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SOCIAL MEDIA AND GAMIFICATION ON LEARNING EFFECTIVENESS

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Abstract:-

Along with the times and technology, learning is also experiencing adjustment phases, both in terms of methods and media. In general, obstacles in the learning process are inseparable from both. This paper aims at two things; first, see the participants' interest if learning is carried out with e-learning. Second, how the impact of the use of social media and gamification methods on the effectiveness of learning. The method used is a survey and experiment. The survey is used to find out interests or interests in e-learning methods. Experiments are used to see the impact of the use of social media and gamification methods on selected samples. The results of this study are that social media and gamification methods have a positive effect on increasing the motivation and participation of participants when applied in Indonesia. The MODLE group showed an increase in effectiveness as indicated by an increase in the results of the evaluation of learning. E-learning method supported by social media and gamification strategies can increase learning effectiveness. Participatory and consolidation atmosphere through community of practice should be created to produce positive effect on learning effectiveness.

Keywords: - *E-learning, social media, gamification, effectiveness*

INTRODUCTION

Knowledge is an intangible asset and has an essential role in the success or failure of an organisation (Ooi, 2014). Knowledge is a resource which helps the organisation in developing improvement and innovation activities, thus producing a competitive advantage for the organisation (Gonzalez and Martins, 2017). Knowledge categorised into two types, i.e. explicit and tacit knowledge (Nonaka, 1991). Tacit knowledge is a knowledge which is difficult to formalise or articulate (Polanyi, 1966). Conversely, explicit knowledge is knowledge gathered in the form of documentation, e.g. word, audio, or image (Dalkir, 2011).

The tacit dimension can be considered the base or bottom of the iceberg of one's knowledge, which support everything the person knows and therefore can be said to be the complete unthinkable explicit knowledge (Polanyi, 1966 a: 7). Sharing knowledge is knowing who will use and for what purpose. It relates to searching something from the past that is still useful today. To share tacit knowledge, "thinking together" is necessary (McDermott, 2000: 20). Thinking together as a process of knowing interpersonally is the appropriate way to share tacit knowledge. In this case, knowledge is rebuilt rather than transferred from one person to another.

Four components related to learning are identified, i.e. meaning, practice, community and identity (Wenger, 1998). A community of practice is defined as "a group of people who have concern or desire for something they do and learn how to do it better, and they regularly interact" (Wenger, 1998). Community of Practice must be based on desire or need to think together. The concept of thinking together is based on Polanyi's concept (1962 a) on indwelling. When indwelling inside individuals in a community is open, they will be able to help each other through understanding to recognise real issues in their lives, and they will share tacit knowledge indirectly.

LITERATURE REVIEW

Amid the rapid development of technology, especially information technology, Millennials are considered more familiar with technology than the previous generations. Technology allows Millennials connect and communicate with each other easily in daily activities. According to Papp and Matulich (2011), Millennials do not only use technology to communicate and connect, but also to learn or just neutral.

Beside community of practice, information technology has been recognised as a very effective tool in transforming how people share knowledge and interacts with each other. For example, social media is recognised to be a tool in the transformation (Newgarden, 2009). Social media can improve a sense of connection by offering creative ways to encourage collaboration using online knowledge construction and allowing regular interaction despite being geographically separated (Flynn, Jalali and Moreau, 2015). The benefit of social media in terms of online approach is making members of community feels attached through formal and informal activities (Roland and Brazil, 2015). Social media is a tool, but experienced facilitator is also necessary in guiding activities and interactions to achieve learning objectives (Richardson and Cooper, 2013)(Russell et al., 2004).

Social method shows that there is another learning method and sharing knowledge does not have to be done indoors or in training. According to Wenger (1998,) the basic concept of community of practice in the idea is defined as a group of people sharing knowledge consistent with their interest or activity and learning how to do it better than usual. In this era of technology, community of practice can be collaborated with technology and used as a tool which changes people's way of sharing knowledge and interacting with others, e.g. social media as a form of transformation.

Social media can be one of important instruments for media learning and forming community in the virtual world. The implementation of social media in community of practice can be a means to promote physical activity in learning, but what is more important is sharing activity in online community so virtual community of practice can be created.

Based on the description above, the present study proposes the hypothesis that "social media and gamification" affects "Millennial's learning" (Hypothesis 1). Social media and gamification are independent variables to the learning result. The social media selected here was Instagram considering the application is more suitable for millennials. The gamification used was point reward type per activity type related with learning mechanism. Moreover, the present study also tried to determine whether Instagram as social media is useful or has positive effect on the knowledge transfer of Millennials. Instagram is usually used for various virtual activities in cyberspace by Millenials, e.g. selfie, sharing activities, mentioning each other, and campaigning for certain things.

This article examines the effect of social media as a media to develop Social Learning and Community of Practice. Nowadays, knowledge is an important part of development and innovation in a company. Knowledge management process becomes very strategic to enable knowledge to be stored and distributed well to the employees.
Very big user data, interesting functions and features, and analytics application can be used as a tool to see real time data. It makes social media interesting to study. Some studies have also used social media as the analysis element:

- Some studies which consider social media (Bruns and Stieglitz, 2013) used research on Twitter regarding political communication and activism, and brand communication (Stieglitz and Kruger, 2011).

- Formation of community and network on social media aside from community of practice approach is also widely known. For example, (Honey and Herring, 2009) showed that Twitter was not only used as one-way communication but aslo as conversation media.
- Existing studies use social media with different analysis methods, e.g. content and linguistic analysis, social network analysis, and content analysis.

MATERIALS AND METHODS

Research Design proposed based on our research is as follows:

1. Research Strategy
   The research strategies used in this study were Experiment and Survey. Experiment method was used because the study aimed to see the effect of a treatment on sample. The method was used to examine whether certain method or treatment has significant effect on a group. This was done by separating respondents into 2 groups or more, depending on the treatment. In the present study, we separated them into two groups in which the first group did not receive treatment while the second groups received new treatment. The result was examined with certain test method to determine whether the treatment has any significant effect. In this study, the test method was Independent Sampling T-Test. However, we still performed survey to find quantitative illustration of the respondents' characters, tendencies, habits and attitude.
2. Study Setting
   The study setting was natural environment or non-contrived, i.e. collecting data directly in the field. The study was field study by sampling respondents set in power plant units in some locations. The units can be considered representing the learning character in the location. By performing a study in the actual condition without conditioning, valid result would be obtained because the present study studied the direct effect of learning method on employee.
3. Unit of Analysis
   Unit of Analysis used in the present study was individual because the present study measured the effect on each employee. The second option was group, i.e. collecting data to see any pattern or effect of method on learning effectiveness on Millennial employees.
4. Time Horizon
   This study used one shot or cross-sectional study method. In Cross sectional method, the study is observed once for a certain period. Each research subject is only observed once and assessment period is performed on character status or variable of during research. Research subjects do not have to be observed at the same time. The design can determine which is the process and outcome, as well as clear causal relation correlation (Notoatmodjo, 2002). In short, Cross sectional study is a study that learns several observation variables in a period at once to find causal relation between independent variable and dependent variable.

Sampling Design

1. The target population was millennial employees, i.e. people born in the 80s to late 2000s. In terms of age, they were 20 to 40 years old. They were employees, so they were at that age and working. They worked at a company which applied e-learning.
2. The parameters included:
   a. Number of accesses (log in) and length of log in to LMS (learning management system) application.
   b. Number of social media activities with the criteria: posting, commenting, and liking certain posts.
   c. Number of days completing material (content and question) in e-learning between the group without treatment and the group with treatment.
3. No sample framework
4. The sampling method was simple random sampling. This was performed by determining the criteria of sample to be taken (for example: born after 1980 to 2000 and was working then survey was distributed to companies randomly as long as the respondents met the set criteria. There were 10 companies selected and they were all power plants across Indonesia. They also actively developed their employees conventionally (using face to face development method) and had or currently applied e-learning method whether had used social media method or not.
5. To determine sample size, ± 694 millennial employees in their companies were divided into 2 groups of 30 members each.

According to Cohen, et al. (2007, pp. 101,) the bigger the sample of population, the better, but there is a minimum limit that should be sampled, i.e. 30 samples. It is also stated by Bailey in Mahmud (2011; 159) that for research which uses statistical data analysis, the minimum sample size is 30.

In line with them, Roscoe in Sugiyono (2012; 91) suggests the following sample size:

- Appropriate sample size in research is between 30 to 500.
- If the sample is divided into categories, the minimum number of samples in each category is 30.
- If the study uses analysis by multivariate (correlation or multiple regression), the minimum sample size is 10 times the number of variables. For example, there are 5 research variables (independent + dependent), so the sample size = 10 x 5 = 50.
- In simple experiment using experimental group and control group, the number of members of each group is 10 to 20.

Similarly, Gay in Mahmud (2011, 159) argues that the minimum sample size by research method is:

a. Descriptive method, minimum 10% of the population. For small population, it is minimum 20%,
b. Descriptive correlational method, minimum 30 subjects
c. Ex post facto method, minimum 15 subjects per group
d. Experimental method, minimum 15 subjects per group

Based on the references above, this study determined that each class receiving learning treatment either experiential learning or conventional learning had 30 members per class.

Research Subjects

The researchers studied employees in 11 power plant units across Indonesia, i.e. PLTA Asahan, PLTU Amurang, PLTU Anggrek, PLTU Bangka, PLTU Belitung, PLTU Bolok, PLTU Kendari, PLTU Ketapang, PLTU Ropa, PLTU Tembilahan, and PLTU Tidore. Employees in the 11 power plants were sorted by year of birth, i.e. 1981 to 1996 or maximum 39 years in early 2020 (Michael Dimock, 2019). The population was 694 employees. Only 3% of the population was female. It was because power plant units were dominated by male employees. The composition of 20 to 30 years old employees was 61% while the rest was 30 to 40 years old. The number of engineering employees was 88% of the population. The rest was nonengineering. Engineering employees were those working in operation and maintenance. Because the present study includes experiment to compare treatments in learning process, the sample was divided into 2 (two) to represent group with e-learning without treatment and group with treatment consistent with the research title. To determine sample size, instead of following Slovin, the number per group was determined.

According to Supranto J (2000,) research with completely randomised design, random group or factorial can be formulated as:

$$(t-1)\,(r-1) > 15$$

Where:

t = number of treatment group

r = number of replications

The present study was carried out using two treatments, i.e. traditional learning and modern learning. Thus, based on the calculation above, the number of samples should be over 16.

The sample was divided into team 1 called "TRADLE" or traditional learning and team 2 called "MODLE" or modern learning. TRADLE had 30 samples (n = 30) and so did MODLE (n = 30).

a. TRADLE had 50 samples performing e-learning in the usual way, i.e.: must access learning content that consisted of 4 materials its quizzes.
b. MODLE also had 50 samples. They were given certain treatment beside accessing and completing contents like TRADLE. There were also 4 materials with quizzes. The materials were the same as the materials of team TRADLE. MODLE consisted of 5 teams: team A, team B, team C, team D, and team E.

Community of Practice – to implement knowledge management mechanism in learning, MODLE had a whatsapp group (WAG) with the expectation of creating intense interactions during sampling period. The interaction was added with tasks in mission levelling.

LMS (learning management system) – used existing LMS application. It required how many accesses and how long it took to access material per person. Total time to complete learning was a separate point.

Instagram– the selected social media was Instagram. It was not only because previous studies have used other social media but also Instagram was considered the most popular social media among Millennials today. Facebook was used in "*Learn+Fun! Social Media and Gamification Sum Up to Foster A Community of Practice During an Emergency Medicine Rotation*" by Tiago de Araujo Guerra Grangeia et al. (2018) and twitter was used in "*Twitter Data Analysis for Studying Communities of Practice in The Media Industry*" by Marlen Komorowski et al. This study also involved another social media, i.e.Whatsapp, because the CoP used the media.

Instagram

Social media is used by employees to interact, thus enable them to share. The social media selected in the present study was Instagram, because it was most frequently accessed by Millennials. Instagram as a social media is a place to share pictures with other social network users. It also has caption features to add information on uploaded picture, as well as hashtag (#) to discuss certain topic and tag (@) to share with certain person. The study was performed to find out whether social learning via Instagram can increase learning motivation of employee and Instagram had correlation with interaction among members. An analytics system also can be used in human resources department of company to identify member data of community of practice and social learning better, understand their behaviours on social media, and discover the resources of the members.

The Instagram account used in the present study was @kmpjbs which was the official account of the knowledge management in the company. Instagram was used as a means to interact with other members on a particular topic selected in a team. Instagram features were used to make it more attractive, e.g. using #pjbselearninggamification in performing social learning and gamification process. In social learning and gamification process, the employee selected a topic to be discussed through the comment feature with other team members. Knowledge management division could monitor the

activities from the Instagram account and the management could get notification to see the development through the mention feature (@).

E-learning

The materials required by every employee could be accessed via e-learning. Access to elearning system was flexible by utilising information technology, so that users could open it from all work units of the company. E-learning would display material consistent with the field of competency of every member and their team to be studied and discussed further via social media.

Gamification System

To implement learning in team MODLE, a special method with game scenario was used. It was expected that the participants would enjoy the learning process, so that they did not feel pressured when completing stages in learning. The game scenario implemented for team MODLE was as follows:

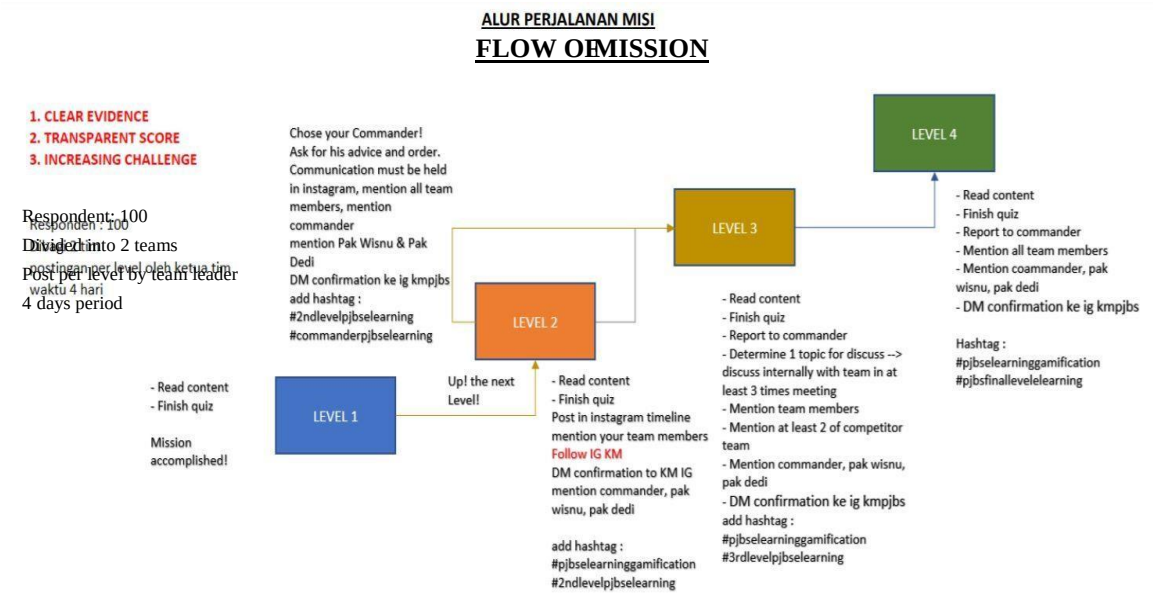


Figure 7. Flow of Gamification Strategy

The description was as follows :

Maximum total time to complete all missions was 4 days.

- ❏ Team 2 would be given 1 WAG (Whatsapp group) for social learning.
- ❏ Score per person would be updated every 4 hour on WAG (at 11.00 a.m. and at 03.00 p.m. Western Indonesian Time).
- ❏ Every participant must post evidence of completing each mission on Instagram consistent with the requirement to complete the mission level.
- ❏ The challenge increased as the level rose.
- ❏ Team 1 was then called TRADLE (traditional e-learning); Team 2 was MODLE (modern e-learning).
- ❏ MODLE would be divided into 5 teams consisting of 10 people respectively.
- ❏ Team-A to Team-E of MODLE were led by a Team Leader
- ❏ The total duration to complete learning of all respondents would be calculated after completing all missions.
- ❏Team-A to Team-E of MODLE had to select a COMMANDER who would give instruction/order (to unlock to level 3). A COMMANDER was a person deemed able/an expert to be the Coach or Commander in the field. ACOMMANDER could be from PJBS or PJB and had to have IG account. Team Leader could first contact the person to be appointed as a COMMANDER before mentioned him on IG.
- ❏ Members of Team-A to Team-E of MOODLE had to have Instagram account.
- ❏ The selected COMMANDER also had to have Instagram account.
- ❏ Sample of report to COMMANDER in level 2:

"Reporting for duty, COMMANDER! I am "Edi", the Leader of Team B of Team MODLE Gamification e-learning of PJBS! We have completed the missions of level 1 and level 2 called "Turbine Protection" and "Turbine Valves" in 2 hours. We are currently on our way to the mission in level 3 called "Closed cooling water". As instructed by the Mission Owner, we must receive instruction from the COMMANDER as the requirement to UNLOCK level 3. That is all, COMMANDER! Report over!"

❏ Teams A-E of MODLE had to follow Knowledge Management of PJBS's Instagram account on di https://www.instagram.com/kmpjbs/

❏ Teams A-E of MODLE had to mention 3 accounts in every post:

- Dedi Budi Utomo at https://www.instagram.com/dedi_budi_utomo
- Wisnu Rahmadi at https://www.instagram.com/wisnu.rahmadi.7
- Khoirul Azis R at https://www.instagram.com/khoirul_azisr

❏ Sample of report to COMMANDER in level 3 :

Reporting for duty, COMMANDER! I am "Edi", the Leader of Team B of Team MODLE Gamification e-learning of PJBS! We have completed the mission of level 3 called "Turbine Mean Inspection" in 2 hours. We are currently on our way to the mission in level 4 called "Vacuum Pump water ejector pump." We have also completed the COMMANDER's order to "find an example of a case which happens during turbine inspection work." The result is presented here. That is all, COMMANDER! Report over!

❏ The topic determined in level 3 had to be posted on the timeline and had to be replied within at least three virtual meetings.

❏Sample of the report to COMMANDER in the final level:

"Reporting for duty, COMMANDER! I am "Edi", the Leader of Team B of Team MODLE Gamification e-learning of PJBS! We have completed the final level called "Circulating water" in 5 hours. The problem we found in level 3 has been solved in 3 meetings with the following evidence. Based on the issue, we propose

"....."

That is all, COMMANDER! Report over!"

❏ in every completion of a mission level, Team Leader had to DM the KM PJBS account to validate the evidence.

Every activity in gamification was also scored, as shown in the following table:

SCORING RULES

Table 2. Scoring Rules

No	Activity	Description	Score
1	Mission Completion Time (Mission Completed)	4 days	50
		3 days	80
		2 days	100
2	Read Content & Finish Quiz	Any Level	10
3	Quiz Score	> 80	5
	Mission Complete	Level 1	20
		Level 2	50
		Level 3	70
		Level 4	85
	Posting IG		20
	Find and Mention Commander		20
	Finish Commander Order		50
	Topic Determined		30
	Topic Solved		80
	Final Report		50
	Total Likes Per Posting		Number of like

Data Collection

Respondents are divided into group TRADLE and MODLE. They will access the learning management system (LMS). Every person received 4 materials in accordance with their field. LMS was open in a certain period in which all participants were expected to have completed content access and quizzes. Team TRADLE only had to access LMS (access the contents and complete quizzes). In contrast, team MODLE had to do the same as TRADLE and posted their learning result on the Instagram account following the guideline above. Team MODLE had Whatsapp group (WAG) to communicate with each other. The score was updated every day and posted to WAG so that every participant could see it. As explained above, the score was obtained from completing LMS and their activities on Instagram accounts.

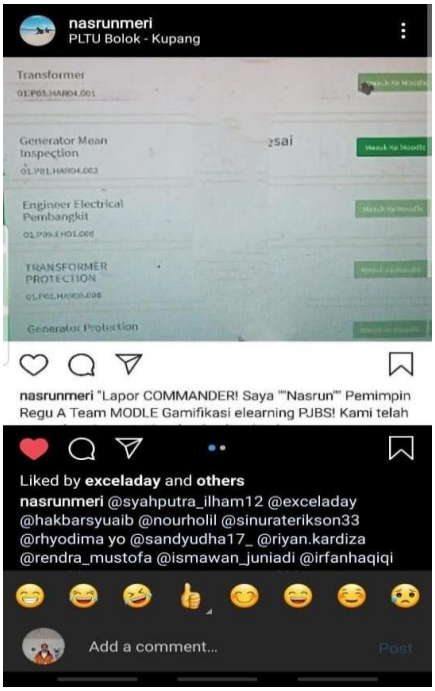


Figure 8. Example of Instagram Post

The image above is the post of an employee who had passed the mission in level 2. Nasrun reported to the Commander that he had completed the task in level 2. He would continue the mission in level 3. The right image was e-learning or LMS (learning management system) display of the company, which was used in this learning process. Nasrun mentioned all members of his team and some names which were required.

Data Analysis

Based on the experiment on both teams, the test result or quiz score of each quiz item per material was obtained. Because the hypotheses were simple and the data did not involve comparing before, and after data, independent sample t-test was used for data analysis. For T-test, some assumptions should be met first, namely:

a. Parametric test requirements should be fulfilled.
b. The sample was collected randomly.
c. Data from the sample should be normally distributed.
d. Data was homogenous.
e. The number of sample for each subject was the same.

Independent T-Test Parametric Test

1. To perform Independent T-Test, data completeness must meet parametric test requirements. The following was some requirements which have to be fulfilled first to perform parametric test:
2. Randomised sampling. The respondents in the present study were also selected by simple random sampling method.
3. Collected data from sample had a normal distribution. The normality test did this.
4. Collected data were homogenous data.
5. The number of samples (n) of every subject should be the same. As stated above, the sample of each group was 30, so the total was 60 respondents.

Therefore, group 1 and 2 will perform the normality and homogeneity tests.

1. Normality Test

a. Group 1

Table 3. The Result of Normality Test of Data Distribution by Kolmogorov Smirnov of Group 1

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
VAR00001	,104	30	,200*	,978	30	,762

*A lower bound of the true significance.
Significance Correction

The Sig. value from Kolmogorov – Smirnov is > 0.05; with confidence level 95%, so the significance value is 0.2 (0.2>0.05,) it means that the data in group 2 is normally distributed.

b. Group 2

Table 4. The Result of Normality Test of Data Distribution by Kolmogorov Smirnov of Group 2

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
VAR00001	,137	30	,155	,947	30	,138

a. Lilliefors Significance Correction

Sig. Value of Kolmogorov – Smirnov table above is 0.155 (> 0.05); with confidence level 95%, so the significance value is 0.155 (0.155>0.05,) it means that the data in group 2 were normally distributed.

Meanwhile, variance homogeneity use Levine's Test of Equality of Error Variance. It aims to measure whether a data group has the same variance and ensure that any difference is due to different treatment between groups. The recapitulation of the variance homogeneity test result is in Table 5.

2. Homogeneity Test

Table 5.The Result of Homogeneity Test

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
VAR00001	Based on Mean	,319	1	58	,574
	Based on Median	,318	1	58	,575
	Based on Median and with adjusted df	,318	1	57,812	,575
	Based on trimmed mean	,319	1	58	,575

Based on the data above, significance value is 0.574 > 0.05, it means that the data was homogenous or had the same variance.

After ensuring the data was normally distributed and homogenous, the next test to determine or confirm whether there was any difference in the results of the treatment group and control group was performed.

As stated above, the test method was "independent sampling T-test" or T test for unrelated sample. The method was chosen because the respondents in group 1 or TRADLE were different from the respondents in group 2 or MODLE. Both groups, as required in independent sample t-test, received different treatments. The description was written above and the test result is explained below:

3. Independent T Test

1) H0 : social media and gamification method has positive effect on learning effectiveness
2) H1 : social media and gamification method does not have positive effect on learning effectiveness
3) Significance level: the significance level in this study was 0,05
4) Test Criteria:

If probability (sig) > 0.05, H0 is accepted and H1 is rejected
If probability (sig) < 0.05, H1 is accepted and H0 is rejected

5) Calculation Result:

Table 6. The Result of Group Statistics Test

	VAR00002	N	Mean	Std. Deviation	Std. Error Mean
VAR00001	1,00	30	49,1667	9,92066	1,81126
	2,00	30	56,9267	9,46616	1,72828

Each group had 30 samples. The evaluation result of level 2 of group 2 was higher than group 1 since the averages are 56.9 and 49.2 respectively.

Table 7. The Result of Independent Sample Test

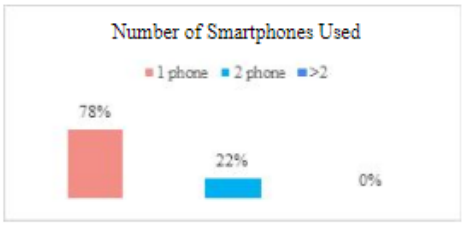
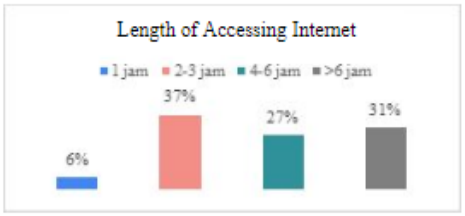
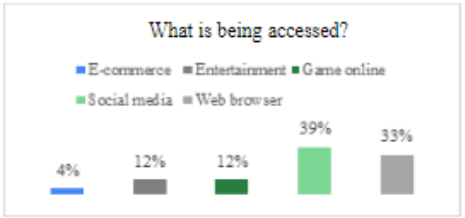
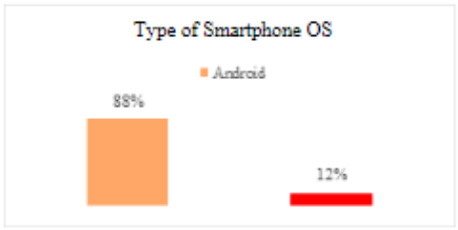
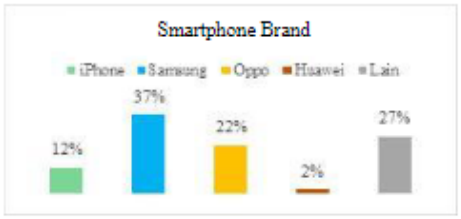
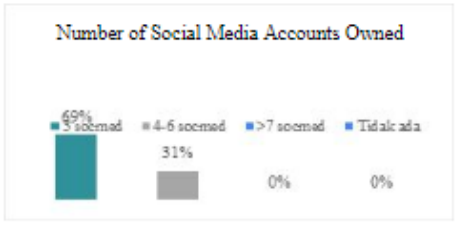
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
VAR00001	Equal variances assumed	,319	,574	-3,100	58	,003	-7,76000	2,50352	-12,77133	-2,74867
	Equal variances not assumed			-3,100	57,873	,003	-7,76000	2,50352	-12,77157	-2,74843

1) Decision:
The Independent table gives sig = 0.003 < 0.05, so H0 was rejected

2) Conclusion
From the statistic table above, there was a difference between the mean of scores of teams TRADLE and MODLE, i.e. 49.2 and 56.9 respectively. In t test table, the significance value was 0.003. 0.003 <0.05 so the difference was significant. It could be seen that the treatment for team MODLE (as the TREATMENT group) with social learning, social media, and gamification had significant different from the result of team TRADLE (as the CONTROL).

In addition to do learning, the respondents were also asked to fill a survey of 10 questions as follows:

Table 8. The Survey Result

1	In everyday life, how many smartphones do you have/use?	
2	How much time do you spend to access internet?	
3	What do you most frequently access when using internet?	
4	What operation system do you use on your smartphone?	
5	What is the brand of the smartphone you use in everyday life?	
6	How many social media accounts do you have?	

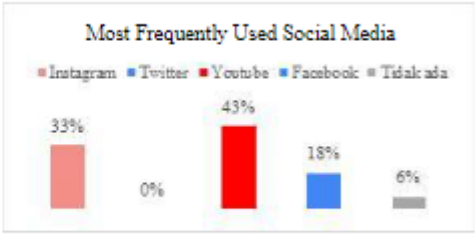
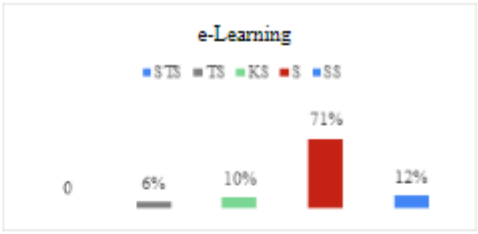
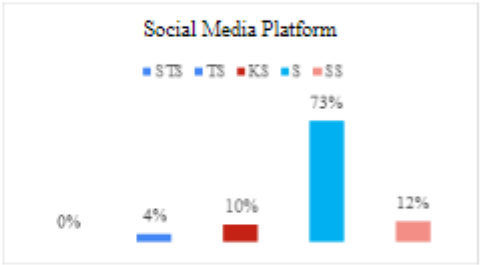
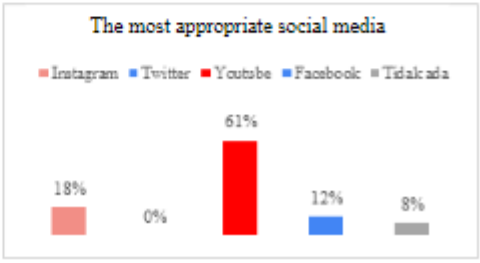
7	What social media do you use most frequently in everyday life?	
8	In your opinion, is learning via e-learning method effective?	
9	In your opinion, is it interesting if learning uses social media platform?	
10	Which social media you think can be used to support learning?	

Table 8 above shows the quantitative result of the surveyed respondents. From 60 respondents, 49 people filled the questionnaires (82%) and the rest did not fill it. It did not affect the research result. The survey was used to enrich the data statistic. From 10 questions, the following points should be the focus:

- Regarding what was most frequently access when surfing in the internet, 39% of the respondents answered social media. Web browser came in second place with 31%. Interestingly, surfing e-commerce was in the last pace with 4% because the respondents were in units located far from cities, so that shipping fee was a consideration.
- Question 7: what social media is most frequently access in everyday life? It was found that Instagram was in second place with 33%. The respondents more frequently accessed YouTube with 43%. The rest accessed Facebook (18%). Interestingly, no respondent answered twitter as the most frequently accessed social media.
- Question 8: is learning via e-learning method effective? It showed that 71% agreed while 12% strongly agreed. The question determines the employees' acceptance to learning or training by e-learning method.
- After determining employee acceptance to e-learning method, the next question was whether it was interesting if learning used social media platform? It showed that 73% respondents agreed.
- The final question was which social media the respondents thought was most suitable to be used or utilised to support learning? Most of the respondents (61%) answered YouTube. The respondents felt Instagram was less attractive than YouTube as only 18% respondents said Instagram was the most suitable social media for learning media.

RESULTS AND DISCUSSIONS

Discussion

The research result above showed that social media and gamification methods were effective tools to increase learning motivation and participation in e-learning model. Data analysis on both experiment groups showed positive result on the usage of social media and gamification strategy to increase learning via social learning and community of practice with active participation of the members. The data indicated that the learning outcome of group MODLE with social media and gamification showed an increase in the evaluation result of level 2. The e-learning method with social media combined with gamification method could be used to meet the employees' need for competition and give learning motivation to the employees.

Based on the survey result, employees quite often used internet daily for about 2-3 hours. Internet was mostly used to access social media (39 percent) and web browser (33 percent). The type of social media followed the trend which was dominated by YouTube (43 percent) followed by Instagram (33 percent). Based on the data above, YouTube application should be considered as a tool in learning.

CONCLUSIONS

E-learning method supported by social media and gamification strategies can increase learning effectiveness. Participatory and consolidation atmosphere through community of practice should be created to produce positive effect on learning effectiveness. Employees, particularly Millennials employees, can enhance their competencies through more effective learning system and by using communication media most frequently used by Millennials, i.e. social media. Based on the treatment result and survey on the respondents, the conclusions are as follows:

1. The respondents are Millennials employees working in power plant units located in various locations, not all of which are close to cities, and most frequently access is social media, followed by web browser. E-commerce is in the last place probably because the shipping fee to their work locations is costly.
2. YouTube is social media most frequently accessed by the respondents, followed by Instagram. No respondent select twitter as the most frequently used social media. This is supported by data that YouTube is selected by most respondents to become social media supporting learning.
3. The respondents also state that learning method by e-learning is suitable as effective learning method, especially when combined with social media platform.
4. Based on the experiment on learning effectiveness, the following conclusions are drawn:
   - There is significant different between the learning outcomes of group TRADLE and group MOODLE.
   - E-Learning combined with social learning, social media platform, and gamification has positive effect.

For future researches, it is suggested the following:

1. Millennials are very familiar with gadgets and internet. Therefore, it is very important to explore further which method is most suitable and appropriate for them and effective in affecting their competency development.
2. Social media is the means for Millennials to express themselves. They have their own limits on how to use social media. Future researchers should consider privacy or individual acceptance when their social media is used for something not suitable with their interests.

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