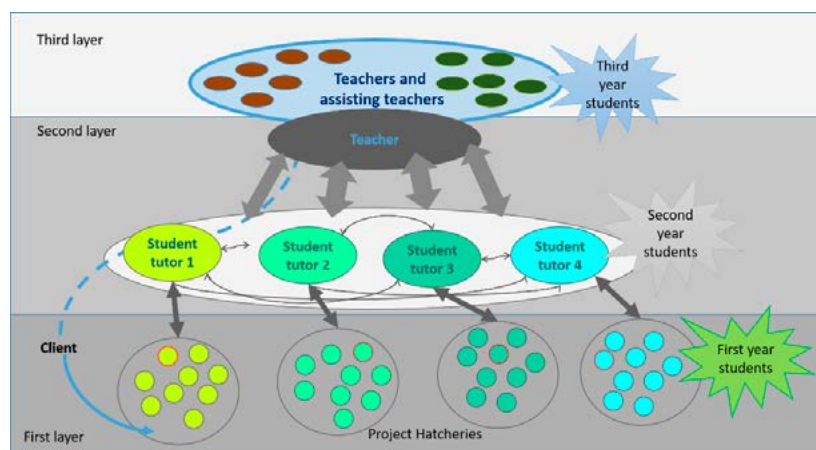
When creating learning environments and planning learning methods it is good to bear in mind that sometimes learning in one type of setting is not accessible after the learner is moved to another setting. To avoid this transfer problem it has to be ensured that education and working include identical elements (Kettunen 2011, 2013; Illeris 2009).

ERDIM methods are developed to serve the purpose and the aim of innovation pedagogy. The cornerstones of innovation pedagogy create a learning environment where the methods are used to guarantee that the development of innovation competencies becomes possible (Kairisto-Mertanen, Räsänen, Lehtonen & Lappalainen 2012; Keinänen & Oksanen, 2017; Keinänen & Butter, in press; Keinänen & Kairisto-Mertanen, in press).

## 4. ERDIM methods used in the INDOPED project

### *Project Hatchery*

Project Hatchery (PH) is one of the ERDIM methods developed at Turku University of Applied Sciences. As Figure 3 describes, it is an entire working environment including three different layers that offers studies for students coming from different study programmes and from different levels of academic studies (Kairisto-Mertanen, Räsänen, Lehtonen & Lappalainen 2012).



**Figure 3:**  
Project Hatchery with its three layers

When Project Hatchery was started some ten years ago at Turku University of Applied Sciences, it included only the first layer presented in Figure 3, a five ECTS credit study unit delivered at the very beginning of the studies for first-year students. The idea was to make students from different study programmes work together in groups of 12 to 15 students towards a common aim, which they tailor during the working process by themselves. The groups get assignments that represent real-life cases, stemming from the enterprises in the university's network or from the research, development and innovation projects of the university. The aim is to combine real-life assignments, peer counselling and working in multi-disciplinary groups while including the international aspect in all work, and giving the groups plenty of room to design their own way of working.

The work includes the groups starting to create new ideas as they work with people who have versatile agendas and ways of thinking. It is very fruitful to be able to start bonding with students with different aims and learn how to turn problems and differences in interests into a creative resource base. Introducing this study unit usually also influences the general atmosphere in the environment, as it creates situations where different students start socialising and working together.

It is extremely important to discuss the goals together with the students at the beginning of the PH study unit. During the whole implementation of the Project Hatchery, it is important to make learning visible by reflecting with students on the desired learning goals, as new students do not always notice the progress they are making. The whole project is more about learning skills that produce innovation competencies and soft skills that very often are referred to as 21st century skills. We have to make the students aware of the importance of these learning outcomes.

There are scheduled meetings for the teams once a week, every Wednesday morning, but they are also expected to work outside of these hours according to a timetable set by themselves. The hatchery work also includes information sessions based on selected readings organised for the students on Wednesday mornings. These sessions include information about project work, how to write a project plan or prepare a poster, or how give a presentation.

The aims and outcomes of the study unit are defined to include learning how to tolerate insecurity, how to define aims and targets for one's own work, and how to effectively present ideas and make presentations. They also include learning to work in a critical research-based way, which requires one's own activity in teams and networks. Finally, through this process the students are expected to develop a creative and enthusiastic attitude towards learning and start taking responsibility for their future studies.

The concept of Project Hatchery is due to develop as a result of feedback gained from every implementation. After the first implementations we added a second layer, see Figure 3, to the concept and introduced a study unit meant for second year students who already had a first-year experience of PH.

The aim of this five-credit 'leading a team' study unit is to prepare the students to act as tutors for the Project Hatchery groups. The second layer studies include learning how to initiate group work, how to effectively lead the group through the forming stage to the performing mode, how to handle the storming stage and finally successfully get to presenting results and adjourning the team. It means that the student tutors learn about group dynamics, leadership and group behaviour in general. They get constant support in weekly meetings with their teacher tutor

who always has around four student tutors to counsel and coach. The role of the teacher tutors is mostly to help the student tutors; although when needed, they can be accessed by the Project Hatchery students as well.

The third layer in the Project Hatchery execution is meant for advanced students who find leadership and teaching positions interesting and who have plans to develop their skills in these. The students participating in the third-layer studies act as assisting teachers and this way have more responsibilities than student tutors.

A specially appointed faculty member is in charge of the execution of the entire environment. They organise the original grouping of the students, select the tutor teachers and tutor students, and are responsible for coaching the tutor students in the second layer. They also organise counselling sessions for the teacher tutors where special issues raised during the implementation can be handled. It is also essential to have one person responsible for the further development of the environment.

### *Learning by Teaching*

In the Learning by Teaching method, university students act in the role of teacher training pupils or students from lower educational levels. Usually the students come from vocational schools, general upper secondary schools or comprehensive schools, but they can also come from the university level when the content to be learnt does not belong to their core studies. A good real-life example of using this method is when sales students act as teachers for engineering students and teach them the basics of selling.

In this method, students form teams of three to five and it is the teams' role to plan, organise and implement the complete training programme independently. The trainers have to start by understanding the learning needs of the target group, and then plan the content and schedule for the training, design materials to be used and finally implement the final learning sessions. The teacher's role in this method is to guide and give support and feedback to the teaching team.

Participating in a Learning by Teaching study unit is a very beneficial experience for any student. Having to teach something to somebody else usually requires the one who is teaching to have a deep understanding of the issue. Teaching also requires the preparation of materials and standing in front of other people, which means applying presentation skills. Students who have participated in this learning method usually report having learnt presentation skills as well as skills needed when dealing with unsecure and difficult situations.

### *Project Module*

Project Module builds on the skills learnt in Project Hatchery. Project Hatchery is meant for students at the beginning of their studies and its main aim is to start developing their innovation competencies by introducing a student-centred way of working and increasing their responsibility towards their own learning. Project Module is for students who are capable of working on a project and have already learnt more about their future profession.

A group of students, coming from one or preferably different study programmes, work together as a team to solve a real-life problem as part of their studies. Because the problems in question are often quite complex, the scope of the module is 15 ECST credits, representing 405 hours of individual student work. As there is a whole group of students working on one problem, the amount of work allocated to the working life partner behind the assignment can be huge.

It is important to realise that in Project Module the students work independently on real-world cases coming from the working life partners and that there are no lectures unless specifically required by the students. The students must first learn to understand what they don't know and ask for a lecture or information about a specific topic. This way of working connects students with people from the industry and working life in general, as they are acting as tutors for the students working on the assignments. Each student team presents the results of their work four times during the implementation. First, they prepare a presentation about the project plan, and after that they give two mid-project presentations and one final presentation concerning the end results and documentation. When Project Module is implemented there are several student teams working on different projects. This gives a good opportunity for the students to learn from each other and we encourage them to connect with other teams.

## **5. Lessons learnt and conclusions**

The aim of this article is to introduce innovation pedagogy as a new approach to be followed in the university and explain in more detail the three ERDIM methods introduced to Indonesian partners in the INDOPED project for application in their universities. This article describes the methods as they have been applied at Turku University of Applied Sciences, where they were originally developed.

Several Indonesian universities implemented the methods of Project Hatchery, Learning by Teaching and Project Module. The cases are described in detail in the following articles written by the corresponding Indonesian partners in the INDOPED project. The application shows that the methods are also applicable in these circumstances, which are so entirely different, both culturally and geographically, and it proves that all the parties benefit from this application.

Relying on new methods and new ways of delivering education requires courage and openness to new experiences from teachers. Implementing active learning models redefines the roles of the students and faculty members. At the beginning, the participating faculty must be prepared for extra efforts but then again the workload will diminish over subsequent years.

During the implementation, the methods were developed further, which is a requirement for continuous improvement and successful application. The Indonesian partners invented new additions, which increased the applicability of the methods in their different circumstances. It was rewarding to note that the use of the methods found new variations, which proves that ultimately students need similar kinds of activating practices on whatever continent they might be studying.

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# Can We Teach in an Untraditional Way? Lessons Learnt and the Way Forward

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The INDOPED project ran from 2015 to 2018 and was designed to introduce European tested pedagogy to Indonesian universities. INDOPED is an attempt to challenge the ‘datang duduk diam’ (come, sit and listen) typical for English language institutions. In the previous chapters of this book, the Indonesian partners have reported their journey in piloting these methods. This chapter pulls the threads together to form a concise and overarching lesson learnt from all the piloting efforts.

## 1. General implementations: uniqueness offered

The five Indonesian university partners piloted different methods with different adaptations and different scope, not to mention local challenges. As a result, the institutions brought different nuances to the learning methods, which then enriched the original ones. The following table shows the uniqueness resulting from the implementation of learning methods in partner institutions.

| Institution scope                 | Learning methods     | Uniqueness in implementation                                                    | European partner |
|-----------------------------------|----------------------|---------------------------------------------------------------------------------|------------------|
| Bina Nusantara University         | Learning by Teaching | Peer mentoring in content knowledge                                             | TUAS             |
|                                   | Innocamp             | Sustainable adoption in student orientation                                     | Aarhus           |
| Universitas Syiah Kuala           | Project Hatchery     | Implementing Project Hatchery in an existing course                             | TUAS             |
| Universitas Negeri Yogyakarta     | Project Hatchery     | Implementing Project Hatchery in an existing course                             | TUAS             |
| Widya Mandala Catholic University | Gamification         | Adopt experimental design to compare results with traditional teaching classes  | Gdańsk           |
| Widya Mandala Catholic University | Learning by Teaching | Rigid technical mechanism to ensure learning outcomes were met                  | TUAS             |
| UIN Syarif Hidayatullah           | Gamification         | Added a feature that makes it possible for students to check their marks online | Gdańsk           |

**Table 1:**

The uniqueness resulting from implementation of learning methods in partner institutions

For example, one of the most extreme adaptations was experienced by Project Hatchery (PH) from TUAS. Originally designed as a dedicated course for Year 1 students as the foundation of their INNOPEDA curriculum, two universities (Universitas Syiah Kuala and State University Yogyakarta) adopted PH to teach content knowledge rather than PH as a stand-alone course without specific theoretical content, in order to teach students working as a group on a project. Both Indonesian partners used the principle of PH to shift the technical knowledge focus of their courses to a combination of technical and soft skills development.

A few of the pilots have also brought institutional changes, which are sustainable. For example, at Bina Nusantara University, the adoption of Innocamp continued to be the orientation activity used for new students in the Master of Management programme. This sustainable practice is very encouraging, and it is hoped that this kind of sustainability can surface in all partner institutions.

## **2. Lessons learnt**

The lessons learnt are presented based on the stakeholders involved: students, lecturers and external stakeholders. Learning values and challenges are described for each stakeholder.

### Students

Teaching and learning activities are used to achieve a set of learning outcomes, which usually consists of programme-specific technical skills or knowledge. Thus, it is interesting that in evaluating the success of the learning method, only the Gamification method piloted by Widya Mandala Catholic University (WMCU) was structured as an experiment with pilot and control classes. Learning by Teaching at WMCU applied pre- and post-tests to evaluate the progress of the students. Through both learning method reports, WMCU provides evidence that the piloted methods are effective for learning technical skills and knowledge. The class using Gamification had a higher average score and fewer students who failed to progress compared to the regular parallel classes. The class delivered in LbT mode shows that students' average test results increased between the pre- and post-tests. These results indicate that a new way to deliver material is not less effective than the traditional method, and may be more superior in its results.

However, the most consistent result of the pilot across the Indonesian partners was the reference to students' motivation, the classroom environment and the development of soft skills. All partners enthusiastically reported the additional benefit of using the learning methods provided by the European partners. The benefits include innovativeness, critical thinking skills, professionalism and learning motivation. A list of perceived benefits as listed by students and lecturers are provided in Table 2.

| Area                        | Skills                                         | Learning Methods Used                   |
|-----------------------------|------------------------------------------------|-----------------------------------------|
| Professional working skills | Effective communication                        | Project Module, Project Hatchery        |
|                             | Networking                                     | Project Module                          |
|                             | Public speaking                                | LbT                                     |
|                             | Teamwork, including multidisciplinary teamwork | LbT, Innocamp                           |
|                             | Collaboration                                  | Innocamp                                |
|                             | Time management                                | Innocamp                                |
|                             | Critical thinking                              | Innocamp                                |
|                             | Creativity                                     | Gamification                            |
|                             | Analytical thinking                            | Learning by Case                        |
|                             | Innovation                                     | PH, Innocamp                            |
| Lifelong learners           | Active in learning                             | PH, Gamification                        |
|                             | Independent learning                           | Gamification                            |
|                             | Social learning                                | PH, Learning by Case                    |
|                             | Deep learning                                  | LbT, Learning by Case                   |
| Character                   | Confidence                                     | LbT, Project Module                     |
|                             | Patience                                       | LbT                                     |
|                             | Curiosity                                      | Innocamp                                |
|                             | Resilience                                     | Innocamp                                |
|                             | Courage                                        | Innocamp                                |
|                             | Leadership                                     | Innocamp                                |
|                             | Resilience                                     | Innocamp, Project Module                |
|                             | Taking risk                                    | Gamification                            |
| Classroom environment       | Motivation                                     | Gamification                            |
|                             | Better engagement                              | Gamification                            |
|                             | Better engagement with practice                | Learning by Case method, Project Module |

**Table 2:**  
Skills gathered through piloting European learning methods

The long list of non-technical skills/knowledge signifies the real value of these non-traditional methods. Through activating the students, there are four main areas that benefited significantly: professional skills, lifelong learners, character and classroom environment. Traditional methods like lecturing were seen to fail to address the needs to develop these soft skills, and it raised concerns from the institutions participating in this project. Becoming 21st century learners, as mentioned by the Innocamp team, is crucial for students, and should be the focus of Higher Education 4.0.

However, shifting from traditional to non-traditional methods is not without its challenges. Students need to interact with more than their own lecturers and peers. The nature of interaction with peers also changed, from individual learning to social learning. Some learning methods

also require students to interact with external stakeholders, such as Learning by Teaching, Project Module, Project Hatchery and Innocamp. These differences disrupted the students' (and lecturers) comfort zones, and required them to change their approach to learning. Students identify their challenges in communication skills, confidence, critical thinking, perseverance, time management, fair participation, fair share in group work, and managing dominant team members. The challenges are listed in Table 3 below.

| Area                        | Challenges                                                                                   | Learning methods                       |
|-----------------------------|----------------------------------------------------------------------------------------------|----------------------------------------|
| Professional working skills | Managing time and activities between project and other study commitments                     | Project Module                         |
|                             | Communication skills                                                                         | Project Module                         |
|                             | Managing (over) dominant team member                                                         | Project Hatchery                       |
|                             | Networking with external stakeholders                                                        | Project Hatchery, Innocamp             |
|                             | Time management                                                                              | Innocamp                               |
| Lifelong learning           | Changing relations with lecturers – lecturers were deemed not up-to-date and too theoretical | Project Module                         |
|                             | Motivation changed quickly, depending on facilitator                                         | Project Hatchery                       |
|                             | Not confident in expressing ideas                                                            | PH                                     |
|                             | No preparation prior to class                                                                | Learning by Case                       |
|                             | Did not participate actively in discussions or group work                                    | Learning by Case                       |
|                             | Unwilling to do extra work                                                                   | Learning by Teaching, Learning by Case |

**Table 3:**  
Students' challenges using European learning methods

Through the challenges students face, it can be concluded that changing learning styles posed challenges for students.

Lecturers

The benefits of the new learning methods are not only seen by students, but also lecturers. It seems that most lecturers embraced the new experience, and were enthusiastic about the pilot. Through mentoring from the European partners, lecturers went through the preparation stage to the evaluation stage.

As students were mostly enthusiastic, lecturers were affected by this enthusiasm themselves. The experience was considered valuable by most of the lecturers involved. Thanks to the mentoring from the European partners, they learnt to become facilitators rather than teachers. Preparation was more complex, as lecturers needed to engage with external stakeholders, facilitate discussions, and work to engage and activate students instead of delivering a set of materials.

Piloting a new teaching and learning method put the lecturers on the front line. It is not only students who have to adapt to new ways of learning – lecturers learnt a completely new way to deliver the material. For each institution team, there is a risk that lecturers would be reluctant to try the method, or would feel forced to join the project, like the experience in the piloting of Project Module. When the buy-in did not happen, the lecturer might fail to see the value of the learning method to the students. The complex preparation was the main challenge of the learning method, as it is time consuming and requires a different skill set compared to traditional teaching. The European learning methods also emphasised the need to be relevant to practice through real external stakeholders or simulated cases. This is also challenging for lecturers, as they need to update their knowledge on how the theory fits the practice. Failing to respond to that need led to students judging their lecturers as irrelevant and too ‘bookish’.

As the teaching methods were new to the institutions, not all lecturers had the required skills or wanted to embrace it. Therefore, in methods that required many facilitators, such as PH and Innocamp, a lack of facilitators can hinder learning, as happened in the Project Hatchery pilot at UNY. Moreover, the local context may also limit the extent of how one learning method can be implemented. For instance, as it is impossible to create a dedicated course for Project Hatchery as it was at TUAS due to curricular constraints, the lecturers piloting it need to embed the content of a dedicated course. Thus, students learnt both sets of content, engaged with external stakeholders, and worked on a relevant and challenging project. The adaptation required lecturers to modify the methods to suit the local context, and possibly to create a new learning method as a localised PH.

### External stakeholders

Some teaching methods required external stakeholder engagement to situate the learning to be as relevant as possible. Innocamp, Project Hatchery, Project Module and LbT engaged external parties as clients and as industry mentors. The benefits for external stakeholders include having potential solutions to their problems, providing a service to the education community, and sourcing potential new recruits.

The community groups and business serving as clients in Innocamp and Project Hatchery were generous with their time and information. They allocated time to attend the event and be interviewed, and they actively worked together with the students. In return, they got the potential solutions they needed.

The company participating in BINUS University’s Project Module showed great commitment to supporting students’ learning by offering both technological and non-technological coaching. Although it can be argued that they got free extra human resources in their project, hosting students as required in PM was actually asking for a lot of commitment and resources from the company.

The challenges faced by the external stakeholders were mostly related to the time that needed to be dedicated to support the activity. Coordination with schedules and commitment remained challenging aspects of the new learning methods. In addition, companies that need strong technical skills identified gaps between students' skills and the companies' requirements, which meant that they had to spend time and resources to bring the students to the standard requirement as in the PM pilot.

### **3. Discussion**

The enthusiasm of both students and lecturers indicate that there is a need for change in the management of learning in higher education. The nature of higher education has changed due to financial constraints, public accountability and managerialism. Higher education has to show relevance to the industry and lifelong learning skills. As has been continuously referred to in this book, almost all Indonesian partners cited the Top 10 Worker Skills Needed in 2020 (Grey, 2016) as the motivation for adopting the learning method. This has shown that time has kept up with pedagogy in higher education.

Teacher-led and one-way interaction has gradually become irrelevant. The Top 10 Worker Skills Needed in 2020 listed soft skills such as complex problem-solving, critical thinking, creativity, people management and coordinating with others in the top five. Millennial students are naturally different to the previous generations in terms of their technological adeptness and learning preferences. External pressures, the generation gap and user requirements force a new way of facilitating learning. Learning can no longer follow the model of master and students, especially concerning the development in access to technology.

These external motivations differed to the principles of the student-centred learning approach, which has internal motivation to it. As argued by scholars in the area, especially those who promoted student-centred learning – the responsibility of learning needs to be shifted to learners instead of being the full responsibility of lecturers, as in the teacher-centred model (see Ramsden, 2003; Biggs & Tang, 2011). Thus, student-centred learning wants to 'activate' students, moving them from a passive recipient of knowledge to an active agent (Brabrand & Andersen, 2006). This approach is very much in line with the generational characteristics and the external pressure to produce graduates fit for a high-quality workforce. However, a study indicated that millennial tertiary students are ambivalent about the educational values of group work, visual aids and traditional lectures (Barnes & Jacobsen, 2015). It is thus an indication that non-traditional learning methods should be well-designed and purposeful to be perceived as being as valuable as the well-established lecture method.

In Indonesia, the move away from one-way learning has been initiated by the government in the new curriculum in primary and secondary education. The new curriculum for 2013 adopted a thematic approach, which blended different subjects into one theme. The idea is that students can use a multidisciplinary approach in working on one subject. Interactive and active pedagogy have been mentioned in this book, in which students are directed to undertake group work, engage in discussions, experiment, and make creative output like a comic. However, when it comes to higher education, there are fewer directives and less coordination in terms of moving from the expert role to the facilitator of learning role.

Therefore, projects such as INDOPED are extremely valuable for Indonesian higher education. It provides the opportunity to find the most workable formula in each institution. The flexibility of the learning methods is also helpful, but they can remain useful if the core components are maintained.

#### **4. The way forward**

The lessons we learnt should be made sustainable and drawn into a bigger context in order to make a real difference to students' experience. Some of the pilots have been made into sustainable practice, such as the Innocamp at Bina Nusantara University. To allow for sustainable practice of new pedagogy, the experience at Bina Nusantara University shows that the institution's support is very much needed. This support includes the freedom to choose the best pedagogical method, flexibility in operational implementation, funding support, and keeping the staff-to-student ratio lower.

In addition to the support listed, it is very important to raise the awareness and capability of transitioning from teacher to facilitator. It is important that the lecturers have sufficient skills, have a rich lexical pedagogy and use it accordingly. This is not always simple, as lecturers do not usually want to spend more time preparing. The transition from lecturer to facilitator does not mean that lecturers do not have to master the content knowledge. On the contrary, they need to be an expert on the subject, but they then need to be willing to immerse in the scholarship of teaching and learning (SoTL) to sensitise themselves to the pedagogical side of their profession.

At the end of the day, the success of learning in the classroom is determined by the lecturers, directly or indirectly. Therefore, lecturers' effort in this project will need to be recognised and utilised as much as possible through further socialisation in their respective campuses and collaboration between them. INDOPED has opened a door to better teaching practices, and it is hoped that more collaboration like this can take place on a national and international scale to enrich Indonesian lecturers' pedagogical lexicons.

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