

Innovative Approach on Education about Standardization Through Development of The Monopoly SNI Game

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Abstract

National Standardization Body (BSN) is a non-ministerial government institutions Indonesia with the main task to develop and foster standardization activities in the country of Indonesia. In order to promote the development and implementation of standards, BSN has been working with relevant stakeholders, one of which is the university. At present, there has been cooperation with 28 universities through the signing of a Memorandum of Understanding (MOU). One form of cooperation is to teach the subject of standardization in the university. Universitas Surabaya (UBAYA) as one of the University who has been working with BSN, has also taught courses standardization in the Department of Industrial Engineering as a compulsory subject in the field of Performance Management and Quality.

This paper presents the work of students and a lecturer in the Standardization for the year 2011, a game of Monopoly SNI development as an innovative learning media standardization. The game is played for senior high school students in the form of Standardization Game Competition. The results of the implementation of the game, then do a survey to students relating to the application of this game and an understanding of the SNI standard. The majority of respondents who tried the game, stating that the game is to help them in: understanding the standards, know the benefits of standards and know that there are different types of SNI. In addition, respondents also said that this game is very interesting and helpful in increasing their knowledge related to standards.

Keywords: standardization, development of the Monopoly SNI Game

1. Background

As we know that standardization is one strategy to improve competitiveness, especially in the era of free trade, where products and services produced in the country will be examined from the aspect of quality, safety, security, health and the environment.

On the other hand, the level of public awareness of the standardization of products/services is still low. From the study of BSN (2006) showed that the new business uses only about 20% of the approximately 6800 SNI that have been published. This fact indicates that the BSN should work harder in socializing SNI in the business. Because they do not fully understand the benefits of the implementation of standards in the organization [3]. From the observations also indicate that the public knows only a limited product SNI helmets, gas stove, bottled water and instant noodles, etc.

This situation, encourage BSN to work with colleges or universities to jointly promote standards in their respective communities. In addition, the university is expected to produce graduates who have the ability in the field of standardization.

In 2005, BSN started its cooperation with the University of Diponegoro (UNDIP) in education, research, and community service in the field of standardization. In 2007, BSN and UNDIP formed a team to develop curriculum of standardization. In 2008, the curriculum was implemented at the Faculty of Industrial Engineering UNDIP. Results of implementation, to be the input revise the curriculum to the second edition. Furthermore, in 2009, the team also developed a textbook of introduction to standardization. This textbook was launched on the education forum of standardization, which is a forum of the signing college of the MoU with BSN. They agreed to include standardization or content of standardization in subjects, and using the textbook as the its main reference. [5]

Cooperation BSN with UBAYA

UBAYA interested to establish cooperation with BSN in the development of education about standardization is expressed by the Rector of the University of Surabaya (UBAYA), through a letter written to the Head of BSN in August 2009 which stated the Rector of UBAYA ready to sign MoU with BSN [6]. Cooperation activities can be done by the academic community to contribute promote standardization by engaging expertise of member of faculty in standardization activities and also participated in developing the introduction of standardization in the community with the university "language". One of the real form of

cooperation, among others, is teaching a standardization subject as a compulsory subject for students of Department of Industrial Engineering in field Quality & Performance Management, Faculty of Engineering, University of Surabaya. As additional information, UBAYA also has been active in promoting standards and SNI in province of East Java. For example, UBAYA is host a gathering of bikers in the activities of SNI Thon (campaign of Helmet SNI, from Surabaya city to Jakarta) in 2009, even the lecturer and students of Department of Industrial Engineering UBAYA have been conducted campaigns of SNI product in some Mall in Surabaya.

Subject of Standardization in Department of Industrial Engineering

The Department of Industrial Engineering have been to develop curriculum year 2010, in order to anticipate changes in need of the user's graduates and stakeholder and to achieve of UBAYA vision toward internationalization. One indicator is UBAYA graduates capable of competing at international level and one of the factors supporting is the mastery in the field of standardization. Therefore, the Department of Industrial Engineering and the curriculum development team agreed to include courses for Standardization as a compulsory subject in field of Quality and Performance Management and effectively be taught in even semester of 2010/2011.

Lecturing of Standardization Subject

Preparations have been conducted in the teaching of standardization, include: (a) the provision of UBAYA lecturer or visiting lecturer of the industry, (b) the provision of infrastructure (such as classrooms, textbooks, program of visits to industries, etc.), and (c) selection of teaching methods.

Especially for the selection of teaching methods, after reviewing textbook provided by BSN, felt the material was too heavy and less attractive. It was said the material is too heavy to taught because almost all of material is the addition of insight so that the level of learning lies at the level of understanding. Level of learning at this level, often requiring many memorizing. Therefore, teaching methods should be designed using the method of direct involvement of students in subject matter (interactive learning), for example the discussion of case studies, role playing, simulations, visits to industries and provision of project tasks. Assignment of a project is making an standardization game. Through the game which they designed is expected to better understand the material being taught and then they can also contribute to the introduce of standardization at student of senior high school and the public.

Problems

This paper discusses the task of student projects related with design of media of education about standardization through the game development of popular in the community. It is hoped through this game the public could learn about standardization with ease and fun.

2. Literature Review

Before discussing the settlement of the problem, there are some things that need to be understood together, especially related to the definition and understanding of standards, standardization, conformity assessment, metrology and the use of instructional media such as a monopoly game for learning about standardization.

Standar dan Standardisasi. According to ISO/IEC Guide 2 (ISO 2004-1), **Standards** is a “document established by consensus and approved by a recognized body, providing for common and repeated use rules, guidelines, or characteristics for activities or their results aimed at the achievement of the optimum degree of order in a given context. Meanwhile, **Standardization** is as “the activity of establishing—with regard to actual or potential problems—provision for common and repeated used aimed at the achievement of the optimum degree of order in a given context” [1]

According to this definition, standardization aims to achieve maximum of overall economy and provide benefits to various sectors of society, such as standards provide access to markets and facilitate trade, the standard provides benefits for improving the quality, safety, reliability and efficiency of production, and so forth.

Indonesia National Standard (SNI). SNI is a document containing the technical provisions of an activity or the results are formulated by consensus and set by the BSN to be used by stakeholders with the aim of achieving an optimum arrangement in terms of the context of a specific purpose [3]. BSN as the bodies responsible for national standardization activities, interested party in increased the application of SNI both voluntary and mandatory in manufacturing / services in order to increase the competitiveness of nations.

Conformity Assessment. ISO / IEC 17000:2004 defines conformity assessment as a statement that the product, process, system, person or institution has met certain requirements, which may include activities of testing, inspection, certification, accreditation and conformity assessment bodies.

Just as standards, conformity assessment is also basically a voluntary activity in accordance with the needs of the transacting parties. In practice,

conformity assessment can be done by the manufacturer (first party), by the buyer (second party), as well as other parties (third parties) which are not part of producers and consumers.

Metrology. Requirements in the standards, particularly with respect to product characteristics, the general form of the quantitative limits that are based on the results of measurements made on the conformity assessment process. Therefore, to achieve its implementation should be created a guarantee equality of outcome measures between all parties concerned with the application of a standard.

In ISO / IEC Guide 99: 2007, metrology is defined as the science of measurement and its application, which covers all theoretical and practical aspects of measurement, the overall level of measurement uncertainty and the whole field of its application. [2]

Learning Media through Games. Play a game is fun because the game was designed as a medium of entertainment. Therefore, all the matter of education and learning will be very interesting and easily digestible by the students when designed in the form of the game. Games are always played again and over again until the players are satisfied, thus the materials submitted will be easily digested and understood by the game player. Many types of interactive games that can be used as a medium of education and learning. For example, puzzle games, monopoly games, etc. [8].

Monopoly Games. Monopoly is one of the most famous board game in the world. The goal is to master all the plots on the board through property purchases, leases and exchanges in a simplified economic system.

Each player in turn throws the dice to move pawn, and when he landed in the plots that have not owned by another player, he can buy at a price appropriate patch listed. If the plot had been bought another player, he must pay the rent that the players whose numbers have also been established. [7]

Therefore, the monopoly game that was developed can be used as a medium of learning that are innovative, fun and easily digestible by the public to learn about standardization.

3. Research methodology

The methodology used in this study were (a) Designing of learning media of standardization through the game development of the SNI Monopoly, (b) measuring a player's perception related to the understanding of the standardization. Perception of a player is measured by questionnaires deployment which are then processed descriptively and analyzed. Level of perception was measured using a Likert scale where a scale of 1 indicates strongly disagree, 2

states less agree, 3 states indifferent, 4 and 5 states agree and strongly agree

Target respondents is student of senior high school who playing the SNI monopoly game who follow the Standardization Game Competition organized by the Department of Industrial Engineering-UBAYA in November 2011 at Surabaya city.

4. Results and Discussion

Design of the Monopoly SNI Game

Game standardization which to developed should include three things, namely the understanding of participants on: (1) standardization, (2) assessment of the suitability and (3) metrology. In addition, the game should be played en masse and are competitive. Looking at these conditions, then the lecturers and students participating in the course of Standardization decided to design and develop the game of monopoly that has been popular in the community to modified related with material content of standardization and SNI.

The game is aimed at providing insight to the participants / players regarding the three pillars that have been mentioned before, namely standards, standardization, conformity assessment and metrology. In addition, players are also introduced to various types of SNI that could be associated with the products of the regions and benefit from the application of SNI. The results of the design can be seen in Figure 1. From this picture it appears that various regions in the country of Indonesia is assumed to require products that have the SNI.



Figure 1. Design of game of the Monopoly SNI

Furthermore, players who are in a the area (see Figure 2), must answer the questions from committee related to the material of standardization to determine the understanding of regard to standards. If the answer is correct, then the players are asked to make form of triangular, rectangular, square or a circle of a piece of colored paper, depending on the area where the player stand up

(Figure 4). The colored paper must be purchased in advance from the paper supplier. Players can check firstly quality of the purchased-paper before use.

Paper forms are made shall be measured in advance, in accordance with the specifications defined and ascertained that the measuring equipment has been calibrated (Fig. 3). When done, the player handed the paper form (which is assumed to be the appropriate product standard SNI) to the committee (in this case the committee acts as conformity assessment bodies/testing agency) to be tested whether the piece of paper forms have been conformity with the specifications required (Fig. 5). If appropriate, the committee will give a sort of stamp of approval that the product complies with ISO (with giving tick mark) and the player is allowed to conduct trade with the region where it is located. And here, participants will receive the money earned from the business transactions which were paid through a bank (Fig. 6). Then the player moves again to another area. More and more players were able to pass the test of the product testing agency, the more money earned, and he will be declared the winner. From this it could mean that the organization that most of accomplish of standards, is the party that won the business competition. And vice versa, the products that are made do not pass the test SNI products, then they got losses. For the notes, at the beginning of the game, players are given capital money by the Bank for the purchase of raw materials, auxiliary materials (paper) and measuring instruments and the payment of damages if the product did not pass the test.

The Standardization Game Competition

Implementation of game of Monopoly SNI was held in event the Standardization Game Competition for high school students at city of Surabaya, Sidoarjo and surrounding areas.

Students of UBAYA act as a committee to promote the game competition through UBAYA website, distributing brochures and posters to schools. There are about 30 teams (each consisting of 3 students of senior high school) as participant and competing in this event. After conducting of the technical meeting, participants are ready to compete on November 24, 2011 at Cito Mall-Surabaya. The choice of a place in the mall with the intention that the game can be viewed by the public and covered by the mass media so that we get obtained the multiplier effect relating to socialization of standards to society.

Evaluation of the Game Participants

After passing through a fun game, to get feedback, participants were asked to express his perception

associated with the monopoly SNI game. The result can be seen in Table 1.

Table 1. The results of participants' perceptions related to the Monopoly SNI Game

No	Variables	Level of agree (%)				
		1	2	3	4	5
1	the Monopoly SNI is interesting game to played	0	6	22	53	20
2	the Monopoly SNI is game which easy understood and played	0	0	20	53	27
3	Display of game of the monopoly SNI is colorfull and shapes attractive	0	0	18	53	29
4	Discussion about SNI which listed on the game is attractive	0	0	33	45	22
5	Discussion about SNI which listed on the game is clear and easily understood	0	0	9	55	36
6	Game of SNI is very useful for providing information and to getting knowledge about kinds of SNI	0	0	9	46	45

Source: [4]

From Table 1, shows that 73% of participants had agreed and strongly agreed that the game is interesting, 80% of participants stated the game is easy to understood and played, 82% of participants stated the game is full of color and interesting shape. Perception further stated that 67% of participants expressed a discussion of SNI in this exciting game, and 91% of participants stated that SNI discussion on this game is clear and easy to understand, and most important that 91% of participants stated that the game SNI is very useful in providing information and knowledge related with standards and kinds of SNI.

From the results of descriptive statistics, one might say that the learning media on education about the standardization through games of this kind could succeed in introducing to the public about the standards and SNI.

Evaluation of Learning Process on Standardization Subjects

On the other hand, we also need to evaluate the learning process on standardization subject itself. It is known that as elective courses, from point of view related with the number of students, it can said that it has been achieved participants for odd semesters 2011/2012 number of 46 students. number of participants was increased compared with the previous semester namely a number of 22 participants. Implementation of evaluation of the learning process conducted by the Quality Assurance unit-UBAYA for each lecturer at each faculty, and the results of evaluation of standardization subject can be seen in Table 2.

Table 2. Results of Evaluation for Learning process of Standardization subjects

Kode MK	KP	Nama MK	IPK MK	IPK Dosen
638031	A	STATISTIKA INDUSTRI II	K = 3.81	K = 3.80
638031	B	STATISTIKA INDUSTRI II	K = 3.81	K = 3.80
638151	-	STANDARISASI	K = 3.65	K = 4.00
638161	-	MANAJEMEN KUALITAS	K = 3.72	K = 3.80
638204	-	SISTEM MAN. K3 OHSAS 18000	K = 3.93	K = 4.00

From Table 2, the performance index for the standardization subjects can be explained as follows: (a) for the teaching material and learning process got a score of 3.65, and (b) for teachers got the maximum score of 4. For the teaching material and learning process did not get maximum score due to some of student have delivered complaints related with implementation the project assignment namely most of consuming time, so that makes the task of another subjects a bit neglected. However, in general most of the students stated that this event is very interesting and they hope can be implemented for next year. They also said that the method of teaching is very interesting, let alone taught by lecturers who are competent in their field.

Conclusion

Although to be further improved, the learning media through game such as the monopoly SNI for teaching about standardization is very interesting, and hoped could be developed again to look for another media which suitable both for level of school and public in order to accelerate socialization of standardization in the community.

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Figure 2. Implementation of the Monopoly SNI Games



Figure 5. Participants cut out a paper in accordance form with the requirement



Figure 3. Participants looking for Answers the question in the Standardization book



Figure 6. The committee play role as a testing agency (conformity assessment)



Figure 4. Participants Drawing shapes using a ruler which calibrated internally



Figure 7. The committee play role committee as a financial institution (Bank)