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Reports

INDOPED – Modernising Indonesian Higher Education with Tested European Pedagogical Practices

Report on Piloted Pedagogical Practices

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

INDOPED Consortium

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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:
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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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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 the14 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).
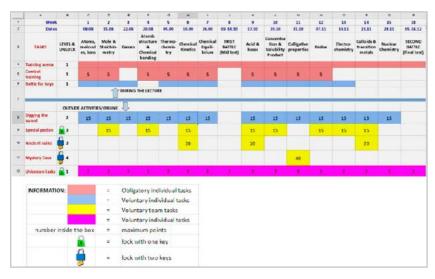
3.   Piloting process

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,

anyone that can defeat the Ettin, the mighty two-headed troll living in the forest surrounding the empire. The mission for the players in the game is to defeat the Ettin in order to become the heir to the 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.

The table in Figure 1 below explains the Gamification scheme applied in the basic chemistry course. Rows 1 and 2 state the week and dates of each topic stated in row 3. Column A states the type of tasks while column B states the level of each task and whether the task were locked or not and how many keys were needed to unlock the task. The keys can be gained by students in several topics in the 'Battle for Keys' task (row 6). The number inside the box gives information on the maximum points that can be earned from each task.

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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